Appendix AA

Baseline Human Health Risk Assessment

pepco
An Exelon Company

BASELINE HUMAN HEALTH RISK ASSESSMENT REPORT (FINAL)

Benning Road Facility
3400 Benning Road, N.E.
Washington, DC 20019

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List of Acronyms and Abbreviations

µg/L	micrograms per liter
µg/m^3	microgram per cubic meter
2,3,7,8-TCDD	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
4,4'-DDD	4,4'-dichlorodiphenyldichloroethane
4,4'-DDE	4,4'-dichlorodiphenyldichloroethylene
7Q10	Lowest 7-day average streamflow that occurs on average once every 10 years
AAF	Absorption Adjustment Factor
ACS	American Cancer Society
ADAF	Age-Dependent Adjustment Factor
ADE	Average Daily Exposure
Ah	Aryl hydrocarbon
ARSP	Anacostia River Sediment Project
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	Bioaccumulation Factor
BaP	Benzo(a)pyrene
BERA	Baseline Ecological Risk Assessment
bgs	Below ground surface
BHHRA	Baseline Human Health Risk Assessment
BMD	Benchmark Dose
BMDL	Benchmark Dose Lower Bound
BTV	Background Threshold Value
CADD	Chronic Average Daily Dose
CalEPA	California Environmental Protection Agency
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/hr	Centimeters per hour
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
DAF	Dermal Absorption Fraction
DC	District of Columbia
DDx	Dichlorodiphenyltrichloroethane, Dichlorodiphenyldichloroethylene, Dichlorodiphenyldichloroethane
DOEE	Department of Energy and Environment
DPT	Direct-Push Technology
DRO	Diesel Range Organics
ELCR	Excess Lifetime Cancer Risk
EPC	Exposure Point Concentration
FOD	Frequency of Detection
FS	Feasibility Study

ft^2	square feet
ft^3/sec	cubic feet per second
ft/sec	feet per second
g/day	grams per day
GLFATF	Great Lakes Fish Advisory Task Force
HEAST	Health Effects Assessment Summary Tables
HI	Hazard Index
HQ	Hazard Quotient
IRIS	Integrated Risk Information System
K_p	Permeability Constant
LADD	Lifetime Average Daily Dose
LMS	Linearized Multistage
LOAEL	Lowest Observed Adverse Effect Level
LWZ	Lower Water-bearing Zone
m^3/kg	cubic meters per kilogram
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
$mg/cm^2/hr$	Milligrams per square centimeter per hour
mg/cm^3	Milligrams per cubic centimeter
mg/kg	Milligrams per kilogram
mg/kg-day	Milligrams per kilogram of body weight per day
mg/m^3	Milligrams per cubic meter
MRL	Minimal Risk Level
MTBE	Methyl tert-butyl ether
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NPS	National Park Service
NRWQC	National Recommended Water Quality Criteria
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic Aromatic Hydrocarbon
RBA	Relative Bioavailability Factor
PCB	Polychlorinated Biphenyl
PEF	Particulate Emission Factor
POD	Point of Departure
PPRTV	Provisional Peer Reviewed Toxicity Values
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBSL	Risk-Based Screening Level
ReP	Relative Potency
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RPD	Relative Percent Difference

RPF	Relative Potency Factor
RSL	Regional Screening Level
SAB	Science Advisory Board
SRC	Syracuse Research Corporation
SVOC	Semivolatile Organic Compound
TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalence
TPH	Total Petroleum Hydrocarbon
UCL	Upper Confidence Limit on the Mean
UF	Uncertainty Factor
URF	Unit Risk Factor
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UWZ	Upper Water-bearing Zone
VDEQ	Virginia Department of Environmental Quality
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound
WHO	World Health Organization

1 Introduction

1.1 Background

AECOM has prepared this Baseline Human Health Risk Assessment (BHHRA) on behalf of Potomac Electric Power Company (Pepco) and Pepco Energy Services, Inc. (collectively "Pepco") to evaluate potential human health risks associated with Pepco's Benning Road Facility (the Site), located at 3400 Benning Road NE, Washington, DC, and a segment of the Anacostia River (the River) adjacent to the Site. The general location of the Site is shown on **Figure 1-1**. The 77-acre Site is defined by the property boundary shown on **Figure 1-2**. Together, the Site and an adjacent segment of the River are referred to herein as the "Study Area." Pepco performed the Remedial Investigation/Feasibility Study (RI/FS) pursuant to the requirements of a consent decree with the District of Columbia (DC) that was entered by the U.S. District Court for the District of Columbia on December 1, 2011 (the Consent Decree).

The RI/FS Study Area investigation consists of a "Landside" component focused on the Site itself, and a "Waterside" component focused on the shoreline and sediments in the segment of the River adjacent to and immediately downstream of the Site (aa area of approximately one-half mile of shoreline). The Landside and Waterside Investigation Areas are depicted on **Figure 1-2**.

Pepco submitted the Draft RI/FS Work Plan to the Department of Energy and Environment (DOEE) in July 2012 and made subsequent revisions to address comments from DOEE and the public. The BHHRA Work Plan was included as Appendix E of the Draft RI/FS Work Plan. DOEE provided final approval for the Work Plan in December 2012 (AECOM, 2012). During 2014, two addenda to the RI/FS Work Plan were prepared to describe supplemental Phase I RI field investigation activities; these were approved by DOEE in March and July 2014 (AECOM, 2014a, 2014b). The 2012 approved work plan and the two addenda formed the basis for the Phase I RI.

The Draft RI Report, which describes the Phase I field investigation and its findings, was finalized on February 26, 2016 (AECOM, 2016a). A preliminary BHHRA was included as Appendix Z of the Draft RI Report. The Draft RI Report was made available for public comment from March 01, 2016 through April 18, 2016. A response to public comments was prepared and released to the public in August 2016. The Draft RI Report identified several data gaps with respect to the Phase I Site characterization, background data evaluation, and human health and ecological risk assessments. Per DOEE's RI Path Forward letter of January 14, 2016, Pepco prepared three technical memoranda to further define data needs and prepare for additional site characterization. The Technical Memorandum #1 – Conceptual Site Model

(CSM) (AECOM, 2016b) provided a detailed description of the operational Site history, with a focus on the use, storage, disposal, release, and cleanup of various chemicals and waste materials, and identified data gaps and uncertainties in the Study Area characterization conducted to date as part of the RI/FS. The Technical Memorandum #2 – Refined Background Evaluation Work Plan (AECOM, 2016c) described the rationale and procedures for revising the background data evaluation originally presented in the Draft RI Report. The Technical Memorandum #3 – Baseline Human Health and Ecological Risk Assessment Work Plan (AECOM, 2016d) described the rationale and procedures for revising the preliminary BHHRA and preliminary baseline ecological risk assessment (BERA) originally presented in the Draft RI Report. The three technical memoranda were approved by DOEE in October 2016.

Work Plan Addendum #3 (AECOM, 2016e) was developed in conjunction with the three technical memoranda to detail the Phase II field investigation to address the remaining data gaps and uncertainties identified. Work Plan Addendum #3 was approved by DOEE in October 2016 and formed the basis for the Phase II RI.

A Draft Final RI Report was finalized in September 2019. The Draft Final RI Report was made available for public comment from October 4, 2019 through December 6, 2019. This Final RI Report incorporates the public comments received during the comment period.

Consistent with United States Environmental Protection Agency (USEPA) guidance (2002a, 2005a), a risk-based framework has been adopted for this RI/FS. This framework utilizes an iterative approach coupled with Site-specific information to define the conceptual site model, assess potential risks, and evaluate further actions. The use of Site-specific information is consistent with principles articulated by the National Research Council of the National Academy of Sciences (NRC, 2001) and USEPA guidance on risk assessment and risk management decision-making at contaminated sites (USEPA, 1989a, 2002a, 2005a, 2011, 2014a).

1.2 BHHRA Methodology

This revised BHHRA was performed in accordance with the DOEE approved Risk Assessment Work Plan and Addendum (AECOM, 2012, 2016d).

In the absence of DOEE-specific guidance, and as discussed with DOEE staff, the BHHRA was conducted to comply with USEPA guidance for conducting a risk assessment including, but not limited to, the following:

- Risk Assessment Guidance for Superfund (RAGS): Volume 1 - Human Health Evaluation Manual (Part A) (USEPA, 1989a);

- Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. Office of Solid Waste and Emergency Response (OSWER) 9355.0-30. April 1991 (USEPA, 1991);
- Guidance for Data Usability in Risk Assessment (Part A) (USEPA, 1992a);
- Guidelines for Exposure Assessment (USEPA, 1992b);
- Land Use in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedy Selection Process (USEPA, 1995);
- Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites (USEPA, 2002b);
- Human Health Toxicity Values in Superfund Risk Assessments, OSWER Directive 9285.8-53 (USEPA, 2003a);
- RAGS: Volume I. Human Health Evaluation Manual. Part E, Supplemental Guidance for Dermal Risk Assessment (USEPA, 2004a);
- Guidelines for Carcinogen Risk Assessment (USEPA, 2005b);
- Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens (USEPA, 2005c):
- Exposure Factors Handbook (USEPA, 2011);
- Tier 3 Toxicity Value White Paper (USEPA, 2013)
- RAGS, Human Health Evaluation Manual Supplemental Guidance: Update of Standard Default Exposure Factors (USEPA, 2014a)
- ProUCL Version 5.1, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations (USEPA, 2016);
- Regional Screening Levels (USEPA, 2018a).

The BHHRA evaluated potential human health effects using the following four-step paradigm, as identified by the USEPA (USEPA, 1989a):

- Data Evaluation and Hazard Identification
- Toxicity (dose-response) Assessment
- Exposure Assessment
- Risk Characterization

The BHHRA is organized into the following sections:

- Section 2 – Site Characterization and Conceptual Site Model
- Section 3 – Data Evaluation and Hazard Identification
- Section 4 – Dose-Response Assessment
- Section 5 – Exposure Assessment
- Section 6 – Risk Characterization
- Section 7 – Uncertainty Analysis
- Section 8 – Summary and Conclusions
- Section 9 – References

Tables and figures are presented at the end of the text. Note that tables are numbered based on the section in which they are referenced. Informational tables embedded within the text of the BHHRA are not numbered.

2 Site Characterization and Conceptual Site Model

A description of the Study Area and its setting is provided below, followed by a discussion of the human health CSM. The CSM describes potential sources, migration routes, routes of exposure, and potential receptors based on available information. The receptor/exposure pathway scenarios that are potentially complete and require further evaluation are identified. The CSM presented in this BHHRA report updates the preliminary CSM presented in the RI/FS Work Plan (AECOM, 2012).

2.1 Study Area Description

As discussed previously, the Study Area is divided into Landside and Waterside (Anacostia River) Investigation Areas, which are described below. The general Study Area location is shown on **Figure 1-1**. The Site, as defined by the property boundary on **Figure 1-2**, is located on the east side of the Anacostia River approximately 4.7 miles upstream of the confluence of the Anacostia and Potomac Rivers.

2.1.1 Landside Investigation Area

The Site has two distinct operational areas: a former power plant area to the west and the Benning Service Center to the east (see **Figure 1-2**). The Benning Service Center supports activities related to construction, operation, and maintenance of Pepco's electric power transmission and distribution system serving the Washington, DC, area. The Service Center occupies the largest part of the property (about 78%), and accommodates approximately 700 Pepco employees. Service Center employees work in maintenance and construction of Pepco's electric distribution system; system engineering; vehicle fleet maintenance and refueling; and central warehouses for all the materials, supplies, and equipment needed to operate the Pepco electrical distribution system. The Service Center also houses three electrical substations supporting Pepco's transmission and distribution system. The Benning Road Power Plant was constructed in 1906. Over the years, the power plant operated and subsequently retired several different generating units, reflecting the advances in technology and operating on different types of fuels. The power plant was shut down in 2012. Demolition and removal of the power plant building and related infrastructure commenced in 2014, and all demolition and site restoration activities were completed in May 2015. The Site will continue to be used as a Pepco Service Center.

The Site is completely surrounded by a fence with two guarded entrances, as indicated in **Figure 1-2**. The guard stations are manned 24 hours a day, 7 days a week. The majority of the Site is covered by impervious material such as concrete or asphalt. Storage areas not covered by impervious material are covered in gravel. Railroad tracks enter the Site from the south and run to the north. The tracks were formerly used to transport coal to the power plant and are no longer active.

As shown in **Figure 2-1**, land uses in the vicinity of the 77-acre Site include a mix of commercial, residential, parkland/green space, and transportation. The Site is bordered by a DC solid waste transfer station to the north, Kenilworth Maintenance Yard, owned by the National Park Service (NPS) to the northwest, the Anacostia River to the west, Benning Road to the south, and residential areas to the east and south (across Benning Road). Major transportation corridors in the area include the Anacostia Freeway running north-south and East Capitol Street NE running east-west. The Minnesota Avenue Metrorail Station of the Washington Metropolitan Area Transit Authority light rail system is located immediately to the east of the Site.

Aquifers underneath the Site consist of saturated sand layers within the Patapsco and Patuxent Formation and include (from shallowest to deepest) the Upper Patapsco Aquifer, the Lower Patapsco Aquifer, the Upper Patuxent Aquifer, and the Lower Patuxent Aquifer. The Lower Patapsco and upper Patuxent Aquifers are separated by the thick Arundel Clay unit. The Arundel Clay has very low conductivity and acts as a regional aquitard between the Patapsco and Patuxent Formations. The subsurface investigation identified a silt-clay semi-confining layer underlying much of the Site and dividing the Patapsco Formation aquifer into an upper water-bearing zone (UWZ) and lower water-bearing zone (LWZ). The top of the silt-clay layer was encountered between 25 and 40 feet below ground surface (bgs), and the layer averaged about 6 feet in thickness.

The Site is in Ward 7 in the District of Columbia, within the 20019 zip code. Ward 7 contains a mix of residences and parkland, including Fort Mahan Park, Fort Davis Park, Fort Chaplin Park, Fort Dupont Park, Kenilworth Park and Aquatic Gardens, Watts Branch Park, Anacostia River Park, and Kingman and Heritage Islands Park. The neighborhoods to the south of the Site along the east side of the River include River Terrace, Mayfair, and Eastland Gardens. Four schools are located within a 0.25-mile radius of the Site boundary: Thomas Elementary School, Cesar Chavez Middle and High School, Benning Elementary School, and River Terrace Elementary School (Google Earth). Drinking water in the area is provided by a remote municipal source (DC Water) that originates on the upper Potomac River.

2.1.2 Waterside Investigation Area

The Anacostia River begins in Bladensburg, MD, at the confluence of its two major tributaries, the Northwest Branch and the Northeast Branch, and flows a distance of approximately 8.4 miles before discharging into the Potomac River in Washington, DC (Sullivan and Brown, 1988). The upstream portion of the River is non-tidal. Below the confluence of the Northeast and Northwest Branches, the Anacostia is a tidal river with habitat suitable for a variety of freshwater and estuarine species, including American eel, brown bullhead, channel catfish, largemouth and smallmouth bass, carp, and sunfish. A water body-specific fish consumption advisory is in effect for the Anacostia and Potomac Rivers recommending against consumption of some species (catfish, carp, and American eel) and limited consumption of other species (e.g., largemouth bass, sunfish) (DOEE, 2016a). However, some people may not be aware of the advisory, or may choose to catch and eat river fish despite the presence of the advisory.

The public may access the River at several locations, including parks, boat docks, and launches. Anacostia Park, a 1,200-acre unit of National Capital Parks – East, stretches 5 miles along the banks of the Anacostia River between the Fredrick Douglas Memorial Bridge and the DC-Maryland line. Within the park, the Anacostia Riverwalk Trail runs along the shorelines of the River continuing beyond the north and south boundaries of the park. A public boat launch is located about 1.5 miles downstream from the Waterside Investigation Area. Dense vegetation along the east bank adjacent to the Site may limit access to the River in this area. The Langston Golf Course is located directly across the River from the Site. Kingman Island divides the main channel of the River from Kingman Lake to the west and provides recreation opportunities via pier and trail access. Based on the bathymetric survey conducted by Gahagan & Bryant Associates, Inc. for the RI in 2013, water depths in the Waterside Investigation Area range from approximately 4 to 14 feet below mean lower low water level in the channel and shallower toward the banks (see Section 3 of the RI Report). The average variation in the River's stage over a tidal cycle is approximately 3 feet.

Because of its location in the Washington metropolitan area, the majority of the watershed is highly urbanized. The Anacostia River has been the subject of numerous environmental studies, and was identified by USEPA, the Syracuse Research Corporation (SRC), and the National Oceanic and Atmospheric Administration (NOAA) as one of the most contaminated rivers in the Chesapeake Bay watershed (SRC and NOAA, 2000). The Site is one of six sites that have been identified by USEPA as potential sources of sediment contamination in the River (Fritz and Weiss, 2009).

Section 305(b) of the Federal Clean Water Act requires each state/district to monitor, assess, and report on the quality of its waters relative to designated uses established in accordance with the District's Water Quality Standards. Section 303(d) of the Act requires each state/district to list waters not meeting water quality standards and prioritize those waters for management. Reporting for these waters is submitted to USEPA every 2 years. According to the 2016 District of Columbia integrated water quality assessment report, the Anacostia River is on the District's 303(d) list of impaired waters. The impaired designated uses include fish consumption, as well as habitat for fish, other aquatic life, and wildlife due to nutrient/eutrophication biological indicators and chemical pollutants (DOEE, 2016b).

2.2 Human Health Conceptual Site Model

The human health CSM provides the framework for the human health risk assessment and is used to identify appropriate exposure pathways and receptors for evaluation in the risk assessment. The purpose of the CSM is to identify (1) potential source areas, (2) potential migration pathways of chemicals from source areas to environmental media where exposure can occur, (3) potential human receptors, and (4) potential exposure pathways by which chemical uptake into the body may occur. Potentially complete exposure pathways are identified for consideration for further evaluation in the risk assessment. For an exposure pathway to be complete, the following conditions must exist (USEPA, 1989a):

1. A source and mechanism of chemical release to the environment;
2. An environmental transport medium (e.g., air, water, soil);
3. A point of potential receptor contact with the medium; and
4. A human exposure route at the contact point (e.g., inhalation, ingestion, dermal contact).

The first step in developing the CSM is the characterization of the site setting and surrounding area. This includes characterization of current and reasonably foreseeable future land uses and potential receptors (e.g., residential, recreational, commercial/industrial). Potential exposure scenarios identifying appropriate environmental media and exposure pathways for current and reasonably foreseeable future land uses and receptors are then developed. Chemicals of Potential Concern (COPCs) are identified for each exposure pathway based on the application of risk-based screening criteria and other evaluation of the field sampling data. Each potentially complete exposure pathway for any COPC is evaluated quantitatively in the risk assessment. The CSM is meant to be a "living" model that can be updated and modified as appropriate when additional data become available.

Some receptor populations may be potentially exposed to COPCs by more than one pathway. Although there may be more than one potential exposure pathway, USEPA guidance (USEPA, 1989a) cautions that the first step is to identify reasonable exposure pathway combinations, and then to determine "whether it is likely that the same individuals would consistently face the reasonable maximum exposure by more than one pathway" [emphasis in the original]. With this in mind, the CSM is developed by constructing potential exposure scenarios and identifying the hypothetical receptors to be used in evaluating these exposures. It is important to note that the exposure scenarios are typically constructed for hypothetical receptors who are assumed to be the most frequently exposed. The receptors are not intended to represent specific individuals.

An updated preliminary human health CSM based on available data was presented in the Risk Assessment Work Plan Addendum (AECOM, 2016d). The preliminary CSM identified potential sources of

COPCs, including spills and releases, surface runoff, groundwater migration, storm sewers and outfalls, and atmospheric deposition. These sources may have resulted in impacts to environmental media, including soil, groundwater, sediment, and surface water in the River. Because of the presence of bioaccumulative chemicals, including polychlorinated biphenyls (PCBs), potential uptake into the food chain and bioaccumulation in biota including sport fish may also have occurred. Human receptor populations may subsequently contact COPCs present in these environmental media via direct contact (i.e., incidental ingestion and dermal contact) with fringe surface sediment[1] and surface water, and via indirect exposure, specifically consumption of fish tissue. **Figures 2-2** (On-Site Sources) and **2-3** (Off-Site Sources) present an updated human health CSM for the Study Area.

2.2.1 Landside Investigation Area

For the Landside Investigation Area, all direct human exposure pathways under the current scenario are judged to be incomplete or insignificant, based on both limited access and soil cover. There is tight security at the Site that limits the potential for access. The majority of the Site is covered by impervious material such as concrete or asphalt as shown on Figure 1-7 of the RI. Active storage areas not covered by impervious material are covered in gravel. Consequently, there is very little potential for individuals to trespass onto the Site and come into contact with impacted surface soils. The presence of impervious or gravel cover also limits the potential for on-Site workers to come into contact with surface soils. The facility's health and safety plan includes an employee hazard communication program and procedures that prevent or manage potential exposure to impacted subsurface soils by workers who may perform excavation activities on Site. Based on current and anticipated future Site conditions and uses, the Risk Assessment Work Plan concluded that direct current and future contact exposure pathways for on-Site soils are incomplete or insignificant (AECOM, 2012). The existing operational and institutional controls that are in place at the Site continue to provide effective exposure prevention measures. However, if any of these conditions were to change in the future, on-Site workers may potentially contact surface soil, and construction workers may contact subsurface soil via incidental ingestion, dermal contact, and inhalation of volatiles or dust derived from soil. Therefore, the Risk Assessment Work Plan Addendum (AECOM, 2016d) specified that the revised BHHRA would include an evaluation of potential future worker exposures to soil.

In the future, if Site access or security was to change and the existing soil cover removed, it is possible that recreational receptors would contact on-Site surface soil. Therefore, a future recreational user is

[1] Fringe surface sediment is sediment under water depths of a few feet or less. The surface sediment data set for the BHHRA was limited to these locations because of the greater potential for contact.

evaluated. It is assumed that future recreational exposures will be limited to the western portion of the Site next to Anacostia Avenue[2] (see **Figure 1-2**). This area was previously the location of the former power plant demolished between 2012 and 2015. This area of the Site remains under controlled access and Pepco has no plans to convert this area to public recreational use. Nonetheless, because this portion of the Site is the closest to the Anacostia River and the existing NPS park land located across Anacostia Avenue, DOEE directed that the BHHRA evaluate a hypothetical future exposure scenario in which this area becomes public park land or green space. The BHHRA otherwise assumes that the Site will remain industrial/commercial with secure fencing and 24-hour security to deter trespassing and will continue to be used as a service center into the foreseeable future due to the important role it serves in Pepco's electric transmission and distribution system. The available data do not suggest that historic operations have resulted in impacts to off-Site soils in residential areas. Therefore, on- and off-Site residential exposure scenarios are not evaluated.

Site groundwater is not used as a source of drinking water; thus, consumption of groundwater is not a complete exposure pathway. The depth to groundwater (UWZ) generally ranges from 9 to 16 feet bgs across the Site, with depths up to 26 feet bgs in the south-central portion of the Site (see Section 3 of the RI Report). While groundwater may be encountered if excavation depths reach an excess of 9 feet bgs, most underground utilities and other subsurface infrastructure at the Site that may require future maintenance, repair, or replacement are located at depths well above 9 feet bgs. Electric utility lines at the Site range from 3 to 8 feet bgs, which is above the shallowest depth of the UWZ. Therefore, no contact with groundwater is expected during maintenance of electric utility lines. The Metro and sewer lines are located deeper below ground surface. According to Pepco Underground, any maintenance on these lines would be performed from the inside by a designated confined-space-permitted contractor outfitted with appropriate personal protective equipment. Therefore, it is not anticipated that excavation below the water table for the purposes of utility maintenance will take place in the future. Additionally, based on experience, worker exposure to contaminated groundwater under a short-term excavation scenario typically poses minimal risk. Thus, direct contact with groundwater is considered to be an incomplete or insignificant potential exposure pathway and does not warrant further consideration in the BHHRA.

Vapor intrusion from groundwater into an excavation trench may occur; however, this potential route of exposure is anticipated to be of short duration, and any volatiles in trench air would be subject to

[2] The Risk Assessment Work Plan Addendum (AECOM, 2016d) also stated that recreational use of the off-Site parcel of land owned by the National Park Service (Kenilworth Maintenance Yard) would be evaluated. However, as discussed in Section 3.1.2, this area does not warrant further evaluation in the BHHRA.

windblown dispersion. Despite the short duration of the potential exposure, the potential for vapor intrusion from the UWZ into a future excavation trench was evaluated in this revised BHHRA.

Under the current use scenario, vapor intrusion into the indoor air of buildings is an incomplete exposure pathway, as there are no buildings in areas of elevated volatile organic compounds (VOCs) in groundwater. However, a screening level evaluation of the potential for vapor intrusion under a future scenario in which buildings are constructed in areas of elevated VOCs in groundwater was included in this revised BHHRA based on the results of additional groundwater sampling conducted during Phase II sampling activities.

Based on local hydrogeology and topography, Site groundwater may discharge to the Anacostia River. Therefore, the revised BHHRA includes an evaluation of the potential impacts of Site groundwater on River water and associated receptors.

The potential receptors and potentially complete exposure pathways evaluated in this BHHRA for the Landside Investigation Area are as follows:

- Current/Future Construction Worker. Potential direct contact (ingestion and dermal) with surface and subsurface soil and potential inhalation of soil-derived fugitive dust during utility or other construction work requiring excavation. In addition, the construction worker may be exposed to volatiles in the air of an excavation trench due to volatilization from groundwater infiltrating the trench.
- Future Outdoor Industrial Worker. Potential direct contact (ingestion and dermal) with surface soil and potential inhalation of surface soil-derived fugitive dust, in the event of a change in the existing Site use controls and existing on-Site soil cover in the future.
- Future Indoor Industrial Worker. Potential inhalation of volatile compounds in indoor air resulting from groundwater vapor intrusion.
- Future Recreational Visitors. Potential direct contact (ingestion and dermal) with surface soil, and potential inhalation of surface soil-derived fugitive dust in the western portion of the Site next to Anacostia Avenue (see **Figure 1-2**), if the area were to become publicly accessible in the future.

2.2.2 Waterside Investigation Area

For the Waterside Investigation Area, a number of potential human exposure pathways are potentially complete. Potential receptors include shoreline workers, anglers, and other receptors who visit the River to recreate (e.g., swimmers, waders, boaters). The potential Waterside Investigation Area receptors and how they may contact COPCs are described below and summarized in **Figure 2-2**. The potential receptors and potentially complete exposure pathways evaluated in this revised BHHRA are as follows:

- Current/Future Recreational Anglers. Potential direct contact with fringe surface sediment and surface water while fishing, and ingestion of fish from the Waterside Investigation Area.
- Current/Future Swimmers. Potential direct contact with fringe surface sediment and surface water while swimming in the Waterside Investigation Area.
- Current/Future Waders. Potential direct contact with fringe surface sediment and surface water while wading in the Waterside Investigation Area.
- Shoreline Workers. Potential direct contact with fringe surface sediment and surface water while performing maintenance, landscaping, or other activities along the shoreline of the River adjacent to the Site.

In addition, a current/future high-end consuming Angler scenario (i.e., potential direct contact with fringe surface sediment and surface water while fishing, and consumption of fish from the Waterside Investigation Area at a higher rate than recreational anglers) is evaluated in Section 7.3.2.2 of the uncertainty analysis.

2.3 Consideration of Background Conditions

The Anacostia River has been impacted by a variety of historical and ongoing sources of chemical, physical, and biological stressors from point and non-point sources, including National Pollutant Discharge Elimination System discharges, surface runoff, combined sewer and storm sewer outfalls, refuse disposal practices, tributary inputs, and atmospheric deposition (SRC and NOAA, 2000). The multitude of sources has resulted in diffuse distributions of some constituents, including polycyclic aromatic hydrocarbons (PAHs), metals, PCBs, and pesticides, with some localized hot spots (Wade et al., 1994; Velinsky et al., 1996; Velinsky et al., 2011). Surficial sediment concentrations have decreased over the past few decades, likely due to improved environmental practices, PCB use restrictions, and deposition of cleaner sediment (Velinsky et al., 2011). Based on fish tissue monitoring, concentrations of PCBs in tissue have also declined over the years (Pinkney, 2017[3]), although levels reflected by the most recent fillet sampling data from 2013 are still sufficiently elevated throughout the Anacostia and Potomac Rivers to warrant issuance of advisories warning against consumption of some species of fish (DOEE, 2016a, MDE, 2018).

The risk calculations presented in the BHHRA reflect total constituent concentrations, whether related to past Site activities or attributable to some other source. However, for purposes of evaluating responses to potential risks, it is essential to consider background information. USEPA's guidance on the role of background in the Superfund cleanup process (USEPA, 2002e) notes that a primary objective of

[3] Report was originally published in September 2014 and revised in November 2017.

CERCLA risk assessments is to provide information on risks that can be effectively addressed through remedial actions. Taking into account background area information during the risk assessment process provides a basis for distinguishing risks associated with site releases from risks resulting from the presence of constituents that may have migrated into the site, or that may reflect regional conditions related to human activities (Judd et al., 2003).

USEPA (2002d) defines background as: "Substances or locations that are not influenced by the releases from a site and are usually described as naturally occurring or anthropogenic: (1) Naturally occurring substances are present in the environment in forms that have not been influenced by human activity; (2) Anthropogenic substances are natural and human-made substances present in the environment as a result of human activities (not specifically related to the CERCLA site in question)." It further defines a background reference area as: "The area where background samples are collected for comparison with samples collected on site. The reference area should have the same physical, chemical, geological, and biological characteristics as the site being investigated, but has not been affected by activities on the site."

USEPA (2002e) provides the following guidance on addressing background in the risk assessment:

> *Specifically, the COPCs with high background concentrations should be discussed in the risk characterization, and if data are available, the contribution of background to site concentrations should be distinguished. COPCs that have both release-related and background-related sources should be included in the risk assessment.*

Therefore, consistent with USEPA guidance (2002e), the potential contribution from background has been evaluated in this BHHRA using data representative of background conditions. Appendix W of the RI Report provides the background evaluation, including the derivation of background threshold values (BTVs) and comparison with Study Area data.

3 Data Evaluation and Hazard Identification

The purpose of the hazard identification process is two-fold: (1) to evaluate the nature and extent of chemicals present in site media; and (2) to identify COPCs for further quantitative evaluation in the risk assessment. This step involves compiling and summarizing the data relevant to the risk assessment and selecting COPCs based on a series of screening steps. Section 3.1 describes the data sets that were used, including the assessment of data quality. Section 3.2 describes the hazard identification process, including the calculation of summary statistics and the COPC screening process.

3.1 Data Sets Used in BHHRA

As discussed in detail in Section 2 of the RI Report, analytical chemistry data collected between 2013 and 2018 comprise the soil, groundwater, sediment, and surface water data sets for the BHHRA. Details regarding the sampling and analysis program are found in the RI/FS Work Plan (AECOM, 2012), three addenda to the RI/FS Work Plan (AECOM, 2014a, AECOM, 2014b, AECOM, 2016e), and the RI Report and associated appendices. The fish tissue data were obtained from publicly available sources, including DOEE and United States Fish and Wildlife Service (USFWS) fish sampling programs. The data sets utilized in the BHHRA are summarized below for the Landside and Waterside evaluations. In addition, the data sets for the Anacostia Park Property adjacent to Kenilworth Maintenance Yard and background are summarized.

3.1.1 Landside Investigation Area Data

Soil and groundwater sampling were conducted over two phases, which are described in detail in the RI Report, Section 2.1 (Phase I) and Section 2.3 (Phase II). PCBs were analyzed as both congeners and Aroclors, although the vast majority of samples were analyzed as Aroclors. The FS will include details on the congener analysis, which was conducted on a limited subset of samples for forensic purposes. The data sets are summarized below. The Aroclor data were used in the evaluation of abiotic media in this BHHRA.

Soil

Soil sampling was conducted between February 2013 and July 2018, and consisted of surface and subsurface soil samples. As discussed in greater detail in Section 2 of the RI Report, depending on the characterization and delineation objectives, soil samples were submitted for chemical analysis, including inorganics, PCBs, pesticides, total petroleum hydrocarbon (TPH) fractions, semivolatile organic compounds (SVOCs), and dioxins and furans. Not all chemicals were analyzed in each sample. Surface soil is defined as the ground surface to a depth of 1 foot bgs. However, several samples were collected from beneath obstructions such as concrete or asphalt, and the ground surface was considered the top of the slab. The first sample collected below the slab is therefore considered surface soil. Because subsurface excavations typically do not exceed 10 to 15 feet bgs, only subsurface soil data from samples collected to a maximum depth of 16 feet bgs were included in the BHHRA. The soil sample locations are depicted in **Figure 3-1**, and samples included in this BHHRA are listed in **Table 3-1**. The soil sample results are presented in Section 4 of the RI Report.

Groundwater

Groundwater samples were collected using Direct-Push Technology (DPT) at locations across the Site between March 2013 and March 2017. These samples were collected to characterize various target areas across the Site, and the chemical analysis was dependent on the area being investigated.

A total of 30 monitoring wells were installed as nested well pairs at 15 locations across the Site. Two monitoring wells were installed at each location, a shallow well in the UWZ and a deep well in the LWZ. Two rounds of monitoring well sampling took place, the first in November 2014 and the second between November and December 2016. Samples were analyzed for metals, dioxins and furans, pesticides, PCBs, SVOCs, VOCs, and forensics parameters,[4] but not every sample was analyzed for the full list.

As previously noted, exposure pathways for on-Site groundwater are judged to be complete or potentially complete only for inhalation of vapors in an excavation trench, inhalation of the indoor air of a hypothetical future building, and groundwater migration to the Anacostia River. To evaluate the potential impact of groundwater on the River, groundwater data from the four monitoring wells located adjacent to the western downgradient boundary of the Site were used (MW-01, MW-02, MW-03, and MW-04), as well as MW-08 and MW-11, which are located along the northwestern and northern downgradient Site boundary. The groundwater data from these six locations have been identified as representative of the types and concentrations of chemicals that may be migrating from the Site into the Anacostia River. As discussed in the RI Report, contaminants detected in on-Site wells further from the River are not expected to contribute significantly to the potential migration to surface water pathway. Groundwater samples from both the UWZ and LWZ were used in the evaluation of groundwater migration to surface water.

The locations of the DPT borings and monitoring wells are depicted in **Figure 3-1**. Only groundwater samples from the UWZ were used in this BHHRA to evaluate the excavation trench and vapor intrusion

[4] The forensics evaluation will be provided in the FS.

pathways. Groundwater samples included in the BHHRA are listed on **Table 3-3**. The groundwater analytical results are presented in Section 4 of the RI Report.

3.1.2 Anacostia Park Property Adjacent to Kenilworth Maintenance Yard Data

Anacostia Park Property Soil

Records provided by NPS indicate that Pepco had proposed to stage dredge spoils on a portion of the Anacostia Park property during an intake dredging project in 1967. It is not known if the dredge spoil staging activity actually took place. At DOEE's direction, Pepco conducted a field investigation in the suspected dredge spoils area on the NPS property. The area proposed for staging is located to the west of the Site and adjacent to the Anacostia River, as shown on **Figure 3-2**. Sample locations are indicated on **Figures 3-2** and **3-3** and are listed on **Table 3-1**.

With the exception of arsenic and chromium, sample results (composite and discrete) were below screening levels. As indicated in the RI Report, arsenic was detected in all 12 discrete surface soil samples at concentrations ranging from 2.3 milligrams per kilogram (mg/kg) to 15 mg/kg. Total chromium was detected in all 12 samples at concentrations ranging from 26 mg/kg to 51 mg/kg, and hexavalent chromium was detected in three samples at concentrations less than 1 mg/kg. Based on the discrete sampling results, hexavalent chromium is below its screening level, and concentrations of trivalent chromium (total chromium minus hexavalent chromium) are below its screening level. Concentrations of arsenic in Anacostia Park property soils are below the arsenic BTV of 17 mg/kg derived in Appendix W of the RI Report.

Anacostia Park Property Groundwater

Three borings were advanced by DPT in April 2017. Groundwater samples were collected from the water table aquifer in each of the three borings. The samples were analyzed for inorganics, PCBs, pesticides, TPH fractions, SVOCs, VOCs, and dioxins and furans. The analytical results are presented in Section 4 of the RI Report. As discussed in greater detail in Section 4.5 of the RI Report, inorganic concentrations are close to or below background levels, indicating that they are likely naturally occurring.

Anacostia Park Property Summary

The soil and groundwater data from the Anacostia Park Property indicate that (1) there are no adverse impacts from the alleged historical staging of dredge spoils on Anacostia Park property, and (2) groundwater transport from the Site has not impacted the subsurface conditions at Anacostia Park. Therefore, soil and groundwater at the Anacostia Park property are not further evaluated in this BHHRA.

3.1.3 Background Data for Soil and Groundwater

Soil

To support the refined background evaluation for Site soil, background soil samples were collected from 20 locations in the vicinity of the Site. The background locations were selected away from known or suspected sources of contamination and are considered to be representative of urban background conditions within northeast Washington, DC. Background surface soil samples were collected from 0 to 1 feet bgs, and subsurface soil samples were collected from 3 to 4 feet bgs. Background samples were analyzed for inorganics, PCBs (Aroclors), pesticides, dioxins and furans, TPH, SVOCs, and VOCs. The background soil sample locations are depicted in **Figure 3-4**, and samples are listed in **Table 3-2**. The analytical results are presented in Appendix W of the RI Report.

Groundwater

To support the refined background evaluation for groundwater, groundwater samples were collected via DPT drilling and temporary well sampling methods at 10 background locations in the vicinity of the Site. Consistent with the background soil sample locations, the background groundwater sample locations were selected away from known or suspected sources of contamination and are considered to be representative of urban background conditions within northeast Washington, DC. Initial background groundwater sampling was conducted from March 2 to April 20, 2017, and additional locations were sampled from August 22 to 29, 2017. Background samples were analyzed for inorganics, PCBs (Aroclors), pesticides, dioxins and furans, TPH, SVOCs, and VOCs. Background groundwater sample locations are shown on **Figure 3-4**, and the samples are listed in **Table 3-4**. The analytical results are presented in Appendix W of the RI Report.

3.1.4 Waterside Investigation Area Data

3.1.4.1 Sediment

Sediment data are available from the Waterside Investigation Area and from background locations.

Waterside Investigation Area

Sediment sampling was conducted between November 2013 and June 2017. Surface sediment samples were collected from 0 to 4 or 6 inches below sediment surface (**Figure 3-5**). Subsurface sediment samples collected at depths greater than 6 inches were not included in the risk assessment, per the approved Risk Assessment Work Plans (AECOM, 2012, 2016d).

As depicted in **Figure 3-5**, surface sediment samples were collected throughout the Waterside Investigation Area. Transects of three samples spanning the River channel were located along the length of the Waterside Investigation Area. Some samples were collected from locations close to the shoreline adjacent to the Site; others were collected mid-channel and closer to the opposite shore and under deeper water. In general, water depths along the shoreline are shallower and channel slopes more gradual on the east side of the River adjacent to the Site. USEPA (2004a) provides the following guidance regarding sediment sample locations for a human health risk assessment:

> *Sediment samples must be located in areas in which individuals are likely to come into direct contact with the sediments. For wading and swimming, this includes areas which are near shore and in which sediments are exposed at some time during the year. Sediments which are consistently covered by considerable amounts of water are likely to wash off before the individual reaches the shore.*

Because of the greater potential for contact with surface sediment under water depths of a few feet or less, the surface sediment data set for the BHHRA was limited to these locations, referred to as fringe surface sediment locations. Fringe surface sediments were identified as locations falling within the low tide minus 1 foot area, consistent with the Draft RI Report for the Anacostia River Sediment Project (ARSP; TetraTech, 2018) and are shown on **Figure 3-5**. Additionally, only fringe surface sediment locations located on the east bank of the River were included, since these are the locations that represent potential exposures closest to the Site. The fringe surface sediment data collected by Pepco were supplemented with relevant fringe surface sediment data collected by DOEE for the ARSP. These data are reported in the ARSP RI Report (TetraTech, 2018).

Based on the combined data sets, a total of 42 fringe surface sediment samples from 32 locations were identified on the east bank (see **Table 3-5**). **Table 3-5** provides the rationale for excluding some locations from the BHHRA (either because the location is not located in a fringe area or because it is not along the east bank of the River). Of the 42 fringe surface sediment samples, all but one of the ARSP samples were analyzed for PCBs (Aroclors) and metals. A subset of fringe surface sediment samples was analyzed for VOCs (13 samples), SVOCs (33 samples), pesticides (28 samples), petroleum hydrocarbons (21 samples), and dioxins and furans (24 samples). Fringe surface sediment analytical results used in this BHHRA are presented in **Attachment A**.

<u>Background</u>

Pepco collected 11 background/upstream surface sediment samples and 4 duplicates (see **Table 3-6** and **Figure 3-6**). These were supplemented with 38 surface sediment samples/locations and 1 duplicate collected for the ARSP (TetraTech, 2018). The selection of the upstream Site-specific background locations is addressed in Technical Memorandum #2 which was approved by DOEE on October 14, 2016. As part of the background evaluation for this RI, Pepco performed a further analysis of potential tidal influence to confirm that all sediment sampling locations included in the Site-specific background dataset were upstream of any influence from the Site. The details of the analysis and the results are provided in Appendix W. Pepco's analysis confirms that the background location SEDBACK20 and background locations upstream of SEDBACK20 will not be influenced by any Site-related contaminants as a result of tidal exchanges. No sampling locations downstream of SEDBACK20 were included in the dataset for the purpose of calculating site-specific background values.

Based on the combined data sets, 49 background surface sediment samples and 5 duplicates were identified. The background surface sediment samples were analyzed for PCBs VOCs, SVOCs, pesticides, petroleum hydrocarbons, and dioxins and furans. The background surface sediment data set is presented in Appendix W of the RI Report.

3.1.4.2 Surface Water

DOEE collected samples of surface water in September and October 2013 at 20 locations in the Anacostia River (10 in the Waterside Investigation Area and 10 from background locations). These locations are depicted in **Figure 3-5** (Site-adjacent) and **Figure 3-6** (background). The surface water samples were collected from approximately 1 foot above the sediment-water interface. All 20 samples were analyzed for PCBs (Aroclors), total and dissolved metals, and PAHs. A subset of 11 samples (5 in the Waterside Investigation Area and 6 from background locations) was analyzed for VOCs, SVOCs, pesticides, and dioxins and furans. **Table 3-7** lists the surface water samples included in this BHHRA. The analytical results are presented in Section 4 of the RI Report.

While surface water samples were collected by DOEE for the ARSP, only three of the sample locations (R5-05, R5-06, and R6-17[5]) are within the Waterside Investigation Area. Location R5-05 was sampled once in October 2014; sampling methods were similar to those used by Pepco. Locations R6-06 and R6-17 were sampled four times in 2016 under maximum (spring/summer) and minimum (fall/winter) river flow conditions. As the Pepco data have better spatial coverage than the DOEE data, and the collection methods for the DOEE 2016 data are dissimilar, only the Pepco data were included. The uncertainty associated with this is discussed in Section 7.

[5] The surface water sample from location R6-17 was collected from within the Pepco Waterside Investigation Area. The sediment and pore water samples were collected upstream of Pepco and are therefore included in the background data set.

3.1.4.3 Fish Tissue Data

As agreed with DOEE, samples of fish tissue were not collected during this program (AECOM, 2012). Rather, as specified in the Risk Assessment Work Plan (AECOM, 2012), other studies conducted in the Anacostia River and the Potomac River were evaluated to determine whether relevant and appropriate fish tissue data are available.

Several investigations of fish tissue chemistry have been conducted for the Anacostia and Potomac Rivers, including data summarized by Velinsky and Cummins (1996), SRC and NOAA (2000), Haywood and Buchanan (2007), Pinkney et al. (2001), and Pinkney (2009, 2017). Two sources of recent fish tissue data were identified: (1) sampling conducted in 2013 by USFWS in the District's stretch of the Anacostia and Potomac Rivers and reported in Pinkney (2017), and (2) sampling conducted by TetraTech in 2016 in the upstream non-tidal portion of the Anacostia River above the DC-Maryland state line and the northeast and northwest tributaries (TetraTech, 2018). The tissue sampling areas for each program are presented in **Figure 3-7** (Anacostia), **Figure 3-8** (Potomac), and **Figure 3-9** (Upstream Non-Tidal Anacostia), and discussed below.

The available fish tissue data were evaluated according to the following five river reaches:

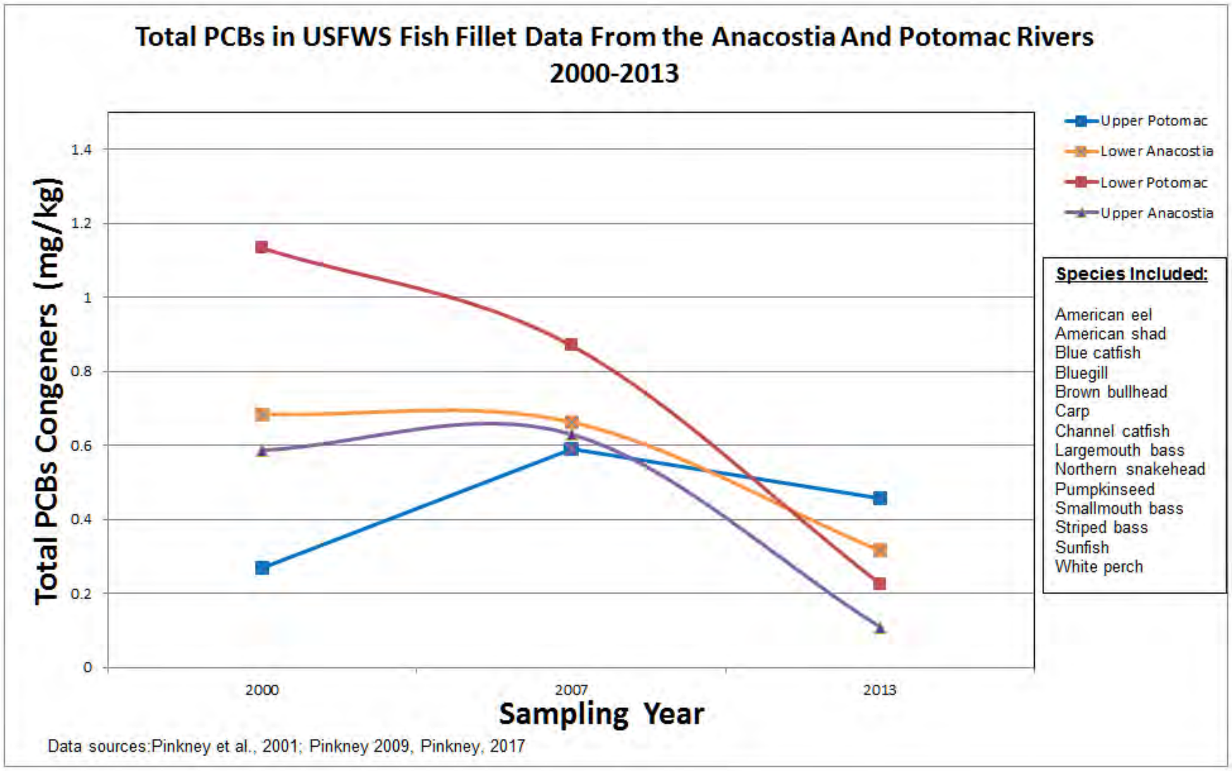
- Upper Anacostia River Area (upstream of the CSX bridge); this is an approximately 3.2 mile reach, encompassing the Waterside Investigation Area (see **Figure 3-7**), and extending approximately 1.3 miles downstream and 1.9 miles upstream of the Benning Road bridge;
- Lower Anacostia River Area (downstream of the CSX bridge);
- Lower Potomac River (downstream of the 14th Street bridge);
- Upper Potomac River (upstream of the 14th Street bridge);
- Upstream Non-Tidal Anacostia River (north of the Maryland state line); this is upstream of the Waterside Investigation Area and was used as the background area.

The four reaches comprising the Upper and Lower Anacostia and Upper and Lower Potomac Rivers were defined in the fish tissue sampling conducted in 2013 by USFWS (Pinkney, 2017). Composite fish fillet samples from each of these four reaches were collected in support of the District's fish consumption advisories, not as part of an RI program (Pepco Benning, ARSP, or other), and therefore were not intended to assign attribution to any upland source (note: these data were also used in DOEE's ARSP).

Because the exact collection points are not specified in the Pinkney study, the samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several-mile-long river reach that was sampled (or possibly the larger home range for some of the fish species sampled) and may not reflect the specific conditions within the Waterside Investigation Area. The same qualification applies for the fish samples collected within the Lower Anacostia and the Potomac River. Accordingly, although the tissue data for the Upper Anacostia Reach were used for this BHHRA per the direction of DOEE, there is insufficient information to make any definitive conclusions about the relationship between this fish tissue data and specific conditions within the Waterside Investigation Area. This will be discussed further as part of the uncertainty analysis.

U.S. Fish and Wildlife Tissue Data

Pinkney (2017) reported on the collection of fish tissue samples in 2013 by USFWS and DOEE in the Upper and Lower Anacostia River and Upper and Lower Potomac River sampling areas to support DOEE's fish consumption advisories. USFWS and DOEE also conducted tissue sampling in these areas in 2000 (Pinkney et al., 2001) and 2007 (Pinkney, 2017). A substantial decline in median PCB tissue concentrations was observed in all species except sunfish (Pinkney, 2017). The figure below shows tissue concentrations over time for the USFWS fillet data (all species combined) for sampling years 2000, 2007, and 2013. As shown below, concentrations in all reaches declined between 2000 and 2013. The decline does not appear to be related to differences in fish size or lipid content, as Pinkney (2017) noted that similar-sized fish were collected over the years and there was no discernable pattern in lipid content among species over time.



The 2013 USFWS tissue data were selected for evaluation in the BHHRA because these data are the most recent available, and the Upper Anacostia sampling reach includes the Waterside Investigation Area. The 2013 USFWS tissue data for the Upper and Lower Potomac and for the Lower Anacostia were also evaluated in the BHHRA to provide information regarding potential risks from fish consumption in the larger regional area. **Table 3-8** summarizes the species collected from each area.

All specimens were filleted, and the skin was left on for most species with the exception of channel and blue catfish (skin-off fillets) and American eel (skin and viscera removed, and muscle and bone included in the sample). The fillet is the principal part of the fish typically consumed by anglers, and therefore is the tissue type of greatest interest for risk assessment (USEPA, 2000; Gibson and McClafferty, 2005). Chemical analyses of the USFWS data included PCB congeners, PAHs, pesticides, polybrominated diphenyl ethers, metals, lipids, and moisture content. PCB congener analysis included a list of 119 congeners, including the 12 congeners with presumed dioxin-like effects (USEPA, 2010).

The fish tissue data were validated as part of the RI for the ARSP (TetraTech, 2018). Qualifiers were added to the data in some cases, and where the laboratory reported results below the method detection limit, results were raised to the reporting limit and qualified as not detected (U). Results between the detection limit and reporting limit were qualified as estimated (J). Therefore, in some cases, the validated data used in this BHHRA will differ from that presented in Pinkney (2017). The validated results for the Anacostia fish fillet samples were presented in Appendix A of the ARSP RI Report (TetraTech, 2018). The analytical results used in this BHHRA are presented in **Attachment A.**[6]

DOEE Fish Tissue Data

Fish tissue samples were collected from the Upstream Non-Tidal Anacostia River in 2016 and were reported in the ARSP RI Report (TetraTech, 2018). A total of 29 fish fillet samples were collected and analyzed for dioxins and furans, PCBs, pesticides, metals, and SVOCs. Of the 29 samples, 19 were largemouth bass, six were smallmouth bass, three were striped bass, and one was a northern snakehead. The samples are listed in **Table 3-8**. The results are presented in **Attachment A**.

3.1.5 Data Quality Assessment

The data collected by AECOM as part of the RI program for the Study Area were validated by project chemists as specified in the Quality Assurance Project Plan (QAPP) (AECOM, 2012). All project data from laboratory chemical analyses were validated using criteria specified in the approved QAPP, the relevant USEPA reference methods, and USEPA's National Functional Guidelines for Inorganic and Organic Data Review (USEPA, 2008). Note that the data quality assessment performed as part of the Benning Road RI did not include the tissue data collected by other parties. TetraTech conducted Phase 2B validation of the fish tissue data sets collected by DOEE (Pinkney, 2017, TetraTech, 2018). Pinkney (2017) noted that quality assurance procedures followed included the analysis of blanks, laboratory and field replicates, and standard reference materials.

The laboratory Quality Control (QC) results for the RI samples, specified as laboratory deliverables in the QAPP, were reviewed. The method-specific QC results included method blanks, equipment blanks, laboratory control samples, matrix spikes, matrix duplicates, laboratory duplicates, field duplicates, and/or surrogates, and were summarized on QC forms, where applicable. Additional method-specific parameters and the laboratory report narratives, which detail all QC non-conformances, were also reviewed with regard to any potential impacts to the sample data usability.

Qualifiers were applied to the data due to QC non-conformances where applicable. Upon completion of the data validation of each data set, data validation reports, which summarize the sample delivery group(s) and parameter(s) reviewed, and any QC non-conformances, were prepared. In addition, the

[6]The RI Report (TetraTech, 2018) did not include all of the analytes reported in Pinkney (2017). Therefore, for those analytes, the data were taken directly from Pinkney (2017). Additionally, some of the data for two carp samples (UACA01 and LPCA01) were transposed in the 2014 Pinkney publication and were corrected based on the 2017 revised publication.

reports summarize the qualifiers applied to the data as a result of any non-conformances noted during the validation process. Data validation reports for each data set are included in Appendix S of the RI Report. A summary of the data validation and project quality assurance assessments is provided in Section 4 of the RI Report. Overall, more than 99% of the data reviewed was found to be reliable and acceptable for use in risk assessment and remedial decision-making.

Analytical data were compiled and tabulated in a database for statistical analysis. **Tables 3-1** to **3-8** identify samples included in this BHHRA for the various media, as summarized below.

Area	Matrix	Number of Samples for BHHRA
Landside Investigation Area	On-Site Surface Soil (0-1 ft bgs)	291
	On-Site Subsurface Soil (1 to 16 ft bgs)	623
	On-Site Groundwater (UWZ)	125
	On-Site Downgradient Groundwater (LWZ and UWZ)	6 LWZ wells and 6 UWZ wells
Waterside Investigation Area	Anacostia River Fringe Surface Sediment	42
	Anacostia River Surface Water	10
	Upper Anacostia River Fish Tissue - Species include blue catfish, brown bullhead, channel catfish, carp, largemouth bass, northern pike, and sunfish	7
Background	Background Surface Soil (0-1 ft bgs)	19
	Background Subsurface Soil (3-4 ft bgs)	19
	Background Groundwater	14
	Anacostia River Surface Sediment (background)	49
	Anacostia River Surface Water (background)	10
	Upstream Non-Tidal Anacostia River Fish Tissue - Species include largemouth bass, striped bass, smallmouth bass, and northern snakehead	29
Regional	Lower Anacostia River Fish Tissue - Species include American eel, blue catfish, channel catfish, carp, largemouth bass, and sunfish	6
	Lower Potomac River Fish Tissue - Species include American eel, American shad, brown bullhead, blue catfish, carp, channel catfish, largemouth bass, and sunfish	9
	Upper Potomac River Fish Tissue - Species include American eel, brown bullhead, carp, channel catfish, largemouth bass, northern snakehead, striped bass, sunfish, and white perch.	9

3.2 Hazard Identification

Hazard identification is the first step in a four-step process of a BHHRA (USEPA, 1989a). As noted above, a major purpose of the hazard identification step is to identify a subset of COPCs from all chemicals detected during the investigation. These COPCs are then carried forward for quantitative evaluation in the subsequent baseline risk assessment.

The COPC screening process is intended to identify the following:

1. Chemicals that pose negligible risks and can be eliminated from further evaluation, and

2. Chemicals that merit further evaluation, either quantitatively or qualitatively, based on their potential to adversely affect humans depending on specific types of exposures.

This section describes the approach used to summarize the data and the steps followed to identify the human health COPCs. The results of the screening process are presented, and the COPCs retained in each medium for further evaluation in the BHHRA are summarized. Screening levels used in the COPC selection are described in Section 3.2.2 and are presented in **Tables 3-9** to **3-12**.

3.2.1 Summary Statistics

Summary statistics, consisting of frequency of detection, minimum and maximum detections, and arithmetic mean concentration, were calculated for detected chemicals in soil, groundwater, fringe surface sediment, surface water, and fish tissue, as shown in **Tables 3-13** to **3-21**.

When a sample and a duplicate pair were collected, they were treated as one sample for calculation of summary statistics (including maximum detection and frequency of detection). When a chemical was detected in both the sample and the duplicate, the higher concentration was used.[7] When chemicals were not detected in either the sample or its duplicate, the higher sample-specific quantitation limits was used. When a chemical in one of the pair was reported as not detected and the chemical was detected in the other, the detected concentration was used to represent the value. The following summary statistics are presented, reflecting the rules stated above regarding sample/duplicate pairs:

- Frequency of Detection: The frequency of detection is reported as a ratio based on the total number of samples analyzed and the number of samples reported as detected for a specific chemical.
- Maximum Detected Concentration: This is the maximum detected concentration for each chemical/area/medium combination.
- Mean Detected Concentration: This is the arithmetic mean concentration for each chemical/area/medium combination based on detected results only.
- Minimum Detected Concentration: This is the minimum detected concentration for each chemical/area/medium combination.

[7] In comments on the preliminary BHHRA, DOEE requested that sample/duplicate pairs be evaluated based on relative percent difference (RPD) between the parent and duplicate sample, using the average where the RPD is less than or equal to 25% and the maximum where the RPD is greater than 25%. To simplify, the maximum was conservatively used in this BHHRA.

Calculation of Totals

Total PCBs were calculated for each sample by summing the detected individual PCB Aroclor or congener results (fish tissue results only). If none of the individual PCB Aroclors/congeners were detected, the total concentration was flagged as non-detect (U-qualified) with a reporting limit equal to the maximum reporting limit of the individual PCB Aroclors/congeners in the total.

For samples with dioxin and furan results, the concentration of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) toxicity equivalence (TEQ) was calculated, as described in Section 4.6.1. If none of the dioxin and furan congeners were detected, the sample total was flagged as non-detect (U-qualified) and the 2,3,7,8-TCDD-TEQ concentration was set equal to the highest toxicity-weighted reporting limit.

PCB-TEQs for fish tissue were calculated for the 12 PCB congeners considered to have potential dioxin-like toxicity, as described in Section 4.6.2.2. The same method used to treat non-detected congeners in the calculation of 2,3,7,8-TCDD-TEQ concentrations was also used for PCB-TEQ.[8]

Chromium

Many metals can exist in different oxidation states; for some metals, the oxidation state can have different toxicities. This is the case for chromium. Chromium exists in two common oxidation states: trivalent chromium (chromium-3, Cr [III], or Cr+3), and hexavalent chromium (chromium-6, Cr [VI], or Cr+6). Trivalent chromium is essentially nontoxic as evidenced by its residential soil screening level of 120,000 mg/kg (USEPA, 2018a). It can be bought over-the-counter as a supplement and is included in most vitamins. Hexavalent chromium was concluded to be a human carcinogen by the inhalation route of exposure (USEPA, 2018b). Chromium is most commonly present in the environment in the trivalent state because typical conditions in the environment favor the reduction of chromium from the hexavalent to the trivalent state. Hexavalent chromium in soil is expected to be reduced to trivalent chromium by organic matter, which is facilitated by low pH (ATSDR, 2012). In addition, if hexavalent chromium is ingested, it is rapidly converted to the trivalent form after entering the stomach and is therefore not considered by USEPA to pose a cancer risk via the ingestion route of exposure (USEPA, 2018b).

Chromium (total) was detected in soil, groundwater, fringe surface sediment, surface water, and fish tissue. There is no history of using chromium at the Site, so it is likely that the form of chromium present

[8] PCB-TEQs for fish from the tidal Anacostia and Potomac Rivers presented in the ARSP RI Report (TetraTech, 2018) did not include PCB-156, which is identified by USEPA as a dioxin-like congener (USEPA, 2010). PCB-TEQs for this BHHRA were calculated to include PCB-156. Furthermore, where co-eluting congeners included dioxin-like and non-dioxin-like congeners, the toxicity equivalency factor (TEF) for the dioxin-like congener was used. This approach is conservative and results in a marginal increase in the PCB-TEQ result.

in soil is trivalent. To verify this assumption, soil samples were collected from the Landside Investigation Area, as well as the Anacostia Park property, and analyzed for both total chromium and hexavalent chromium. The data are presented in **Table 3-22.** The percent of hexavalent chromium was calculated for each sample. The average percent hexavalent chromium was calculated in several ways, both including and excluding non-detected results, and based on the combined Landside Investigation Area and Anacostia Park data sets. The calculated averages range from less than 1% to about 1.5%. Therefore, it is assumed that hexavalent chromium is present at 1.5% of total chromium in soil for the evaluation of samples for which speciation is not available. Given the lack of history of chromium use at the Site, and the low detections in soil, it is unlikely that hexavalent chromium is present in other media at the Study Area. Therefore, total chromium is evaluated as trivalent chromium in soil, groundwater, fringe surface sediment, surface water, and fish tissue.

Arsenic

Arsenic was reported as total arsenic in the fish tissue samples. The Federal Drug Administration (FDA, 1993) estimated that 10% of the total arsenic in fish tissue is the more toxic inorganic form. Others have reported that the inorganic form usually comprises only a small fraction of total arsenic in fish and shellfish (typically less than 10%) (Schoof et al. 1999, Greene and Crecelius 2006, Karouna-Renier et al. 2007), with the remainder consisting of less toxic organic forms (ATSDR, 2007). In the analysis of the Anacostia River and Potomac River fish tissue data, Pinkney (2017) considered total arsenic concentrations that were at least 10 times the inorganic arsenic guidance value as exceedances. Therefore, while COPC selection is based on the results for total arsenic, the derivation of fish tissue exposure point concentrations (EPCs) is based on the assumption that 10% of total arsenic is inorganic and 90% is organic.

3.2.2 Selection of COPCs

COPCs are a subset of the complete set of chemicals detected at a site that are carried through the quantitative risk assessment process. The selection of COPCs identifies those chemicals observed in site media that have the most potential to be a significant contributor to human health risk (USEPA 1993a, 1989a). As stated in USEPA guidance (USEPA, 1993a):

> *Most risk assessments are dominated by a few compounds and a few routes of exposure. Inclusion of all detected compounds at a site in the risk assessment has minimal influence on the total risk. Moreover, quantitative risk calculations using data from environmental media that may contain compounds present at concentrations too low to adversely affect public health have no effect on the*

overall risk estimate for the site. The use of a toxicity screen allows the risk assessment to focus on the compounds and media that may make significant contributions to overall risk.

Several factors are typically considered in identifying COPCs for risk assessment, including toxicity and magnitude of detected concentrations, frequency of detection, and essential nutrient status. Whether a chemical's presence is a result of site-related activities or is an artifact of natural and/or anthropogenic activities, background conditions may also be considered, although upfront elimination of COPCs based on consistency with background is generally not performed (USEPA, 2002e).

For this BHHRA, a toxicity screening approach was used to identify COPCs by comparing the maximum concentrations of chemicals detected in each medium to conservative risk-based screening levels (RBSLs).[9] RBSLs were selected in accordance with the Risk Assessment Work Plan and Addendum (AECOM, 2012, 2016d). In addition, essential nutrient status was considered; calcium, iron, potassium, and sodium were not identified as COPCs, as they are considered essential nutrients. The identification of appropriate RBSLs and the results of the COPC screening are discussed below on a medium-specific basis. For chemicals with RBSLs for both potential carcinogenic and noncarcinogenic effects, the lower of the two was used for screening. The selected RBSLs are presented in **Tables 3-9** to **3-12** for soil and fringe surface sediment, groundwater, surface water, and fish tissue, respectively.

3.2.2.1 Landside Investigation Area COPC Selection

<u>Soil</u>

The USEPA Regional Screening Levels (RSL) for industrial soil (USEPA, 2018a) were used to identify soil COPCs (see **Table 3-9**). The industrial soil RSLs are derived assuming daily year-round soil contact by an adult worker assuming incidental ingestion, dermal contact, and inhalation of soil-derived dusts and vapors for 25 years. The RSLs are based on a target risk of $1x10^{-6}$ for potential carcinogens and a target hazard quotient (HQ) of 1 for potential noncarcinogens (or a target HQ of 0.1 to account for potential additivity of chemicals with the same toxic endpoint) (USEPA, 1993a, 2018a). For screening of noncarcinogenic chemicals, the more conservative RSLs corresponding to an HQ of 0.1 were used. Use of these RSLs for screening occasional worker or recreational soil contact exposures is very conservative.

Table 3-13 presents the COPC screening results for on-Site soil. The maximum detected concentration of total chromium (400 mg/kg) is below the trivalent chromium industrial soil RSL (180,000 mg/kg). Assuming that hexavalent chromium may be present at 1.5% of total chromium (see Section 3.2.1), an

[9] The RBSL for lead is derived using the Adult Lead Model (USEPA, 2003b), which uses the average soil exposure concentration in the calculation of the fetal blood lead concentration of an adult female worker. For consistency with the recommended application of the model, the average lead concentration is used in COPC screening.

estimated maximum concentration of 6 mg/kg hexavalent chromium was calculated for the samples for which speciation was not available. The estimated concentration was calculated based on the maximum total chromium concentration of 400 mg/kg multiplied by the assumed hexavalent chromium percentage of 1.5%. The estimated hexavalent chromium concentration is below the industrial soil RSL (6.3 mg/kg), and chromium is therefore not identified as a COPC for Site soils. The maximum detections of the following chemicals in on-Site soil exceeded their respective screening levels, and thus were identified as COPCs in soil:

- 2,3,7,8-TCDD-TEQ
- arsenic
- cobalt
- manganese
- nickel
- thallium
- vanadium
- PCBs
- TPH- diesel range organics (DRO) (C10-C20)
- benzo(a)pyrene
- benzo(b)fluoranthene
- dibenz(a,h)anthracene
- benzo(a)anthracene
- benzo(k)fluoranthene
- chrysene*
- indeno(1,2,3-cd)pyrene
- naphthalene

While the maximum detection of chrysene was less than its RSL, it was included as a COPC because the other potentially carcinogenic PAHs in Site soil were identified as COPCs (listed above with an asterisk *). The maximum concentrations of many of the inorganics and all of the pesticides, VOCs, and SVOCs, except for a limited number of PAHs, were below their respective RSLs. Therefore, these chemicals were not identified as COPCs and do not require further evaluation.

Groundwater

As discussed in Section 2.2.1, potentially complete exposure pathways for Site groundwater include discharge to the Anacostia River, vapor intrusion from groundwater into an excavation trench, and potential vapor intrusion into the air of a future building if it were constructed in the vicinity of VOCs detected above screening levels in groundwater. The groundwater discharge (groundwater-to-surface water) pathway is discussed in Section 5.6. COPCs for the vapor intrusion into indoor air pathway are discussed in **Attachment B.** The excavation trench pathway is discussed below.

COPCs in UWZ groundwater were selected to evaluate vapor intrusion to an excavation trench pathway; these COPCs are listed in **Table 3-14**. There are no published screening levels directly applicable to this pathway. Vapor Intrusion Screening Levels (VISLs) are applicable to indoor air and are thus overly conservative for the excavation trench pathway. USEPA tapwater RSLs are derived assuming consumption of site-derived water as drinking water and are also conservative for the inhalation of trench air pathway. Consistent with the Risk Assessment Work Plan Addendum (AECOM, 2016d), maximum detected concentrations of VOCs were compared to the USEPA RSLs for tapwater based on a cancer risk level of $1x10^{-6}$ for potential carcinogens and a target HQ of 0.1 for potential noncarcinogens (See **Table 3-10**). The following VOCs were identified as COPCs for the excavation trench air pathway:

- bromodichloromethane
- tert-butyl alcohol
- chloroform
- methyl tert-butyl ether (MTBE)
- tetrachloroethylene
- trichloroethene
- vinyl chloride

3.2.2.2 Waterside Investigation Area COPC Selection

Waterside Investigation Area Fringe Surface Sediment

The routes of potential exposure to chemicals in fringe surface sediment were considered to identify appropriate sediment RBSLs. As identified in the CSM, human receptors who visit the Anacostia River may incidentally ingest and dermally contact fringe surface sediment while recreating at the River. A comprehensive set of risk-based sediment screening levels based on occasional direct contact exposures is not available from either USEPA or DOEE. In the absence of sediment screening levels based on direct contact exposures, the USEPA RSLs for residential soil were used to identify COPCs for the recreational receptor fringe surface sediment direct contact scenarios (see **Table 3-9**). The residential soil RSLs are derived assuming daily year-round soil contact by an adult and child via incidental ingestion, dermal contact, and inhalation of soil-derived dusts and vapors for 26 years. Because exposure to fringe surface sediment is expected to be much less frequent and intensive than exposure to residential soil, the residential soil RSLs represent highly conservative screening levels for fringe surface sediment. Consistent with the approach used for soil, the RSLs corresponding to a target risk of $1x10^{-6}$ for potential carcinogens and a target HQ of 0.1 for potential noncarcinogens were used.

Table 3-15 presents the COPC screening for Waterside Investigation Area fringe surface sediment. The following COPCs were identified:

- 2,3,7,8-TCDD-TEQ
- aluminum
- antimony
- arsenic
- cobalt
- manganese
- nickel
- thallium
- vanadium
- PCBs (Aroclors)
- benzo(a)anthracene
- benzo(a)pyrene
- benzo(b)fluoranthene
- benzo(k)fluoranthene*
- chrysene*
- dibenz(a,h)anthracene
- indeno(1,2,3-cd)pyrene
- TPH (C10-C28)

While the maximum detections of benzo(k)fluoranthene and chrysene are less than their respective RSLs, they are included as COPCs because the other potentially carcinogenic PAHs in fringe surface sediment were identified as COPCs (listed above with an asterisk *).

Waterside Investigation Area Surface Water

The routes of potential exposure to chemicals in surface water were considered to identify appropriate RBSLs. As identified in the CSM, receptors who visit the River may incidentally ingest and dermally contact surface water while recreating at the River. A comprehensive set of risk-based surface water screening levels based on occasional direct contact exposures is not available from either USEPA or DOEE. In the absence of relevant surface water screening levels, the following hierarchy of surface water screening level guidance was used for COPC screening (see **Table 3-11**):

1. DOEE, Title 21 of the District of Columbia Municipal Regulations, Chapter 11, Water Quality Standards. Effective November 1, 2013 (DOEE, 2013).
2. USEPA, National Recommended Water Quality Criteria (NRWQC) for Priority Pollutants. Value for Human Health for the consumption of organisms, accessed August 2018 (USEPA, 2018c).
3. USEPA, RSL for tapwater, November 2018 (USEPA, 2018a).

The DOEE water quality standards and USEPA NRWQC are based on protection of fish and shellfish that may be consumed by humans. These criteria are typically derived by relating acceptable risk-based concentrations in fish tissue to concentrations in surface water via a bioaccumulation factor (BAF). As such, the use of these criteria, as well as the RSLs for tapwater, to select COPCs for evaluating occasional direct contact exposures to surface water is highly conservative. **Table 3-11** identifies the three sets of surface water criteria, and the criterion that was selected for screening.

Table 3-16 presents the COPC screening for Waterside Investigation Area surface water. The following COPCs were identified:

- 2,3,7,8-TCDD-TEQ
- arsenic
- cobalt
- manganese
- 4,4'-DDT

While total PCBs (Aroclors) was not detected in Waterside Investigation Area or background surface water samples, the analytical method that was used (Method 8082) achieves a detection limit of approximately 0.01 micrograms per liter (µg/L), which is above the applicable surface water screening level of 0.000064 µg/L for total PCBs. Therefore, total PCBs (Aroclors) was conservatively identified as a surface water COPC and carried forward in the risk calculations assuming it is present at the lowest reporting limit achieved for surface water (0.0094 µg/L).

Fish Tissue

USEPA no longer provides default RSLs for fish tissue ingestion, and recommends they be calculated using the online RSL calculator tool (USEPA, 2018d). Therefore, fish tissue RSLs were calculated using the conservative historical default fish ingestion rate of 54 grams per day that was previously used by USEPA for RSL development. **Table 3-12** presents the fish tissue RSLs corresponding to a target risk level of 10^{-6} and a hazard index (HI) of 0.1. **Tables 3-17** to **3-21** present the comparison of maximum detected fish tissue concentrations in each of the five reaches to the fish RSLs. The following COPCs were selected:

COPC	Anacostia River (Tidal)		Potomac River		Upstream Non-Tidal Anacostia
	Upper	Lower	Upper	Lower	
Dioxins and Furans					
2,3,7,8-TCDD-TEQ	[a]	[a]	[a]	[a]	X
PCBs					
Total PCBs (congeners)	X	X	X	X	X
PCB-TEQ	X	X	X	X	X
Inorganics					
Arsenic		X	X	X	X
Cobalt					X
Mercury	X	X	X	X	X
Thallium					X
Pesticides					
4,4'-Dichlorodiphenyldichloro-ethane (DDD)	X	X	X	X	X
4,4'-Dichlorodiphenyldichloro-ethylene (DDE)	X	X	X	X	X
Aldrin	X	X	X		X
alpha-Chlordane	X	X	X	X	X [b]
beta-Hexachlorocyclohexane			X		
cis-Nonachlor	X	X	X		
Dieldrin	X	X	X	X	X
gamma-Chlordane	X	X	X	X	
Heptachlor epoxide	X	X	X	X	X
Hexachlorobenzene			X		
Mirex	X	X	X		
Oxychlordane	X	X	X	X	
trans-Nonachlor	X	X	X	X	

Notes:
[a] Data are not available.
[b] Represents total chlordane.

3.2.3 COPC Summary

Table 3-23 presents a summary of the COPCs. Soil COPCs include dioxins and furans, several inorganics, PCBs, DRO, naphthalene, and potentially carcinogenic PAHs. Several VOCs were identified as COPCs for the groundwater to air excavation trench pathway and for the hypothetical future vapor intrusion to indoor air pathway. **Table 3-23** also presents a summary of the Waterside Investigation Area COPCs, which include dioxins and furans, inorganics, pesticides, PCBs, and carcinogenic PAHs. These COPCs were carried forward in the risk calculations for the BHHRA.

4 Dose-Response Assessment

The purpose of the dose-response assessment is to identify the types of adverse health effects that may be associated with potential exposure to a chemical, and to define the relationship between the dose of a chemical and the likelihood and magnitude of an adverse effect (response) (USEPA 1989a). Combining the results of the toxicity assessment with information on the magnitude of potential exposure (developed in the exposure assessment) yields an estimate of potential risk (provided in the risk characterization).

Adverse effects are classified by USEPA as potentially carcinogenic or noncarcinogenic (i.e., potential effects other than cancer). Dose-response relationships are typically defined by USEPA for oral exposure and for exposure by inhalation. Because of the scarcity of toxicological data and established values for the dermal route of exposure, oral toxicity values are used to assess dermal exposures, with an appropriate adjustment for differences in absorption (USEPA, 2004a).

For evaluation of potential noncancer effects, USEPA has developed oral reference doses (RfDs) and inhalation reference concentrations (RfCs) for effects known or assumed to be produced through a nonlinear “mode of action” (USEPA, 2018b). Mode of action is defined as a sequence of key events and processes, starting with interaction of an agent with a cell and resulting in cancer formation. The RfDs and RfCs were developed based on the assumption that thresholds exist for certain toxic effects (such as gastrointestinal effects). The RfD is expressed in units of milligrams of a chemical per kilogram of body weight per day (mg/kg-day), and the RfC is expressed in units of milligrams of a chemical per cubic meter of air (mg/m^3). In general, the RfDs and RfCs are estimates (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. For evaluation of potential noncarcinogenic effects, exposures are characterized as chronic (i.e., lasting longer than 7 years) or subchronic (i.e., lasting 7 years or less). Consistent with the Science Advisory Board (SAB) recommendation cited in the soil screening-level guidance (USEPA, 2002c), a child of 1 to 6 years is considered to have a chronic exposure.[10] The construction worker scenario evaluated in this BHHRA is a 1-year, sub-chronic exposure scenario.

[10] The SAB noted that the combination of the 6-year childhood exposure with a chronic RfD may be appropriate for chemicals with toxic endpoints specific to children or with steep dose-response curves but is likely to be over-protective for most chemicals (USEPA, 1993c).

For evaluation of potential cancer effects, USEPA has characterized the weight of evidence for human carcinogenicity and developed oral slope factors and oral and inhalation unit risks (USEPA, 2018b). USEPA presents the quantitative dose-response estimates in three ways: (1) the slope factor is presented as the risk per (mg/kg-day); (2) the unit risk is the quantitative estimate in terms of either ingestion risk per µg/L of drinking water or inhalation risk per microgram per cubic meter (µg/m^3) of air breathed; and (3) a chemical concentration in drinking water or air is based on predicted cancer risks of 1 in 10,000, 1 in 100,000, or 1 in 1,000,000.

The dose-response assessment is presented in six subsections. Section 4.1 describes the basis of the dose-response relationships characterized by USEPA. Section 4.2 describes the sources of toxicity values applied in this BHHRA. Section 4.3 describes the toxicity values developed by USEPA for the evaluation of potential noncarcinogenic effects. Section 4.4 describes the toxicity values developed by USEPA for the evaluation of potential carcinogenic effects. Section 4.5 discusses the use of oral toxicity values and absorption adjustment factors to estimate dermal exposure. Section 4.6 discusses specific toxicity approaches used for certain chemicals.

4.1 Basis of Dose-Response Relationships

The dose-response relationships characterized by USEPA toxicity values are often determined from studies of laboratory animals conducted under controlled conditions designed to minimize responses due to confounding variables and are conducted at relatively high dose levels to ensure that responses can be observed using as few animals as possible in the experiments. Mathematical models and uncertainty factors (UFs) are used to extrapolate the relatively high doses administered to animals to predict potential human responses at dose levels far below those tested in animals.

Humans are typically exposed to chemicals in the environment at levels much lower than those tested in animals. These low doses may be detoxified or rendered inactive by the myriad of protective mechanisms that are present in humans (Ames et al., 1987) and which may not function at the high dose levels used in animal experiments. Moreover, as noted by USEPA (1993b), “in the case of systemic toxicity, however, organic homeostatic, compensating, and adaptive mechanisms exist that must be overcome before a toxic endpoint is manifested.” Therefore, the results of these animal studies may only be of limited use in accurately predicting a dose-response relationship in humans (USEPA, 1989a). In fact, many effects seen in laboratory animals at the high doses tested are not seen in human exposures to chemicals. For example, while PCBs have been demonstrated to produce tumors in animals, human epidemiological data do not support the carcinogenicity of PCBs (Shields, 2006; Golden et al. 2003, Golden and Kimbrough, 2009).

Despite these uncertainties, and with the goal of being protective of human health, USEPA assumes that the results of animal toxicity studies are predictive of potential toxicity in humans. Moreover, based on the assumption that humans are more sensitive to chemicals than laboratory animals, USEPA incorporates conservative assumptions and UFs when deriving numerical toxicity values from laboratory studies, as discussed in Sections 4.3 and 4.4. However, USEPA explicitly recognizes these extrapolations from high doses to low doses and from animal studies to predict responses in humans as uncertainties in the risk assessment process (USEPA, 1989a).

In some cases, data from human exposure to chemicals are used to develop dose-response values. However, these data also have uncertainties because often it is not possible to determine from human exposure studies whether one or more chemicals are responsible for the observed effects, and it is even more difficult to determine precise exposure levels (USEPA, 1989a). Moreover, where effects are observed in humans, they generally occur at high exposure levels (often in industrial settings), and it is difficult to predict potential human responses at the much lower dose levels that occur in environmental exposure scenarios (USEPA, 1989a).

4.2 Sources of Toxicity Data

The USEPA's (2003a) guidance regarding the relevant human health dose-response values for use in risk assessment was followed in this assessment using the following hierarchy:

- Tier 1 - USEPA's Integrated Risk Information System (IRIS), an online database of the Agency's most current, verified, consensus-based toxicity values (USEPA, 2018b)
- Tier 2 - USEPA's National Center for Environmental Assessment (NCEA), Superfund Health Risk Technical Support Center Provisional Peer Reviewed Toxicity Values (PPRTV) (USEPA, 2018e)
- Tier 3 - Other sources of information, such as the PPRTV screening toxicity values, California Environmental Protection Agency (CalEPA), the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs), and the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997a), with priority given to those sources that are most current, transparent, and have been peer reviewed (USEPA, 2003a)

Numerical toxicity values used in this assessment are oral RfDs, oral cancer slope factors (CSFs), inhalation RfCs, and inhalation unit risk factors (URFs). **Tables 4-1** (oral/dermal) and **4-2** (inhalation) present the noncancer toxicity values used in this BHHRA, and **Tables 4-3** (oral/dermal) and **4-4** (inhalation) present the cancer toxicity values used in this BHHRA. As indicated in **Tables 4-1** through **4-4**, the majority of the toxicity values are Tier 1 values found in the IRIS database (USEPA, 2018b).

COPCs for which Tier 2 and Tier 3 dose-response values are used are listed in the table below. For many, IRIS (Tier 1) values are available for some values, as noted in the table.

Tier 2 and Tier 3 Dose-Response Values Used in the BHHRA				
COPC	**Oral RfD**	**RfC**	**Oral CSF**	**URF**
2,3,7,8-TCDD-TEQ	Tier 1 IRIS	Tier 3 CalEPA	Tier 3 CalEPA	Tier 3 CalEPA
4,4-DDD	Tier 3 PPRTV screening value	No value available	Tier 1 IRIS	Tier 3 CalEPA
4,4-DDE	Tier 3 PPRTV screening value	No value available	Tier 1 IRIS	Tier 3 CalEPA
Aluminum	Tier 2 PPRTV	Tier 2 PPRTV	No value available	No value available
Arsenic (inorganic)	Tier 1 IRIS	Tier 3 CalEPA	Tier 1 IRIS	Tier 1 IRIS
Arsenic (organic)[a]	Tier 3 ATSDR	No value available	No value available	No value available
Bromodichloromethane	Not a COPC for oral/dermal	No value available	Not a COPC for oral/dermal	Tier 3 CalEPA
Chloroform	Not a COPC for oral/dermal	Tier 3 ATSDR	Not a COPC for oral/dermal	Tier 1 IRIS
Cobalt	Tier 2 PPRTV	Tier 2 PPRTV	No value available	Tier 2 PPRTV
DRO	Tier 3 PPRTV screening value	Tier 3 PPRTV screening value	No value available	No value available
MTBE	Not a COPC for oral/dermal exposures	Tier 1 IRIS	Not a COPC for oral/dermal exposures	Tier 3 CalEPA
Mirex	Tier 1 IRIS	No value available	Tier 3 CalEPA	Tier 3 CalEPA
Naphthalene	Tier 1 IRIS	Tier 1 IRIS	No value available	Tier 3 CalEPA
Nickel	Tier 1 IRIS	Tier 3 ATSDR	No value available	Tier 3 CalEPA
Thallium	Tier 3 PPRTV screening value	No value available	No value available	No value available
Vanadium	Tier 1 IRIS	Tier 3 ATSDR	No value available	No value available
Notes: [a] Used in the evaluation of fish consumption exposure pathway only				

It should be noted that the Tier 2 and 3 values used in this BHHRA were also used by USEPA in RSL development (USEPA, 2018a).

When toxicity data were not available from any of the available sources, surrogates were assigned based on structurally and toxicologically similar chemicals. Surrogates were assigned as follows:

- Toxicity values for technical chlordane were used to evaluate chlordane isomers (alpha-chlordane, gamma-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane)
- Toxicity values for isopropanol were used to evaluate tert-butyl alcohol

4.3 Noncarcinogenic Toxicity Assessment

Chemicals with known or potential noncarcinogenic effects are assumed to have a dose below which no adverse effect occurs or, conversely, above which an adverse effect may be seen. This dose is called the threshold dose. A conservative estimate of the true threshold dose is referred to as a No Observed Adverse Effect Level (NOAEL). The lowest dose at which an adverse effect has been observed is referred to as a Lowest Observed Adverse Effect Level (LOAEL). The NOAEL, or if not available, the LOAEL, is used as the point of departure (POD) for extrapolating from experimental data to predict a threshold level for humans. By applying UFs to the NOAEL or the LOAEL, USEPA has developed RfDs for chronic exposure to chemicals with noncarcinogenic effects (USEPA, 1997a, 2002f, 2018b).

In more recent derivations, USEPA has used a benchmark dose (BMD) approach to define the POD for an observed adverse outcome, or benchmark response, from experimental observations. The BMD approach provides a more quantitative alternative to the first step in the dose-response assessment than the current NOAEL/LOAEL process for noncancer health effects. Derivation of the BMD is a two-step process: (1) response data are modeled in the range of empirical observation; and then (2) extrapolation below the range of observation is accomplished by modeling. The POD for BMD modeling is the benchmark dose lower bound (BMDL), or the lower 95% bound on the dose/exposure associated with the benchmark response (i.e., adverse response), typically 10% above the control response. Using the BMDL accounts for the uncertainty inherent in a given study and ensures (with 95% confidence) that the target benchmark response is not exceeded. UFs are then applied to the BMDL, as in the case for the NOAEL/LOAEL approach, to derive an RfD.

In regulatory toxicity assessment, USEPA assumes that humans are as sensitive, or more sensitive, to the toxic effects of a chemical as the most sensitive species used in the laboratory studies. Moreover, the RfD or RfC is developed based on the most sensitive or critical adverse health effect observed in the study population, with the assumption that if the most critical effect is prevented, then all other potential toxic effects are prevented. UFs are applied to the BMDL or NOAEL (or LOAEL, when a NOAEL is unavailable) for this critical effect to account for uncertainties associated with the dose-response relationship. These include using an animal study to derive a human toxicity value, extrapolating from a LOAEL to a NOAEL, extrapolating from a subchronic (partial lifetime) to a chronic lifetime exposure, and evaluating sensitive subpopulations. Generally, a 10-fold UF is used to account for each of these uncertainties, although a UF of 3 can be used where uncertainty is lower; thus, the total UF can range from 3 to 10,000, although USEPA (2002f) recommends limiting the total combined UF for a chemical to 3,000. In addition, a UF or a modifying factor of up to 10 can be used to account for inadequacies in the database or other uncertainties. The UFs for the COPCs evaluated in this risk assessment range from 3 to 3,000. USEPA's standard UFs and the modifying factors are identified below (USEPA, 1993b).

Standard Uncertainty Factors:

- Use a 10-fold factor when extrapolating from valid experimental results in studies using prolonged exposure to average healthy humans. This factor is intended to account for the variation in sensitivity among the members of the human population and is referenced as "10H."
- Use an additional 10-fold factor when extrapolating from valid results of long-term studies on experimental animals when results of studies of human exposure are not available or are inadequate. This factor is intended to account for the uncertainty involved in extrapolating from animal data to humans and is referenced as "10A."
- Use an additional 10-fold factor when extrapolating from less than chronic results on experimental animals when there are no useful long-term human data. This factor is intended to account for the uncertainty involved in extrapolating from less than chronic NOAELs to chronic NOAELs and is referenced as "10S."
- Use an additional 10-fold factor when deriving an RfD from a LOAEL instead of a NOAEL. This factor is intended to account for the uncertainty involved in extrapolating from LOAELs to NOAELs and is referenced as "10L."

The final UF is derived by multiplying the individual UFs and rounding to one significant figure. Uncertainty and modifying factors that were applied to the COPCs included in this BHHRA are listed in **Tables 4-1** and **4-2**, which range from 3 (arsenic RfD, manganese RfD) to 10,000 (DRO RfD).

The resulting RfDs are conservative, i.e., health protective, because of the frequent use of multiple uncertainty and modifying factors. Consequently, an RfD provides reasonable certainty that no noncarcinogenic health effects are expected to occur, even for sensitive individuals and if daily exposures were to occur at the RfD level for a lifetime. As noted above, RfDs and exposure doses are expressed in mg/kg-day). The lower the RfD value, the lower the assumed threshold for effects, and the greater the assumed toxicity.

Table 4-1 summarizes the oral noncarcinogenic toxicity values (i.e., RfDs) and the corresponding critical effects for the COPCs. **Table 4-2** summarizes the inhalation noncarcinogenic toxicity values (i.e., RfCs) and the corresponding critical effects for COPCs. For each COPC, the chemical abstracts service number (CAS number), the dose-response value (RfD or RfC), and the reference for the toxicity value are presented. In addition, the USEPA confidence level in the value, the uncertainty factor, the modifying factor, the study animal, study method, target endpoint, or critical effects upon which the toxicity value is based are presented for each COPC, where available. USEPA's confidence in the toxicity value is based on confidence in the selected study and the extent of available toxicity information. Adjustments for dermal absorption are discussed in Section 4.5.

Subchronic toxicity values are applicable to the construction worker scenario for which exposures are expected to occur over a brief (e.g., 40-day) duration. Subchronic toxicity values are not generally found in IRIS. Therefore, chronic toxicity values were conservatively used to evaluate the construction worker pathway initially and were updated with subchronic toxicity values where warranted and available.[11] The noncancer toxicity values used to evaluate oral and inhalation exposures for the construction worker scenario are presented in **Tables 4-1** and **4-2**, respectively.

4.4 Carcinogenic Toxicity Assessment

USEPA has developed carcinogen risk assessment guidelines (USEPA, 2005b) that revise and replace the previous carcinogen risk assessment guidelines (USEPA, 1986). However, the carcinogen risk assessments for many of the chemicals listed in USEPA's IRIS database, including PCBs, still follow the classification system developed in the previous guidance (USEPA, 1986). The classification system in the previous guidance was developed according to the weight of evidence from epidemiologic and animal studies:

Group A Human Carcinogen (sufficient evidence of carcinogenicity in humans)

Group B Probable Human Carcinogen (B1 - limited evidence of carcinogenicity in humans; B2 – sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans)

[11] PCBs and vanadium were the only COPCs with exceedances for the construction worker based on chronic toxicity values. A subchronic RfD for PCBs is available and was therefore used. No subchronic toxicity data are available for vanadium.

Group C Possible Human Carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data)

Group D Not Classifiable as to Human Carcinogenicity (inadequate or no evidence)

Group E Evidence of Noncarcinogenicity for Humans (no evidence of carcinogenicity in adequate studies)

In the previous guidance, it was assumed that there is some finite level of risk associated with each non-zero dose. The USEPA has developed computerized models that extrapolate dose-response relations observed at the relatively high doses used in animal studies to the low dose levels encountered by humans in environmental situations. The mathematical models developed by USEPA assume no threshold and use both animal and human data (where available) to develop a potency estimate for a given chemical. The potency estimate for oral and dermal exposure, i.e., the CSF, is expressed in units of $(mg/kg\text{-}day)^{-1}$; the higher the CSF, the greater the carcinogenic potential.

USEPA (2005b) places greater emphasis on critically evaluating all available data from which a default linear low-dose extrapolation option may be invoked if needed in the absence of critical information. The guidance also emphasizes the consideration of mode of action data. As previously noted, mode of action is defined as a sequence of key events and processes, starting with interaction of an agent with a cell and resulting in cancer formation. Some modes of action are anticipated to be mutagenic and are assessed with a linear approach. Other modes of action may be modeled with either linear or nonlinear approaches after a rigorous analysis of available data under the guidance provided in the framework for mode of action analysis. USEPA (2005b) uses a weight of evidence narrative rather than the classification system that was used in the previous guidance. The following descriptors are recommended along with the weight of evidence narrative:

- **Carcinogenic to humans** – this descriptor indicates strong evidence of human carcinogenicity.
- **Likely to be carcinogenic to humans** – this descriptor is appropriate when the weight of evidence is adequate to demonstrate carcinogenic potential to humans.
- **Suggestive evidence of carcinogenic potential** – this descriptor is appropriate when the weight of evidence is suggestive of carcinogenicity; a concern for potential carcinogenic effects in humans is raised, but the data are judged not sufficient for a stronger conclusion.
- **Inadequate information to assess carcinogenic potential** – this descriptor is appropriate when available data are judged inadequate for applying one of the other descriptors.

- **Not likely to be carcinogenic to humans** – this descriptor is appropriate when the available data are considered robust for deciding that there is no basis for human hazard concern.

More than one descriptor can be used when a chemical's effects differ by dose or exposure route.

While these narrative descriptions represent important advances in carcinogen risk assessment, the approach has not generally been implemented for chemicals with toxicity values on IRIS. Therefore, the alphanumeric system is still presented on IRIS and is included here, as several COPCs remain classified under the older system.

Table 4-3 summarizes the oral toxicity information for the COPCs with presumed carcinogenic effects via the oral route of exposure. The CAS number, USEPA carcinogenicity class, the oral CSF, and the reference are provided. In addition, the study animal and route of exposure upon which the CSF is based are presented. Adjustments for dermal absorption are discussed in Section 4.5. **Table 4-4** presents the inhalation toxicity information for COPCs with presumed carcinogenic effects via the inhalation route of exposure.

4.4.1 Mutagenic Mode of Action

USEPA guidance for early life exposure to carcinogens (USEPA, 2005b) requires that potential risks from chemicals that act by a mutagenic mode of action be calculated differently than chemicals that do not act via a mutagenic mode of action. For carcinogens presumed to act via a mutagenic mode of action, dose-response values are generally based on the linearized multistage (LMS) model, which assumes that cancer risks are linear in the low-dose region (USEPA, 2005b, c). Consistent with the Cancer Guidelines and Supplemental Guidance for Assessing Susceptibility for Early-Life Exposure to Carcinogens (USEPA, 2005c), the application of age-dependent adjustment factors (ADAFs) for chemicals with a mutagenic mode of action has been used in the calculation of risk from specific chemicals, including potentially carcinogenic PAHs. While both trichloroethylene and vinyl chloride are potentially mutagenic, they are COPCs only for the excavation trench air pathway for a construction worker and the vapor intrusion to indoor air pathway for an industrial worker, and thus ADAFs do not apply. The ADAFs applied to the potentially carcinogenic PAHs are listed below:

- Ages 0-2: ADAF = 10
- Ages 2-6: ADAF = 3
- Ages 6-16: ADAF = 3
- Ages >16: ADAF = 1

Age-weighted ADAFs were calculated for the young child and older child/teen group based on the exposure durations. For the reasonable maximum exposure (RME) scenarios, the ADAFs for the entire age span of the receptor were averaged. The ADAFs used for the RME scenarios were also used for the central tendency exposure (CTE) scenarios. The derivation of the ADAFs for each age range is presented below.

Receptor Age (years)	1<7	7<19
RME Exposure Duration (years)	6	12
CTE Exposure Duration (years)	3	6
Age Range	**ADAF**	
0<1		
1<2	10	
2<3	3	
3<4	3	
4<5	3	
5<6	3	
6<7	3	
7<8		3
8<9		3
9<10		3
10<11		3
11<12		3
12<13		3
13<14		3
14<15		3
15<16		3
16<17		1
17<18		1
18<19		1
RME and CTE ADAF [a]	**4.2**	**2.5**

Notes:
[a] RME ADAF is the average of the ADAFs for the receptors assumed exposure duration, which is the same as the age span of the receptor. The RME ADAFs were also applied to the CTE scenarios.

4.5 Absorption Adjustment for Dermal Toxicity Values

As there are no dermal dose-response values available for the COPCs addressed in this BHHRA, oral dose-response values were used to evaluate dermal exposures. The equation for calculating dermal absorption gives rise to an absorbed dose, making it necessary to adjust the oral toxicity factor (which reflects an administered dose rather than an absorbed dose). This adjustment accounts for the gastrointestinal absorption efficiency in the critical study that forms the basis of the RfD or CSF. For example, when oral absorption in the critical study is essentially complete (i.e., 100%), the absorbed dose is equivalent to the administered dose, and therefore no adjustment is necessary. Adjustment is only recommended when gastrointestinal absorption is less than 50%. For organic chemicals, no adjustment is considered necessary, since their gastrointestinal absorption is generally high. Five of the inorganics evaluated in this risk assessment (antimony, manganese, mercury, nickel, and vanadium) require adjustment, as indicated in **Table 4-1**. USEPA (2004a, Exhibit 4-1) provides recommended adjustment factors for oral dose-response values.

4.6 Chemical-Specific Approaches

The toxicity assessment approach used for COPCs with specific toxicological issues is discussed in this section:

- Dioxins and Furans (Section 4.6.1)
- PCBs (Section 4.6.2)
- PAHs (Section 4.6.3)

4.6.1 Dioxins and Furans

Dioxins and furans, expressed as 2,3,7,8-TCDD-TEQ, were identified as COPCs in fringe surface sediment, surface water, and Upstream Non-Tidal Anacostia River fish tissue. The approaches used to estimate potential carcinogenic risks and noncarcinogenic hazards associated with 2,3,7,8-TCDD-TEQ are described below. Because dioxins and furans occur in complex mixtures, the toxicity of 2,3,7,8-TCDD, by far the most extensively studied of the group, is used as a reference for the other members of this family of chlorinated chemicals. Based on their ability to bind to the aryl hydrocarbon (Ah) receptor, seven 2,3,7,8-chlorinated dioxin and ten 2,3,7,8-chlorinated furan congeners are assumed to have a mechanism of toxicity similar to that of TCDD. Toxicity equivalency factors (TEFs) have been developed by the World Health Organization (WHO) (Van den Berg et al., 2006) to equate the toxicity of each dioxin-like congener to that of TCDD. TEFs have been identified for 17 dioxins and furans, ranging from 0.0003 to 1, as shown below. In December 2010, USEPA published guidance that adopts the 2005 WHO mammalian TEFs for risk assessment (USEPA, 2010).

Chemical	WHO 2005 Toxicity Equivalency Factor (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
Source: Van den Berg et al., 2006; USEPA, 2010.	

By multiplying the concentration of each dioxin-like congener in an environmental sample by its TEF and summing the results, a 2,3,7,8-TCDD-TEQ concentration can be calculated for the sample.

Due to the lack of Tier 1 or 2 toxicity factors, the CalEPA toxicity values for 2,3,7,8-TCDD were used to evaluate potential carcinogenic effects of 2,3,7,8-TCDD-TEQ via the oral, dermal, and inhalation pathways, as well as noncarcinogenic effects via the inhalation route of exposure (CalEPA, 2018). The USEPA Tier 1 RfD for TCDD was used to estimate the potential noncancer hazard associated with 2,3,7,8-TCDD-TEQ via oral and dermal exposure (USEPA, 2018b).

4.6.2 Polychlorinated Biphenyls

PCBs were identified as a COPC in soil, fringe surface sediment, surface water, and fish tissue. For abiotic media (soil, fringe surface sediment, and surface water), PCBs were evaluated as total PCBs (sum of Aroclors). For biotic media (fish tissue), PCBs were evaluated as both total PCBs (sum of congeners) and as PCB-TEQ. This approach recognizes two potential mechanisms of toxicity and the potential for enrichment of certain presumed dioxin-like congeners in biotic media (USEPA, 2010, 2018b). Therefore, for the angler receptor who is assumed to eat fish, two separate PCB cancer risks and noncancer hazards are calculated, one for total PCBs and one for PCB-TEQ. Therefore, for fish consumption, the BHHRA presents two separate estimates of cumulative cancer risks, one based on total PCBs, which includes all COPCs except PCB-TEQ, and one based on PCB-TEQ, which includes all COPCs except total PCBs. The uncertainty associated with the PCB toxicity approaches is discussed in the uncertainty analysis (Section 7). The approaches used to estimate potential carcinogenic risks and noncarcinogenic hazards associated with PCBs are described below.

4.6.2.1 Total PCBs Approach

For the total PCBs approach, the potential cancer risks and noncancer hazards posed by PCBs were calculated using the toxicity factors published on IRIS for PCB mixtures and specific Aroclors (USEPA, 2018b). The approach for evaluating carcinogenic effects is described first, followed by noncarcinogenic effects.

Carcinogenic Effects

USEPA provides three tiers of oral CSFs for evaluation of total PCBs: (1) high risk and persistence, (2) low risk and persistence, and (3) lowest risk and persistence (USEPA, 2018b). The choice of CSF depends on the route and medium of exposure and PCB chlorine content (USEPA, 2018b), as shown below. The CSFs are derived from animal cancer bioassay studies, and because mixtures of PCBs were used, the toxicity observed is the result of the combined effects of the mixtures on the whole animal (including presumed dioxin-like effects, as discussed in the uncertainty analysis).

Scenario	Upper-Bound Slope Factor (mg/kg-day)$^{-1}$	Central-Estimate Slope Factor (mg/kg-day)$^{-1}$	Slope Factor Basis	Criteria for Use:
High Risk and Persistence	2	1	Several studies on carcinogenicity of Aroclor 1260 and 1254	• Food chain exposure • Sediment or soil ingestion • Dust or aerosol inhalation • Dermal exposure, if an absorption factor has been applied • Presence of dioxin-like, tumor-promoting, or persistent congeners • Early-life exposure (all pathways and mixtures)
Low Risk and Persistence	0.4	0.3	Several studies of carcinogenicity of Aroclor 1242	• Ingestion of water-soluble congeners • Inhalation of evaporated congeners • Dermal exposure if no absorption factor has been applied
Lowest Risk and Persistence	0.07	0.04	Several studies of carcinogenicity of Aroclor 1016	• Congener or isomer analyses verify that congeners with more than 4 chlorines comprise less than 0.5% of total PCBs.
Source: USEPA, 2018b.				

Cancer risks via oral and dermal routes associated with total PCBs were evaluated as follows:

- Ingestion of soil, fringe surface sediment, and fish tissue, and dermal contact with soil and fringe surface sediment: high-risk and persistence, upper-bound CSF of 2 (mg/kg-day)$^{-1}$
- Ingestion of and dermal contact with surface water: low risk and persistence, upper-bound CSF of 0.4 (mg/kg-day)$^{-1}$

Inhalation URFs for PCBs are derived from the oral CSFs above assuming an inhalation rate of 20 mg/m^3 per day and a body weight of 70 kilograms (USEPA, 2018b). Consistent with the USEPA hierarchy for assigning a PCB slope factor by exposure pathway, the high risk and persistence values are applicable to the dust inhalation pathway (USEPA, 2018b). Therefore, the high risk and persistence upper-bound CSF was used to derive the URF. The use of the upper-bound CSF for the CTE scenario is conservative, as discussed in the uncertainty analysis in Section 7 below.

Noncarcinogenic Effects

USEPA has not developed an oral RfD for PCBs as a class;[12] however, USEPA has conducted threshold effect assessments for the following individual PCB mixtures: Aroclor 1254, 1016, and 1248. The USEPA provides an oral RfD of 2E-05 mg/kg-day for Aroclor 1254 and an oral RfD of 7E-05 mg/kg-day for Aroclor 1016. USEPA reviewed information on Aroclor 1248 but did not derive an RfD. The Aroclor oral RfDs on IRIS (USEPA, 2018b) were used to evaluate potential noncarcinogenic effects from PCBs. Although no specific guidance has been provided by USEPA or others concerning whether to use the oral RfD for Aroclor 1016 or Aroclor 1254, it is reasonable and scientifically valid to use the oral RfD for the Aroclor that most closely approximates the congener composition in the environmental media being evaluated. The RfD for Aroclor 1254 was used for this BHHRA based on the available data for Aroclor patterns in soil and sediment. PCBs in soil and River sediment samples collected adjacent to the Site were identified by Method 8082 as primarily an Aroclor 1248 and Aroclor 1260 mix, and Aroclor 1254 is midway between 1248 and 1260 in congener/homologue range.

The RfD for Aroclor 1254 of 2E-5 mg/kg-day is based on a subchronic toxicity study, with a total UF of 300, 10 for sensitive individuals, 3 for extrapolation from animals to humans, 3 for the use of a minimal LOAEL and 3 for extrapolation from a subchronic to chronic exposure duration (USEPA, 2018b). Therefore, the UF of 3 for extrapolation from subchronic to chronic exposure duration is removed to derive a subchronic RfD of 5E-5 mg/kg-day for the construction worker scenario (LOAEL of 5E-3 mg/kg-day divided by the remaining uncertainty factor of 100).

4.6.2.2 Dioxin-Like PCBs Approach

Certain PCB congeners have been identified as having a mechanism of toxicity similar to that of 2,3,7,8-TCDD (USEPA, 1996, 2010; Van den Berg et al., 2006). The designation as a “dioxin-like compound” is based on Ah receptor binding and similarities in biochemical activity and bioaccumulation potential to 2,3,7,8-TCDD. Twelve coplanar PCBs with four or more chlorines with one or no substitutions at ortho positions have been identified as having potential dioxin-like toxicity, and TEFs were developed to equate the toxicity of each dioxin-like PCB congener to that of 2,3,7,8-TCDD (Van den Berg et al., 2006). The “coplanar” PCBs lack ortho chlorines on both rings, allowing the rings to orient in the same plane, but this conformation is not rigid. USEPA’s December 2010 guidance adopts the 2005 WHO mammalian TEFs for the 12 coplanar PCBs (USEPA, 2010). The TEFs for dioxin-like PCBs are shown below.

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[12] An IRIS assessment of the potential noncarcinogenic effects of PCB mixtures is underway (USEPA, 2018b).

Chemical	WHO 2005 Toxicity Equivalency Factor (TEF)
Non-ortho–substituted PCBs	
3,3’,4,4’-tetraCB (PCB 77)	0.0001
3,4,4’,5-tetraCB (PCB 81)	0.0003
3,3’,4,4’,5-pentaCB (PCB 126)	0.1
3,3,’4,4’,5,5’-hexaCB (PCB 169)	0.03
Mono-ortho–substituted PCBs	
2,3,3’,4,4’-pentaCB (PCB 105)	0.00003
2,3,4,4’,5-pentaCB (PCB 114)	0.00003
2,3’,4,4’,5-pentaCB (PCB 118)	0.00003
2’,3,4,4’,5-pentaCB (PCB 123)	0.00003
2,3,3’,4,4’,5-hexaCB (PCB 156)	0.00003
2,3,3’,4,4’,5’-hexaCB (PCB 157)	0.00003
2,3’,4,4’,5,5’-hexaCB (PCB 167)	0.00003
2,3,3’,4,4’,5,5’-heptaCB (PCB 189)	0.00003

The potential cancer risk posed by PCB-TEQ via fish consumption was evaluated in the BHHRA using the CSF for 2,3,7,8-TCDD of 130,000 (mg/kg-day)$^{-1}$.

Noncarcinogenic Effects

The oral RfD of 7E-10 mg/kg-day derived for 2,3,7,8-TCDD (USEPA, 2018b) was used to evaluate the potential noncarcinogenic effects of PCB-TEQ via fish consumption.

To avoid double counting of PCB risks, two separate sets of cancer risks and noncancer hazards were derived for the fish consumption scenario, with one set based on the toxicity factors for total PCBs and the other based on the toxicity factors for dioxin-like PCBs as PCB-TEQ.[13]

4.6.3 Polycyclic Aromatic Hydrocarbons

The following potentially carcinogenic PAHs were identified as COPCs in fringe surface sediment and in soil:

[13] Summing total PCB and PCB-TEQ cancer risks overestimates the risk posed by an environmental PCB mixture, as coplanar PCBs were present in the commercial Aroclor mixture used to derive the total PCBs CSF; hence, there is “double counting” of the risk posed by the coplanar PCBs if total PCB and PCB-TEQ risks are summed.

- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene

Benzo(a)pyrene (BaP) is the most studied of the PAHs and the only chemical in the group for which rodent bioassay data are considered by USEPA to be adequate for estimating an oral CSF. Therefore, the carcinogenic potency of the other PAHs with presumed carcinogenic effects was evaluated relative to BaP using relative potency factors (RPFs) (USEPA, 1993d). The current USEPA RPFs for the seven potentially carcinogenic PAHs are shown below. By multiplying the BaP CSF by each of the RPFs, a PAH-specific oral CSF can be calculated. The resulting CSFs applied in the BHHRA are shown below.

Chemical	Relative Potency Factor (USEPA, 1993d)	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	CSF Source
Benzo(a)pyrene	1	1	USEPA, 2018b
Benzo(a)anthracene	0.1	0.1	BaP CSF x RPF
Benzo(b)fluoranthene	0.1	0.1	BaP CSF x RPF
Benzo(k)fluoranthene	0.01	0.01	BaP CSF x RPF
Chrysene	0.001	0.001	BaP CSF x RPF
Dibenz(a,h)anthracene	1	1	BaP CSF x RPF
Indeno(1,2,3-c,d)pyrene	0.1	0.1	BaP CSF x RPF

An RfD is available from IRIS (USEPA, 2018b) for BaP. Currently, oral RfDs are not available for the other potentially carcinogenic PAHs from USEPA's hierarchy of sources (USEPA, 2003a). Therefore, oral RfDs were not assigned to the other potentially carcinogenic PAHs.

5 Exposure Assessment

The objective of the exposure assessment is to estimate the magnitude, frequency, duration, and routes of current and reasonably anticipated future human exposure to COPCs associated with the Study Area. The extent of a receptor's exposure is estimated by identifying exposure scenarios that describe the potential pathways of exposure to COPCs and the specific activities and behaviors (e.g., wading, fishing) of individuals that might lead to contact with COPCs in the environment.

USEPA guidance documents stress the importance of using data that represent the characteristics of the local population(s) and site when possible and appropriate (USEPA, 1989a, b, 1998, 2000, 2011). Default exposure assumptions, which are often intentionally conservative, may be appropriate when site-specific data are lacking, or when there is little reason to believe site conditions and/or receptor characteristics differ substantively from the default (e.g., human body weight, lifetime). Consistent with USEPA guidance and the approved Risk Assessment Work Plans (AECOM, 2012, 2016d), the exposure assessment for the Study Area utilizes both site-specific and default assumptions.

This section is organized as follows:

- Section 5.1 discusses potential exposure scenarios, based on the CSM presented in Section 2.2, including the potentially affected media and the pathways by which people may be exposed to Study Area media.
- Section 5.2 presents the methods used to quantify potential exposures for each potential exposure scenario.
- Section 5.3 identifies the exposure parameters and values used to quantify potential exposures.
- Section 5.4 presents chemical-specific parameters.
- Section 5.5 describes EPCs.
- Section 5.6 presents the groundwater-to-surface water screening evaluation.

5.1 Identification of Potential Exposure Scenarios

Exposure scenarios were developed based on the BHHRA CSM, as described in Section 2.2. Both Waterside and Landside exposure scenarios were evaluated. **Table 5-1** presents a summary of the receptors and exposure scenarios evaluated in the BHHRA. Because of the differences in activity patterns and sensitivity to exposures, three age groups were evaluated (USEPA, 2014a):[14]

- Young child age 1 to 6 years (from 1 up to the 7th birthday, 1 to <7),
- Older child/teen age 7 to 18 years (from 7 up to the 19th birthday, 7 to <19), and
- Adults (>18 years of age).

For carcinogenic risk characterization, which assumes that effects are additive over a lifetime, potential risks for the young child and adult age groups were calculated separately, and then summed to estimate the total potential lifetime excess cancer risk for the receptor. For noncarcinogenic risk characterization, effects were evaluated over the period of exposure. Therefore, noncancer hazards were calculated and presented separately for the young child, older child, and adult age groups.

5.1.1 Landside Investigation Area

The Site is completely surrounded by a fence with two guarded entrances. The guard stations are manned 24 hours a day, 7 days a week. The majority of the Site is covered by impervious material such as concrete or asphalt. Therefore, contact with on-Site media is unlikely under the current scenario. However, if conditions change in the future, it is possible that receptors may be potentially exposed to on-Site media.

Eight exposure areas were defined for soil and groundwater based on current Site use, as indicated below (see **Figure 3-1**):

- Hypothetical Future Park Land /Green Space
- Warehouse and Laydown Area
- Salvage Yard and Waste Storage Area
- Stores and Fleet Maintenance Area
- Offices and Parking Lot
- Substation #7
- Transformer Shop
- Vehicle Refueling Area

As discussed in Section 2.2.1, it is assumed that future recreational exposures will be limited to the western portion of the Site next to Anacostia Avenue (see **Figure 3-1**).

[14] Infants under 1 year of age are assumed to not be exposed to Study Area-related media; the potential contribution from early life exposures to lifetime risk is discussed in the uncertainty analysis.

5.1.1.1 Current/Future Construction Worker

A current and/or future construction worker (adult) may contact surface and subsurface soil during utility or other construction work requiring excavation into the subsurface. The construction worker is assumed to be exposed to soil via incidental ingestion and dermal contact as well as via inhalation of particulates and vapors from soil in outdoor air. The construction worker is also assumed to be potentially exposed to vapors migrating from the subsurface into the air of an excavation trench.

5.1.1.2 Future Outdoor Industrial Worker

It is assumed that in the future, should current Site configuration with respect to soil cover change, an industrial worker (adult) may contact surface soil. The industrial worker is assumed to be exposed to surface soil via incidental ingestion and dermal contact with surface soil, as well as inhalation of particulates and vapors from soil in outdoor air. The potential for future industrial workers to contact subsurface soil is discussed in the uncertainty analysis section.

5.1.1.3 Future Indoor Industrial Worker

It is assumed that if a future building were constructed in an area of the Site with groundwater concentrations above VISLs, a future indoor worker may be exposed via inhalation to vapors from groundwater due to vapor intrusion.

5.1.1.4 Future Recreational User

In the future, if Site access or security changes and the existing soil covers are removed, it is possible that recreational receptors will contact on-Site surface soil. Therefore, a future recreational user was evaluated (older child/teen). The recreational user is assumed to be potentially exposed to on-Site surface soil via incidental ingestion and dermal contact with surface soil, as well as inhalation of particulates and vapors from soil in outdoor air. It is assumed that future recreational exposures will be limited to the portion of the Site closest to the Anacostia River. The remainder of the Site will remain industrial/commercial with secure fencing and 24-hour security to deter trespassing. The Site will continue to be used as a service center into the foreseeable future due to the important role it serves in Pepco's electric transmission and distribution system.

5.1.2 Waterside Investigation Area

The public may access the Anacostia River at several locations, including parks, boat docks, and launches (**Figure 2-1**). Anacostia Park, a 1,200-acre unit of National Capital Parks – East, stretches 5 miles along the banks of the Anacostia River between the Fredrick Douglas Memorial Bridge and the DC-Maryland line. Within the park, the Anacostia Riverwalk Trail runs along the shoreline of the River, continuing beyond the north and south boundaries of the park. A public boat launch is located about 1.5 miles downstream from the Study Area.

Most of the eastern shoreline adjacent to the Site is stabilized with either sheet pile or rock wall. Dense vegetation along much of the shoreline adjacent to the Site may limit access in this area. Kingman Island divides the Anacostia Channel from Kingman Lake to the west and provides recreation opportunities via pier and trail access. The western shoreline is uniformly stabilized with a continuous rock wall with dense tree cover throughout.

As shown in **Figure 2-2**, recreational and worker exposure scenarios were identified in the CSM as potentially complete and warranting further evaluation. The receptors and applicable exposure pathways are summarized below.

5.1.2.1 Recreational Angler

The recreational angler (adult, older child/teen, young child) was assumed to be potentially exposed to COPCs via direct contact (incidental ingestion and dermal contact) with fringe surface sediment and surface water while fishing in the Waterside Investigation Area. It was also assumed that anglers keep and eat fish they catch in the Waterside Investigation Area and bring fish home to share with other members of the household (adult, older child/teen, young child).

Based on the survey results presented in Gibson and McClafferty (2005), some anglers may supplement a sizeable fraction of their diet with river fish. In addition to evaluating a recreational angler exposure scenario, the BHHRA also considers an exposure scenario involving a high-end consuming angler who fishes year-round and consumes two fish meals per week of Anacostia River fish in the uncertainty analysis (Section 7).

5.1.2.2 Swimmer/Wader

In addition to angling, visitors (adult, older child/teen, young child) to the River may wade, swim, boat, or engage in other activities that bring them into contact with river media. It was assumed that recreational receptors, including swimmers and waders, are exposed to COPCs via direct contact (incidental ingestion and dermal contact) with fringe surface sediment and surface water while wading or swimming in the Waterside Investigation Area. Potential exposures during boating are expected to be similar to those during wading and therefore were not evaluated separately.

5.1.2.3 Shoreline Workers

It was assumed that shoreline workers are exposed to COPCs via direct contact (incidental ingestion and dermal contact) with fringe surface sediment and surface water while working along the shore of the River next to the Site.

5.2 Quantification of Potential Exposures

To estimate human health risk from COPCs at the Site, it is necessary to estimate the potential exposure dose for each COPC. The exposure dose is estimated for each COPC for each exposure pathway by which the receptor is assumed to be exposed. Exposure dose equations combine the estimates of COPC concentrations in the environmental medium of interest with assumptions regarding the type and magnitude of each receptor's potential exposure to provide a numerical estimate of the exposure dose (intake). The exposure dose is defined as the amount of COPC taken into the receptor and is expressed in units of milligrams of COPC per kilogram of body weight per day (mg/kg-day) (USEPA, 1989a).

Exposure doses are defined differently for potential carcinogenic and noncarcinogenic effects. The chronic daily intake is used to estimate a receptor's potential average daily dose from exposure to a COPC with noncarcinogenic effects. According to USEPA (1989a), the chronic daily intake should be calculated by averaging the exposure dose over the period of time for which the receptor is assumed to be exposed. Therefore, the averaging period is the same as the exposure duration for COPCs with noncarcinogenic effects. For COPCs with potential carcinogenic effects, however, the chronic daily intake is calculated by averaging the exposure dose over the receptor's assumed lifetime (70 years). Therefore, the averaging period is the same as the receptor's assumed lifetime. The standardized equations for estimating a receptor's intake (both chronic and lifetime) are presented below. Receptor-specific parameters are discussed in Section 5.3.

5.2.1 Estimating Potential Exposures to COPCs in Soil or Fringe Surface Sediment

The following equations were used to calculate the estimated exposures to COPCs in soil or fringe surface sediment (USEPA, 1989a, 2004a).

Intake (lifetime and chronic) following incidental ingestion of soil or sediment (mg/kg-day):

$$Intake = \frac{CS\ x\ IR_S\ x\ FI\ x\ EF\ x\ ED\ x\ AAF_o\ x\ CF}{BW\ x\ AT}$$

where:

Intake	=	intake (mg/kg-day)
CS	=	soil/fringe surface sediment concentration (mg/kg – dry weight)

IR_s	=	ingestion rate of fringe surface soil/sediment (mg/day)
FI	=	fraction ingested from Study Area (unitless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
AAF_o	=	oral absorption adjustment factor (chemical-specific) (unitless)[15]
CF	=	unit conversion factor (kg/10^6 mg)
BW	=	body weight (kilograms)
AT	=	averaging time (days)

Intake (lifetime and chronic) following dermal contact with soil or fringe surface sediment (mg/kg-day):

$$Intake = \frac{CS\ x\ SA\ x\ AF\ x\ EF\ x\ ED\ x\ DAF\ x\ CF}{BW\ x\ AT}$$

where:

Intake	=	intake (mg/kg-day)
CS	=	soil/fringe surface sediment concentration (mg/kg – dry weight)
SA	=	exposed skin surface area (cm^2/day)
AF	=	skin adherence factor (mg /cm^2)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
DAF	=	dermal absorption fraction (chemical-specific) (unitless)
CF	=	unit conversion factor (kg /10^6 mg)
BW	=	body weight (kilograms)
AT	=	averaging time (days)

5.2.2 Estimating Potential Exposures to COPCs in Air

The following equation is used to calculate the estimated exposure from COPCs in outdoor air, excavation trench air, or indoor air.

Average daily exposure (lifetime and chronic) following inhalation of COPC (mg/m^3):

$$ADE = \frac{CA\ x\ ET\ x\ EF\ x\ ED}{AT}$$

where:

ADE	=	average daily exposure (mg/m^3)

[15] The term AAF is synonymous with the term Relative Bioavailability Factor (RBA).

CA	=	air concentration (mg/m^3)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
AT	=	averaging time (hours)

5.2.3 Estimating Potential Exposures to COPCs in Surface Water

The following equations were used to calculate the estimated exposures to COPCs in surface water (USEPA 1989a, 2004a).

Intake (lifetime and chronic) following incidental ingestion of surface water (mg/kg-day):

$$Intake = \frac{CW\ x\ IR_W\ x\ ET\ x\ EF\ x\ ED}{BW\ x\ AT}$$

where:

Intake	=	intake (mg/kg-day)
CW	=	water concentration (mg/L)
IR_W	=	ingestion rate of water (L/hour)
ET	=	exposure time (hours/day)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (year)
BW	=	body weight (kilograms)
AT	=	averaging time (days)

Calculation of the dose from dermal exposure to surface water follows USEPA guidance (2004a), which differentiates between organic and inorganic chemicals, as presented below. The following equations are used to estimate the dermally absorbed dose following dermal contact with surface water.

Dermally absorbed dose (lifetime and chronic) following dermal contact with surface water (mg/kg-day):

$$DAD = \frac{DA_{event}EF\ x\ EV\ x\ ED\ x\ SA}{BW\ x\ AT}$$

where:

DAD	=	dermally absorbed dose (mg/kg-day)
DA_{event}	=	absorbed dose per event (mg/cm^2-event)
EF	=	exposure frequency (days/year)
EV	=	event frequency (1 event/day)

ED	=	exposure duration (years)
SA	=	body surface area (cm^2)
BW	=	body weight (kilograms)
AT	=	averaging time (days)

The calculation of the dose absorbed per unit area per event (DA_{event}) for inorganics or highly ionized organics is as follows:

$$DA_{event} = K_p \ x \ CW \ x \ ET \ x \ CF$$

where:

DA_{event}	=	absorbed dose per event (mg/cm^2-event)
CW	=	concentration in water (mg/L)
K_p	=	permeability constant (cm/hour)
ET	=	exposure time (hours/event)
CF	=	conversion factor (L/1000 cm^3)

The calculation of DA_{event} for organics is as follows:

If ET < t*, then:

$$DA_{event} = 2FA \ x \ K_p \ x \ CW \ x \ CF \sqrt{\frac{6T \ x \ ET}{\pi}}$$

If ET > t*, then:

$$DA_{event} = FA \ x \ K_p \ x \ CW \ x \ CF \ x \left[\frac{ET}{1+B} + 2T\left(\frac{1+3B+3B^2}{(1+B^2)}\right)\right]$$

where:

t*	=	time to steady state (hour)
DA_{event}	=	absorbed dose per event (mg/cm^2-event)
FA	=	fraction absorbed water (dimensionless)
K_p	=	permeability constant (cm/hour)
CW	=	concentration in water (mg/L)
CF	=	conversion factor (L/1000 cm^3)
T	=	lag time per event (hours/event)
ET	=	exposure time (hours/event)

B = dimensionless ratio of the K_p of a chemical through the stratum corneum relative to its K_p across the viable epidermis

5.2.4 Estimating Potential Exposures to COPCs in Fish Tissue

The following equation is used to calculate the estimated exposures to COPCs via fish consumption (USEPA, 1989a).

Intake (lifetime and chronic) following fish consumption (mg/kg-day):

$$Intake = \frac{Cf \ x \ FCR \ x \ FI \ x \ (1 - Loss) x \ EF \ x \ ED}{AT \ x \ BW}$$

where:

Intake	=	intake (mg/kg-day)
Cf	=	concentration in fish tissue (mg/kg - wet weight)
FCR	=	fish consumption rate (kg/day)
FI	=	fraction ingested from Study Area
Loss	=	preparation/cooking loss (unitless)
EF	=	exposure frequency (days/year)
ED	=	exposure duration (years)
BW	=	body weight (kilograms)
AT	=	averaging time (days)

5.3 Receptor-Specific Exposure Parameters

This section identifies the receptor-specific exposure parameters that were used to estimate exposure doses for the potential receptors in the BHHRA. As described in the Risk Assessment Work Plan, both RME and CTE scenarios were evaluated. The CTE uses average exposure parameters to calculate an average exposure to an individual. The RME provides an estimate of the upper range of exposure in a population (the 90th percentile or greater of expected exposure, consistent with USEPA, 1992b) and is based on a combination of the upper-bound and central estimates of exposure parameters. As stated in the RAGS Part A (USEPA, 1989a):

> *Actions at Superfund sites should be based on an estimate of the RME expected to occur under both current and future land-use conditions. The reasonable maximum exposure is defined here as the highest exposure that is reasonably expected to occur at a site. RMEs are estimated for individual pathways.*

It is not appropriate to set all RME exposure factor inputs to upper-percentile values, inasmuch as the resulting exposure estimates may exceed RMEs for the population of interest (USEPA, 2004b). The intent of the RME is to estimate a conservative exposure case that is above the average case but still within the range of possible exposures (USEPA, 1989b, 1992b). The purpose of evaluating both CTE and RME scenarios in the BHHRA is to provide risk managers and stakeholders with an estimate of the range of risks from average to upper-bound.

There are a number of parameters for which site-specific data are critical, and use of default exposure assumptions, such as those provided in USEPA risk assessment guidance documents (USEPA, 1989a, 2011, 2014a), may overestimate or underestimate site-specific conditions. For example, recreational exposures at a river depend on factors such as water quality, land and waterway use, public access, and fishery characteristics, as well as demographics of the population. For parameters such as fish consumption rate, exposure frequency, and the duration of exposure events, use of site-specific information promotes development of exposure parameter values that are realistic. For the Benning Road BHHRA, local fish consumption studies, water quality and fishery information, land use and recreation information, and demographic data were considered.

Tables 5-2, 5-3, 5-4, 5-5, and **5-6** present the exposure parameter values used to quantitatively estimate potential risks from exposures to soil, excavation trench air, fringe surface sediment, surface water, and fish tissue, respectively. Exposure factors used in the screening level evaluation of the vapor intrusion to indoor air pathway are those recommended in USEPA (2014a). In accordance with guidance (USEPA, 1989a), the assumptions are intended to capture exposures under both current and future Study Area conditions. The conceptual site model was developed taking into consideration the existing parks, walking trails, boat docks, and fishing activity within the Waterside Investigation Area, as well as potential improvements to these resources. However, it is possible that recreational use could increase at a level higher than assumed here. Therefore, a discussion of the potential for increased exposure in the future is provided in the uncertainty analysis (Section 7). Uncertainties associated with the selected exposure parameters are also discussed in the uncertainty analysis.

A description of each Landside receptor evaluated in the BHHRA is provided in Section 5.3.1 and of each Waterside receptor in Section 5.3.2. The technical basis for the following exposure parameters used in the BHHRA is discussed in **Attachment C**:

- Fish Consumption Exposure Parameters
- Fringe Surface Sediment Ingestion Rates
- Surface Water Ingestion Rates
- Body Surface Areas Exposed
- Skin Adherence Factors
- Exposure Frequency
- Exposure Duration
- Body Weight

5.3.1 Landside Receptors

Landside receptors are assumed to be potentially exposed to soil and groundwater and include potential future recreational visitors and workers.

5.3.1.1 Current/Future Construction Worker

It is assumed that current and future construction workers performing subsurface excavations for utility repair or other construction work may be exposed to COPCs via the following pathways:

- Direct contact (incidental ingestion and dermal contact) with soil (surface and subsurface)
- Inhalation of particulates derived from soil in outdoor air (no volatile COPCs were identified in soil)
- Inhalation of vapors from groundwater in an excavation trench

5.3.1.2 Future Outdoor Industrial Worker

It is assumed that the future outdoor industrial worker may be exposed to COPCs in surface soil via the following pathways:

- Direct contact (incidental ingestion and dermal contact) with surface soil
- Inhalation of particulates derived from surface soil in outdoor air (no volatile COPCs were identified in soil)

5.3.1.3 Future Indoor Industrial Worker

It is assumed that the future indoor industrial worker may be exposed via inhalation to volatile COPCs resulting from groundwater vapor intrusion to indoor air.

5.3.1.4 Future Recreational Visitor

It is assumed that the future recreational visitor (older child/teen, age 7 to <19) may be exposed to COPCs in surface soil in via the following pathways:

- Direct contact (incidental ingestion and dermal contact) with surface soil
- Inhalation of particulates derived from surface soil in outdoor air (no volatile COPCs were identified in soil)

5.3.2 Waterside Receptors

Waterside receptors are assumed to be potentially exposed to Anacostia River media adjacent to the Site (fringe surface sediment, surface water, and fish tissue). Both recreational and worker receptors were considered, as described below.

5.3.2.1 Angler

Angler receptors are defined as those individuals who consume self-caught fish from the Anacostia River in spite of the consumption advisories. Adults and older children/teenagers (7 to <19 years old) are assumed to fish in the Waterside Investigation Area and consume their catch. These anglers are assumed to share self-caught fish with other members of their household.

Anglers can fish from various locations along the shoreline, including parks, bulkheads, bridges, boat launches, and docks, as well as from boats. Anglers are not expected to contact surface water or fringe surface sediment on days when they fish from bridges or bulkheads. However, on days when anglers fish from areas such as mudflats or accessible shoreline, they may be exposed to COPCs in fringe surface sediment and surface water.

A number of parameters were used to calculate the potential risk from consumption of fish, including consumption rate, species, tissue type consumed, fraction ingested from the Waterside Investigation Area, preparation and cooking methods, and years of fishing at the Site. In selecting appropriate fish consumption exposure parameters, USEPA guidance (USEPA, 1989a, b, 1998, 2000, 2011) discusses the importance of considering site-specific factors, including water quality, public access, abundance of desirable species, and proximity of other desirable water bodies, as well as characteristics of the angling population.

The Anacostia River is a tidal river with habitat suitable for a variety of freshwater and estuarine species, including American eel, brown bullhead, channel catfish, largemouth and smallmouth bass, carp, and sunfish. Angling has been observed from shore and boat. A water body-specific fish consumption advisory is in effect for the Anacostia and Potomac Rivers recommending against consumption of some species (catfish, carp, and American eel) and limited consumption of other species (e.g., largemouth bass and sunfish) due to PCBs and pesticides (DOEE, 2016a). However, some people may not be aware of the advisory, or may choose to catch and eat river fish despite the presence of the advisory.

To aid in the development of appropriate fish consumption exposure parameters, available local and regional angler studies were consulted. The fish consumption rate and fraction ingested exposure parameters used in the BHHRA are discussed in **Attachment D**. Cooking loss factors, which are chemical-specific parameters, are discussed in Section 5.4.4.

It is assumed that the current/future angler receptor may be exposed to COPCs via:

- Consumption of fish caught in the Anacostia River within the Waterside Investigation Area
- Direct contact (incidental ingestion and dermal contact) with fringe surface sediment in the Waterside Investigation Area
- Direct contact (incidental ingestion and dermal contact) with River surface water in the Waterside Investigation Area

5.3.2.2 Swimmer

Recreational users of the Anacostia River may occasionally swim in the River within the Waterside Investigation Area, although this is expected to be an infrequent activity. The swimmer receptor includes the young child (1 to <7 years), older child/teen (7 to <19 years), and adults (>18 years). Given visible deterrents, including the presence of trash and debris along the shoreline and floating in the water, the generally urban setting, including combined sewer overflows and lack of designated swimming spots along the River, as well as pathogen loadings,[16] the frequency and duration of swimming is expected to be low under both current and future conditions.

It is assumed that the current/future swimmer may be exposed to COPCs via:

- Direct contact (i.e., incidental ingestion and dermal contact) with fringe surface sediment within the Waterside Investigation Area
- Direct contact (i.e., incidental ingestion and dermal contact) with River surface water within the Waterside Investigation Area

5.3.2.3 Wader

Recreational users of the Anacostia River may occasionally wade along the River's edge in the Waterside Investigation Area. This includes individuals who may boat and contact fringe surface sediment and surface water while entering and exiting their boat (e.g., canoe, kayak, scull), as well as a variety of other activities, such as general play, dog walking, bird watching, etc. Waders include the young child (1 to <7 years), older child/teen (7 to <19 years), and adults (>18 years).

[16] The presence of high levels of pathogens in the Anacostia is the primary reason the River is not considered safe for swimming (DOEE, 2008, 2014b).

It is assumed that the current/future wader may be exposed to COPCs via:

- Direct contact (incidental ingestion and dermal contact) with fringe surface sediment within the Waterside Investigation Area
- Direct contact (incidental ingestion and dermal contact) with River surface water within the Waterside Investigation Area

5.3.2.4 Shoreline Worker

Workers, including NPS employees, may perform outdoor activities such as trash collection, shoreline maintenance, or other activities that bring them into contact with fringe surface sediment and surface water along the edge of the River adjacent to the Waterside Investigation Area. The worker receptor is assumed to be an adult. It is assumed that the current/future worker may be exposed to COPCs via:

- Direct contact (incidental ingestion and dermal contact) with fringe surface sediment within the Waterside Investigation Area
- Direct contact (incidental ingestion and dermal contact) with River surface water within the Waterside Investigation Area

5.4 Chemical-Specific Parameters

The chemical-specific dermal and oral absorption, dermal water absorption, and preparation/cooking loss parameters identified in the equations presented in Section 5.2 are described below.

5.4.1 Dermal Absorption Fractions

The dermal absorption fraction (DAF) accounts for lower absorption through the skin. USEPA chemical-specific DAFs were used where available (USEPA, 2004a). The DAFs for COPCs in soil and fringe surface sediment were compiled from RAGS Part E (USEPA, 2004a) and are presented in **Table 5-7**.

5.4.2 Oral Absorption Adjustment Factors

Absorption adjustment factors (AAFs), or relative bioavailability factors (RBAs), are used in risk assessment to account for absorption differences between humans exposed to substances in environmental situations and experimental animals in the laboratory studies used to derive dose-response values. Support for use of AAFs is provided in USEPA guidance (1989a, 1992b). The AAF is the ratio between the estimated human absorption factor for the specific medium and route of exposure, and the known or estimated absorption factor for the laboratory study from which the dose-response value was derived.

AAF = (fraction absorbed in humans for the environmental exposure) / (fraction absorbed in the dose-response study)

The use of an AAF allows the risk assessor to make appropriate adjustments if the efficiency of absorption between environmental exposure and experimental exposure is known or expected to differ because of physiological effects and/or matrix or vehicle effects. When the dose-response curve is based on administered dose data, and if it is estimated that the fraction absorbed from the site-specific exposure is the same as the fraction absorbed in the laboratory study, then the AAF is 1. In the absence of detailed toxicological information on every chemical, it has been common practice for risk assessors to use a default oral AAF value of 1. However, use of AAFs in standard risk assessment calculations can provide more accurate and more realistic estimates of potential human health risk.

For all soil and fringe surface sediment COPCs except arsenic, a conservative default oral AAF value of 1 was used, which is consistent with the approach used by USEPA in the derivation of RSLs (USEPA, 2018a). For arsenic, USEPA's default oral AAF/RBA of 0.6 was used, which is also consistent with the derivation of soil RSLs (USEPA, 2012, 2018a). The default oral AAFs are presented in **Table 5-7**. The uncertainty associated with using default absorption factors is discussed in the uncertainty analysis.

5.4.3 Dermal Water Parameters

The estimation of exposure resulting from incidental dermal contact with surface water requires the use of a dermal permeability constant (K_p) in units of centimeters per hour (cm/hr). This method assumes that the behavior of chemicals dissolved in water is described by Fick's Law. In Fick's Law, the steady-state flux of the solute across the skin (in milligrams per square centimeter per hour [$mg/cm^2/hr$]) equals the permeability constant (K_p, cm/hr) multiplied by the concentration difference of the solute across the membrane (in milligrams per cubic centimeter [mg/cm^3]). This approach is discussed by USEPA (USEPA, 1989b, 2004a).

The K_p values were obtained from USEPA (2004a) Exhibit B-3. In addition to the K_p, several other parameters are necessary to calculate dermal dose from exposure to organic chemicals in water. These parameters, also obtained from USEPA (2004a) Exhibit B-3, include the ratio of the permeability coefficient of a chemical through the stratum corneum relative to its permeability coefficient across the viable epidermis (B, dimensionless), lag time (τ, hours/event), and time to steady state (t*, hours).[17]

[17] The spreadsheets that accompany RAGS Part E (USEPA, 2004a) (available on USEPA's website https://www.epa.gov/risk/risk-assessment-guidance-superfund-rags-part-e) were used to obtain the specific numerical values for the dermal water dose parameters, as the printed version shows 0.0 for small values.

Consistent with USEPA guidance (2004a, 2018a), dermal contact with surface water was not evaluated for COPCs that are outside the effective predictive domain of the regression model used to derive K_p values, including 2,3,7,8-TCDD-TEQ, 4,4-DDT, and PCBs. These COPCs are discussed qualitatively in the uncertainty analysis.

Table 5-8 presents the dermal water parameters used in the BHHRA.

5.4.4 Preparation/Cooking Loss

Preparation and cooking procedures can modify the amount of COPC ingested by fish consumers (USEPA, 2000). Numerous studies have demonstrated the loss of chemicals such as PCBs and other organic chemicals from fish tissues during preparation and cooking (e.g., Bayen et al., 2005; Hori et al., 2005; Moya et al., 1998; Schecter et al., 1998; Zabik et al., 1994, 1995a, 1995b, 1996; Skea et al., 1979). Cooking loss factors have been included in HHRAs for several sediment sites, including the Housatonic River (Weston, 2005), Lower Fox River (RETEC, 2002), and Kalamazoo River (CDM, 2003). In addition, a preparation and cooking loss factor of 50% for PCBs is used in the derivation of consumption advisories for the Great Lakes (Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory, GLFATF, 1993).

While there is variability and uncertainty in the amount of chemical that is lost during preparation and cooking, the default assumption that no chemical is lost is overly conservative. An assumption of 0% loss represents consumption of a raw, untrimmed fish, since even consuming the cooking juices is unlikely to result in 100% of all of the chemical lost. Consistent with the intent of using an upper-bound (e.g., 90th percentile) value for the RME scenario, a lower 10th percentile on the range of cooking loss factors represents an RME estimate for cooking loss. **Attachment D** presents the calculation of selected percentiles of cooking loss factors for COPCs in fish tissue based on a review of the literature. As shown in **Table 5-9**, the 10th percentile values were used for the RME scenario, and median values were used for the CTE scenario. **Attachment D** presents the derivation of the cooking loss values.

5.5 Exposure Point Concentrations

Exposure points are located where potential receptors may contact COPCs at or from the Study Area. The concentration of COPCs in the environmental medium that receptors may contact must be estimated in order to determine the magnitude of potential exposure. The estimation of EPCs in media evaluated in this BHHRA is discussed below. Both measured and modeled EPCs are discussed where applicable.

5.5.1 Measured EPCs

Per the approved Risk Assessment Work Plans (AECOM, 2012, 2016d), the EPC is defined as the 95% upper confidence limit on the mean (UCL) (USEPA, 2002b) for the RME scenario, and the mean for the CTE scenario.[18]

UCLs were calculated using USEPA's ProUCL software (ProUCL Version 5.1, USEPA, 2016). Reporting limits for non-detected data were entered into ProUCL at the full reporting limit. ProUCL identifies the appropriate method with which to estimate the concentrations of the non-detect results rather than simply substituting a value such as the detection limit or one-half the detection limit. The UCL recommended by ProUCL was selected as the EPC, unless the recommended UCL was based on the H-statistic[19] or exceeded the maximum detected concentration, in which case an alternate UCL was selected (USEPA, 2002b).

Based on information presented in the ProUCL guidance (USEPA, 2015) regarding minimum sample size and frequency of detection, UCLs were calculated when at least 10 samples and at least six detected results were available. While ProUCL version 5.1 recommends a minimum of 10 samples with six detected values to calculate reliable UCLs, the guidance recognizes that this may not always be possible due to resource or other restraints and allows the user best professional judgment when determining the validity of the calculations. Due to the small size of the fish tissue data sets for the tidal Anacostia River and the Potomac River, UCLs were calculated when at least four detected results were available. For the other data sets, UCLs were calculated when at least 10 samples and six detected results were available.

The input to and the output from the ProUCL program are presented in **Attachment E**.

Soil and Groundwater

Exposure areas are the discrete areas over which a specific exposure pattern is expected to occur over the duration of exposure. As noted in Section 5.1.1, eight exposure areas were defined for soil and groundwater. EPCs are presented in the following tables:

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[18] The mean of detected concentrations was used when frequency of detection (FOD) was 100%, and the Kaplan Meyer mean (which includes non-detects) was used when the FOD was less than 100%. When the Kaplan-Meier mean could not be calculated due to an insufficient number of detections, then the arithmetic mean of the detected results was selected.

[19] ProUCL computes and outputs UCLs based on the H-statistic for historical reasons only, and notes in the output that "the H-statistic often results in unstable (both high and low) values of UCL95" (USEPA, 2015). Further, the guidance states that "it is therefore recommended to avoid the use of H-statistic based 95% UCLs," and recommends use of non-parametric statistics.

- Surface soil – **Table 5-10** (RME) and **5-11** (CTE)
- Soil (0 to 16 feet bgs) – **Table 5-12** (RME) and **5-13** (CTE)
- Groundwater (UWZ) – **Table 5-14** (RME) and **5-15** (CTE)

Fringe Surface Sediment

The Waterside Investigation Area was evaluated as one exposure area for fringe surface sediment. **Tables 5-16** and **5-17** present the RME and CTE fringe surface sediment EPCs, respectively.

Surface Water

As described in Section 3.1.4.2 and depicted in **Figure 3-5**, 10 surface water samples were collected in the Waterside Investigation Area. Because river water is continuously moving, all of the Waterside Investigation Area samples were included in the calculation of the surface water EPCs. **Tables 5-18** and **5-19** present the RME and CTE surface water EPCs, respectively.

Fish Tissue

Anglers' species preferences, species abundance, and feeding guilds were considered in developing tissue EPCs. Based on the angler surveys, the species that is most preferred for consumption is catfish (Gibson and McClafferty, 2005; OpinionWorks, 2012). Catfish have historically been abundant in the DC area waters (MDNR, 2016). In addition to catfish, other species have been reported to be consumed by local anglers, including largemouth bass, striped bass, bullhead, sunfish, and occasionally carp. Thus, the BHHRA evaluated a mixed fish diet scenario that assumed consumption of multiple species representing various feeding guilds and habitats based on angler preferences and available tissue data for each River reach evaluated. This species mix included bottom feeders (carp, catfish, eel), predators (largemouth bass), sunfish, and northern snakehead. Little consumption of carp and eel was reported by anglers (Gibson and McClafferty, 2005). Thus, including these bottom-dwelling species, which generally have high tissue concentrations of lipophilic chemicals including PCBs, results in a conservative mixed fish EPC for the BHHRA. The uncertainty analysis provides an evaluation of a catfish only diet.

EPCs were calculated for each of the five river reaches identified in Section 3.1.4.3 and shown in **Figures 3-7** to **3-9**:

- Upper Anacostia River Area (upstream of the CSX bridge); includes the Waterside Investigation Area, and extends approximately 1.3 miles downstream and 1.9 miles upstream of the Benning Road bridge;
- Lower Anacostia River Area (downstream of the CSX bridge);

- Lower Potomac River (downstream of the 14th Street bridge);
- Upper Potomac River (upstream of the 14th Street bridge);
- Upstream Non-Tidal Anacostia River (north of the Maryland state line); upstream of the Waterside Investigation Area; background area

Tables 5-20 and **5-21** present the RME and CTE fish tissue EPCs, respectively. Mixed diet EPCs were calculated using the available fish species in each reach. Alternative fish diets are evaluated in the uncertainty analysis, as well as consumption of other biota. The available data suggest that crabbing and crab consumption is limited in the Anacostia River. Only six of the 247 DC area anglers interviewed during the 2004 survey reported consuming crab (Gibson and McClafferty, 2005). In addition, blue crabs are not typically present in the Anacostia River (NOAA, 2012).

5.5.2 Modeled EPCs

Fugitive Dust

EPCs for COPCs in fugitive dust (outdoor air) were predicted by combining soil EPCs (calculated as discussed in Section 5.5.1) with particulate emission factors (PEFs) calculated in accordance with USEPA guidance (2002c). PEFs were conservatively calculated based on the total size of the Site (77 acres).

The PEF of 5.7×10^8 cubic meters per kilogram (m^3/kg) for outdoor industrial workers and recreational visitors (see **Table 5-22**) was calculated in accordance with USEPA guidance (2002c) using default inputs for a wind-driven/non-excavation scenario and climate inputs representative of Philadelphia, which is the closest city with data available from USEPA (2002c, Exhibit 5-2). The PEF of 8.2×10^5 m^3/kg for construction workers (see **Table 5-23**) was calculated using default inputs for an unpaved road traffic scenario (USEPA 2002c, Exhibit 5-2). The PEF model takes into account the number of days per year with precipitation of at least 0.01 inches. Based on information from the University of North Carolina, Southeast Regional Climate Center,[20] the annual average number of days per year with at least 0.01 inches of precipitation, measured at the Ronald Reagan Washington National Airport in Washington, DC, is 107 days.

Outdoor air EPCs for the non-excavation scenarios are presented in **Tables 5-24** (RME) and **5-25** (CTE). Outdoor air EPCs for the excavation scenario are presented in **Tables 5-26** (RME) and **5-27** (CTE).

[20] https://sercc.com/climateinfo/historical/meanprecip.html

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Groundwater Volatilization to Air

Excavation trench air concentrations of COPCs resulting from volatilization from groundwater infiltrating an excavation trench were modeled using a Virginia Department of Environmental Quality (VDEQ) model (VDEQ, 2018). The model for groundwater less than 15 feet bgs was used, with modifications, as discussed in **Attachment F**. The trench air concentrations were used to evaluate the current/future construction worker receptor. Trench air EPCs are presented in **Tables 5-28** (RME) and **5-29** (CTE).

Estimated concentrations of COPCs in indoor air under a potential future vapor intrusion evaluation were estimated using USEPA's VISL calculator in **Attachment B**.

5.6 Groundwater-to-Surface Water Evaluation

Groundwater in the area of the Site discharges to the adjacent Anacostia River. The BHHRA included an evaluation of the potential impact of Site groundwater on the River by comparing estimated in-stream concentrations of chemicals entering the river via groundwater flow from the Site to applicable surface water screening levels. Six nearshore monitoring wells located at the downgradient edge of the Site (MW-01, MW-02, MW-03, MW-04, MW-08, and MW-11) were used to estimate potential Site-related chemicals in groundwater that may be migrating to the River. As discussed in the RI Report, the wells further from the River are not expected to contribute significantly to the potential migration to surface water pathway. The calculation of in-stream concentrations of groundwater chemicals and comparison to surface water screening levels is described below.

5.6.1 Dilution Attenuation Factor Calculation

Groundwater discharges from the Site to the River were calculated for the UWZ and LWZ at the six pairs of nested waterfront wells, from which dilution attenuation factors were computed. Groundwater flux was computed using Darcy's Law: Q = KIA, where "Q" is discharge in cubic feet per second (ft^3/sec), "K" is hydraulic conductivity in feet per second (ft/sec), "I" is hydraulic gradient (unitless), and "A" is the area through which the groundwater flows in square feet (ft^2). For waterfront wells in which aquifer testing was conducted during the RI (MW-01, MW-03, and MW-11), the average calculated K value was used for the wells' hydraulic conductivity. For wells in which aquifer testing was not conducted, the geometric mean of hydraulic conductivities from the three nearest aquifer-tested wells was used. A local hydraulic gradient was calculated for each well using the slope of the plane formed by the low-tide groundwater level in the well and the groundwater levels in two upgradient wells (three-point problem approach using USEPA's online tool, USEPA, 2018f). A unique cross-sectional area was computed for each well based on water-bearing zone thickness at the well (upper or lower) and a length of boundary segment through which groundwater flows to the River.

The dilution attenuation factors were calculated by dividing the groundwater discharges for each waterfront well by the 7-day, 10-year low streamflow (7Q10) of the River adjacent to the Site (13.9 ft^3/sec), estimated using the United States Geological Survey (USGS) Maryland StreamStats application, an online GIS tool for estimating stream flows at ungauged locations (USGS, 2018). The 7Q10 is the lowest 7-day average streamflow that occurs on average once every 10 years.

5.6.2 Instream Surface Water Concentration Calculation

The instream concentrations for each chemical detected in the waterfront wells was calculated by multiplying the groundwater concentrations by the corresponding dilution attenuation factor. The nearshore wells were sampled in November 2014, and samples were analyzed for dioxins and furans, metals, pesticides, PCBs, SVOCs, and VOCs. As discussed in the Risk Assessment Work Plan Addendum (AECOM, 2016d), a number of the elevated constituent concentrations detected during the initial sampling, including dioxins and furans, were attributed to turbidity in the groundwater samples. The turbidity was suspected to be due in part to inadequate well development at the time of monitoring well installation. Therefore, the wells were re-developed and resampled using low-flow methods. The 2016 samples were analyzed for a sub-set of the chemicals analyzed in 2014 and varied by well. For the nearshore wells included in the groundwater to surface water evaluation, the following were analyzed in 2016:[21]

- MW-01A: PAHs, dioxins and furans, VOCs
- MW-01B: PAHs, VOCs
- MW-02A: PAHs, VOCs
- MW-02B: PAHs
- MW-03A/B: no analysis relevant to BHHRA
- MW-04A: dioxins and furans
- MW-04B: pesticides
- MW-08A: no analysis relevant to BHHRA
- MW-08B: pesticides
- MW-11A: dioxins and furans, pesticides, VOCs
- MW-11B: dioxins and furans, VOCs

To provide a complete analysis of the potential for groundwater discharge to surface water, the most recent data point for each well and chemical was used to estimate in-stream concentrations.

Table 5-30 presents the groundwater concentrations and estimated instream concentrations for each of the waterfront wells. The dilution attenuation factor calculations are provided in **Attachment G**.

[21] Only analysis methods used in the BHHRA are listed; for example, PCB congeners, PAHs via method ID-0016, and forensics parameters are not included.

5.6.3 Comparison to Surface Water Screening Levels

The same groundwater-to-surface water screening levels used for COPC selection were also used in the surface water evaluation (see Section 3.2.2). The DOEE water quality standards and USEPA national recommended water quality criteria are based on protection of fish and shellfish that may be consumed by humans. As previously noted, these criteria are typically derived by relating acceptable risk-based concentrations in fish tissue to concentrations in surface water via a BAF. Therefore, they are appropriate screening levels for evaluating the potential impact of Site groundwater on the Anacostia River.

As shown in **Table 5-30**, none of the estimated in-stream concentrations of chemicals in either the UWZ or LWZ exceed their respective surface water screening levels. In summary, based on the results of this screening-level evaluation, Site groundwater is not adversely impacting the Anacostia River.

6 Risk Characterization

The potential risk to human health associated with exposure to COPCs in environmental media at the Study Area was evaluated in the risk characterization step of the risk assessment process. Risk characterization is the process in which the dose-response information (Section 4) is integrated with quantitative estimates of human exposure derived in the Exposure Assessment (Section 5). The result is a quantitative estimate of the likelihood that humans will experience any adverse health effects given the exposure assumptions made. Two general types of health risk are characterized for each potential exposure pathway considered: potential carcinogenic risk and potential noncarcinogenic hazard. Potential carcinogenic risk is evaluated by averaging exposure over a normal human lifetime, which, based on USEPA guidance (1989a), is assumed to be 70 years.[22] Potential noncarcinogenic hazard is evaluated by averaging exposure over the total exposure period.

Characterization of the potential health effects of potential carcinogenic and noncarcinogenic chemicals is approached in very different ways. The difference in approaches arises from the conservative assumption that substances with possible carcinogenic action proceed by a no-threshold mechanism, whereas other toxic actions may have a threshold, i.e., a dose below which few individuals would be expected to respond. Thus, under the no-threshold assumption, it is necessary to calculate a risk, but for chemicals with a threshold, it is possible to simply characterize an exposure as above or below the threshold. In risk assessment, that threshold is termed a reference dose or reference concentration. Reference doses and cancer slope factors were discussed in Section 4. The approach to carcinogenic risk characterization is presented in Section 6.1, and the approach to noncarcinogenic risk characterization is presented in Section 6.2. The risk characterization results are presented in Section 6.3. Potential carcinogenic risks and noncarcinogenic hazard indices are presented in the text and tables using one significant figure.[23] Section 6.4 discusses potential chemicals of concern (COCs), and Section 6.5 addresses background conditions in relation to risk. The risk calculations are presented in **Attachment H** and summarized in tables in this section.

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22 More up-to-date "lifetimes" of 75 years (males), 80 years (females), and 78 years (males and females) are provided in the USEPA's updated Exposure Factors Handbook (2011), which would lower cancer risk estimates by approximately 7% (males only), 13% (females only), and 10% (males and females combined). However, USEPA (2014a) has retained the default of 70 years pending additional evaluation by NCEA.

23 Based on standard practice for number rounding, risk estimates for which the first digit after the decimal place was equal to or greater than 5 were rounded up (e.g., 1.5 x 10^{-4} rounds to 2 x 10^{-4}), and risk estimates for which the digit after the decimal place was less than 5 were rounded down (e.g., a hazard index of 1.4 rounds to 1).

6.1 Carcinogenic Risk Characterization

The purpose of carcinogenic risk characterization is to estimate the upper-bound likelihood that a human receptor will develop cancer in his or her lifetime as a result of exposure to a chemical in an environmental medium. This likelihood is a function of the dose of a chemical (described in the Exposure Assessment) and the CSF (described in the Dose-Response Assessment) for that chemical.

The American Cancer Society (ACS) estimates that the lifetime probability of contracting cancer in the U.S. is 1 in 3 based on data from 2012 to 2014 (ACS, 2018). The Excess Lifetime Cancer Risk (ELCR) associated with estimated exposures at a site is the likelihood, over and above the lifetime probability, that an individual will develop cancer in his or her lifetime due to those site exposures. The cancer risk is expressed as a probability (e.g., 10^{-6}, or 1 in one million). An ELCR of 10^{-6} indicates that an individual would have a 1 in one million chance of developing cancer in addition to the 1 in 3 chance estimated by the ACS. The relationship between the ELCR and the estimated lifetime average daily dose (LADD) or average daily exposure (ADE) of a chemical may be expressed as:

$$ELCR = 1\text{-}e^{-(CSF \text{ x } LADD \text{ or } ADE)}$$

If the product of the CSF and the LADD is much greater than 1, the ELCR approaches 1 (i.e., 100 percent probability). If the product is less than 0.01 (1 chance in 100), the equation can be closely approximated by:

- Oral/Dermal: ELCR = LADD (mg/kg-day) x CSF $(\text{mg/kg-day})^{-1}$
- ELCR = Lifetime ADE (mg/m^3) x URF $(\mu\text{g/mg}^3)^{-1}$ x 1,000 µg/mg

The product of the CSF/URF and the LADD/ADE is unitless and provides an upper-bound estimate of the potential carcinogenic risk associated with a receptor's exposure to a chemical or an exposure pathway for each receptor. Current USEPA risk assessment guidelines assume that cancer risks are additive or cumulative. Pathway- and area-specific risks are summed to estimate the total potential cancer risk for each receptor.

USEPA has established target risk levels under the National Contingency Plan (NCP) (USEPA, 1990). Target risk levels refer to levels of cancer risk or hazard indices that are deemed acceptable by the USEPA or other regulatory agencies. These are levels below which the potential for adverse effects to humans are assumed to be negligible or inconsequential. The NCP establishes a target cancer risk range of 10^{-6} to 10^{-4} and a target HI of less than or equal to 1 (USEPA, 1990). The USEPA subsequently clarified that, "Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted, unless there are adverse environmental impacts" (USEPA, 1991). Potential COCs are identified in this BHHRA, per DOEE request, as those COPCs with individual cancer risks greater than 1 x 10^{-6}. The identified COCs are discussed and summarized in Section 6.4.

6.2 Noncarcinogenic Risk Characterization

The potential for adverse noncarcinogenic health effects is estimated for each receptor by comparing the chronic average daily dose (CADD) for each COPC with the RfD for that COPC. The resulting ratio, which is unitless, is known as the HQ for that chemical. The HQ is calculated using the following equations:

- Oral/dermal: HQ = CADD (mg/kg-day) ÷ RfD (mg/kg-day)
- Inhalation: HQ = ADE (mg/m^3) ÷ RfC (mg/m^3)

The target HQ is defined as an HQ of less than or equal to 1 (USEPA, 1989a). When the HQ is less than or equal to 1, the RfD or RfC has not been exceeded, and no adverse noncarcinogenic effects are expected. If the HQ is greater than 1, there may be a potential for adverse noncarcinogenic health effects to occur; however, the magnitude of the HQ cannot be directly equated to a probability or effect level.

The total HI is calculated for each exposure pathway by summing the HQs for each individual chemical. The total HI is calculated for each potential receptor by summing the HIs for each pathway associated with the receptor. If the total HI is greater than 1 for any receptor, a more detailed evaluation of potential noncarcinogenic effects based on specific target organs/health endpoints is performed (USEPA, 1989a).

A summary of all HIs for each receptor group is presented in this section and compared to the target HI of 1. The tables summarizing the per COPC HI show both the total HI and the highest HI by target endpoint; the tables presented in **Attachment H** also show the HI for each target endpoint. The summary tables embedded in the text of Section 6.3 present the highest target organ HI. Each COPC that has an HI above 1 for a particular receptor and for a particular target endpoint is designated a COC. If the cumulative target endpoint HIs for a receptor are less than 1, then no further evaluation or action is recommended to address potential noncarcinogenic hazards (carcinogenic risks must also be considered as discussed above). COPCs having a cumulative target endpoint HI for a receptor greater than 1 are also identified as COCs.

6.3 Risk Characterization Results

The results of the risk characterization are presented below for Landside receptors and Waterside receptors. The risk calculations, including the COPC-specific risks calculated for each receptor, medium, and exposure pathway, are presented in **Attachment H** for both the RME and CTE scenarios. **Attachment H** also presents the calculation of HI by target endpoint.

6.3.1 Landside Receptors

Risk characterization results for Landside receptors are presented below.

6.3.1.1 Current/Future Construction Worker

The construction worker receptor is assumed to be exposed to COPCs in soil via incidental ingestion and dermal contact, and via inhalation from particulates derived from soil as well as volatiles infiltrating an excavation trench from groundwater. The risk characterization results for the construction worker receptor are presented in **Tables 6-1** through **6-4** as follows:

- Table 6-1 Total Potential Carcinogenic Risks for Construction Worker Receptor, RME
- Table 6-2 Total Potential Hazard Index for Construction Worker Receptor, RME
- Table 6-3 Total Potential Carcinogenic Risks for Construction Worker Receptor, CTE
- Table 6-4 Total Potential Hazard Index for Construction Worker Receptor, CTE

As shown in **Tables 6-1** and **6-3**, the total potential carcinogenic risks are within or below the USEPA target risk range of 10^{-4} to 10^{-6} for the RME and CTE scenarios. As shown in **Tables 6-2** and **6-4**, total potential noncarcinogenic hazards are above the USEPA target HI of 1 for the RME scenario in the warehouse and laydown area, the salvage yard and waste storage space, and the transformer shop. While the total HI in the potential future park land/green space exceeds 1, target endpoint HIs do not exceed 1. Total HIs are below 1 under the CTE scenario. The cumulative RME and CTE cancer risks and noncancer hazards for the construction worker receptor are summarized in the following table.

Cumulative Risks/Hazards for Current/Future Construction Worker				
	Cancer		Noncancer [a]	
Exposure Area	**RME**	**CTE**	**RME**	**CTE**
Hypothetical Future Park Land/Green Space	2E-08	8E-09	1	0.3
Warehouse and Laydown Area	4E-07	7E-08	3	0.5
Salvage Yard and Waste Storage Area	5E-07	1E-07	0.7	0.1
Stores and Fleet Maintenance Area	9E-08	3E-08	0.2	0.07
Offices and Parking Lot	4E-07	8E-08	0.8	0.2
Substation #7	3E-07	3E-08	0.5	0.08
Transformer Shop	2E-06	7E-07	1.6	0.5
Vehicle Refueling Area	4E-08	1E-08	0.2	0.08

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that cumulative risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Highest target endpoint HI.

The only COPC with a potential cancer risk greater than 10^{-6} is total PCBs under the RME scenario for the transformer shop, driven by direct-contact with soil.

As indicated in the risk calculation tables in **Attachment H**, target endpoint-specific HIs exceed 1 in two areas:

- Warehouse and laydown area. A target endpoint HI of 3 for respiratory effects from inhalation of particulates from soil was calculated for the warehouse and laydown area. The majority of the HI is due to inhalation of vanadium in soil fugitive dust. The RfC for vanadium is the ATSDR MRL for chronic exposure, which is defined as exposure durations greater than or equal to 1 year (a subchronic RfC for vanadium is not available). Therefore, the inhalation HI for vanadium is conservative and likely an overestimate of the potential hazard from short-term (40-day) inhalation exposure to soil during an excavation event in the warehouse and laydown area.
- Transformer shop. A target endpoint HI of 1.6 for eye, nails, and immune effects from ingestion and dermal contact with soil was calculated for the transformer shop, due to total PCBs. The HI for total PCBs is based on the subchronic RfD.

The target endpoint evaluation indicates that no other COPCs drive the exceedance of an HI of 1 on a target endpoint basis.

6.3.1.2 Future Outdoor Industrial Worker

The outdoor worker receptor is assumed to be exposed to COPCs in surface soil via incidental ingestion and dermal contact, and via inhalation from particulates derived from surface soil. The risk characterization results for the outdoor industrial worker receptor are presented in **Tables 6-5** through **6-8** as follows:

- Table 6-5 Total Potential Carcinogenic Risks for Outdoor Industrial Worker Receptor, RME
- Table 6-6 Total Potential Hazard Index for Outdoor Industrial Worker Receptor, RME
- Table 6-7 Total Potential Carcinogenic Risks for Outdoor Industrial Worker Receptor, CTE
- Table 6-8 Total Potential Hazard Index for Outdoor Industrial Worker Receptor, CTE

As shown in **Tables 6-5** and **6-7**, the total potential carcinogenic risks are within or below the USEPA target risk range of 10^{-4} to 10^{-6} for the RME and CTE scenarios with the exception of the transformer shop. As shown in **Tables 6-6** and **6-8**, the total potential noncarcinogenic hazards are below 1 with the exception of the transformer shop. The cumulative RME and CTE cancer risks and noncancer hazards for the outdoor industrial receptor are summarized in the following table.

Cumulative Risks/Hazards for Future Outdoor Industrial Worker				
	Cancer		**Noncancer [a]**	
Exposure Area	**RME**	**CTE**	**RME**	**CTE**
Hypothetical Future Park Land/Green Space	1E-06	1E-07	0.3	0.1
Warehouse and Laydown Area	2E-05	1E-06	1	0.2
Salvage Yard and Waste Storage Area	1E-05	1E-06	0.3	0.05
Stores and Fleet Maintenance Area	4E-06	4E-07	0.08	0.03
Offices and Parking Lot	3E-06	4E-07	0.03	0.01
Substation #7	2E-05	6E-07	0.3	0.02
Transformer Shop	2E-03	3E-05	124	8
Vehicle Refueling Area	1E-06	1E-07	0.03	0.01

Notes:
Blue highlighting indicates that cumulative cancer risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that cumulative risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Highest target endpoint HI.

COPCs with potential risks greater than 1×10^{-6} or a target endpoint HI above 1 under the RME scenario include:

COPC	Risk/ HI	Warehouse and Laydown Area	Salvage Yard and Storage Area	Stores and Fleet Maintenance Area	Substation #7	Transformer Shop
2,3,7,8-TCDD-TEQ	Risk	--	4E-06	--	--	--
	HI	--	--	--	--	--
Arsenic	Risk	1E-05	4E-06	2E-06	1E-05	--
	HI	--	--	--	--	--
Total PCBs	Risk	5E-06	2E-06	--	4E-06	2E-03
	HI	--	--	--	--	124

Notes:
-- Indicates that cancer risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.

While the total potential cancer risk in the offices and parking lot area exceeds 10^{-6}, there are no individual COPCs with cancer risks greater than 10^{-6}.

Under the CTE scenario, the only COPC with a potential cancer risk greater than 10^{-6} or an HI greater than 1 is total PCBs in the transformer shop, driven by direct-contact with soil. The target endpoint evaluation presented in **Attachment H** indicates that no other COPCs drive the exceedance of an HI of 1 on a target endpoint basis under the RME or CTE scenario.

The RME EPC of 2,013 mg/kg for total PCBs in the transformer shop area is based on 48 surface soil samples with total PCB concentrations ranging from less than 1 mg/kg to 8,800 mg/kg,[24] an average of 189 mg/kg, and a median value of 0.09 mg/kg. The next highest surface soil concentration of total PCBs (130 mg/kg) occurred at location SUSDP21-3M. Removal of the elevated total PCB value from the EPC derivation results in an RME EPC of 25 mg/kg, a cancer risk of $2x10^{-5}$, and an HI of 1.5. Because the estimated cancer risk and noncancer hazard in this area driven by elevated concentrations detected at a single sampling location out of 48 total samples, the results are associated with a high degree of uncertainty.

The RME surface soil EPC of 5.1 mg/kg for total PCBs in the substation #7 area is based on 13 surface soil samples. This EPC is the maximum detected concentration from location SUSDP20 in 2013. The next highest concentration of 0.42 mg/kg from location SUS201F results in an estimated cancer risk of $1x10^{-7}$,

[24] This concentration was detected in surface soil sample SUSDP21-3G, which had an elevated concentration of Aroclor-1248 (2,500 mg/kg initial analysis and 8,800 mg/kg in re-analysis). The higher concentration was used in the EPC derivation.

an order of magnitude below $1x10^{-6}$. Therefore, the estimated cancer risk, which is driven by one elevated concentration, is associated with a high degree of uncertainty.

While potential risks associated with arsenic exceed 10^{-6}, arsenic concentrations in soil are consistent with background in several areas of the Site, as further discussed in Section 6.5.

6.3.1.3 Future Indoor Industrial Worker

A future indoor industrial worker was evaluated for potential exposures to VOCs resulting from groundwater vapor intrusion into indoor air of a potential future building, as shown in **Attachment B**. Based on the screening level evaluation and maximum detected groundwater concentrations, potential cancer risks are within or below the USEPA target risk range of 10^{-4} to 10^{-6}. The total HI is greater than 1 along the southern boundary. Total potential risks and HI values are indicated in the table below. COPCs with potential risks greater than $1x10^{-6}$ or a target endpoint HI above 1 are indicated with highlighting in the tables below:

COPC	Potential Cancer Risk			
	Southern Boundary[a]	Northern Boundary (DP-60)	Downgradient Perimeter (TA19C1, TA19C2)	MW05A
Chloroform	4E-07	4E-06	ND	2E-07
Tetrachloroethylene	7E-06	7E-09	5E-07	2E-07
Trichloroethylene	6E-06	ND	8E-07	3E-07
Vinyl Chloride	2E-06	ND	ND	ND
Total	**2E-05**	**4E-06**	**1E-06**	**8E-07**

Notes:
ND – Not detected.
Blue highlighting indicates that the cumulative potential risk is within USEPA's target risk range of 10^{-6} to 10^{-4}.
(a) Wells with exceedances: DPA3, DPA4, DPA5, DPB10, DPB3, DPB5, DPB6, DPB7, DPB9, DPC4, DPC5, DPC7, MW09A, SUSDP09.

COPC	Potential Noncancer Hazard Index (HI)			
	Southern Boundary[a]	Northern Boundary (DP-60)	Downgradient Perimeter (TA19C1, TA19C2)	MW05A
Chloroform	0.0005	0.005	ND	0.0003
Tetrachloroethylene	2	0.002	0.1	0.06
Trichloroethylene	2	ND	0.3	0.1
Vinyl Chloride	0.01	ND	ND	ND
Total	**4**	**0.007**	**0.4**	**0.2**

Notes:
ND – Not detected.
Yellow highlighting indicates that the target endpoint HI exceeds one.
(a) Wells with exceedances: DPA3, DPA4, DPA5, DPB10, DPB3, DPB5, DPB6, DPB7, DPB9, DPC4, DPC5, DPC7, MW09A, SUSDP09.

6.3.1.4 Future Recreational Visitor

The recreational visitor receptor is assumed to be exposed to COPCs in surface soil via incidental ingestion and dermal contact, and via inhalation from particulates derived from surface soil. The recreational visitor is assumed to be potentially exposed to COPCs only in the hypothetical future park land/green space area. The risk characterization results for the recreational visitor receptor are presented in **Tables 6-9** through **6-12** as follows:

- Table 6-9 Total Potential Carcinogenic Risks for Recreational Visitor Receptor, RME
- Table 6-10 Total Potential Hazard Index for Recreational Visitor Receptor, RME
- Table 6-11 Total Potential Carcinogenic Risks for Recreational Visitor Receptor, CTE
- Table 6-12 Total Potential Hazard Index for Recreational Visitor Receptor, CTE

As shown in **Tables 6-9** and **6-11**, the total potential carcinogenic risks are below 10^{-6} for both the RME and CTE scenarios. As shown in **Tables 6-10** and **6-12**, the total potential noncarcinogenic hazards are below 1. The cumulative RME and CTE cancer risks and noncancer hazards for the recreational visitor are summarized in the following table.

Cumulative Risks/Hazards for Future Recreational Visitor Receptor Hypothetical Future Park Land/Green Space		
	Older Child/Teen	
Receptor	**Cancer**	**Noncancer [a]**
Recreational Visitor (RME)	7E-08	0.04
Recreational Visitor (CTE)	7E-09	0.009
Notes: [a] Highest target endpoint HI.		

6.3.2 Waterside Receptors

Risk characterization results for Waterside receptors are presented below.

6.3.2.1 Angler Receptor

The angler receptor is assumed to be exposed to COPCs in fringe surface sediment and surface water via incidental ingestion and dermal contact and to COPCs from ingestion of fish caught from the Upper Anacostia River. As described in Section 5.5.1, the evaluation of fish consumption risks considered a mixed fish diet; a catfish only diet is considered in the uncertainty analysis.

The risk characterization results for the angler receptor are presented in **Tables 6-13** through **6-16** for the Upper Anacostia River. To provide additional context, risk characterization results are also presented in **Tables 6-17** through **6-20** for the following four additional regional river reaches: the Lower Anacostia, the Upper Potomac, the Lower Potomac, and the Upstream Non-Tidal Anacostia River (background)**.** The results are presented in the following tables:

- Table 6-13 Total Potential Carcinogenic Risks for Angler Receptor, RME
- Table 6-14 Total Potential Hazard Index for Angler Receptor, RME
- Table 6-15 Total Potential Carcinogenic Risks for Angler Receptor, CTE
- Table 6-16 Total Potential Hazard Index for Angler Receptor, CTE
- Table 6-17 Total Potential Carcinogenic Risks for Angler Receptor, RME, Regional
- Table 6-18 Total Potential Hazard Index for Angler Receptor, RME, Regional
- Table 6-19 Total Potential Carcinogenic Risks for Angler Receptor, CTE, Regional
- Table 6-20 Total Potential Hazard Index for Angler Receptor, CTE, Regional

Note that exposure to fringe surface sediment and surface water were not evaluated for the regional reaches, as these areas are outside the boundary of the Waterside Investigation Area. Further, as indicated in Tables **6-13** to **6-16,** these pathways are minor contributors to total risk for the angler receptor.

As shown in these tables, the total potential carcinogenic risks (RME and CTE) are within the USEPA target risk range of 10^{-4} to 10^{-6} for all of the recreational angler scenarios except for the RME scenario for the Upper Potomac River reach. The total potential HI for the RME recreational angler exceeds the target noncancer HI of 1 for all reaches except for the Upstream Non-Tidal Anacostia River, as discussed further below. The exceedance of the noncancer target HI of 1 is due to PCBs in fish tissue (based on both total PCBs for eye, nail, and immune effects and PCB-TEQ for reproductive and developmental effects). The potential carcinogenic risks and noncarcinogenic hazards posed by direct contact with fringe surface sediment and surface water are within or below USEPA's target risk levels.

For the young child age group, which has the highest noncancer hazards, the highest RME target endpoint HI for the Upper Anacostia is 4 and is driven by total PCBs. RME target endpoint HIs for regional reaches range from 0.6 (Upstream Non-Tidal Anacostia River) to 10 (Upper Potomac, driven by total PCBs). The highest RME target endpoint HI for the downstream, Lower Anacostia River reach is 5 and is driven by PCBs. Using CTE assumptions, the noncancer HIs for all age groups and areas are at or below 1. The target endpoint evaluation provided in **Attachment H** indicates that no other COPCs drive the exceedance of an HI of 1 on a target endpoint basis.

The cumulative RME and CTE cancer risks and noncancer hazards for the recreational angler receptor are summarized in the following tables. The cumulative risks/hazards are presented separately by area for total PCBs and PCB-TEQ.

Cumulative Risks/Hazards for Recreational Angler Receptor (RME)					
Receptor	Cancer		Noncancer [a]		
	Adult/ Young Child	Older Child/Teen	Adult	Young Child	Older Child/Teen
Anacostia River [b]					
Upper Anacostia (Total PCBs)	4E-05	2E-05	2	3	2
Upper Anacostia (PCB-TEQ)	2E-05	9E-06	0.4	0.7	0.4
Background River Reaches [c]					
Upstream Non-Tidal Anacostia (Total PCBs)	7E-06	3E-06	0.4	0.6	0.4
Upstream Non-Tidal Anacostia (PCB-TEQ)	8E-06	3E-06	0.4	0.6	0.4
Regional River Reaches [c]					
Lower Anacostia (Total PCBs)	7E-05	3E-05	3	5	3
Lower Anacostia (PCB-TEQ)	9E-05	4E-05	2	3	2

Cumulative Risks/Hazards for Recreational Angler Receptor (RME)					
Receptor	Cancer		Noncancer [a]		
	Adult/ Young Child	Older Child/Teen	Adult	Young Child	Older Child/Teen
Lower Potomac (Total PCBs)	6E-05	2E-05	1	2	1
Lower Potomac (PCB-TEQ)	6E-05	3E-05	0.7	1	0.7
Upper Potomac (Total PCBs)	2E-04	7E-05	9	10	9
Upper Potomac (PCB-TEQ)	2E-04	1E-04	6	9	5

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that cumulative risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Highest target endpoint HI.
[b] Includes incidental ingestion and dermal contact with fringe surface sediment and surface water, and consumption of a mixed fish diet. Upper Anacostia encompasses the Waterside Investigation Area (**See Figure 3-7**).
[c] Includes consumption of a mixed fish diet.

Cumulative Risks/Hazards for Recreational Angler Receptor (CTE)					
Receptor	Cancer		Noncancer [a]		
	Adult/Young Child	Older Child/Teen	Adult	Young Child	Older Child/Teen
Anacostia River [b]					
Upper Anacostia (Total PCBs)	2E-06	1E-06	0.2	0.3	0.2
Upper Anacostia (PCB-TEQ)	1E-06	5E-07	0.03	0.06	0.04
Background Area [c]					
Upstream Non-Tidal Anacostia (Total PCBs)	5E-07	2E-07	0.08	0.1	0.03
Upstream Non-Tidal Anacostia (PCB-TEQ)	5E-07	3E-07	0.08	0.1	0.03
Regional Reaches [c]					
Lower Anacostia (Total PCBs)	3E-06	2E-06	0.3	0.5	0.4
Lower Anacostia (PCB-TEQ)	4E-06	2E-06	0.2	0.3	0.2
Lower Potomac (Total PCBs)	2E-06	1E-06	0.2	0.3	0.2
Lower Potomac (PCB-TEQ)	2E-06	1E-06	0.08	0.1	0.08
Upper Potomac (Total PCBs)	5E-06	2E-06	0.5	0.7	0.5
Upper Potomac (PCB-TEQ)	7E-06	3E-06	0.3	0.5	0.4

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
[a] Highest target endpoint HI.
[b] Includes incidental ingestion and dermal contact with fringe surface sediment and surface water, and consumption of a mixed fish diet. Upper Anacostia encompasses the Waterside Investigation Area (see **Figure 3-7**).
[c] Includes consumption of a mixed fish diet.

COPCs with potential risks greater than 1×10^{-6} or an HI above 1 under the RME scenario based on the combined adult and child for cancer and the child for non-cancer include:

COPCs with Risks Greater than 10^{-6} and Hazards above 1 RME Scenario							
COPC	**Risk/ HI**	**Upper Anacostia[a]**	**Lower Anacostia[b]**	**Upper Potomac[b]**	**Lower Potomac[b]**	**Upstream Non-Tidal Anacostia[b]**
PCBs and Dioxins						
Total PCBs	Risk	3E-05	5E-05	1E-04	2E-05	3E-06
	HI	3	5	14	2	--
PCB-TEQ	Risk	1E-05	7E-05	2E-04	3E-05	4E-06
	HI	--	3	9	--	--
2,3,7,8-TCDD-TEQ	Risk	2E-06	--	--	--	--
Pesticides						
4,4-DDE	Risk	--	--	4E-06	--	--
Dieldrin	Risk	5E-06	1E-05	2E-05	5E-06	--
Heptachlor epoxide	Risk	--	2E-06	--	--	--
Inorganics						
Arsenic	Risk	--	2E-06	3E-06	3E-05	--

Notes:
-- Indicates that cancer risk is less than or equal to 10^{-6} or HI is less than or equal to 1. Risk is presented for the sum of the adult and the young child, and the HI is presented for the young child. The older child/teen risk and HI values are lower.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that cancer risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Upper Anacostia encompasses the Waterside Investigation Area (see **Figure 3-7**). Potential cancer risks and noncancer hazards include fish consumption and direct contact with fringe surface sediment and surface water.
[b] Potential risks and hazards include fish consumption only.

Under the CTE scenario, total PCBs (in fish tissue) exceeds $1x10^{-6}$ in the Upper Anacostia (but is less than $1x10^{-5}$). Total PCBs and PCB-TEQ (in fish tissue) exceeds $1x10^{-6}$ in the Lower Anacostia and the Upper Potomac, as indicated below. All CTE HIs are below 1.

COPCs with Risks Greater than 10^{-6} and Hazards above 1 CTE Scenario						
COPC	**Risk**	**Upper Anacostia[a]**	**Lower Anacostia[b]**	**Upper Potomac[b]**	**Lower Potomac[b]**	**Upstream Non-Tidal Anacostia[b]**
PCBs and Dioxins						
Total PCBs	Risk	2E-06	3E-06	4E-06	--	--
PCB-TEQ	Risk	--	3E-06	6E-06	--	--

Notes:
-- Indicates that cancer risk is less than or equal to 10^{-6}. Risk is presented for the sum of the adult and the young child. The older child/teen risk is lower.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
[a] Upper Anacostia encompasses the Waterside Investigation Area (see **Figure 3-7**). Potential cancer risks and noncancer hazards include fish consumption and direct contact with fringe surface sediment and surface water. Potential risks and hazards are driven by fish consumption.
[b] Potential risks include fish consumption only.

6.3.2.2 Swimmer Receptor

The swimmer receptor is assumed to be exposed to COPCs in fringe surface sediment and surface water via incidental ingestion and dermal contact (all three age groups). The risk characterization results for the swimmer receptor are presented in **Tables 6-21** through **6-24** as follows:

- Table 6-21 Total Potential Carcinogenic Risks for Swimmer Receptor, RME
- Table 6-22 Total Potential Hazard Index for Swimmer Receptor, RME
- Table 6-23 Total Potential Carcinogenic Risks for Swimmer Receptor, CTE
- Table 6-24 Total Potential Hazard Index for Swimmer Receptor, CTE

As shown in **Tables 6-21** and **6-23**, the total potential carcinogenic risks are within or below the USEPA target risk range of 10^{-6} to 10^{-4} for the RME and CTE scenarios. As shown in **Tables 6-22** and **6-24**, the total potential noncarcinogenic hazards are below the USEPA target HI of 1 for the RME and CTE scenarios. The cumulative RME and CTE cancer risks and noncancer hazards for the swimmer receptor are summarized in the following table.

Cumulative Risks/Hazards for Swimmer Receptor					
Receptor	Cancer		Noncancer [a]		
	Adult/Young Child	Older Child/Teen	Adult	Young Child	Older Child/Teen
Swimmer (RME)	2E-06	7E-07	0.03	0.08	0.03
Swimmer (CTE)	9E-08	7E-08	0.001	0.008	0.003

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
[a] Highest target endpoint HI.

There are no COPCs with an individual risk greater than 10^{-6} or an HI greater than 1.

6.3.2.3 Wader Receptor

The wader receptor is assumed to be exposed to COPCs in fringe surface sediment and surface water via incidental ingestion and dermal contact (all three age groups). The risk characterization results for the wader receptor are presented in **Tables 6-25** through **6-28**, as follows:

- Table 6-25 Total Potential Carcinogenic Risks for Wader Receptor, RME
- Table 6-26 Total Potential Hazard Index for Wader Receptor, RME
- Table 6-27 Total Potential Carcinogenic Risks for Wader Receptor, CTE
- Table 6-28 Total Potential Hazard Index for Wader Receptor, CTE

As shown in **Tables 6-25** and **6-27**, the total potential carcinogenic risks are within or below the USEPA target risk range of 10^{-4} to 10^{-6} for the RME and CTE scenarios. As shown in **Tables 6-26** and **6-28**, the total potential noncarcinogenic hazards are below the USEPA target HI of 1 for the RME and CTE scenarios. The cumulative RME and CTE cancer risks and noncancer hazards for the wader receptor are summarized in the following table.

Cumulative Risks/Hazards for Wader Receptor					
Receptor	Cancer		Noncancer [a]		
	Adult/Young Child	Older Child/Teen	Adult	Young Child	Older Child/Teen
Wader (RME)	4E-06	1E-06	0.04	0.2	0.05
Wader (CTE)	2E-07	1E-07	0.004	0.02	0.006

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
[a] Highest target endpoint HI.

The only COPC with a potential risk greater than 10^{-6} is 2,3,7,8-TCDD-TEQ for the adult/child receptor RME scenario. The potential risk is driven by direct contact with fringe surface sediment. There are no COPCs with an HI greater than 1.

6.3.2.4 Shoreline Worker Receptor

The shoreline worker receptor is assumed to be exposed to COPCs in fringe surface sediment and surface water via incidental ingestion and dermal contact (adult age group). The risk characterization results for the wader receptor are presented in **Tables 6-17** through **6-20**, as follows:

- Table 6-29 Total Potential Carcinogenic Risks for Shoreline Worker Receptor, RME
- Table 6-30 Total Potential Hazard Index for Shoreline Worker Receptor, RME
- Table 6-31 Total Potential Carcinogenic Risks for Shoreline Worker Receptor, CTE
- Table 6-32 Total Potential Hazard Index for Shoreline Worker Receptor, CTE

As shown in **Tables 6-29** and **6-31**, the total potential carcinogenic risks are within or below the USEPA target risk range of 10^{-4} to 10^{-6} for the RME and CTE scenarios. As shown in **Tables 6-30** and **6-32**, the total potential noncarcinogenic hazards are below the USEPA target HI of 1 for the RME and CTE scenarios. The cumulative RME and CTE cancer risks and noncancer hazards for the shoreline worker receptor are summarized in the following table.

Cumulative Risks/Hazards for Shoreline Worker Receptor		
	Cancer	Noncancer [a]
Receptor	Adult	Adult
Shoreline Worker (RME)	4E-06	0.09
Shoreline Worker (CTE)	1E-07	0.008

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
[a] Highest target endpoint HI.

The only COPC with a potential risk greater than 10^{-6} is 2,3,7,8-TCDD-TEQ under the RME scenario. The potential risk is driven by direct contact with fringe surface sediment. There are no COPCs with an HI greater than 1.

6.4 Potential COCs

Per DOEE's request, potential COCs are identified in this BHHRA as those COPCs with individual cancer risks greater than 1 x 10^{-6} or a target endpoint HI greater than 1.

6.4.1 Landside Investigation Area

The table below presents the potential COCs with potential risks greater than 10^{-6} or a target endpoint HI of 1 for the Landside Investigation Area; the hazard value representing the highest target endpoint HI is presented.

Potential COC	Risk/HI	Landside Investigation Area				
		Warehouse and Laydown Area	Salvage Yard and Storage Area	Stores and Fleet Maintenance Area	Substation #7	Transformer Shop
2,3,7,8-TCDD-TEQ	Risk	--	4E-06[a]	--	--	--
Arsenic	Risk	1E-05	4E-06[a]	2E-06[a]	1E-05[a]	--
Vanadium	HI	3[b]	--	--	--	--
Total PCBs	Risk	5E-06[a]	2E-06[a]	--	4E-6[a]	2E-03[a]
	HI	--	--	--	--	124[a] 1.6[b]

Notes:
-- Indicates that cancer risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Future outdoor industrial worker surface soil (0-1 foot bgs).
[b] Current/future construction worker soil (0-16 feet bgs).

As shown in the table above, arsenic in on-Site soil was found to pose a potential risk in excess of 10^{-6}, however, the background evaluation (see Section 6.5) found that arsenic concentrations in on-Site soil are consistent with background. Therefore, arsenic is not identified as a potential Landside soil COC.

Based on the conservative screening level evaluation of the vapor intrusion pathway, the following table presents the COCs identified for the potential future scenario in which a building is constructed along the southern or northern property boundary. The hazard value representing the highest target endpoint HI is presented.

COPC	Risk/HI	Potential COCs for the Future Vapor Intrusion Pathway[a]	
		Southern Boundary (a)	Northern Boundary (DP-60)
Chloroform	Risk	--	4E-06
Tetrachloroethylene	Risk	7E-06	--
	HI	2	--
Trichloroethylene	Risk	6E-06	--
	HI	2	--
Vinyl Chloride	Risk	2E-06	--

Notes:
-- Indicates that cancer risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Future outdoor industrial worker.

6.4.2 Waterside Investigation Area

The table below presents the potential COCs with potential risks greater than 10^{-6} or a target endpoint HI of 1 for the Upper Anacostia River and the Waterside Investigation Area; the hazard value representing the highest target endpoint HI is presented.

Potential COC	Risk/HI	Fish Tissue [a]	Fringe Surface Sediment
		Upper Anacostia	Pepco Waterside Investigation Area
2,3,7,8-TCDD-TEQ	Risk	--	2E-06 [a] 3E-06 [b,c]
Total PCBs	Risk	3E-05	--
	HI	3	--
PCB-TEQ	Risk	1E-05	--
Dieldrin	Risk	5E-06	--

Notes:
-- Indicates that cancer risk is less than or equal to 10^{-6} or HI is less than or equal to 1. Risk is presented for the sum of the adult and the young child, and the HI is presented for the young child. The older child/teen risk and HI values are lower.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Current/future recreational angler.
[b] Current/future shoreline worker.
[c] Current/future wader.

The potential COCs for all receptors and exposure scenarios are summarized in the following table.

Potential COC	Landside		Waterside	
	Soil	Groundwater (Vapor Intrusion)	Fringe Surface Sediment	Upper Anacostia Fish Tissue
2,3,7,8-TCDD-TEQ	X [a]		X	
Arsenic	X [b]			
Vanadium	X [c]			
Total PCBs	X [d]			X
PCB-TEQ				X
Dieldrin				X
Chloroform		X [e]		
Tetrachloroethylene		X [f]		
Trichloroethylene		X [f]		
Vinyl Chloride		X [f]		

Notes:
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
Highlighting indicates that cumulative risks exceed 10^{-4} or the target endpoint HIs exceed one.
[a] Salvage yard and storage area, surface soil.
[b] Warehouse and laydown area, salvage yard and storage area, stores and fleet maintenance area, substation #7. Surface soil.
[c] Warehouse and laydown area, soil (0-16 feet bgs).
[d] Warehouse and laydown area, surface soil. Transformer shop, soil (0-16 feet bgs).
[e] Northern boundary.
[f] Southern boundary.

6.5 Evaluation of Background and Regional Fish Tissue Data

6.5.1 Background Evaluation

Accounting for background area information is integral to evaluating risks posed by the release of hazardous substances in the Study Area. USEPA (2002e) notes that a primary objective of CERCLA risk assessments is to provide information on risks that can be effectively addressed through remedial actions. USEPA (2002e) states, “Specifically, the COPCs with high background concentrations should be discussed in the risk characterization, and if data are available, the contribution of background to site concentrations should be distinguished.” Taking background area information into account during the risk assessment process informs the understanding of risks associated with site releases, as opposed to risks resulting from the presence of constituents that may have migrated into the site, or that may reflect regional conditions related to human activities (Judd et al. 2003).

USEPA (2002d) defines background as: “Substances or locations that are not influenced by the releases from a site and are usually described as naturally occurring or anthropogenic: (1) Naturally occurring substances are present in the environment in forms that have not been influenced by human activity; (2) Anthropogenic substances are natural and human-made substances present in the environment as a result of human activities (not specifically related to the CERCLA site in question).” It further defines a background reference area as: “The area where background samples are collected for comparison with samples collected on site. The reference area should have the same physical, chemical, geological, and biological characteristics as the site being investigated, but has not been affected by activities on the site.” Based on these definitions, the most appropriate data sets from which to obtain information on background and reference information are those collected from areas that have similar characteristics to the environment of the Site and the Anacostia River.

Appendix W of the RI Report describes the methodology of the refined background evaluation for each environmental medium. The refined background evaluation methodology includes both graphical and statistical evaluations. Graphical evaluation includes boxplots, probability plots, and index plots. Statistical analyses include distribution testing, outlier testing, calculation of background threshold value (BTV) statistics, and population tests. Outliers were removed prior to calculating BTVs and running population tests, as described in Appendix W of the RI Report. The 95% upper tolerance limit was selected as the BTV statistic. A two-sample hypothesis test was conducted for each COPC for which sufficient data were available. The tests selected for each COPC was determined by the distributions of the Study Area and background data sets. Appendix W provides results for the COPCs included in the background evaluation; this section summarizes the results for potential COCs in Landside Investigation Area soil and Anacostia River fringe surface sediment.

Soil

2,3,7,8-TCDD-TEQ, total PCBs, and arsenic were identified as potential COCs in surface soil, and total PCBs and vanadium were identified as potential COCs in combined surface and subsurface soil (0 to 16 feet bgs).

The maximum detected concentrations of arsenic in the salvage yard and waste storage area and the stores and fleet maintenance yard are below the BTV of 17 mg/kg, indicating that levels of arsenic in these areas are likely to be consistent with background. Arsenic concentrations in the warehouse and laydown area exceed the BTV. However, the results of the two-sample hypothesis test indicate that Site arsenic concentrations are not greater than background concentrations, which is further supported by the boxplot comparisons provided in Appendix W of the RI Report. Therefore, the background evaluation supports the conclusion that arsenic concentrations on Site are background related and that arsenic is not a Site COC.

Concentrations of 2,3,7,8-TCDD-TEQ, total PCBs, and vanadium exceed BTVs, and the results of the hypothesis tests indicate that Site concentrations of 2,3,7,8-TCDD-TEQ and vanadium are greater than or equal to background. Hypothesis testing could not be conducted on total PCBs due to low frequency of detection in background.

Anacostia River

Sediment and fish tissue in the Anacostia River have been affected by ongoing and historic sources of contamination, as well as stormwater discharges, sewage overflows, and other permitted discharges. These sources contribute to the cumulative exposure of human and ecological receptors in the Anacostia River. The surface sediment background evaluation is discussed below.

As discussed in Section 3.1.4.1, Pepco performed an analysis of potential tidal influence to confirm that all sediment sampling locations included in the Site-specific background dataset were upstream of any potential influence from the Site. The details of the analysis and the results are provided in Appendix W. Pepco's analysis confirms that the background location SEDBACK 20 and background locations upstream of SEDBACK 20 will not be influenced by any Site-related contaminants as a result of tidal exchanges. No sampling locations downstream of SEDBACK 20 were included in the dataset for the purpose of calculating site-specific background values.

BTVs were derived for surface sediment in Appendix W of the RI Report. 2,3,7,8-TCDD-TEQ was identified as a potential COC in this BHHRA based on a potential risk of $3x10^{-6}$ for the wader adult/child and of $2x10^{-6}$ for the shoreline worker potentially exposed to fringe surface sediment. Both the maximum detected concentration (0.0007 mg/kg) and the 95% UCL (0.0002 mg/kg) exceed the BTV of 0.00001 mg/kg). The results of the hypothesis tests indicate that Waterside Investigation Area concentrations of 2,3,7,8-TCDD-TEQ in surface sediment are greater than or equal to background.

6.5.2 Regional Area Fish Tissue Evaluation

The available tissue data are insufficient for calculation of background statistics. Therefore, BTVs were not derived for fish tissue. Appendix W of the RI Report provides a graphical comparison of fish tissue concentrations between the Upper Anacostia reach and regional reaches:

- Upper Anacostia River Area (upstream of the CSX bridge); includes the Waterside Investigation Area, and extends approximately 1.3 miles downstream and 1.9 miles upstream of Benning Road

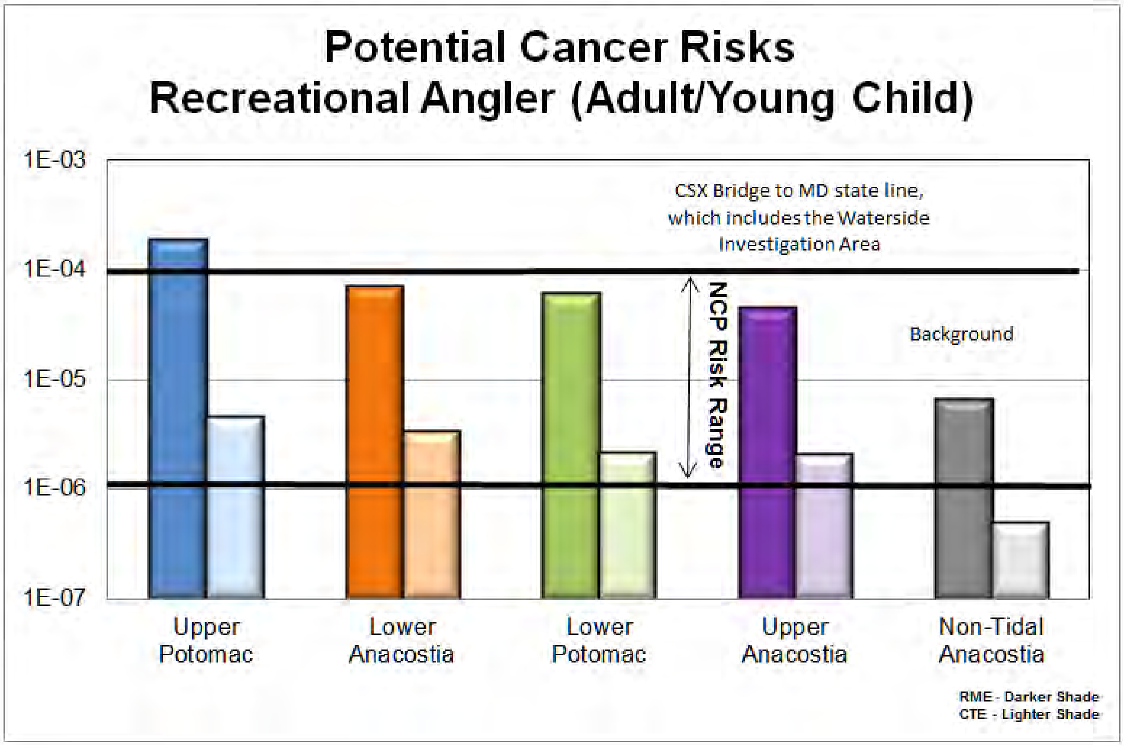
- Lower Anacostia River Area (downstream of the CSX bridge);
- Lower Potomac River (downstream of the 14th Street bridge);
- Upper Potomac River (upstream of the 14th Street bridge);
- Upstream Non-Tidal Anacostia River (north of the Maryland state line); upstream of the Waterside Investigation Area; background area

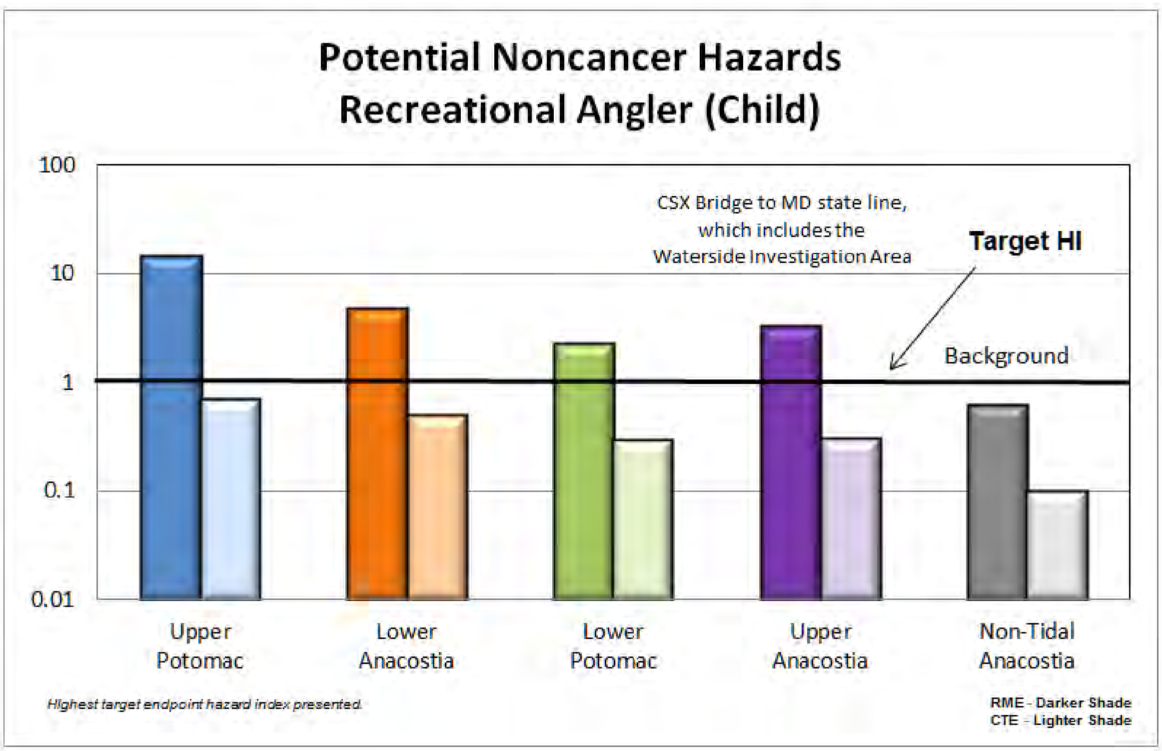
In addition to the graphical comparison of fish tissue concentrations, potential fish consumption risks and hazards were calculated for a background river reach (Upstream Non-Tidal Anacostia) and three nearby regional river reaches (Lower Anacostia, Lower Potomac, Upper Potomac) to provide important context for the Upper Anacostia fish consumption risks and hazards. Potential risks exceed 10^{-4} for fish consumption in the Upper Potomac reach primarily due to PCBs, and in the Lower Potomac reach primarily due to PCBs and arsenic. The HI exceeds 1 in the Potomac River reaches and in the Lower Anacostia reach due to PCBs. For comparative purposes, the table below presents the chemicals with potential risks greater than 10^{-6} or a target endpoint HI of 1 for each of these river reaches; the hazard value representing the highest target endpoint HI is presented. As shown, all of the chemicals identified as potential COCs in the Upper Anacostia reach for fish consumption are also identified in other river reaches in the region, and in many cases, at higher risk and hazard levels. These results are indicative of a regional impact on fish tissue body burdens that may be attributable, at least in part, to sources other than sediment within the Upper Anacostia River reach or the Waterside Investigation Area in particular.

Chemical	Risk/ HI	Fish Tissue [a] RME Scenario			
		Regional Reaches			Background Area
		Lower Anacostia	Lower Potomac	Upper Potomac	Upstream Non-Tidal Anacostia
Arsenic	Risk	2E-06	3E-05	3E-06	--
Total PCBs	Risk	5E-05	2E-05	1E-04	3E-06
	HI	5	2	14	--
PCB-TEQ	Risk	7E-05	3E-05	2E-04	4E-06
	HI	3	--	9	--
4,4-DDE	Risk	--	--	4E-06	
Dieldrin	Risk	1E-05	5E-06	2E-05	
Heptachlor epoxide	Risk	2E-06	--	--	

Notes:
-- Indicates that risk is less than or equal to 10^{-6} or HI is less than or equal to 1. Risk is presented for the sum of the adult and the young child, and the HI is presented for the young child. The older child/teen risk and HI values are lower.
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow Highlighting indicates that cumulative risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Current/future recreational angler.

Potential risks and hazards were highest in the Upper Potomac River and lowest in the Upstream Non-Tidal Anacostia River. Potential risks and hazards for the Upper Anacostia fall within the range of potential risks and hazards in the regional reaches (i.e., Potomac River, Upstream Non-Tidal Anacostia, and Lower Anacostia), as indicated in the graphs below.


Potential Cancer Risks
Recreational Angler (Adult/Young Child)
1E-03
1E-04
1E-05
1E-06
1E-07
CSX Bridge to MD state line, which includes the Waterside Investigation Area
NCP Risk Range
Background
Upper Potomac
Lower Anacostia
Lower Potomac
Upper Anacostia
Non-Tidal Anacostia
RME - Darker Shade
CTE - Lighter Shade


Potential Noncancer Hazards
Recreational Angler (Child)
100
10
1
0.1
0.01
CSX Bridge to MD state line, which includes the Waterside Investigation Area
Target HI
Background
Upper Potomac
Lower Anacostia
Lower Potomac
Upper Anacostia
Non-Tidal Anacostia
Highest target endpoint hazard index presented.
RME - Darker Shade
CTE - Lighter Shade

7 Uncertainty Analysis

Within any of the four steps of the human health risk assessment process, assumptions must be made due to a lack of absolute scientific knowledge. Some of the assumptions are supported by considerable scientific evidence, while others have less support. Every assumption introduces some degree of uncertainty into the risk assessment process. Regulatory risk assessment methodology requires that conservative assumptions be made throughout the risk assessment to ensure that risks are not underestimated. Therefore, when all of the conservative assumptions and approaches are combined, it is more likely that risk results are overestimated rather than underestimated.

The assumptions that introduce the greatest amount of uncertainty in this risk assessment are discussed in this section. The assumptions for which there is not enough information available to assign a numerical value to the uncertainty, and thus cannot be factored into the calculation of risk, are discussed in qualitative terms. In some cases, alternate assumptions are available that are as plausible as the assumptions used in the BHHRA. In some of these cases, the uncertainty is evaluated quantitatively. These uncertainties may also be incorporated into the risk management process during the development of remediation goals, as part of the Feasibility Study. Section 7.1 discusses uncertainty related to data evaluation and COPC selection. Section 7.2 discusses uncertainties related to the toxicity assessment. Section 7.3 discusses uncertainties related to the exposure assessment. Lastly, Section 7.4 discusses uncertainties related to the risk characterization.

7.1 Data Evaluation and COPC Selection

7.1.1 Adequacy and Quality of Analytical Data

The data collected as part of the Study Area RI between 2012 and 2017, as well as biological tissue data from the Anacostia River collected under other agency programs, serve as the basis for the BHHRA. Multiple media were sampled using a sound conceptual understanding of Study Area conditions. As new information was generated, the CSM was refined and used to guide subsequent data gathering efforts. Thus, while it was not possible to sample every location at the Study Area, the extensive soil, groundwater, sediment, and surface water data collected, combined with the knowledge of source areas and potential migration pathways, provide a high degree of confidence that the range of impacts and environmental conditions have been characterized. However, the fish fillet data set for the Upper Anacostia River (which includes the Waterside Investigation Area) is small (seven composite samples). These data may not be representative of the Waterside Investigation Area because of the uncertainty associated with fish home ranges, where the samples were collected within the reach, and bioaccumulation into fish. The uncertainty associated with the limited fish fillet data set is discussed below and in in Section 7.1.2.

Generally, in the site characterization phase of the site assessment, knowledge of past and current use of the study area is used to guide investigations and determine which parameters are analyzed and what analytical methods are employed for the detection of chemicals in the relevant environmental media at the site. While the suite of analytes for this BHHRA included multiple chemical groups, including metals, VOCs, SVOCs, PAHs, pesticides, PCBs, and dioxins and furans, it is possible that chemicals not sampled for may be present at the Study Area. Should this be the case, Study Area risks may be incomplete depending on the nature of the chemicals not included in the sample analyses. Given the high degree of historical knowledge of Site operations and the CSM, it is unlikely that significant concentrations of other chemicals are present. Therefore, it is likely that the primary chemicals of human health concern at the Study Area have been captured in the data set used for the BHHRA.

The fish tissue data set forming the basis of the BHHRA is small; only 7 fillet samples are available for the Upper Anacostia. Fewer than 10 samples are available in each of the Upper and Lower Potomac and Lower Anacostia areas. Furthermore, these data were collected in 2013 and may not be representative of current conditions, as concentrations have been generally declining over time (see graphic in Section 3.1.4.3).

As noted previously, the Pepco 2013 surface water data were used in the BHHRA and were not supplemented with DOEE data. The uncertainty associated with this is low, as surface water is a minor contributor to total risk (i.e., less than 10^{-6} and an HI of 1). The risk assessment for the ARSP also did not identify any potential risks associated with surface water in Reach 456 (the reach that encompasses the Waterside Investigation Area) greater than 10^{-6} or an HI of 1 (TetraTech, 2018).

As discussed in Section 3.1, laboratory results collected under the Pepco RI program were subjected to data validation conducted in accordance with the approved QAPP (AECOM, 2012) prior to use in the BHHRA. Where necessary, qualifiers were applied to the data due to quality control non-conformances. The vast majority of the data generated were found to be reliable and acceptable for use in risk assessment and remedial decision-making. Out of over 550,000 validated results, only about 500 (less than 0.1%) were rejected and deemed not usable for project decisions. These rejected result values were removed from the database used for the risk assessments. TetraTech conducted Phase 2B validation of the fish tissue data sets collected by DOEE (Pinkney, 2017, TetraTech, 2018). Pinkney (2017) noted that quality assurance procedures followed included the analysis of blanks, laboratory and field replicates, and standard reference materials. The DOEE fringe surface sediment sample results used in this BHHRA were also validated by TetraTech (2018).

The use of laboratory J-qualified data adds some uncertainty to the risk assessment by definition, as the true concentration lies between the method detection limit and the sample quantitation limit. However, the estimated value given for each J qualified result is considered the best estimate of the true concentration, and was therefore used in risk calculations (USEPA, 1989a).

Given that the vast majority of the Study Area data were determined to be valid and acceptable for use in the risk assessments, there is a high degree of confidence in the quality of the data used in the BHHRA for soil, groundwater, fringe surface sediment, and surface water. This reduced uncertainty translates to a high degree of confidence in the use of the project data in risk-based decision-making. There is a higher degree of uncertainty associated with the fish tissue data set due to the small size and other considerations as discussed below.

7.1.2 Representativeness of Fish Tissue Data

There is uncertainty associated with the tissue data used to estimate potential fish consumption risk. The fish tissue samples collected in 2013 in the Upper Anacostia River sampling area (from the CSX railroad bridge up to the Maryland state line) may not be representative of the Waterside Investigation Area. The Upper Anacostia River sampling area of approximately 3.2 miles extends approximately 1.3 miles downstream and 1.9 miles upstream of Benning Road (**Figure 3-7**), and these data were not collected to evaluate contaminant sources, but rather for monitoring fish tissue contaminant levels and changes over time (Pinkney, 2017). Fish specimens caught throughout this area were combined to create one composite sample per species to represent the Upper Anacostia River sampling area. Fish species vary in how far they will travel for food and spawning; for example, sunfish typically have a small home range (e.g., 0.23 to 1.12 hectares; Fish and Savitz [1983]), whereas brown bullhead have been found to have a home range of up to 1.3 miles in the Anacostia River (Sakaris et al., 2005). Based on the sample design as well as varying home ranges of the species sampled, the concentrations of contaminants detected in the fish tissue composite samples are expected to represent conditions throughout the approximately 3.2-mile Upper Anacostia River sampling area (see **Figure 3-7**), but they are not necessarily representative of conditions in the Waterside Investigation Area, an area of approximately one-half mile of shoreline.

7.1.3 Analysis for PCBs via Aroclor versus Congeners

The BHHRA was conducted using available PCB congener data for fish tissue. Per the approved RI work plan, PCB Aroclor analysis was performed, and the Aroclor data were used in the BHHRA for soil, groundwater, fringe surface sediment, and surface water. The Aroclor data set is more extensive than the congener data set for the Study Area. However, due to differences in the analytical methods, the use of Aroclor versus congener data represents a potential source of uncertainty in the BHHRA. A subset of soil, groundwater, and fringe surface sediment samples were analyzed for both Aroclors and congeners, allowing for comparison of the two sets of PCB concentrations, as discussed below.

7.1.3.1 Soil

A total of 31 Site soil samples (14 surface and 17 subsurface) were analyzed for both PCB Aroclors and congeners. The ratio of total PCB congeners to total PCB Aroclors ranged from less than 1 (i.e., total concentration was higher based on Aroclor data) to 59, with an average of 5 and a median of 1.5 (**Table 7-1**). These data suggest that the concentration of total PCBs based on the sum of congeners would generally be higher than the sum of Aroclors for soil samples at the Site.

Potential risks/hazards for total PCB Aroclors exceeded 10^{-6} or HI of 1 in surface soil in four areas for the future outdoor industrial worker (the warehouse and laydown area, substation #7, the salvage yard and waste storage area, and the transformer shop). If it were assumed that total PCB concentrations are on average 5 times higher than Aroclor concentrations in surface soil, the stores and fleet maintenance area would also be identified with total PCB risks greater than 10^{-6} (but less than 10^{-5}).

Potential risks and hazards for the hypothetical future recreational visitor associated with total PCBs in surface soil would remain well below 10^{-6} and an HI of 1 even, assuming a 5-fold increase in total PCB concentrations above detected levels of PCB Aroclors.

Potential risks and hazards for total PCB Aroclors exceeded 10^{-6} and an HI of 1 only in the transformer shop soil (0 to 16 feet bgs) for the construction worker. No additional exceedances would be identified based on a 5-fold increase in total PCB concentrations.

7.1.3.2 Groundwater

Monitoring wells were sampled and analyzed for PCB Aroclors in November 2014 and were mostly non-detect, with detections below the USEPA Maximum Contaminant Level (MCL) of 0.5 µg/L (USEPA, 2018g). Samples were collected and analyzed for PCB congeners in December 2014 and December 2016. PCB congeners were detected at relatively low concentrations, with total PCBs well below the MCL of 0.5 µg/L. Therefore, the uncertainty associated with the analytical method for PCBs in groundwater is low, particularly given that the only potential exposures to groundwater at the Site include inhalation of volatile COPCs and discharge to surface water, with considerable dilution between groundwater and surface water.

7.1.3.3 Fringe Surface Sediment

Sixteen fringe surface sediment samples from the Waterside Investigation Area were analyzed for both PCB Aroclors and PCB congeners (nine samples collected by TetraTech for the ARSP and seven samples collected by Pepco). The ratio of total PCB congeners to total PCB Aroclors ranged from less than 1 to 6.2, with an average of 2.3 and median of 2.1 (**Table 7-2**). Potential risks/hazards associated with total PCB Aroclors in fringe surface sediment did not exceed 10^{-6} or an HI of 1 for any receptor. Even assuming that total PCB congeners are present at as much as 6 times the total Aroclor concentration, potential risks and hazards would not exceed 10^{-6} or an HI of 1.

In summary, the use of PCB totals based on Aroclors results in some uncertainty in the risks and hazards presented in this BHHRA for abiotic media; however, the available data suggest that the risk assessment conclusions would not change substantially if congener data were used.

7.1.4 Adequacy of the COPC Selection Process

Not all chemicals detected in a study area are selected as COPCs for quantitative analysis for several reasons. Some chemicals may be present at levels below conservative screening levels. Others may be present at concentrations below sample detection limits. A USEPA review of the results of many risk assessments demonstrates that, in most cases, risks are attributable to a select few chemicals, and that many of the chemicals quantitatively evaluated do not contribute significantly to total risk estimates (USEPA, 1993a).

COPCs identified for evaluation in the BHHRA were described in Section 3. A total of 43 COPCs were identified for quantitative evaluation in the BHHRA, as presented in **Table 3-23**. As discussed in Section 3, the goal of the COPC selection is to include those chemicals that are the most toxic, prevalent, and environmentally persistent in the quantitative portion of the risk assessment. The screening process used to select COPCs for evaluation is intended to: (1) identify with a high degree of certainty those chemicals that can be safely eliminated from further evaluation because their contribution to total site risk is negligible; and (2) identify those chemicals that merit further evaluation (either quantitatively or qualitatively) based on their potential to adversely affect humans depending on specific types of exposures.

The approved COPC screening process for the BHHRA followed a logical approach based on comparison to RBSLs. The use of conservative screening levels, including risk-based concentrations deemed by USEPA to be acceptable for residential exposure to soil (as a surrogate for intermittent exposure to fringe surface sediment), ensures that the chemicals excluded from further evaluation would contribute negligibly to total risk. Therefore, not quantitatively evaluating the excluded chemicals will not measurably affect the numerical estimates of hazard or risk and, thus, will not affect remedial decision-making.

In the COPC selection process, it was assumed that only those chemicals detected are actually present. However, uncertainty can arise if the detection limits for chemicals that were not detected exceed the applicable screening levels. For example, PCBs were identified as a COPC for soil, fringe surface sediment, and fish tissue. PCBs were not detected in surface water using Method 8082, which has a nominal reporting limit of 0.010 µg/L. While this reporting limit is above the PCB national and DOEE water quality criterion for consumption of water and organisms (6.4E-05 µg/L), it is below the RSL for tap water consumption (0.044 µg/L). As previously discussed, use of the tap water RSLs to select COPCs for evaluating occasional surface water contact is highly conservative. However, as a conservative measure in this BHHRA, PCBs were identified as a surface water COPC and included in the risk calculations using the lowest reporting limit as a proxy EPC.

7.2 Dose-Response Assessment

The purpose of the dose-response assessment is to identify the types of adverse health effects a chemical may potentially cause and to define the relationship between the dose of a chemical and the likelihood or magnitude of an adverse effect (response). Risk assessment methodologies typically divide potential health effects of concern into two general categories: effects with a threshold (noncarcinogenic) and effects assumed to be without a threshold (potentially carcinogenic), although there is increasing scientific evidence that many carcinogens also act via a threshold mechanism. Toxicity assessments for both of these types of effects share many of the same sources of uncertainty. To compensate for these uncertainties, USEPA has developed toxicity values that are biased to overestimate rather than under-estimate human health risks. Several of the more important sources of uncertainty and the resulting biases are discussed below.

7.2.1 Animal-to-Human Extrapolation in Noncarcinogenic Dose-Response Evaluation

For many chemicals, animal studies provide the only reliable information on which to base an estimate of adverse human health effects. Oral RfDs are available for 33 COPCs, the majority of which are based on animal studies. RfDs for 2,3,7,8-TCDD-TEQ, inorganic arsenic, cobalt, manganese, and methyl mercury are based on human studies. Inhalation RfCs are available for 24 COPCs, of which 15 are based on animal studies. Extrapolation from animals to humans introduces a great deal of uncertainty into the risk characterization; where human studies are available, uncertainty is reduced. In most instances, it is not known how differently a human may react to the chemical compared to the animal species used to test the chemical. If a chemical's fate and the mechanisms by which it causes adverse effects are known in both animals and humans, uncertainty is reduced. When the fate and mechanism for the chemical are unknown, uncertainty increases.

The procedures used to extrapolate from animals to humans involve conservative assumptions and incorporate uncertainty factors such that overestimation of effects in humans is more likely than underestimation. When data are available from several species, the lowest dose that elicits effects in the most sensitive species is used for the calculation of the RfD. Uncertainty factors are applied to this dose, generally of 1 to 10 each, to account for intraspecies variability, interspecies variability, study duration, and/or extrapolation of a low effect level to a no effect level. Thus, most reference doses used in risk assessment are 100- to 10,000-fold lower than the lowest effect level found in laboratory animals. Uncertainty factors for chronic toxicity values included in this risk assessment range from 3 (arsenic and manganese RfDs) to 10,000 (DRO RfD), as shown in **Tables 4-1** and **4-3**.

Nevertheless, because the fate of a chemical can differ in animals and humans, it is possible that animal experiments will not reveal an adverse effect that would manifest itself in humans. This can result in an underestimation of the effects in humans. The opposite may also be true: effects observed in animals may not be observed in humans, resulting in an overestimation of potential adverse human health effects.

7.2.2 Evaluation of Carcinogenic Dose-Response

Significant uncertainties exist in estimating dose-response relationships for potential carcinogens. These are due to experimental and epidemiologic variability, as well as uncertainty in extrapolating both from animals to humans and from high to low doses. Three major issues affect the validity of toxicity assessments used to estimate potential excess lifetime cancer risks: (1) the selection of a study (i.e., data set, animal species, matrix in which the chemical is administered to the animal) upon which to base the calculations, (2) the conversion of the animal dose used to an equivalent human dose, and (3) the mathematical model used to extrapolate from experimental observations at high doses to the very low doses potentially encountered in the environment. CSFs are available for 29 of the COPCs, and inhalation unit risk factors are available for 38 COPCs.

7.2.2.1 Study Selection

Study selection involves the identification of a data set (experimental species and specific study) that provides sufficient, well-documented dose-response information to enable the derivation of a valid CSF. Human data (e.g., from epidemiological studies) are preferable to animal data, although adequate human data sets are relatively rare. Therefore, it is often necessary to develop dose-response information from a laboratory species, ideally one that biologically resembles humans (e.g., with respect to metabolism, physiology, and pharmacokinetics), and where the route of administration is similar to the expected mode of human exposure (e.g., inhalation and ingestion). It is also important to note that when multiple valid studies are available, the USEPA generally bases CSFs on the one study and site that show the most significant increase in tumor incidence with increasing dose. In some cases, this selection is made in spite of significant decreases of tumor incidence in other organs and total tumor incidence with increasing dose. Consequently, the current study selection criteria are likely to lead to overestimation of potential cancer risks in humans.

For example, the oral cancer slope factors for PCBs are based on rat studies, and USEPA (2018d) has classified PCBs as a “B2” carcinogen. Under the 1986 cancer classification scheme (USEPA, 1986), B2 carcinogens are defined as probably carcinogenic to humans based on evidence in animals, but with little or no human data. While PCBs have been demonstrated to produce tumors in animals, several studies have interpreted human epidemiological data as negative for carcinogenicity (Shields, 2006, Golden et al., 2003, Golden and Kimbrough, 2009). USEPA (2018d) has classified human data on the carcinogenicity of PCBs as inadequate.

7.2.2.2 Interspecies Dose Conversion

Only the CSF for inorganic arsenic and the URFs for arsenic and trichloroethylene are based on human studies. For CSFs/URFs based on animal studies, the USEPA derivation of human equivalent doses by conversion of doses administered to experimental animals requires the assumption that humans and animals are equally sensitive to the toxic effects of a substance, if the same dose per unit body surface area is absorbed by each species, and the mechanism of toxicity is the same. Although such an assumption may hold for direct-acting genotoxicants, it is not necessarily applicable to many indirect-acting carcinogens and likely overestimates potential risk by a factor of 6 to 12, depending on the study species (USEPA, 1992c). Further assumptions for dose conversions involve standardized scaling factors to account for differences between humans and experimental animals with respect to life span, body size, breathing rates, and other physiological parameters. In addition, evaluation of risks associated with one route of administration (e.g., inhalation) when tests in animals involve a different route (e.g., ingestion) requires additional assumptions with corresponding additional uncertainties.

7.2.2.3 High-to-Low Dose Extrapolation

The concentration of chemicals to which humans are potentially exposed in the environment is usually much lower than the levels used in the studies from which dose-response relationships are developed. Estimating potential health effects, therefore, requires the use of models that allow extrapolation of health effects from high experimental doses in animals to low environmental doses. These models are generally statistical in character and have an uncertain biological basis. Thus, the use of a model for dose extrapolation introduces uncertainty in the dose-response estimate. In addition, these models contain assumptions that may also introduce a large amount of uncertainty. Generally, the models have been developed to err on the side of overestimating rather than underestimating potential health risks.

Many of the USEPA CSFs/URFs listed in IRIS are derived using the upper 95% confidence limit of the slope predicted by the LMS model used to extrapolate low dose risk from high dose experimental data. USEPA recognizes that this method produces very conservative risk estimates, and that other mathematical models may exist. USEPA states that the upper-bound estimate generated by the LMS model leads to a plausible upper limit to the risk that is consistent with some of the proposed mechanisms of carcinogenesis. The true risk, however, is unknown and may be as low as zero.

The LMS model is very conservative, as it assumes strict linearity between the lowest dose that produced an effect and zero dose. According to USEPA (1989a), "Because the slope factor is often an upper 95th percentile confidence limit of the probability of response based on experimental animal data used in the multistage model, the carcinogenic risk estimate will generally be an upper-bound estimate. This means that USEPA is reasonably confident that the 'true risk' will not exceed the risk estimate derived through use of this model and is likely to be less than that predicted."

Moreover, the body has mechanisms to detoxify chemicals, especially at low doses, and mechanisms to repair damage if it should occur. Therefore, many scientists believe a number of chemicals cause cancer only above a "threshold" dose (as reviewed in Bradley, 1996). Consequently, the assumption that there is some probability of harm to human health at any level of exposure is very conservative and is expected to result in overestimates of risk, especially when coupled with the use of an upper-bound estimate of cancer potency.

USEPA's current carcinogen risk assessment guidelines (USEPA, 2005b) emphasize mode of action data, and recognize that some carcinogens may act in a nonlinear fashion. Therefore, it is recognized that some carcinogens may have a threshold dose below which effects would not be seen. For example, a threshold for carcinogenic activity has been demonstrated for chloroform and was used as the basis for USEPA's development of dose-response values for chloroform (USEPA, 2018b).

7.2.3 Potential Contribution from Early-Life Exposures to Lifetime Risk

Benzo(a)pyrene (and the six other potentially carcinogenic PAH COPCs), are assumed to act via a mutagenic mode of action. Potential cancer risks for these COPCs were adjusted upward using ADAFs to ensure that the potential contributions from early life exposures are not underestimated. Additionally, trichloroethylene and vinyl chloride are considered to be mutagenic, but are COPCs only for worker (adult) exposure pathways. Therefore, adjustments were not necessary because there are no assumed childhood exposures. For vinyl chloride, the cancer toxicity values based on exposure during adulthood were used.

PCBs are not assumed to exert carcinogenic effects via mutagenic activity. For pre-conception and in-utero life stages, exposure to bioaccumulative COPCs, such as PCBs, would be primarily through the mother's diet, as would exposure of nursing infants. If women of childbearing age, pregnant, or breastfeeding mothers consume large amounts of Anacostia River fish, they could potentially expose the unborn child or nursing infant to lipophilic COPCs and/or bioaccumulative COPCs (e.g., PCBs).

7.2.4 Dioxin-Like Toxicity

Certain PCB congeners have been identified as having a mechanism of toxicity similar to that of 2,3,7,8-TCDD (Van den Berg et al., 2006; USEPA, 2010). The designation as a "dioxin-like compound" is based on Ah receptor binding and similarities in biochemical activity and bioaccumulation potential. Twelve coplanar PCBs with four or more chlorines with one or no substitutions at ortho positions have been identified as having dioxin-like toxicity, and TEFs have been developed to equate the toxicity of each dioxin-like PCB congener to that of 2,3,7,8-TCDD (USEPA, 2010). The "coplanar" PCBs lack ortho chlorines on both rings, allowing the rings to orient in the same plane, but this conformation is not rigid. USEPA's December 2010 guidance adopts the 2005 WHO mammalian TEFs for the 12 coplanar PCBs, but also notes that when exposures are to a single chemical or class of chemicals such as PCBs, the use of the PCB cancer slope factors is sufficient (USEPA, 2010).

However, there is the potential for dioxin-like PCB congeners to preferentially bioaccumulate due to their resistance to metabolism and biodegradation. Therefore, USEPA guidance (1996, 2010) identifies a supplemental approach for evaluating the potential risks posed by PCBs that focuses on the 12 coplanar PCBs that are structurally similar to 2,3,7,8-TCDD and have the capacity to bind to the Ah receptor. The evaluation of the 12 dioxin-like PCBs (referred to as PCB-TEQ) is most applicable to estimating exposure via dietary uptake, because the TEFs are primarily based on oral uptake studies, often through the diet (Van den Berg et al., 2006). There is greater uncertainty in applying TEFs to other exposure pathways and abiotic media due to differences in bioavailability and fate. For the evaluation of the fish ingestion pathway, the potential cancer risks and noncancer hazards posed by PCBs were evaluated as PCB-TEQ, as well as total PCBs. This approach recognizes two potential mechanisms of toxicity and the potential for enrichment of certain presumed dioxin-like congeners in fish tissue.

7.2.4.1 Uncertainty in Application of TEFs to PCBs

The TEFs for dioxin-like PCBs were developed based on a database of laboratory studies in which the relative potency of a test chemical was compared to a reference chemical, usually 2,3,7,8-TCDD. There is uncertainty in the assumption that a subset of PCB congeners exerts toxicity in a manner similar to that of 2,3,7,8-TCDD. Dioxins and furans are rigidly planar molecules with centrally located oxygen atom(s), while PCBs are never truly coplanar and lack the central oxygen atoms. In addition, PCBs that are approximate stereoisomers of dioxin/furan Ah receptor agonists bind the receptor much more weakly than strong Ah receptor agonists such as dioxins and furans. Even with the most favorable chlorination pattern, the affinity of PCBs for the Ah receptor is not nearly that of potent dioxin/furans. Only a handful of Ah receptor agonists have been tested for human Ah receptor affinity even though marked species differences have been demonstrated. For example, 2,3,7,8-TCDD’s and other potent agonist’s affinity for the human Ah receptor is 10-fold less than the receptor affinity in ultra-sensitive animal models (Ema et al., 1994; Fan et al., 2009; Flaveny and Perdew, 2009; Zeiger et al., 2001; Westerink et al., 2008).

The National Research Council of the National Academy of Sciences (NRC, 2006) has stated that

> *Depending on the system examined, the estimated affinity of binding of TCDD (and related compounds) to the human AHR [aryl hydrocarbon receptor] is about 10-fold lower than that observed to the AHR from “responsive” rodent species and is comparable to that observed to the AHR from “nonresponsive” mouse strains.*

More recent studies have indicated that the difference may be even greater. Westerink et al. (2008) compared CYP1A activity (a cytochrome P450 enzyme) in rat H4IIE cells and human HepG2 cells for an extensive array of chemicals, including 2,3,7,8-TCDD and most dioxin-like PCBs. The investigators found that for PCB 126 (regarded as the most potent of the PCBs assigned TEFs), the rat was three orders of magnitude more sensitive to induction of liver enzyme activity than humans. Carlson et al. (2009) investigated whether the difference in relative potency of PCB 126 between rats and humans, as measured by induction of CYP1A1, was also true for other Ah receptor-regulated genes that could be important to toxic effects subsequent to Ah receptor binding. They found that 47 human genes responding in a dose-response manner consistent with the TEF concept were more than 100 times less sensitive than 79 similarly responding rat genes.

It should also be recognized that the relative potency (ReP) database used to derive TEFs is now over 10 years old; studies have been published since 2004 that may change the range and percentiles of RePs for many dioxin-like congeners including PCB 126 (Peters et al., 2006; Sutter et al.; 2010, Trnovec et al., 2013; van Ede, 2014; Larsson et al., 2015; van Ede et al., 2016). Van Ede et al. (2014, 2016) conclude that human in vitro-derived RePs for PCB 126, which has the highest TEF of the dioxin-like PCBs, are significantly lower (one to two orders of magnitude) than the present WHO-TEF, and a re-evaluation of this TEF for human health risk assessment is warranted.

Finally, summing TEF-based risks with risks posed by the non-dioxin-like congeners is in essence double-counting PCB risk, and was therefore not done in this BHHRA. The Aroclor mixtures upon which the PCB high risk and persistence CSF is based included dioxin-like PCBs (Cogliano, 1998; Mayes et al., 1998). Thus, the results of these whole animal studies represent the sum of the toxicities of all of the congeners present and their various mechanisms of actions and interactions, including both the dioxin-like and other toxicities. Several studies comparing these risk calculation methods have concluded that the evaluation of PCBs in fish tissue as total PCBs using the CSFs for PCB mixtures is sufficiently protective (Chaudhuri et al., 2003; Keenan and Samuelian, 2005; Bodishbaugh et al., 2003; Ruffle et al., 2016). The approach used in this BHHRA of calculating and presenting two separate sets of PCB risk and hazard estimates addresses the uncertainty associated with the different measures of toxicity while avoiding the problem of double-counting when dioxin-like and non-dioxin-like risk estimates are summed.

7.2.5 Tier 3 Toxicity Values

There is somewhat more uncertainty associated with the toxicity values from Tier 3 sources due to the variability of peer-review and consensus among scientists on the best estimate of toxicity. The majority of COPCs have Tier 1 or 2 toxicity values. A summary of the COPCs for which Tier 3 toxicity data were used is provided below.

Tier 3 Dose-Response Values Used in the BHHRA		
COPC	**Toxicity Factor Type**	**Source**
2,3,7,8-TCDD-TEQ	RfC, Oral CSF, URF	CalEPA
4,4-DDD	Oral RfD URF	PPRTV screening value CalEPA
4,4-DDE	Oral RfD URF	PPRTV screening value CalEPA
Arsenic, inorganic	RfC	CalEPA
Arsenic, organic	Oral RfD	ATSDR
Bromodichloromethane	URF	CalEPA
Chloroform	RfC	ATSDR
DRO	Oral RfD, RfC	PPRTV screening value
Mirex	Oral CSF, URF	CalEPA
MTBE	URF	CalEPA
Naphthalene	URF	CalEPA
Nickel	RfC URF	ATSDR CalEPA
Thallium	Oral RfD	PPRTV screening value
Vanadium	RfC	ATSDR

The uncertainty associated with the use of Tier 3 toxicity values is on the high side due to uncertainty in modes of action and adequacy of the toxicity data sets. Despite this conservatism, with the exception of 2,3,7,8-TCDD-TEQ in surface soil for the outdoor industrial worker, potential risks and hazards calculated using Tier 3 toxicity values are below 10^{-6} and an HI of 1. Thus, the impact of the uncertainty in the toxicity values used is not expected to be significant.

7.3 Exposure Assessment

The exposure assessment process is inherently uncertain, as assumptions must be made about individuals' behaviors and choices that bring them into contact with site media. Human behaviors are inherently variable, and as such, the assumptions used to characterize exposure are often conservative to ensure that risks to individuals with potential high-end exposures are not underestimated. Furthermore, it can be difficult to characterize exposures under future conditions. Because of uncertainty and variability in quantifying human behavior, the Superfund risk assessment process can lead to the use of less site-specific assumptions as a method to ensure conservatism.

Exposure assessment consists of three basic steps: (1) development of exposure scenario assumptions, (2) estimation of exposure point concentrations, and (3) estimation of human dose. The uncertainty associated with each of these steps, as well as the fish consumption pathway in particular, is discussed below.

7.3.1 Exposure Scenario Assumptions

Exposure scenarios in a risk assessment are selected to be representative of potential exposures to COPCs in media that human receptors may come into contact with based on current and reasonably foreseeable land use. These exposure scenarios were developed for a hypothetical receptor, but one that would represent the RME scenario. Therefore, exposure levels were assumed for these receptors that are greater than expected to typically occur in an actual population. It has been noted that the use of multiple health protective factors to address uncertainty can result in overestimating risk through compounding conservatism (Cullen, 1994; Burmaster and Harris, 1993; Nichols and Zeckhauser, 1988). Consequently, CTE scenarios were also explored to provide an estimate of exposures more likely to represent average exposures and put RME risk estimates into context.

When estimating human doses (i.e., intakes and external exposures) from potential exposure to various media containing COPCs, several assumptions are made. Uncertainty may exist, for example, in assumptions concerning the range of typical rates of ingestion, frequency, and duration of exposure, and bioavailability of the chemicals in the medium. Typically, when limited information is available to establish these assumptions or there are uncertainties associated with projecting future exposures, a conservative estimate of potential exposure is employed to ensure that a potentially exposed individual's risk is not underestimated. USEPA's default exposure assumptions for the RME scenario are intended to be conservative and representative of an individual on the upper end of the range of possible exposures (e.g., someone who frequently contacts affected environmental media at an upper-bound intake rate for many years). Moreover, it is often assumed that contact is with environmental media containing some of the highest chemical concentrations for the entire exposure duration used in the risk assessment, due to both statistical handling of the data and the assumption that concentrations do not change over time, despite natural recovery processes that tend to reduce environmental concentrations. Depending on the number of upper-bound assumptions employed, the probability of the potential exposure scenario occurring can be very low, as discussed further in Section 7.4.2.

This section discusses uncertainty associated with some of the key exposure assumptions selected for the BHHRA, and potential impact on risk estimates. Potential uncertainties associated with exposure frequency for the Anacostia River in the vicinity of the Waterside Investigation Area are described below. Consumption of fish represents the largest source of potential risk, and the associated uncertainties are discussed in Section 7.3.2.

Waterside Investigation Area Exposure Frequencies

The surface water and sediment exposure frequencies used in the BHHRA were developed taking into consideration the existing parks, walking trails, boat docks, and fishing activity within the Waterside Investigation Area, as well as potential improvements in these resources. However, it is possible that River use in the future could increase to a level higher than assumed in the BHHRA. As previously noted, direct contact with surface water and sediment are minor contributors to total risks and hazards when compared to potential fish consumption risks and hazards, as discussed below. Therefore, an increase in exposure frequencies for surface water and sediment is unlikely to result in changes to the conclusions of this BHHRA.

7.3.2 Fish Consumption Pathway

A number of parameters are used to estimate risk from consumption of fish, including consumption rate, species, body parts consumed, fraction ingested from the site, preparation and cooking methods, and years of fishing at the site. In selecting appropriate fish consumption rates, USEPA guidance (USEPA, 1989b, 2011) discusses the importance of considering site-specific factors, including water quality, public access, abundance of desirable species, and availability of other desirable water bodies, as well as characteristics of the angling population. Some of the major areas of uncertainty associated with key variables for assessing risk from consumption of fish, and implications for risk results, are discussed below.

7.3.2.1 Fish Consumption Rate

Data from angler surveys that included the Anacostia River were used to characterize fishing practices and consumption behaviors of anglers who fish at the River. Using these data instead of default assumptions or studies of other water bodies reduces uncertainty in the estimated fish consumption rates. However, as these studies were not conducted for the purpose of estimating fish consumption rates for use in human health risk assessment, there is some uncertainty in the reliability of the data for estimating long-term consumption rates.

Based on Site-specific survey data, RME and CTE fish consumption rates of 20 and 10 grams per day (g/day), respectively, were estimated for the adult recreational angler who eats his or her catch from the Waterside Investigation Area. Although there is currently a fish consumption advisory, it is possible that fish consumption rates would increase in the event the advisory is lifted. Additional improvements in the River could also lead to increased fish consumption in the future. Therefore, to provide perspective on these fish consumption rates, several alternate fish consumption rates are discussed below.

- **7.5 g/day,** which is equivalent to a one half-pound fish meal per month. This rate has been used at other sediment sites to provide risk information to the public and decision-makers on potential risks associated with consumption of various types of recreationally caught fish/crabs (e.g., Lower Duwamish Waterway). One meal per month is also a common target level of consumption used in setting consumption advisories.
- **22 g/day**, which is the fish/shellfish consumption rate used by USEPA to derive water quality criteria protective of the general public, as well as the average sport angler (USEPA, 2014b). The 22 g/day rate is based on per capita intake of freshwater and estuarine finfish and shellfish by the general population and represents the 90th percentile of US freshwater and estuarine finfish and shellfish consumption by the general population based on the 2003 to 2010 National Health and Nutrition Examination Survey (USEPA, 2014b).
- **32 g/day**, which is used by DOEE and Maryland Department of the Environment (MDE) to set fish consumption advisory levels that allow for a one half-pound fish meal per week.
- **65 g/day**, which is the 98th percentile rate reported by DC area anglers (Gibson and McClafferty, 2005). This corresponds to eating two self-caught fish meals per week year-round.

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The alternate rates are summarized in the following table, including the corresponding number of fish meals per year (assuming a fish meal equates to a conservative half-pound of fish) and the ratio of the alternate rate to the rate used in this BHHRA for the RME adult angler.

Fish Ingestion Rates – Adult Angler			
Ingestion Rate (g/day)	**Fish Meals per Year**	**Basis**	**Ratio of Alternate Rate to BHHRA RME Rate**
7.5	12	One fish meal per month	0.4
10	*16*	*BHHRA CTE rate*	*0.5*
20	*32*	*BHHRA RME rate*	*1*
22	35	90th percentile of US freshwater & estuarine finfish and shellfish consumption by the general population	1.1
32	52	Advisory rate of one fish meal per week	1.6
65	104	98th percentile of DC area anglers consuming fish	3.25

Using the alternative consumption rates, potential risks from fish consumption could be less than the risks calculated in this BHHRA to as much as 6.5-fold higher (taking into account the site-specific fraction ingested factor of 0.5 as discussed in Section 7.3.2.3). If the fish consumption were to increase to one meal per week (32 g/day) potential risks and hazards could increase by 60%. Potential risks for an adult/young child angler would increase (from $4x10^{-4}$ to about $6x10^{-5}$), but would still be within the risk range. The HI would continue to exceed one. Therefore, the increase would not substantially impact the conclusions of this BHHRA.

The consumption rate of 65 g/day is based on the Gibson and McClafferty survey. However, it should be noted that the survey was conducted in 2004 by Virginia Tech researchers during warm weather months when fishing is highest and represents fish consumption from both the Potomac and Anacostia Rivers; both of these factors likely lead to overestimates of consumption of Anacostia River fish or the Waterside Investigation Area. An analysis of the potential risks/hazards for a high-end consuming angler for whom a large fraction of his or her diet is Anacostia River fish is discussed in Section 7.3.2.2, below.

7.3.2.2 High-End Consuming Angler Scenario

Based on the survey results presented in Gibson and McClafferty (2005), some anglers supplement a sizeable fraction of their diet with river fish. An analysis of a high-end consuming angler who fishes year-round and consumes two fish meals per week of Anacostia River fish is presented below. As noted in Section 7.3.2.1, the consumption rates based on the survey may be overestimated due to upward biases in the survey. Potential risks/hazards for the high-end consuming angler were calculated using a multiplier from the recreational risks/hazards and are summarized below.

Parameter	**Recreational Angler**	**High-End Consuming Angler**	**Recreational Consumption to High-End Consumption Multiplier**
RME Adult			
Consumption Rate (g/day)	20	65	3.25
Fraction of Diet[a]	0.5	1	2
		Overall:	**6.5**
RME Child			
Consumption Rate (g/day)	7	21	3
Fraction of Diet	0.5	1	2
		Overall:	**6**
Combined RME Adult/Child			**6.38**[b]

Notes:
[a] Fraction of mixed fish diet from Waterside Investigation Area.
[b] Weighted average assuming 6 years as a child and 6.5 years as an adult. Used as multiplier for potential carcinogenic effects.

The total risks/hazards for the high-end consuming angler who consumes a mixed fish diet are summarized in the following table along with the results for the recreational angler for comparison. Cancer risks are shown for the young child/adult and noncancer hazards for the young child angler.

Cumulative Risks/Hazards for Consumption of Fish (RME)				
Receptor	Cancer (Adult/Young Child)		Noncancer (Young Child) [a]	
	High-end	Recreational	High End	Recreational Young Child
Anacostia River [b]				
Upper Anacostia (Total PCBs)	2.7E-04	4.2E-05	19.2	3.2
Upper Anacostia (PCB-TEQ)	1.4E-04	2.2E-05	4.4	0.73
Background Area [b]				
Upstream Non-Tidal Anacostia (Total PCBs)	4.3E-05	6.7E-06	3.7	0.61
Upstream Non-Tidal Anacostia (PCB-TEQ)	5.0E-05	7.9E-06	3.7	0.61
Regional Reaches [b]				
Lower Anacostia (Total PCBs)	4.5E-04	7.1E-05	28	4.7
Lower Anacostia (PCB-TEQ)	5.8E-04	9.1E-05	18	3.0
Lower Potomac (Total PCBs)	3.9E-04	6.1E-05	14	2.3
Lower Potomac (PCB-TEQ)	4.1E-04	6.5E-05	7.2	1.2
Upper Potomac (Total PCBs)	1.1E-03	1.8E-04	84	14
Upper Potomac (PCB-TEQ)	1.6E-03	2.5E-04	55	9.1

Notes:
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that cumulative risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Highest target endpoint HI.
[b] Includes consumption of a mixed fish diet. Upper Anacostia encompasses the Waterside Investigation Area (**See Figure 3-7**).

As shown, the estimated total risks/hazards for the high-end consuming angler are 6- to 6.5-fold higher than for the recreational angler. Potential cancer risks and noncancer hazards for the high-end consuming angler exceed USEPA's risk thresholds in all reaches, except for cancer risk for the Upstream Non-Tidal Anacostia River reach. The highest potential total PCB risks for the high-end consuming angler are in the Upper Potomac, the same as for the recreational angler.

7.3.2.3 Fraction Ingested for Fish

There is uncertainty in the RME assumption that half of the recreational angler's self-caught fish comes from the Waterside Investigation Area and half comes from other locations. Similarly, there is uncertainty in the CTE assumption that 25% of the recreational angler's catch comes from the Waterside Investigation Area. However, given the relatively small portion of river shoreline adjacent to the Site relative to the length of the Anacostia River (less than 6%), the presence of undergrowth limiting access in the vicinity of the Site, and the proximity of other fishable water bodies, including the upstream reaches in Maryland, the Potomac River, and Chesapeake Bay, it is likely that even those anglers who live near the Study Area fish at multiple water bodies in the surrounding area. Thus, use of fraction ingested factor of 50% for the RME and 25% for the CTE is reasonable.

7.3.2.4 Cooking Loss

Loss of hydrophobic COPCs upon cooking is a recognized phenomenon that can have a significant effect on the calculated COPC exposure dose from tissue consumption by humans. Losses vary with cooking method (e.g., broil, bake, pan fry), preparation method (e.g., trimmed/untrimmed, skin-on/skin-off), and species. Based on available guidance and literature on chemical loss of PCBs and pesticides from preparation and cooking of fish, the following cooking loss factors were derived in **Attachment D** based on a literature review:

COPC	Number of Studies [a]	Number of Data Points	Cooking Loss Factor	
			10th Percentile RME	Median CTE
Total PCBs	14	79	0.13	0.30
Dioxins, furans, and coplanar PCBs	4	12	0.29	0.48
DDx	10	70	0.10	0.32

Notes:
DDx = dichlorodiphenyltrichloroethane, dichlorodiphenyldichloroethylene, and dichlorodiphenyldichloroethane
[a] See **Attachment D** for study references.

The studies on loss of PCBs from fish tissue due to preparation and cooking report little to no loss to as much as 74% loss. However, most of the studies reported some loss, with a median of 30%. For dioxins, furans, and coplanar PCBs, cooking loss ranged from 28% to 63%. Median losses by cooking method ranged from 29% (boil/poach) to 57% (bake/roast), with an overall median of 48%. For DDx, cooking loss ranged from 3% to 80%. Median losses by cooking method ranged from 22% (boil/poach) to 45% (smoke), with a median of 32% when all DDx data are combined regardless of cooking method. Cooking loss for other pesticides was assumed to be similar to DDx. Therefore, the DDx cooking loss factors were applied to the remaining pesticide COPCs.

The amount of chemical mass loss varied within and between studies, which is likely due to a variety of factors, such as cooking time, temperature, tissue preparation (skinning and trimming) and fillet geometry, lipid content, initial chemical concentration, analytical method, and extraction efficiency, which are not consistently controlled for across the various studies. Based on the available data, the use of the 10th percentile cooking loss value for the RME and the median cooking loss value for the CTE is reasonable and conservative, and the cooking loss parameter is not expected to be a major source of uncertainty in the BHHRA.

7.3.2.5 Consumption of Other Fish Species

The BHHRA assumed that the angler consumes a mixed diet comprising multiple species that reside in the Anacostia River (i.e., American eel, catfish, carp, largemouth bass, northern snakehead, and sunfish). The species included in the EPC for each River reach was based on the available samples for that reach and was calculated as a pooled EPC combining the samples without assigning any percentages to specific species. For example, in the Upper Anacostia Reach, there are seven available fish fillet samples consisting of brown bullhead, blue catfish, carp, channel catfish, largemouth bass, northern snakehead, and sunfish. The EPC was calculated as the 95% UCL of these seven samples.

However, the species consumed by anglers varies and depends on a variety of factors, such as:

- Season of the year
- Water quality characteristics, including temperature, dissolved oxygen, and turbidity
- Fishery characteristics, including habitat and species abundance
- Angler characteristics, including fishing method, bait, and species preferences

Some anglers have preferences for particular species and may limit their consumption to those species; it is also possible that different ratios of the available species are consumed. This section addresses the potential risks from alternate consumption practices, such as single-species diets and alternate mixed fish diets.

The table below presents the total cancer risks and noncancer hazards (calculated in **Attachment H**) for the RME angler based on a range of potential consumption practices. For illustrative purposes, estimated risks and hazards are based on total PCBs and are shown for the Upper Anacostia River, which includes the Waterside Investigation Area. Seven fish fillet samples are available for the Upper Anacostia, as noted above.

Potential Risk and Hazard for Total PCBs for Baseline and Alternate Fish Diets				
Fish Diet	**RME Angler (Cancer) Upper Anacostia**		**RME Angler (Noncancer) Upper Anacostia**	
	Child	**Adult**	**Child**	**Adult**
Baseline Diet				
Mixed species diet (7 samples)	1.1E-05	2.2E-05	3.2	2.0
Alternative Diets				
100% catfish (2 samples)	7.8E-06	1.6E-05	2.3	1.4
100% carp (1 sample)	2.1E-05	4.2E-05	6.1	3.7
100% largemouth bass (1 sample)	3.7E-06	7.5E-06	1.1	0.65
100% sunfish (1 sample)	1.3E-06	2.6E-06	0.38	0.23
100% northern snakehead (1 sample)	1.5E-06	3.1E-06	0.45	0.27
50% catfish & 50% largemouth bass (3 samples)	5.7E-06	1.2E-05	1.7	1.0

For the catfish single-species diet, the higher of the channel and blue catfish concentration (channel catfish sample) was used to represent catfish in the alternative diet evaluation. For the other single-species diets, the detected concentration was used. For the mixed catfish/largemouth bass diet, the detected concentration in largemouth bass was averaged with the maximum catfish concentration. The estimation of potential risks for alternate diets are based on very small data sets, one each for carp, largemouth bass, sunfish, and northern snakehead, and two for catfish. Therefore, the same uncertainties discussed in Section 7.1.2 regarding the size (and age) of the fish tissue data set apply to the analysis of single-species diets presented here.

The baseline mixed diet falls within the range of the alternate diets. The risks and hazards associated with a 100% catfish diet or a mixed catfish/largemouth bass diet are lower than the baseline mixed fish diet. As discussed in Section 7.3.2.1, angler survey data indicate a preference for catfish. Therefore, the baseline mixed fish diet may overestimate potential risks and hazards to most anglers.

7.3.2.6 Fish Tissue Type Consumed

The BHHRA assumed that only the fish fillet was consumed, as this is the body part typically consumed by most anglers (USEPA, 2000; Gibson and McClafferty, 2005). However, some anglers may consume the whole fish or additional parts besides just the fillet (e.g., use the head and carcass in soup or stock).

Because whole body concentrations for lipophilic chemicals are usually higher than fillet concentrations, risks may be underestimated for those who consume more than just the fillet. Whole body fish tissue data are not available from the Pinkney data sets (Pinkney, 2017) for the Upper and Lower Anacostia River or the Upper and Lower Potomac River. Samples of fillet and whole body fish tissue were collected from the Upstream Non-Tidal Anacostia. The ratio of whole body to fillet concentrations for total PCBs in those samples ranged from 3.3 to 13.6, as follows, by species:

Species	Ratio of Whole Body to Fillet Concentration for Total PCBs			
	Number of Samples	Minimum Ratio	Maximum Ratio	Mean Ratio
Largemouth bass	19	3.4 to 1	11.7 to 1	5.7 to 1
Smallmouth bass	6	4.2 to 1	9.2 to 1	5.7 to 1
Striped bass	3	3.3 to 1	4.5 to 1	3.8 to 1
Northern snakehead	1	13.6		

The ratio of whole body to fillet concentrations reported in the literature varies by species and lipid content, ranging from 1 to 1 to 1.5 to 1 for fish with high lipid content (e.g., lake trout, carp) to 3 to 1 to 5 to 1 or more for species with low lipid content (e.g., bass, pike, perch) (Skinner et al., 2009; Burman and Rygwelski, 2006; Amrhein et al., 1999). Thus, depending on species, estimated whole body fish consumption risks may be higher than the fillet-based risks estimated in the BHHRA.

7.3.2.7 Consumption of Other Biota

It is possible that other biota present in the Anacostia River besides fish, such as turtles, ducks, frogs, etc., are consumed.[25] However, due to the lack of data on consumption of other aquatic species or waterfowl, this potential exposure pathway was not evaluated quantitatively in the BHHRA. The angler surveys revealed little crabbing or crab consumption on the Anacostia River. Based on available data, fish are the primary target of Anacostia River anglers. Not evaluating consumption of other biota in the BHHRA is unlikely to have resulted in the omission of a significant route of exposure to this population.

7.3.3 Estimation of Exposure Point Concentrations

The data used to calculate the EPCs were assumed to be representative of general area conditions. Sample locations were selected based on several factors, including prior knowledge of source areas,

[25] Due to low salinity levels in the River in the vicinity of the Site, crabs are not expected to be present (NOAA, 2012).

potential migration patterns, and ensuring adequate spatial coverage. Nevertheless, due to spatial and temporal variability, as well as sampling and analytical limitations, there is uncertainty in the EPCs used to estimate current conditions in environmental media. Key uncertainties are discussed below.

Exposure to COPCs is best estimated by the arithmetic mean concentration (USEPA 1989a, 2002b). Because of the uncertainty associated with estimating the true average concentration, USEPA's guidance states that "the 95 percent upper confidence limit of the arithmetic mean should be used for this [the average] variable" (USEPA, 2002b). This statistic provides a conservative upper-bound estimate of the average chemical concentration in an environmental medium. The EPCs used in the BHHRA represent the lower of either the maximum detected concentration or the 95% UCL of the arithmetic mean for the RME scenario and the mean for the CTE scenario (USEPA, 2002b). The use of the UCL (or maximum detection) reduces uncertainty that EPC will understate the true average concentration.

Fish Tissue EPCs

There is substantial uncertainty in the tissue EPCs due to limited sample sizes (e.g., six in the Lower Anacostia and seven in the Upper Anacostia). The use of composite tissue samples, which are comprised of multiple individual specimens, addresses some of the uncertainty associated with small sample sizes. However, the representativeness of the fish tissue EPCs remains uncertain due to the limited tissue data set, and the age of the data set in view of the fact that fish tissue concentrations have been declining over time and the data set does not reflect subsequent improvements, such as may be attributable to recent major reductions in CSOs discharges to the Anacostia River.

Fringe Sediment EPCs

There is uncertainty in the characterization of fringe surface sediment data for the evaluation of direct contact exposures. Per the approved work plan, the top 6 inches of fringe sediment were assumed to be the point of exposure for human contact with sediment. However, it is possible that sediment at depths greater than the top 6 inches or within the deeper part of the channel may be transported to fringe surface sediment as a result of erosion, currents, and/or mixing processes. The concentrations of some COPCs in deeper sediment and farther into the channel are not substantially different from or are generally lower than concentrations in fringe surface sediment. For some other COPCs, concentrations in deeper sediments are generally higher than at the surface. For COPCs with concentrations that are greater at depth, the use of the fringe surface sediment data to estimate current and future EPCs may underestimate direct contact risks if the deeper sediments migrate to the fringe surface sediment in the future. On the other hand, for COPCs with concentrations that change little or are lower at depth, the use of fringe surface sediment data does not underestimate potential direct contact risks.

Soil and Groundwater EPCs

Soil and groundwater sampling at the Site were extensive and included delineation to RBSLs. Based on the large sample sizes and sampling areas, the uncertainty associated with soil and groundwater EPCs is considered low. It was assumed that the future outdoor industrial worker and the hypothetical future recreational visitor are exposed to soils that are currently located at a depth of 0 to 1 foot bgs or immediately below existing slab. However, it is possible that in the future, subsurface soils could be brought to the surface, making them accessible to contact by these receptors, as discussed below.

A review of the EPCs for surface soil (**Table 5-10**) and soil (0 to 16 feet bgs, **Table 5-12**) indicates that for the hypothetical future park land/green space area, soil EPCs are the same as surface soil EPCs (where the maximum detected concentration was from surface soil) or lower than surface soil EPCs (due to a larger data set and calculation of UCL), with one exception. The soil EPC for manganese is just under 2-fold higher than the surface soil EPC; however, the HIs associated with manganese are less than 0.05, and even if doubled, would not exceed 1. Therefore, in this area, potential risks and hazards for both receptors would be the similar to those calculated in the BHHRA based on surface soil EPCs.

Similarly, over 50% of soil EPCs in the remaining areas (outdoor industrial worker exposure only) are the same as or lower than surface soil EPCs. About 10% of the soil EPCs ranged from 1.1 to 1.7 times higher than the surface soil-only EPCs. About 30% of the soil EPCs ranged from about 2 times higher than the surface soil EPCs to about 15 times higher, and only 5% of soil EPCs were more than 15 times greater than surface soil EPCs. No soil EPCs were more than 20 times higher than surface soil EPCs. The majority of cases where soil EPCs were greater than 2 times the surface soil EPCs were for PAHs or DRO in the warehouse and laydown area, the salvage yard and waste storage area, the stores and maintenance area, the offices and parking lot area, and the transformer shop. Therefore, in these areas, it is possible that if subsurface soils are brought to the surface, potential risks and hazards associated with PAHs and DRO could be more than 2 times higher than predicted in the BHHRA based on surface soil EPCs. It should be noted, however, that if subsurface soils were brought to the surface in the future, it would likely be in combination with other Site work and re-grading that would result in mixing the excavated soil, such that the use of current EPCs to model this hypothetical situation is highly uncertain.

It is assumed that the EPCs used in the risk assessment based on current conditions will remain constant for the assumed exposure duration for an industrial or recreational scenario; this is typically a period of 25 to 26 years. However, it is well known that chemicals in the environment are subject to natural attenuation and biodegradation processes. Organic chemicals are naturally degraded in the environment by a variety of processes (i.e., photodegradation, microbial activity, hydrolysis, etc.). At sediment sites, deposition of cleaner sediment is an important process by which constituent concentrations in surface sediment are reduced over time. USEPA recognizes the validity and utility of natural attenuation and biodegradation as a remedial option and has published guidance for its site-specific implementation (USEPA, 1997b; 2005a). Environmental half-lives vary for specific chemicals based on environmental conditions (i.e., presence of bacteria, pH, exposures to sunlight and oxygen), and there are respected literature sources of such information. However, environmental degradation has not been accounted for in the calculation of potential risks and hazards in the Study Area. Current concentrations in Study Area media (soil, groundwater, fringe surface sediment, surface water, and fish tissue) were assumed to remain unchanged into the future for the exposure durations evaluated in the BHHRA (i.e., up to 26 years).

7.3.4 Estimation of Exposure Dose

7.3.4.1 Soil and Fringe Surface Sediment

As discussed in Section 5.4, AAFs/RBAs are used in risk assessment to account for absorption differences between humans exposed to substances in environmental situations and experimental animals in the laboratory studies used to derive dose-response values. Support for use of AAFs/RBAs is provided in USEPA guidance (USEPA, 1989a).

Oral bioavailability is a measure of the degree to which a chemical may be systemically absorbed following ingestion, and dermal bioavailability is a measure of the degree to which a chemical may absorb through the skin and into the blood stream. Some chemicals are absorbed almost completely (100% bioavailability) when ingested in pure form. Other chemicals may pass through the body largely unabsorbed. Thus, the amount that is absorbed is both uncertain and variable. As a result, USEPA's default assumptions regarding absorption are conservative and intended to apply to most sites and exposure conditions. Key factors that influence bioavailability include:

- Physical characteristics of the chemical. In general, as the lipophilicity of a chemical increases, its absorption across the gastrointestinal tract increases.
- The rate at which chemicals dissociate from soil or sediment in the gut. Soil/sediment-bound chemicals, particularly inorganics, are usually absorbed to a lesser degree than chemicals in pure form. The reduced absorption is a result of hydrophobic attraction between the chemical and soil matrix.
- Soil/sediment aging. Aging results in the migration of the chemical into the interior of the soil or sediment particle so that less remains on the exterior surface. This sequestration or aging of the chemical over time reduces the accessibility of a chemical when ingested or dermally contacted by

humans because the chemical is bound in the soil/sediment matrix and not extracted by stomach acid or skin moisture.

Therefore, for chemicals that have been immobilized in soil or sediment by the aging process, the total concentration of the chemical may be a poor indicator of its current relative toxicity. The assumption of 100% oral bioavailability of chemicals in aged soil or sediment is unlikely and has likely resulted in an overestimation of potential risks from incidental ingestion of soil and fringe surface sediments.

While there is uncertainty associated with the use of default DAFs for evaluating dermal exposures, the assumptions and method used are more likely to overestimate than underestimate potential exposures. Further, potential dermal contact risks associated with fringe surface sediment and soil are low (near or below 10^{-6} cancer risk and below an HI of 1). Therefore, the use of the default approach has minimal impact on the conclusions of the BHHRA.

7.3.4.2 Surface Water

The quantification of potential noncancer hazards and cancer risks associated with the surface water pathway followed Exhibit 1-2 in the USEPA RAGS Part E guidance (2004a). Specifically, if dermal assessment was not recommended in USEPA RAGS Part E (2004a), no further evaluation of the dermal pathway was conducted for that COPC. Dermal assessment is not recommended for chemicals with a very large or very small octanol-water partition coefficient value. These chemicals are considered to be outside of the "Effective Prediction Domain," which means that an appropriate K_p value cannot be predicted by the statistical model (USEPA, 2004a). Based on the guidance, the dermal contact pathway associated with 2,3,7,8-TCDD-TEQ, total PCBs, and 4,4-DDT in surface water is considered to be negligible. Given the relatively low concentrations and potential risks/hazards associated with the incidental ingestion pathway, any potential exposure via dermal contact is expected to be negligible.

7.4 Risk Characterization

The potential risk of adverse human health effects is characterized based on estimated potential exposures and potential dose-response relationships. The following areas of uncertainty are introduced in this phase of the risk assessment: the evaluation of potential exposure to multiple chemicals, the combination of upper-bound exposure estimates with upper-bound toxicity estimates, the risks to sensitive populations, and the characterization of background risks.

7.4.1 Risk from Multiple Chemicals

Once potential exposure to and potential risk from each COPC are estimated, the total upper-bound potential risk posed for each receptor is determined by combining the estimated potential health risk from each of the COPCs. Presently, potential carcinogenic effects are added unless evidence exists indicating that the COPCs interact synergistically (a combined effect that is greater than a simple addition of potential individual effects) or antagonistically (a combined effect that is less than a simple addition of potential individual effects) with each other.

For noncarcinogenic effects, the HI should only be summed for chemicals that have the same or similar target endpoints (USEPA, 1989a). The target endpoint is defined as the most sensitive noncarcinogenic health effect used to derive the RfD, RfC or other suitable toxicity value (USEPA, 1989a). Again, there is little evidence to suggest whether those COPCs associated with a common target endpoint are additive, synergistic, antagonistic, or independent in terms of mechanism of action. Whether assuming additivity leads to an underestimation or overestimation of risk is unknown. In this risk assessment, it was assumed that HQs from COPCs with the same target endpoint are additive (e.g., all the HQs from the COPCs with neurological effects are added together). As shown in **Table 4-1**, there is limited overlap in the target endpoints for the COPCs in this BHHRA, suggesting this is a minor area of uncertainty.

Further, PCBs are the dominant COPC driving exceedances of the noncancer target HI of 1. Total PCBs contribute over 99% of the cumulative hazard for the outdoor industrial worker in the transformer shop area (the only area with an HQ greater than 1 for PCBs in soil). Total PCBs contributes approximately 85% of the cumulative noncancer hazard for the angler receptors that consume fish (all age groups) and contact fringe surface sediment and surface water (adult and older child only) in the Anacostia.

7.4.2 Combination of Several Upper-Bound Assumptions

Generally, the goal of a risk assessment is to estimate an upper-bound potential exposure and risk. Most of the assumptions about exposure and toxicity used in this evaluation are representative of statistical upper-bounds or even maxima for each parameter. The result of combining several such upper-bound assumptions is that the final estimate of potential exposure or potential risk is extremely conservative (health-protective).

This is best illustrated by a simple example. Assume that potential risk depends on three variables (soil consumption rate, exposure duration, and CSF). The mean, upper 95% bound and maximum are available for each variable. One way to generate a conservative estimate of potential risk is to multiply the upper 95% bounds of the three parameters in this example. Doing so assumes that the 5% of the people who are most sensitive to the potential carcinogenic effects of a COPC will also ingest soil at a rate that exceeds the rate for 95% of the population and will do so at the same residence for the number of years that represents only 5% of the population. The consequence of combining these assumptions is that the estimated potential risk is representative of 0.0125% of the population (0.05 x 0.05 x 0.05 = 0.000125 x 100 = 0.0125%). Put another way, these serial assumptions overestimate risks for 99.99% of the population or 9,999 out 10,000 people. Thus, the majority of people will have a much lower level of potential risk. The very conservative nature of the potential risks estimated by the risk assessment process is not generally recognized. In reality, the estimates are more conservative than outlined above because more than three upper 95% assumptions are usually used to estimate potential risks.

Alternatively, if the CTE estimate is considered, whereby a single upper 95% assumption of the cancer slope factor is combined with average (50th percentile) assumptions for exposure point concentration and soil ingestion rate, the resulting estimates of potential CTE risk still over-predict the risk to nearly 99% of the potentially exposed population (0.05 x 0.5 x 0.5 = 0.0125 x 100 = 1.25%). This is a conservative and health-protective approach that substantially overestimates the “average” level and even the reasonable maximum level of potential risk.

The risk assessment approach used here employed upper 95% bounds or maxima for most RME exposure and toxicity assumptions. Thus, it produces estimates of potential risk two to three orders of magnitude greater than the risk experienced by the average member of the potentially exposed populations. The CTE scenarios used average estimates of exposure and concentration where possible, but still used the conservative toxicity values, including the use of the upper-bound CSF for PCBs rather than the central-estimate slope factor; thus, even the CTE risk estimates are likely to overestimate risk.

7.4.3 Risks to Sensitive Populations

The health risks estimated in the risk characterization apply to the receptors whose activities and locations were described in the exposure assessment. Some people will always be more sensitive than the average person, and therefore will be at greater risk. Dose-response values used to calculate hazard and risk, however, are frequently derived to account for additional sensitivity of subpopulations (e.g., the uncertainty factor of 10 used to account for intraspecies differences). In addition, as previously discussed, the selection of the study upon which a cancer slope factor is based often involves the most sensitive species and tumor site. Therefore, it is unlikely that this source of uncertainty contributes significantly to the overall uncertainty of the risk assessment.

7.4.4 Characterization of Background

As discussed in Section 6.4, fish consumption risks exceed the target HI of 1 due to PCBs throughout the Anacostia River, including the upstream non-tidal portion of the River. These findings suggest that there are multiple sources of PCBs in the Anacostia River, including upstream of the tidal influence of the Waterside Investigation Area. As stated in guidance, "the presence of high background concentrations of hazardous substances, pollutants, and contaminants found at a site is a factor that should be considered in risk assessment and risk management" (USEPA, 2002e).

There is uncertainty in the characterization of background risks posed by PCBs in fish tissue. A general decline in PCB tissue concentrations over time has been observed in the reach of the Anacostia River within the District (Pinkney, 2017). In summary, while there is some uncertainty in the extent to which background contributes to the Study Area risk, the inclusion of background conditions in the risk assessment results means that the calculated risk cannot be attributed solely, or even primarily, to Site-related constituents.

7.5 Summary of Uncertainty in BHHRA

The assumptions made in the various steps of the BHHRA for the Study Area introduce uncertainty in the results. While the use of assumptions could potentially lead to underestimates of potential risk, the use of numerous conservative (i.e., protective of human health) assumptions, as was done here, more likely overestimates potential risks. Assumptions regarding media concentrations, exposures, and toxicity used in this BHHRA were generally representative of statistical upper-bounds. The result of combining several such upper-bound assumptions is that the final estimate of potential exposure and/or potential risk/hazard is very conservative, and may lie at the extreme upper end, or even above, the distribution of risks in the actual exposed population. Elevated levels of PCBs are present in fish tissue throughout the region, suggesting that a significant portion of the estimated risk is actually a reflection of regional conditions. The results of the BHHRA for the Study Area should be carefully interpreted considering the uncertainty and conservatism associated with the analysis, especially when risk management decisions are made.

8 Summary and Conclusions

This BHHRA was performed for the Study Area located in Washington, DC, in accordance with the approved Risk Assessment Work Plan and Addendum (AECOM, 2012, 2016d) and applicable guidance. The assessment utilized relevant data from Pepco's Landside and Waterside RI activities conducted between January 2013 and July 2018, and DOEE's ARSP (TetraTech, 2018). Based on a Site-specific CSM that considered potential sources, migration pathways, and affected media, the potential routes of exposure to COPCs were identified taking into consideration current and future land uses. Health-protective assumptions and approaches were used to provide a conservative assessment of potential human health risks. The results of the BHHRA will be used to help inform the need for any additional evaluation and/or remedial action at the Study Area.

8.1 Summary of BHHRA for the Study Area

This section summarizes the approach and results of the BHHRA, which was conducted in accordance with the four-step paradigm recommended by USEPA (1989a):

1. Data evaluation and hazard identification
2. Toxicity assessment
3. Exposure assessment
4. Risk characterization

A summary of each of the four steps is presented below.

8.1.1 Data Evaluation and Hazard Identification

The soil, groundwater, sediment, and surface water data collected between 2013 and 2018 in accordance with the DOEE-approved RI/FS Work Plan and addenda (AECOM, 2012, AECOM, 2014a, AECOM, 2014b, AECOM, 2016e) were used in the BHHRA. The RI samples were analyzed for a broad range of chemicals, including inorganics, PCBs, dioxins and furans, pesticides, TPH, VOCs, and SVOCs. The BHHRA data set was augmented with composite samples of fish tissue collected in the Anacostia River under separate DOEE programs. Additionally, the BHHRA fringe surface sediment data set was augmented with fringe surface sediment data collected by DOEE for the ARSP. The combination of these field investigations provided the following BHHRA data set:

Matrix	Number of Abiotic Media Samples for the BHHRA	
	Study Area	Background
Surface soil (0-1 ft bgs)	291	19
Subsurface soil (1 to 16 ft bgs)	623	19
Groundwater	125	14
Fringe surface sediment (0 to 6 inches)	42	42
Surface water	10	10

Species (fillet)	Number of Biotic Media (Tissue) Samples for the BHHRA				
	CSX Bridge to MD State Line	Regional			Background
	Upper Tidal Anacostia	Lower Tidal Anacostia	Lower Potomac	Upper Potomac	Upstream Non-Tidal Anacostia
American eel	--	1	2	1	--
American shad	--	--	1	--	--
Brown bullhead	1	--	1	1	--
Catfish (blue)	1	1	1	--	--
Catfish (channel)	1	1	1	1	--
Common carp	1	1	1	1	--
Largemouth bass	1	1	1	1	19
Northern snakehead	1	--	--	1	1
Smallmouth bass	--	--	--	--	6
Striped bass	--	--	--	1	3
Sunfish	1	1	1	1	--
White perch	--	--	--	1	--
Total	**7**	**6**	**9**	**9**	**29**

The RI data underwent review and validation in accordance with the QAPP and USEPA guidance, and over 99% were found to be reliable and acceptable for use in risk assessment and remedial decision-making.

Based on a conservative screening process, 43 COPCs were identified for further evaluation in the BHHRA. For soil in the Landside Investigation Area, the COPCs included 2,3,7,8-TCDD-TEQ, several inorganics, PCBs, PAHs, and DRO. For groundwater, the only potentially complete exposure pathways identified were vapor intrusion from groundwater into an excavation trench for a construction worker, vapor intrusion from groundwater into the air of a building under a hypothetical future scenario, and discharge to the Anacostia River. Several VOCs, including MTBE, trichloroethylene, tetrachloroethylene, and vinyl chloride, were identified as COPCs in groundwater for the excavation trench pathway. Trichloroethylene, tetrachloroethylene, chloroform, and vinyl chloride were identified as COPCs for the vapor intrusion to indoor air pathway. No exceedances of surface water criteria were identified for groundwater potentially discharging into the Anacostia River after taking into consideration conservative DAFs.

For the Waterside Investigation Area, the COPCs in fringe surface sediment included 2,3,7,8-TCDD-TEQ, several inorganics, PCBs, PAHs, and DRO. COPCs in surface water included 2,3,7,8-TCDD-TEQ, several inorganics, 4,4-DDT, and PCBs. COPCs in Upper and Lower Anacostia fish tissue included arsenic, mercury, pesticides, and PCBs. Of the COPCs identified for fish tissue in the Upper and Lower Anacostia, only arsenic and PCBs were also identified as COPCs for fringe surface sediment and surface water. It should also be noted that several of the chemicals identified as COPCs are also present in upstream, lateral, and atmospheric sources that contribute to the Anacostia River.

8.1.2 Dose-Response Assessment

The dose-response values used in the BHHRA were identified in accordance with USEPA guidance (USEPA, 2003a, 2013). Both cancer and noncancer dose-response values were identified for oral and inhalation exposures. USEPA's DAFs (USEPA, 2004a) were used to evaluate dermal exposures to COPCs in fringe surface sediment and soil.

The majority of dose-response values used in the BHHRA were obtained from the USEPA's primary source of toxicity values, which is the IRIS database (USEPA, 2018b). The selection of dose-response values for COPCs lacking Tier 1 toxicity values followed USEPA's hierarchy of alternative sources of toxicity values (USEPA, 2003a, 2013).

8.1.3 Exposure Assessment

Based on the CSM and consideration of current and future conditions in the Landside Investigation Area, contact with on-Site media is unlikely under the current scenario. Groundwater is not used for drinking water, and direct contact with soil is unlikely based on the limited Site access, tight security, and presence of pavement and/or soil cover across most of the Site. The existing operational and institutional controls in place will continue to provide effective exposure prevention measures in the future. However, in the unlikely event that conditions change in the future, it is possible that receptors may be potentially exposed to on-Site media. Eight exposure areas have been defined for soil and groundwater based on current Site use, as indicated below (see **Figure 3-1**):

- Hypothetical Future Park Land /Green Space
- Warehouse and Laydown Area
- Salvage Yard and Waste Storage Area
- Stores and Fleet Maintenance Area
- Offices and Parking Lot
- Substation #7
- Transformer Shop
- Vehicle Refueling Area

The Waterside Investigation Area was evaluated as one exposure area for direct contact exposures to fringe surface sediment and to surface water. The Upper Anacostia River (upstream of the CSX bridge to the Maryland state line), which includes the Waterside Investigation Area, was evaluated for potential exposure via consumption of fish. Four regional reaches were also evaluated for potential exposure via fish consumption, including the Lower Anacostia River, the Upper Potomac River (upstream of the 14th Street bridge), the Lower Potomac River (downstream of the 14th Street bridge, and the Upstream Non-Tidal Anacostia River background reach (north of the Maryland state line).

Based on the human health CSM developed for the Study Area, the following potential receptors and exposure pathways were identified for quantitative evaluation:

Landside Receptors:

- Current/future construction workers who may be exposed via incidental ingestion of and/or dermal contact with soil (0 to 16 feet bgs) via inhalation of fugitive dust derived from soil, and via inhalation of vapors from groundwater in an excavation trench.
- Future outdoor industrial workers who may be exposed via incidental ingestion of and/or dermal contact with surface soil and via inhalation of fugitive dust derived from surface soil.

- Future indoor industrial workers who may be exposed to VOCs in indoor air resulting from groundwater vapor intrusion, should a building be constructed in an area with volatile COCs in the future.
- Hypothetical future recreational visitors who may be exposed via incidental ingestion of and/or dermal contact with surface soil and via inhalation of fugitive dust derived from surface soil.

Waterside Receptors:

- Anglers who may be exposed via incidental ingestion of and dermal contact with fringe surface sediment and surface water, and via consumption of Upper Anacostia River fish.
- Swimmers and waders who may be exposed via incidental ingestion of and/or dermal contact with fringe surface sediment and surface water within the Waterside Investigation Area.
- Shoreline workers who may be exposed via incidental ingestion of and/or dermal contact with fringe surface sediment and surface water adjacent to the Site.

The BHHRA also included a screening-level evaluation of the potential impact of Site groundwater on the River by comparing estimated in-stream concentrations of chemicals detected in groundwater to applicable surface water screening levels.

Consistent with the approved Risk Assessment Work Plan and Addendum (AECOM, 2012, 2016d), the BHHRA evaluated both RME and CTE scenarios to provide information on a range of potential exposures and risks. Realistic but appropriately conservative exposure parameter values were selected to represent potential exposures under both current and future Site uses. Site-specific information on land uses, populations, and activities were considered in the identification of relevant exposure scenarios and representative parameter assumptions. This included review of available angler surveys to gather information on angler behaviors and consumption practices.

The lower of the 95% UCL of the arithmetic mean and the maximum concentration was used as the exposure point concentration for the RME scenarios, and the mean was used in the evaluation of the CTE scenarios. While PCBs were not detected in surface water, PCBs were conservatively included in the risk calculations for potential surface water exposures using the lowest reporting limit achieved as a proxy EPC.

8.1.4 Risk Characterization

The risk characterization results are discussed below for the Landside and Waterside Investigation Areas, as well as background and regional reaches. For each receptor, the cumulative carcinogenic risks are compared to the USEPA acceptable risk range of 10^{-4} to 10^{-6}. The cumulative noncancer hazards for each receptor are compared to the USEPA goal of protection of an HI of 1 (per target endpoint).

8.1.4.1 Landside Scenarios

The cumulative RME and CTE cancer risks and noncancer hazards for the landside receptors are summarized in the following table.

Landside Receptors – Cumulative Risks/Hazards				
Exposure Area	Cancer		Noncancer [a]	
	RME	CTE	RME	CTE
Current/Future Construction Worker (Adult)				
Hypothetical Future Park Land/Green Space	2E-08	8E-09	1	0.3
Warehouse and Laydown Area	4E-07	7E-08	3	0.5
Salvage Yard and Waste Storage Area	5E-07	1E-07	0.7	0.1
Stores and Fleet Maintenance Area	9E-08	3E-08	0.2	0.07
Offices and Parking Lot	4E-07	8E-08	0.8	0.2
Substation #7	3E-07	3E-08	0.5	0.08
Transformer Shop	2E-06	7E-07	1.6	0.5
Vehicle Refueling Area	4E-08	1E-08	0.2	0.08
Future Outdoor Industrial Worker (Adult)				
Hypothetical Future Park Land/Green Space	1E-06	1E-07	0.3	0.1
Warehouse and Laydown Area	2E-05	1E-06	1	0.2
Salvage Yard and Waste Storage Area	1E-05	1E-06	0.3	0.05
Stores and Fleet Maintenance Area	4E-06	4E-07	0.08	0.03
Offices and Parking Lot	3E-06	4E-07	0.03	0.01
Substation #7	2E-05	6E-07	0.3	0.02
Transformer Shop	2E-03	3E-05	124	8
Vehicle Refueling Area	1E-06	1E-07	0.03	0.01
Future Indoor Industrial Worker (Adult)				
Southern Boundary	2E-5	b	2	b
Northern Boundary	4E-6		0.005	
Downgradient Perimeter	1E-6		0.3	
MW05A	8E-7		0.1	

Landside Receptors – Cumulative Risks/Hazards				
Exposure Area	**Cancer**		**Noncancer [a]**	
Future Recreational Visitor (Older child/teen)				
Hypothetical Future Park Land/Green Space	7E-08	7E-09	0.04	0.009

Notes:
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Highest target endpoint HI
[b] CTE scenario was not included for the screening level vapor intrusion evaluation.

The total potential carcinogenic risks for all Landside receptors are within or below the USEPA target risk range of 10^{-4} to 10^{-6} with the exception of the RME future outdoor industrial worker exposed to surface soil in the transformer shop area. The total potential risk of 2×10^{-3} is driven by PCBs; all COPCs with potential carcinogenic risk greater than 10^{-6} are identified as COCs, as presented in Section 8.2.3.

Target endpoint HIs are below 1 for all Landside receptors under the RME scenario with the following exceptions:

- RME construction worker – inhalation of vanadium as particulates from soil (surface and subsurface) in the warehouse and laydown area; HI of 3 based on respiratory effects.
- RME construction worker – ingestion and dermal contact with PCBs in soil (surface and subsurface) in the transformer shop area; HI of 1.6 based on eye, nail, and immune effects.
- RME outdoor industrial worker – ingestion and dermal contact with PCBs in surface soil in the transformer shop area; HI of 124 based on eye, nail, and immune effects.
- RME future indoor industrial worker – inhalation of tetrachloroethylene, trichloroethylene, and vinyl chloride along the southern property boundary.

8.1.4.2 Waterside Scenarios

The cumulative RME and CTE cancer risks and noncancer hazards for the waterside receptors are summarized in the following table.

Waterside Receptors – Cumulative Risks/Hazards				
Exposure Area	Cancer		Noncancer [a]	
	RME	CTE	RME	CTE
Swimmer Adult/Young Child [a]				
Waterside Investigation Area (Direct Contact) [b]	2E-06	9E-08	0.08	0.008
Wader Adult/Young Child [a]				
Waterside Investigation Area (Direct Contact) [b]	4E-06	2E-07	0.2	0.02
Shoreline Worker				
Waterside Investigation Area (Direct Contact) [b]	4E-06	1E-07	0.09	0.008
Recreational Angler Adult/Young Child [a,c]				
Anacostia River [c] (Fish Consumption and Direct Contact)				
Upper Anacostia (Total PCBs)	4E-05	2E-06	3	0.3
Upper Anacostia (PCB-TEQ)	2E-05	1E-06	0.7	0.06

Notes:
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1. The highest target endpoint HI is shown.
[a] Cancer risks for the swimmer, wader, and angler represent the combined adult and child, and noncancer hazards represent the child only. See Section 6 tables for age-specific risks/hazards.
[b] Includes incidental ingestion and dermal contact with fringe surface sediment and surface water.
[c] Includes incidental ingestion and dermal contact with fringe surface sediment and surface water, and consumption of a mixed fish diet. The Upper Anacostia encompasses the Waterside Investigation Area (see **Figure 3-7**).

Potential cancer risks in the Waterside Investigation Area do not exceed 10^{-4}. The HI exceeds 1 only for the recreational fish consumption pathway. The potential cumulative carcinogenic risk for the RME adult/child recreational angler who is assumed to contact fringe surface sediment and surface water within the Waterside Investigation Area and eat fish caught adjacent to the Site every year for 26 years is 4×10^{-5} (based on total PCBs). Under the CTE scenario, the potential cumulative risk for the adult/child recreational angler is equal to 2×10^{-6}. The highest target endpoint HI for the RME young child recreational angler is 3 and is driven by PCBs in fish tissue (based on total PCBs for eye, nail, and immune effects). Using CTE assumptions, the noncancer HIs for all age groups are below 1. All COPCs with potential carcinogenic risk greater than 10^{-6} or HI greater than 1 are identified as COCs, as presented in Section 8.2.3.

8.1.4.3 Background and Regional River Reaches

The fish consumption RME and CTE cancer risks and noncancer hazards are summarized in the following table.

Regional and Background Reaches– Fish Consumption Risks/Hazards				
Exposure Area	**Cancer [a]**		**Noncancer [a]**	
	RME	**CTE**	**RME**	**CTE**
Recreational Angler Adult/Young Child				
Background Area [b] (Fish Consumption)				
Upstream Non-Tidal Anacostia (Total PCBs)	7E-06	5E-07	0.6	0.1
Upstream Non-Tidal Anacostia (PCB-TEQ)	8E-06	5E-07	0.6	0.1
Regional Reaches [b] (Fish Consumption)				
Lower Anacostia (Total PCBs)	7E-05	3E-06	5	0.5
Lower Anacostia (PCB-TEQ)	9E-05	4E-06	3	0.3
Lower Potomac (Total PCBs)	6E-05	2E-06	2	0.3
Lower Potomac (PCB-TEQ)	6E-05	2E-06	1	0.1
Upper Potomac (Total PCBs)	2E-04	5E-06	10	0.7
Upper Potomac (PCB-TEQ)	2E-04	7E-06	9	0.5

Notes:
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1. The highest target endpoint HI is shown.
[a] Cancer risks represent the combined adult and child, and noncancer hazards represent the child only. See Section 6 tables for age-specific risks/hazards.
[b] Includes consumption of a mixed fish diet only.
[c] CTE scenario was not included for the high-end consuming angler scenario.

The potential cumulative carcinogenic risks for the RME adult/child recreational angler who eats fish from river reaches other than the Upper Anacostia (Waterside Investigation Area) are 2×10^{-4} for the Upper Potomac, 6×10^{-5} for the Lower Potomac, and 7×10^{-6} for the Upstream Non-Tidal Anacostia background (based on total PCBs). In the Lower Anacostia River, potential cumulative carcinogenic risk for the RME adult/child recreational angler is 7×10^{-5} (based on total PCBs). In all of these fish consumption scenarios, potential risks are driven mainly by PCBs, with 4,4-DDE, dieldrin, heptachlor epoxide, and arsenic contributing to a lesser extent in select areas.

The total potential HI for the RME recreational angler in the background and regional reaches exceeds the target noncancer HI of 1 except for the Upstream Non-Tidal Anacostia background reach. The exceedance of the noncancer target HI of 1 is due to PCBs in fish tissue (based on both total PCBs for eye, nail, and immune effects and PCB-TEQ for reproductive and developmental effects). For the young child age group, which has the highest noncancer hazards, RME HIs for the background and regional reaches range from 0.6 (Upstream Non-Tidal Anacostia) to 10 (Upper Potomac, total PCBs). Using CTE assumptions, the noncancer HIs for all age groups and areas are below 1.

As discussed in Section 7.3.2, potential risks and hazards for the recreational receptor are dependent on the species consumed. For example, based on consumption of a diet including catfish only (which is a preferred species based on local angler surveys), the HI for the young child in the Upper Anacostia decreases by almost 30%, and based on consumption of largemouth bass only, decreases to an acceptable HI of 1.

As noted in 7.3.2.2, potential risks and hazards for the high-end consuming angler exceed a cancer risk level of 10^{-4} in all but the Upstream Non-Tidal Anacostia River reach, where the cancer risk is within USEPA's risk range. The HI exceeds 1 for all reaches. As for the recreational angler, the highest potential total PCB risks for the high-end consuming angler are in the Upper Potomac.

8.2 Conclusions

The conclusions of the BHHRA for the Study Area are described in this section.

8.2.1 Landside Investigation Area

Potential exposures to on-Site surface and subsurface soils are currently incomplete due to perimeter fencing, round-the-clock Site security, and the presence of pavement or gravel across the vast majority of the Site. The current lack of access to soil is expected to continue into the foreseeable future. However, the potential for future direct contact exposures to surface and subsurface soil was evaluated. It was also assumed that a construction worker may be potentially exposed via inhalation of vapors from groundwater in an excavation trench. The total potential carcinogenic risk and noncarcinogenic hazards for all Landside receptor scenarios are within or below the USEPA target risk range of 10^{-4} to 10^{-6} and below a target endpoint-specific HI of 1 with the exception of the following:

- RME construction worker in the warehouse and laydown area due to vanadium in soil
- RME construction worker in the transformer shop due to total PCBs in soil
- RME future outdoor industrial worker in the transformer shop due to total PCBs in soil
- RME future indoor industrial worker due to chloroform along the northern boundary and tetrachloroethylene, trichloroethylene, and vinyl chloride in groundwater along the southern property boundary

The Landside receptor scenarios with risks above or within the risk range of 10^{-6} to 10^{-4} or with HIs above 1 were described above in Section 8.1.4.1, and include direct contact with soil (2,3,7,8-TCDD-TEQ, vanadium, total PCBs) and inhalation of VOCs in indoor air (future building scenario only)

Migration of chemicals in Site groundwater to the Anacostia River was also evaluated. In-stream concentrations of chemicals detected in groundwater at the downgradient edge of the property were modeled using conservative dilution attenuation factors. No modeled in-stream concentrations exceeded state and federal surface water screening levels, which indicates that Site groundwater is not adversely impacting the Anacostia River.

8.2.2 Waterside Investigation Area

- None of the potential cumulative receptor carcinogenic risks for the recreational angler exceed the upper end of USEPA's target risk range of 10^{-6} to 10^{-4} for the Waterside Investigation Area for the RME scenario. Recreational angler risks within the risk range of 10^{-6} to 10^{-4} were described above in Section 8.1.4.2. Noncarcinogenic hazards for the recreational angler exceed USEPA's target of an HI of 1 for consumption of Upper Anacostia River fish, as well as consumption of fish from the Upper Potomac River and Lower Potomac and Lower Anacostia Rivers for the RME scenario. The HI is less than 1 for the Upstream Non-Tidal Anacostia River (background area). The HI for fish consumption is less than 1 for all receptors in all areas under the CTE scenario.
- Potential human health risks to recreational receptors and workers posed by direct contact with fringe surface sediment and surface water in the Waterside Investigation Area are within or below USEPA's target risk levels. Potential risks within the risk range of 10^{-6} to 10^{-4} were described above in Section 8.1.4.2 and direct contact with fringe surface sediment (2,3,7,8-TCDD-TEQ).
- PCBs in fish tissue are the dominant COPC and medium driving potential risk; other COPCs contribute much less to cumulative risk*.* PCBs in fish tissue were evaluated separately as total PCBs and as PCB-TEQ. There was little difference between estimated fish consumption cancer risks based on total PCBs and PCB-TEQ. The potential noncancer hazards based on PCB-TEQ were generally lower than corresponding noncancer hazards based on total PCBs.
- Fish consumption hazards estimated using data collected from sampling locations throughout the tidal Anacostia and Potomac Rivers exceed the noncancer target HI of 1; these findings suggest multiple sources of PCBs in the River.

As noted in Section 7.1.2, the COPC concentrations detected in the fish tissue composite samples likely represent conditions throughout the approximately 3.2-mile Upper Anacostia River sampling area and may not be representative of conditions in the Waterside Investigation Area.

8.2.3 Potential COCs

COPCs with a potential risk above 1 x 10^{-6} are summarized in the tables below.

Potential COC	Risk/HI	Landside Investigation Area - Soil			
		Warehouse and Laydown Area	Salvage Yard and Storage Area	Substation #7	Transformer Shop
2,3,7,8-TCDD-TEQ	Risk	--	4E-06[a]	--	--
Vanadium	HI	3[b]	--	--	--
Total PCBs	Risk	5E-06[a]	2E-06[a]	4E-6[a]	2E-03[a]
	HI	--	--	--	124[a] 1.6[b]

Notes:
-- Indicates that risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Future outdoor industrial worker surface soil (0-1 foot bgs).
[b] Current/future construction worker soil (0-16 feet bgs).

COPC	Risk/HI	Landside Investigation Area - Future Vapor Intrusion Pathway[a]	
		Southern Boundary	Northern Boundary (DP-60)
Chloroform	Risk	--	4E-06
Tetrachloroethylene	Risk	7E-06	--
	HI	2	--
Trichloroethylene	Risk	6E-06	--
	HI	2	--
Vinyl Chloride	Risk	2E-06	--

Notes:
-- Indicates that risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Future indoor industrial worker, assuming buildings are constructed in these areas.

Potential COC	Risk/HI	Fish Tissue [a]	Fringe Surface Sediment
		Upper Anacostia	Pepco Waterside Investigation Area
2,3,7,8-TCDD-TEQ	Risk	--	2E-06 [a] 3E-06 [b,c]
Total PCBs	Risk	3E-05	--
	HI	3	--
PCB-TEQ	Risk	1E-05	--
Dieldrin	Risk	5E-06	--

Notes:
-- Indicates that risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Current/future recreational angler.
[b] Current/future shoreline worker.
[c] Current/future wader.

Potential fish consumption risks and hazards were also calculated for the background and other regional river reaches to provide important context for the Upper Anacostia area. For comparative purposes, the table below presents the chemicals with potential risks greater than 10^{-6} or a target endpoint HI of 1; the hazard value representing the highest target endpoint HI is presented. All of the chemicals identified as potential COCs in the Upper Anacostia area for fish consumption are also identified in the regional river reaches, and in many cases, at higher risk and hazard levels. These results are indicative of a regional impact on fish tissue body burdens that may be attributable, at least in part, to sources other than sediment within the Upper Anacostia River reach or the Waterside Investigation Area in particular.

Chemical	Risk/ HI	Fish Tissue [a]			
		Regional Reaches			Background Area
		Lower Anacostia	Lower Potomac	Upper Potomac	Non-tidal Anacostia
Arsenic	Risk	2E-06	3E-05	3E-06	--
Total PCBs	Risk	5E-05	2E-05	1E-04	3E-06
	HI	5	2	14	--
PCB-TEQ	Risk	7E-05	3E-05	2E-04	4E-06
	HI	3	--	9	--
4,4-DDE	Risk	--	--	4E-06	
Dieldrin	Risk	1E-05	5.0E-06	2E-05	
Heptachlor epoxide	Risk	2E-06	--	--	

Notes:
-- Indicates that risk is less than or equal to 10^{-6} or HI is less than or equal to 1.
Blue highlighting indicates that cumulative risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow Highlighting indicates that cumulative risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[a] Current/future recreational angler.

As with all risk assessments, assumptions have been made about variables and processes that are not fully known, such as human behavior, chemical toxicity, or environmental concentrations. While the use of assumptions leads to uncertainty, it is important to note that the assumptions and approaches used in this BHHRA are conservative, such that risks are much more likely to be overestimated than underestimated. In addition, information regarding risks associated with conditions in background and other regional areas should be carefully considered in risk management decision-making for the Study Area.

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Tables

Table 3-1
Soil Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Anacostia Park Property	KMY02	SUSKMY0200N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY03	SUSKMY0300N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY03	SUSKMY0300R	5/15/2018	FD	SUSKMY0300N	WP#3-2018	Surface	0	1
Anacostia Park Property	KMY04	SUSKMY0400N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY05	SUSKMY0500N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY07	SUSKMY0700N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY08	SUSKMY0800N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY09	SUSKMY0900N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY10	SUSKMY1000N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY12	SUSKMY1200N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY13	SUSKMY1300N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY14	SUSKMY1400N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY15	SUSKMY1500N	5/15/2018	N		WP#3-2018	Surface	0	1
Anacostia Park Property	KMY-DU01	SUSNPSMI0100N	4/12/2017	N		WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU02	SUSNPSMI0200N	4/12/2017	N		WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU03	SUSNPSMI0300N	4/13/2017	N		WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU03	SUSNPSMI0300N1	4/13/2017	N		WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU03	SUSNPSMI0300N2	4/13/2017	N		WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU03	SUSNPSMI0300N3	4/13/2017	N		WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU03	SUSNPSMI0300R1	4/13/2017	FD	SUSNPSMI0300N	WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU03	SUSNPSMI0300R2	4/13/2017	FD	SUSNPSMI0300N	WP#3-2017	Surface	0	1
Anacostia Park Property	KMY-DU01	DPSNPS0105N	4/20/2017	N		WP#3-2017	Subsurface	5	6
Anacostia Park Property	KMY-DU01	DPSNPS0110N	4/20/2017	N		WP#3-2017	Subsurface	10	11
Anacostia Park Property	KMY-DU01	DPSNPS0115N	4/20/2017	N		WP#3-2017	Subsurface	15	16
Anacostia Park Property	KMY-DU02	DPSNPS0205N	4/21/2017	N		WP#3-2017	Subsurface	5	6
Anacostia Park Property	KMY-DU02	DPSNPS0210N	4/21/2017	N		WP#3-2017	Subsurface	10	11
Anacostia Park Property	KMY-DU02	DPSNPS0215N	4/21/2017	N		WP#3-2017	Subsurface	15	16
Anacostia Park Property	KMY-DU03	DPSNPS0305N	4/21/2017	N		WP#3-2017	Subsurface	5	6
Anacostia Park Property	KMY-DU03	DPSNPS0310N	4/21/2017	N		WP#3-2017	Subsurface	10	11
Anacostia Park Property	KMY-DU03	DPSNPS0315N	4/21/2017	N		WP#3-2017	Subsurface	15	16
Future Park/Green	SB2	SBS0200N	1/25/2017	N		WP#3-2017	Surface	0	1
Future Park/Green	SUSDP01	SUS0100N	2/4/2013	N		Phase1-2013	Surface	0.33	1
Future Park/Green	SUSDP01	SUS0100R	2/4/2013	FD	SUS0100N	Phase1-2013	Surface	0.33	1
Future Park/Green	SUSDP02	SUS0200N	2/4/2013	N		Phase1-2013	Surface	0.33	0.83
Future Park/Green	SUSDP02	SUS02F00N	1/25/2017	N		WP#3-2017	Surface	0	1
Future Park/Green	DP36	DPS3605N	5/17/2013	N		Phase2-2013	Subsurface	4.5	5.5
Future Park/Green	DP36	DPS3610N	5/20/2013	N		Phase2-2013	Subsurface	9.5	10.5
Future Park/Green	DP36	DPS3610N2	6/13/2013	N		Phase2-2013	Subsurface	9.5	10.5
Future Park/Green	DP36	DPS3615N	5/20/2013	N		Phase2-2013	Subsurface	14.5	15.5
Future Park/Green	SB2	SBS0201N	1/25/2017	N		WP#3-2017	Subsurface	1	2
Future Park/Green	SB2	SBS0202-05N	1/25/2017	N		WP#3-2017	Subsurface	2	5
Future Park/Green	SB2	SBS0205-10N	1/26/2017	N		WP#3-2017	Subsurface	5	10
Future Park/Green	SB2	SBS0210-15N	1/26/2017	N		WP#3-2017	Subsurface	10	15
Future Park/Green	SUSDP01	DPS0103N	5/20/2013	N		Phase2-2013	Subsurface	2.5	3.5
Future Park/Green	SUSDP01	DPS0110N	5/20/2013	N		Phase2-2013	Subsurface	9.5	10.5
Future Park/Green	SUSDP01	DPS0110N2	6/13/2013	N		Phase2-2013	Subsurface	9.5	10.5
Future Park/Green	SUSDP01	DPS0115N	5/20/2013	N		Phase2-2013	Subsurface	14	15
Future Park/Green	SUSDP02	DPS0205N	5/14/2013	N		Phase2-2013	Subsurface	4.5	5.5
Future Park/Green	SUSDP02	DPS0210N	5/20/2013	N		Phase2-2013	Subsurface	9.5	10.5
Future Park/Green	SUSDP02	DPS0210N2	6/13/2013	N		Phase2-2013	Subsurface	9.5	10.5
Future Park/Green	SUSDP02	DPS0215N	5/20/2013	N		Phase2-2013	Subsurface	14.5	15.5
Future Park/Green	SUSDP02	DPS0215N2	6/13/2013	N		Phase2-2013	Subsurface	14.5	15.5
Future Park/Green	SUSDP02	DPS02F01N	1/25/2017	N		WP#3-2017	Subsurface	1	2
Future Park/Green	SUSDP02	DPS02F02-05N	1/25/2017	N		WP#3-2017	Subsurface	2	5
Maintenance	SUS181A	SUS181A00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181B	SUS181B00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181C	SUS181C00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181C	SUS181C00R	1/25/2017	FD	SUS181C00N	WP#3-2017	Surface	0	1
Maintenance	SUS181D	SUS181D00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181E	SUS181E00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181F	SUS181F00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181G	SUS181G00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUS181H	SUS181H00N	1/25/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP15	SUS1500N	2/6/2013	N		Phase1-2013	Surface	0.17	1
Maintenance	SUSDP15	SUS15F00N	1/30/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP15-1C	SUS151C00N	8/14/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP15-1G	SUS151G00N	8/15/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP16	SUS1600N	2/6/2013	N		Phase1-2013	Surface	0.5	1

Table 3-1
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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Maintenance	SUSDP17	SUS1700N	2/6/2013	N		Phase1-2013	Surface	0.5	1
Maintenance	SUSDP18	SUS1800N	2/6/2013	N		Phase1-2013	Surface	0	1
Maintenance	SUSDP18	SUS18F00N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP19-7NW	SUS197NW00N	4/5/2018	N		WP#3-2018	Surface	0	1
Maintenance	SUSDP48	SUS4800N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP48	SUS4800R	1/26/2017	FD	SUS4800N	WP#3-2017	Surface	0	1
Maintenance	SUSDP48	SUS48F00N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP48-1C	SUS481C00N	8/15/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP48-2E	SUS482E00N	1/30/2018	N		WP#3-2018	Surface	0	1
Maintenance	SUSDP49	SUS4900N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP49-1C	SUS491C00N	8/11/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP49-1E	SUS491E00N	8/11/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP51	SUS5100N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP51	SUS51F00N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP52	SUS5200N	1/26/2017	N		WP#3-2017	Surface	0	1
Maintenance	SUSDP65	SUS6500N	1/30/2018	N		WP#3-2018	Surface	0	1
Maintenance	DP32	DPS3210N	4/1/2013	N		Phase2-2013	Subsurface	9.5	10.5
Maintenance	DP32	DPS3210R	4/1/2013	FD	DPS3210N	Phase2-2013	Subsurface	9.5	10.5
Maintenance	DP45	DPS4503N	5/23/2013	N		Phase2-2013	Subsurface	2.5	3.5
Maintenance	DP45	DPS4510N	6/4/2013	N		Phase2-2013	Subsurface	9.5	10.5
Maintenance	DP45	DPS4515N	6/4/2013	N		Phase2-2013	Subsurface	14.5	15.5
Maintenance	SUSDP15	DPS1504N	5/21/2013	N		Phase2-2013	Subsurface	3.5	4.5
Maintenance	SUSDP15	DPS1510N	6/6/2013	N		Phase2-2013	Subsurface	9.5	10.5
Maintenance	SUSDP15	DPS1515N	6/10/2013	N		Phase2-2013	Subsurface	14.5	15.5
Maintenance	SUSDP15	DPS15F01N	1/30/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP15	DPS15F02-05N	1/30/2017	N		WP#3-2017	Subsurface	2	5
Maintenance	SUSDP15	DPS15F05-10N	2/2/2017	N		WP#3-2017	Subsurface	5	10
Maintenance	SUSDP15	DPS15F10-15N	2/2/2017	N		WP#3-2017	Subsurface	10	15
Maintenance	SUSDP15-1C	DPS151C01N	8/14/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP15-1C	DPS151C01R	8/14/2017	FD	DPS151C01N	WP#3-2017	Subsurface	1	2
Maintenance	SUSDP15-1C	DPS151C02N	8/14/2017	N		WP#3-2017	Subsurface	2	3
Maintenance	SUSDP15-1C	DPS151C03N	8/14/2017	N		WP#3-2017	Subsurface	3	4
Maintenance	SUSDP15-1C	DPS151C05N	8/22/2017	N		WP#3-2017	Subsurface	5	6
Maintenance	SUSDP15-1C	DPS151C06N	8/22/2017	N		WP#3-2017	Subsurface	6	7
Maintenance	SUSDP15-1C	DPS151C07N	8/22/2017	N		WP#3-2017	Subsurface	7	8
Maintenance	SUSDP15-1C	DPS151C08N	8/22/2017	N		WP#3-2017	Subsurface	8	9
Maintenance	SUSDP15-1C	DPS151C09N	8/22/2017	N		WP#3-2017	Subsurface	9	10
Maintenance	SUSDP15-1C	DPS151C10N	8/22/2017	N		WP#3-2017	Subsurface	10	11
Maintenance	SUSDP15-1G	DPS151G01N	8/15/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP15-1G	DPS151G05N	8/30/2017	N		WP#3-2017	Subsurface	5	6
Maintenance	SUSDP15-1G	DPS151G06N	8/30/2017	N		WP#3-2017	Subsurface	6	7
Maintenance	SUSDP15-1G	DPS151G07N	8/30/2017	N		WP#3-2017	Subsurface	7	8
Maintenance	SUSDP15-1G	DPS151G08N	8/30/2017	N		WP#3-2017	Subsurface	8	9
Maintenance	SUSDP15-1G	DPS151G09N	8/30/2017	N		WP#3-2017	Subsurface	9	10
Maintenance	SUSDP15-1G	DPS151G10N	8/30/2017	N		WP#3-2017	Subsurface	10	11
Maintenance	SUSDP16	DPS1605N	5/15/2013	N		Phase2-2013	Subsurface	4.5	5.5
Maintenance	SUSDP16	DPS1610N	6/10/2013	N		Phase2-2013	Subsurface	9.5	10.5
Maintenance	SUSDP16	DPS1615N	6/10/2013	N		Phase2-2013	Subsurface	14.5	15.5
Maintenance	SUSDP16	DPS1615R	6/10/2013	FD	DPS1615N	Phase2-2013	Subsurface	14.5	15.5
Maintenance	SUSDP17	DPS1705N	5/23/2013	N		Phase2-2013	Subsurface	4.5	5.5
Maintenance	SUSDP17	DPS1710N	6/11/2013	N		Phase2-2013	Subsurface	9.5	10.5
Maintenance	SUSDP17	DPS1715N	6/11/2013	N		Phase2-2013	Subsurface	14	15
Maintenance	SUSDP18	DPS1803N	5/23/2013	N		Phase2-2013	Subsurface	2.5	3.5
Maintenance	SUSDP18	DPS1810N	6/4/2013	N		Phase2-2013	Subsurface	9.5	10.5
Maintenance	SUSDP18	DPS18F01N	1/26/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP18	DPS18F02-05N	1/26/2017	N		WP#3-2017	Subsurface	2	5
Maintenance	SUSDP19-7NW	DPS197NW01N	4/5/2018	N		WP#3-2018	Subsurface	1	2
Maintenance	SUSDP19-7NW	DPS197NW02N	4/5/2018	N		WP#3-2018	Subsurface	2	3
Maintenance	SUSDP19-7NW	DPS197NW03N	4/5/2018	N		WP#3-2018	Subsurface	3	4
Maintenance	SUSDP19-7NW	DPS197NW04N	4/5/2018	N		WP#3-2018	Subsurface	4	5
Maintenance	SUSDP48	DPS48F01N	1/26/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP48	DPS48F01R	1/26/2017	FD	DPS48F01N	WP#3-2017	Subsurface	1	2
Maintenance	SUSDP48	DPS48F02-05N	1/26/2017	N		WP#3-2017	Subsurface	2	5
Maintenance	SUSDP48	DPS48F02-05R	1/26/2017	FD	DPS48F02-05N	WP#3-2017	Subsurface	2	5
Maintenance	SUSDP48	DPS48F05-10N	1/27/2017	N		WP#3-2017	Subsurface	5	10
Maintenance	SUSDP48	DPS48F10-15N	1/27/2017	N		WP#3-2017	Subsurface	10	15
Maintenance	SUSDP48-1C	DPS481C01N	8/15/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP48-1E	DPS481E01N	8/16/2017	N		WP#3-2017	Subsurface	1	2

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Maintenance	SUSDP48-1G	DPS481G01N	8/16/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP48-2E	DPS482E01N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Maintenance	SUSDP49	DPS4901N	8/11/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP49	DPS4901R	8/11/2017	FD	DPS4901N	WP#3-2017	Subsurface	1	2
Maintenance	SUSDP49	DPS4902N	8/11/2017	N		WP#3-2017	Subsurface	2	3
Maintenance	SUSDP49-1C	DPS491C01N	8/11/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP49-1C	DPS491C02N	8/11/2017	N		WP#3-2017	Subsurface	2	3
Maintenance	SUSDP49-1E	DPS491E01N	8/11/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP49-1E	DPS491E02N	8/11/2017	N		WP#3-2017	Subsurface	2	3
Maintenance	SUSDP49-1E	DPS491E03N	8/11/2017	N		WP#3-2017	Subsurface	3	4
Maintenance	SUSDP49-1E	DPS491E04N	8/11/2017	N		WP#3-2017	Subsurface	4	5
Maintenance	SUSDP51	DPS51F01N	1/26/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP51	DPS51F02-05N	1/26/2017	N		WP#3-2017	Subsurface	2	5
Maintenance	SUSDP51	DPS51F05-10N	1/27/2017	N		WP#3-2017	Subsurface	5	10
Maintenance	SUSDP51	DPS51F10-15N	1/27/2017	N		WP#3-2017	Subsurface	10	15
Maintenance	SUSDP64	DPS6401N	8/10/2017	N		WP#3-2017	Subsurface	1	2
Maintenance	SUSDP65	DPS6501N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUS19-2E	SUS192E00N	3/22/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP09	SUS0900N	2/5/2013	N		Phase1-2013	Surface	0	1
Offices/Parking	SUSDP14	SUS1400N	2/6/2013	N		Phase1-2013	Surface	0.17	1
Offices/Parking	SUSDP19	SUS1900N	2/6/2013	N		Phase1-2013	Surface	0.83	1
Offices/Parking	SUSDP19	SUS19F00N	1/30/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1A	SUS191A00N	2/1/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1B	SUS191B00N	2/1/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1C	SUS191C00N	1/27/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1C	SUS191C00R	1/27/2017	FD	SUS191C00N	WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1D	SUS191D00N	8/22/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1G	SUS191G00N	2/1/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-1H	SUS191H00N	2/1/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-2D	SUS192D00N	3/22/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-2D	SUS192D00R	3/22/2017	FD	SUS192D00N	WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-2M	SUS192M00N	3/23/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-2N	SUS192N00N	3/23/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-2O	SUS192O00N	3/23/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-2P	SUS192P00N	3/23/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-3S	SUS193S00N	8/24/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-3V	SUS193V00N	8/24/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP19-4N	SUS194N00N	1/26/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-4NW	SUS194NW00N	2/1/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-4W	SUS194W00N	2/1/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-5N	SUS195N00N	2/21/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-5NW	SUS195NW00N	2/21/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-5W	SUS195W00N	2/21/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-6N	SUS196N00N	3/15/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-6NW	SUS196NW00N	3/15/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-6W	SUS196W00N	3/16/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-7N	SUS197N00N	4/5/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP19-7W	SUS197W00N	4/5/2018	N		WP#3-2018	Surface	0	1
Offices/Parking	SUSDP53	SUS53F00N	1/31/2017	N		WP#3-2017	Surface	0	1
Offices/Parking	SUSDP09	DPS0905N	5/17/2013	N		Phase2-2013	Subsurface	4.5	5.5
Offices/Parking	SUSDP09	DPS0910N	6/11/2013	N		Phase2-2013	Subsurface	9.5	10.5
Offices/Parking	SUSDP09	DPS0915N	6/11/2013	N		Phase2-2013	Subsurface	14.5	15.5
Offices/Parking	SUSDP14	DPS1403N	5/22/2013	N		Phase2-2013	Subsurface	2.5	3.5
Offices/Parking	SUSDP14	DPS1410N	6/6/2013	N		Phase2-2013	Subsurface	9.5	10.5
Offices/Parking	SUSDP14	DPS1415N	6/6/2013	N		Phase2-2013	Subsurface	14.5	15.5
Offices/Parking	SUSDP19	DPS1902N	5/23/2013	N		Phase2-2013	Subsurface	1.5	2.5
Offices/Parking	SUSDP19	DPS1902R	5/23/2013	FD	DPS1902N	Phase2-2013	Subsurface	1.5	2.5
Offices/Parking	SUSDP19	DPS1910N	6/5/2013	N		Phase2-2013	Subsurface	9.5	10.5
Offices/Parking	SUSDP19	DPS1915N	6/5/2013	N		Phase2-2013	Subsurface	14.5	15.5
Offices/Parking	SUSDP19	DPS1915R	6/5/2013	FD	DPS1915N	Phase2-2013	Subsurface	14.5	15.5
Offices/Parking	SUSDP19	DPS19F01N	1/30/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19	DPS19F02-05N	1/30/2017	N		WP#3-2017	Subsurface	2	5
Offices/Parking	SUSDP19	DPS19F05-10N	2/8/2017	N		WP#3-2017	Subsurface	5	10
Offices/Parking	SUSDP19	DPS19F10-15N	2/8/2017	N		WP#3-2017	Subsurface	10	15
Offices/Parking	SUSDP19-1A	DPS191A02N	2/1/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1A	DPS191A10N	2/8/2017	N		WP#3-2017	Subsurface	10	11
Offices/Parking	SUSDP19-1A	DPS191A15N	2/8/2017	N		WP#3-2017	Subsurface	15	16
Offices/Parking	SUSDP19-1B	DPS191B02N	2/1/2017	N		WP#3-2017	Subsurface	2	3

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Offices/Parking	SUSDP19-1B	DPS191B10N	2/8/2017	N		WP#3-2017	Subsurface	10	11
Offices/Parking	SUSDP19-1B	DPS191B15N	2/8/2017	N		WP#3-2017	Subsurface	15	16
Offices/Parking	SUSDP19-1C	DPS191C10N	2/8/2017	N		WP#3-2017	Subsurface	10	11
Offices/Parking	SUSDP19-1C	DPS191C15N	2/8/2017	N		WP#3-2017	Subsurface	15	16
Offices/Parking	SUSDP19-1C	SUS191C02N	1/27/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1C	SUS191C02R	1/27/2017	FD	SUS191C02N	WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1D	DPS191D01N	8/22/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-1D	DPS191D01R	8/22/2017	FD	DPS191D01N	WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-1D	DPS191D02N	8/22/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1D	DPS191D03N	8/22/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-1D	DPS191D04N	8/22/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-1D	DPS191D05N	8/22/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-1F	DPS191F01N	8/22/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-1F	DPS191F02N	8/22/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1F	DPS191F03N	8/22/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-1F	DPS191F04N	8/22/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-1G	DPS191G02N	2/1/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1G	DPS191G10N	2/8/2017	N		WP#3-2017	Subsurface	10	11
Offices/Parking	SUSDP19-1G	DPS191G15N	2/8/2017	N		WP#3-2017	Subsurface	15	16
Offices/Parking	SUSDP19-1H	DPS191H02N	2/1/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-1H	DPS191H10N	2/8/2017	N		WP#3-2017	Subsurface	10	11
Offices/Parking	SUSDP19-1H	DPS191H15N	2/8/2017	N		WP#3-2017	Subsurface	15	16
Offices/Parking	SUSDP19-2D	DPS192D01N	8/17/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-2D	DPS192D02N	8/17/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-2D	DPS192D03N	8/17/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-2D	DPS192D04N	8/17/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-2D	DPS192D05N	8/17/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-2M	DPS192M03N	8/16/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-2M	DPS192M03R	8/16/2017	FD	DPS192M03N	WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-2M	DPS192M04N	8/16/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-2M	DPS192M05N	8/16/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-2M	SUS192M02N	3/23/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-2N	SUS192N02N	3/23/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-2O	DPS192O03N	8/23/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-2O	DPS192O04N	8/23/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-2O	DPS192O05N	8/23/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-2O	DPS192O06N	3/28/2018	N		WP#3-2018	Subsurface	6	7
Offices/Parking	SUSDP19-2O	DPS192O07N	3/28/2018	N		WP#3-2018	Subsurface	7	8
Offices/Parking	SUSDP19-2O	DPS192O10N	3/28/2018	N		WP#3-2018	Subsurface	10	11
Offices/Parking	SUSDP19-2O	DPS192O11N	3/28/2018	N		WP#3-2018	Subsurface	11	12
Offices/Parking	SUSDP19-2O	SUS192O02N	3/23/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-2P	DPS192P03N	8/17/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-2P	DPS192P04N	8/17/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-2P	DPS192P05N	8/17/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-2P	SUS192P02N	3/23/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-3F	DPS193F01N	8/18/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-3F	DPS193F02N	8/18/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-3F	DPS193F03N	8/18/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-3F	DPS193F04N	8/18/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-3F	DPS193F05N	8/18/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-3S	DPS193S01N	8/24/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-3S	DPS193S01R	8/24/2017	FD	DPS193S01N	WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-3S	DPS193S02N	8/24/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-3S	DPS193S03N	8/24/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-3S	DPS193S04N	8/24/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-3S	DPS193S05N	8/24/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-3V	DPS193V01N	8/24/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-3V	DPS193V02N	8/24/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-3V	DPS193V03N	8/24/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-3V	DPS193V04N	8/24/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-3V	DPS193V05N	8/24/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-3X	DPS193X01N	8/18/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP19-3X	DPS193X02N	8/18/2017	N		WP#3-2017	Subsurface	2	3
Offices/Parking	SUSDP19-3X	DPS193X03N	8/18/2017	N		WP#3-2017	Subsurface	3	4
Offices/Parking	SUSDP19-3X	DPS193X04N	8/18/2017	N		WP#3-2017	Subsurface	4	5
Offices/Parking	SUSDP19-3X	DPS193X05N	8/18/2017	N		WP#3-2017	Subsurface	5	6
Offices/Parking	SUSDP19-4N	DPS194N01N	1/26/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-4N	DPS194N02N	1/26/2018	N		WP#3-2018	Subsurface	2	3

Table 3-1
Soil Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Offices/Parking	SUSDP19-4N	DPS194N02R	1/26/2018	FD	DPS194N02N	WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-4N	DPS194N03N	1/26/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-4N	DPS194N04N	1/26/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-4N	DPS194N05N	1/26/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP19-4N	DPS194N06N	3/28/2018	N		WP#3-2018	Subsurface	6	7
Offices/Parking	SUSDP19-4N	DPS194N07N	3/28/2018	N		WP#3-2018	Subsurface	7	8
Offices/Parking	SUSDP19-4N	DPS194N10N	3/28/2018	N		WP#3-2018	Subsurface	10	11
Offices/Parking	SUSDP19-4N	DPS194N11N	3/28/2018	N		WP#3-2018	Subsurface	11	12
Offices/Parking	SUSDP19-4NW	DPS194NW01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-4NW	DPS194NW02N	2/1/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-4NW	DPS194NW03N	2/1/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-4NW	DPS194NW04N	2/1/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-4NW	DPS194NW05N	2/1/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP19-4NW	DPS194NW06N	3/28/2018	N		WP#3-2018	Subsurface	6	7
Offices/Parking	SUSDP19-4NW	DPS194NW07N	3/28/2018	N		WP#3-2018	Subsurface	7	8
Offices/Parking	SUSDP19-4NW	DPS194NW10N	3/28/2018	N		WP#3-2018	Subsurface	10	11
Offices/Parking	SUSDP19-4NW	DPS194NW11N	3/28/2018	N		WP#3-2018	Subsurface	11	12
Offices/Parking	SUSDP19-4W	DPS194W01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-4W	DPS194W01R	2/1/2018	FD	DPS194W01N	WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-4W	DPS194W02N	2/1/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-4W	DPS194W03N	2/1/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-4W	DPS194W04N	2/1/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-4W	DPS194W05N	2/1/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP19-5N	DPS195N01N	2/21/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-5N	DPS195N02N	2/21/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-5N	DPS195N03N	2/21/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-5N	DPS195N04N	2/21/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-5N	DPS195N05N	2/21/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP19-5NW	DPS195NW01N	2/21/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-5NW	DPS195NW02N	2/21/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-5NW	DPS195NW03N	2/21/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-5NW	DPS195NW04N	2/21/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-5NW	DPS195NW05N	2/21/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP19-5W	DPS195W01N	2/21/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-5W	DPS195W02N	2/21/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-5W	DPS195W03N	2/21/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-5W	DPS195W04N	2/21/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-6N	DPS196N01N	3/15/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-6N	DPS196N02N	3/15/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-6N	DPS196N03N	3/15/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-6N	DPS196N04N	3/15/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-6NW	DPS196NW01N	3/15/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-6NW	DPS196NW02N	3/15/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-6NW	DPS196NW03N	3/16/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-6NW	DPS196NW04N	3/16/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-6NW	DPS196NW05N	3/16/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP19-6W	DPS196W01N	3/16/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-6W	DPS196W02N	3/16/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-6W	DPS196W03N	3/16/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-7N	DPS197N01N	4/5/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-7N	DPS197N02N	4/5/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-7N	DPS197N02R	4/5/2018	FD	DPS197N02N	WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-7N	DPS197N03N	4/5/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-7N	DPS197N04N	4/5/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-7W	DPS197W01N	4/5/2018	N		WP#3-2018	Subsurface	1	2
Offices/Parking	SUSDP19-7W	DPS197W02N	4/5/2018	N		WP#3-2018	Subsurface	2	3
Offices/Parking	SUSDP19-7W	DPS197W03N	4/5/2018	N		WP#3-2018	Subsurface	3	4
Offices/Parking	SUSDP19-7W	DPS197W04N	4/5/2018	N		WP#3-2018	Subsurface	4	5
Offices/Parking	SUSDP19-7W	DPS197W05N	4/5/2018	N		WP#3-2018	Subsurface	5	6
Offices/Parking	SUSDP53	DPS53F01N	1/31/2017	N		WP#3-2017	Subsurface	1	2
Offices/Parking	SUSDP53	DPS53F02-05N	1/31/2017	N		WP#3-2017	Subsurface	2	5
Offices/Parking	SUSDP53	DPS53F05-10N	2/2/2017	N		WP#3-2017	Subsurface	5	10
Offices/Parking	SUSDP53	DPS53F10-15N	2/2/2017	N		WP#3-2017	Subsurface	10	15
Salvage	SUS10-1A	SUS101A00N	1/27/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1B	SUS101B00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1B	SUS101B00R	1/25/2017	FD	SUS101B00N	WP#3-2017	Surface	0	1
Salvage	SUS10-1C	SUS101C00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1D	SUS101D00N	1/25/2017	N		WP#3-2017	Surface	0	1

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Soil Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Salvage	SUS10-1E	SUS101E00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1F	SUS101F00N	1/27/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1G	SUS101G00N	1/27/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1H	SUS101H00N	1/27/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-1H	SUS101H00N2	2/3/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2A	SUS102A00N	3/23/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2B	SUS102B00N	3/23/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2D	SUS102D00N	3/23/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2E	SUS102E00N	3/23/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2F	SUS102F00N	3/22/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2L	SUS102L00N	3/22/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2M	SUS102M00N	3/22/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2N	SUS102N00N	3/22/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2O	SUS102O00N	3/22/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS10-2P	SUS102P00N	3/23/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS12-1B	SUS121B00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS12-1D	SUS121D00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS12-1F	SUS121F00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS12-1H	SUS121H00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUS44-1A	SUS441A00N	1/27/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUS44-1B	SUS441B00N	1/27/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUS44-1C	SUS441C00N	1/25/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUS44-1E	SUS441E00N	1/25/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUS44-1F	SUS441F00N	1/25/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUS44-1G	SUS441G00N	1/25/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUSDP10	SUS1000N	2/5/2013	N		Phase1-2013	Surface	0.5	1
Salvage	SUSDP10	SUS10F00N	1/27/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP10-3F	SUS103F00N	8/8/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP10-3G	SUS103G00N	8/8/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP10-3X	SUS103X00N	8/8/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP10-3X	SUS103X00R	8/8/2017	FD	SUS103X00N	WP#3-2017	Surface	0	1
Salvage	SUSDP10-4NW	SUS104NW00N	1/30/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP12	SUS1200N	2/6/2013	N		Phase1-2013	Surface	0	1
Salvage	SUSDP12	SUS12F00N	1/26/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1A	SUS121A00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1A	SUS121A00N2	8/10/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1A	SUS121A00R	1/25/2017	FD	SUS121A00N	WP#3-2017	Surface	0	1
Salvage	SUSDP12-1C	SUS121C00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1C	SUS121C00N2	8/10/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1E	SUS121E00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1E	SUS121E00N2	8/11/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1E	SUS121E00R2	8/11/2017	FD	SUS121E00N2	WP#3-2017	Surface	0	1
Salvage	SUSDP12-1G	SUS121G00N	1/25/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-1G	SUS121G00N2	8/11/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP12-2K	SUS122K00N	1/30/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP12-3A	SUS123A00N	2/1/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP43	SUS43F00N	1/26/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP43-2J	SUS432J00N	8/8/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP43-2M	SUS432M00N	8/9/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP43-3P	SUS433P00N	1/30/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP43-3T	SUS433T00N	1/30/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP43-4SW	SUS434SW00N	2/23/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP43-5NW	SUS435NW00N	3/15/2018	N		WP#3-2018	Surface	0	1
Salvage	SUSDP44	SUS44F00N	1/27/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUSDP44-1D	SUS441D00N	1/25/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUSDP44-1H	SUS441H00N	1/27/2017	N		WP#3-2017	Surface (a)	1.5	2.5
Salvage	SUSDP50	SUS5000N	1/26/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP50-2A	SUS502A00N	8/8/2017	N		WP#3-2017	Surface	0	1
Salvage	SUSDP50-3A	SUS503A00N	1/30/2018	N		WP#3-2018	Surface	0	1
Salvage	DP26	DPS2604N	3/28/2013	N		Phase2-2013	Subsurface	3.5	4.5
Salvage	DP26	DPS2614N	3/29/2013	N		Phase2-2013	Subsurface	13.5	14.5
Salvage	SUSDP10	DPS1005N	5/15/2013	N		Phase2-2013	Subsurface	4.5	5.5
Salvage	SUSDP10	DPS1010N	6/10/2013	N		Phase2-2013	Subsurface	9.5	10.5
Salvage	SUSDP10	DPS1015N	6/10/2013	N		Phase2-2013	Subsurface	14.5	15.5
Salvage	SUSDP10	DPS10F01N	1/27/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP10	DPS10F02-05N	1/27/2017	N		WP#3-2017	Subsurface	2	5
Salvage	SUSDP10-3F	DPS103F01N	8/8/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP10-3G	DPS103G01N	8/8/2017	N		WP#3-2017	Subsurface	1	2

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Salvage	SUSDP10-3G	DPS103G02N	8/8/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP10-3X	DPS103X01N	8/8/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP10-3X	DPS103X02N	8/8/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP10-3X	DPS103X03N	8/8/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP10-3X	DPS103X04N	8/8/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP10-4E	DPS104E01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP10-4E	DPS104E01R	2/1/2018	FD	DPS104E01N	WP#3-2018	Subsurface	1	2
Salvage	SUSDP10-4NW	DPS104NW01N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP10-4NW	DPS104NW02N	1/30/2018	N		WP#3-2018	Subsurface	2	3
Salvage	SUSDP10-4NW	DPS104NW03N	1/30/2018	N		WP#3-2018	Subsurface	3	4
Salvage	SUSDP12	DPS1205N	6/13/2013	N		Phase2-2013	Subsurface	4.5	5.5
Salvage	SUSDP12	DPS1210N	6/13/2013	N		Phase2-2013	Subsurface	9.5	10.5
Salvage	SUSDP12	DPS1215N	6/13/2013	N		Phase2-2013	Subsurface	14.5	15.5
Salvage	SUSDP12	DPS12F01N	1/26/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP12	DPS12F02-05N	1/26/2017	N		WP#3-2017	Subsurface	2	5
Salvage	SUSDP12	DPS12F05-10N	1/30/2017	N		WP#3-2017	Subsurface	5	10
Salvage	SUSDP12	DPS12F10-15N	1/30/2017	N		WP#3-2017	Subsurface	10	15
Salvage	SUSDP12	DPS12F15N	1/30/2017	N		WP#3-2017	Subsurface	14.5	15.5
Salvage	SUSDP12-1A	DPS121A01N	8/10/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP12-1A	DPS121A01R	8/10/2017	FD	DPS121A01N	WP#3-2017	Subsurface	1	2
Salvage	SUSDP12-1A	DPS121A02N	8/10/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP12-1A	DPS121A03N	8/10/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP12-1A	DPS121A04N	8/10/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP12-1A	DPS121A10N	8/23/2017	N		WP#3-2017	Subsurface	10	11
Salvage	SUSDP12-1A	DPS121A11N	8/23/2017	N		WP#3-2017	Subsurface	11	12
Salvage	SUSDP12-1A	DPS121A12N	8/23/2017	N		WP#3-2017	Subsurface	12	13
Salvage	SUSDP12-1A	DPS121A13N	8/23/2017	N		WP#3-2017	Subsurface	13	14
Salvage	SUSDP12-1A	DPS121A14N	8/23/2017	N		WP#3-2017	Subsurface	14	15
Salvage	SUSDP12-1C	DPS121C01N	8/10/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP12-1C	DPS121C02N	8/10/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP12-1C	DPS121C03N	8/10/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP12-1C	DPS121C04N	8/10/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP12-1C	DPS121C05N	8/23/2017	N		WP#3-2017	Subsurface	5	6
Salvage	SUSDP12-1C	DPS121C10N	8/23/2017	N		WP#3-2017	Subsurface	10	11
Salvage	SUSDP12-1C	DPS121C11N	8/23/2017	N		WP#3-2017	Subsurface	11	12
Salvage	SUSDP12-1E	DPS121E01N	8/11/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP12-1E	DPS121E02N	8/11/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP12-1E	DPS121E03N	8/11/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP12-1E	DPS121E04N	8/11/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP12-1E	DPS121E10N	8/23/2017	N		WP#3-2017	Subsurface	10	11
Salvage	SUSDP12-1E	DPS121E11N	8/23/2017	N		WP#3-2017	Subsurface	11	12
Salvage	SUSDP12-1E	DPS121E12N	8/23/2017	N		WP#3-2017	Subsurface	12	13
Salvage	SUSDP12-1E	DPS121E13N	8/23/2017	N		WP#3-2017	Subsurface	13	14
Salvage	SUSDP12-1E	DPS121E14N	8/23/2017	N		WP#3-2017	Subsurface	14	15
Salvage	SUSDP12-1G	DPS121G01N	8/11/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP12-1G	DPS121G02N	8/11/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP12-1G	DPS121G03N	8/11/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP12-1G	DPS121G04N	8/11/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP12-1G	DPS121G10N	8/23/2017	N		WP#3-2017	Subsurface	10	11
Salvage	SUSDP12-1G	DPS121G11N	8/23/2017	N		WP#3-2017	Subsurface	11	12
Salvage	SUSDP12-1G	DPS121G11R	8/23/2017	FD	DPS121G11N	WP#3-2017	Subsurface	11	12
Salvage	SUSDP12-1G	DPS121G12N	8/23/2017	N		WP#3-2017	Subsurface	12	13
Salvage	SUSDP12-1G	DPS121G13N	8/23/2017	N		WP#3-2017	Subsurface	13	14
Salvage	SUSDP12-1G	DPS121G14N	8/23/2017	N		WP#3-2017	Subsurface	14	15
Salvage	SUSDP12-2K	DPS122K01N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP12-3A	DPS123A01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP12-3A	DPS123A02N	2/1/2018	N		WP#3-2018	Subsurface	2	3
Salvage	SUSDP12-3A	DPS123A10N	3/28/2018	N		WP#3-2018	Subsurface	10	11
Salvage	SUSDP43	DPS4304N	5/17/2013	N		Phase2-2013	Subsurface	3.5	4.5
Salvage	SUSDP43	DPS4310N	6/7/2013	N		Phase2-2013	Subsurface	9.5	10.5
Salvage	SUSDP43	DPS4315N	6/7/2013	N		Phase2-2013	Subsurface	14.5	15.5
Salvage	SUSDP43	DPS43F01N	1/26/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP43	DPS43F02-05N	1/26/2017	N		WP#3-2017	Subsurface	2	5
Salvage	SUSDP43	DPS43F05-10N	1/30/2017	N		WP#3-2017	Subsurface	5	10
Salvage	SUSDP43	DPS43F10-15N	1/30/2017	N		WP#3-2017	Subsurface	10	15
Salvage	SUSDP43-2J	DPS432J01N	8/8/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP43-2J	DPS432J02N	8/8/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP43-2J	DPS432J03N	8/8/2017	N		WP#3-2017	Subsurface	3	4

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Salvage	SUSDP43-2J	DPS432J04N	8/8/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP43-2M	DPS432M01N	8/9/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP43-2M	DPS432M02N	8/9/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP43-2M	DPS432M03N	8/9/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP43-2M	DPS432M04N	8/9/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP43-3A	DPS433A01N	8/10/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP43-3A	DPS433A02N	8/10/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP43-3A	DPS433A03N	8/10/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP43-3A	DPS433A04N	8/10/2017	N		WP#3-2017	Subsurface	4	5
Salvage	SUSDP43-3P	DPS433P01N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP43-3P	DPS433P02N	1/30/2018	N		WP#3-2018	Subsurface	2	3
Salvage	SUSDP43-3T	DPS433T01N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP43-4NW	DPS434NW01N	2/23/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP43-4NW	DPS434NW02N	2/23/2018	N		WP#3-2018	Subsurface	2	3
Salvage	SUSDP43-4SW	DPS434SW01N	2/23/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP43-4SW	DPS434SW02N	2/23/2018	N		WP#3-2018	Subsurface	2	3
Salvage	SUSDP43-5NW	DPS435NW01N	3/15/2018	N		WP#3-2018	Subsurface	1	2
Salvage	SUSDP44	DPS4403N	5/21/2013	N		Phase2-2013	Subsurface	2.5	3.5
Salvage	SUSDP44	DPS4410N	6/10/2013	N		Phase2-2013	Subsurface	9.5	10.5
Salvage	SUSDP44	DPS4415N	6/10/2013	N		Phase2-2013	Subsurface	14.5	15.5
Salvage	SUSDP44	DPS44F01N	1/27/2017	N		WP#3-2017	Subsurface	2.5	3.5
Salvage	SUSDP44	DPS44F01R	1/27/2017	FD	DPS44F01N	WP#3-2017	Subsurface	2.5	3.5
Salvage	SUSDP44	DPS44F02-05N	1/27/2017	N		WP#3-2017	Subsurface	3.5	5
Salvage	SUSDP44	DPS44F02-05R	1/27/2017	FD	DPS44F02-05N	WP#3-2017	Subsurface	3.5	5
Salvage	SUSDP44-1D	DPS441D01N	8/9/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP44-1D	DPS441D02N	8/9/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP44-1D	DPS441D03N	8/9/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP44-1H	DPS441H02N	8/9/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP44-1H	DPS441H03N	8/9/2017	N		WP#3-2017	Subsurface	3	4
Salvage	SUSDP44-2N	DPS442N01N	8/9/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP44-2N	DPS442N02N	8/9/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP44-2N	DPS442N02R	8/9/2017	FD	DPS442N02N	WP#3-2017	Subsurface	2	3
Salvage	SUSDP50	DPS5001N	8/10/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP50	DPS5001R	8/10/2017	FD	DPS5001N	WP#3-2017	Subsurface	1	2
Salvage	SUSDP50	DPS5002N	8/10/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP50-2A	DPS502A01N	8/15/2017	N		WP#3-2017	Subsurface	1	2
Salvage	SUSDP50-2A	DPS502A02N	8/8/2017	N		WP#3-2017	Subsurface	2	3
Salvage	SUSDP50-3A	DPS503A01N	1/30/2018	N		WP#3-2018	Subsurface	1	2
Substation #7	SUS201A	SUS201A00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201B	SUS201B00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201B	SUS201B00R	1/27/2017	FD	SUS201B00N	WP#3-2017	Surface	0	1
Substation #7	SUS201C	SUS201C00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201D	SUS201D00N	2/2/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201E	SUS201E00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201F	SUS201F00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201G	SUS201G00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS201H	SUS201H00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUS25	SUS2500N	2/7/2013	N		Phase1-2013	Surface	0.5	1
Substation #7	SUSDP20	SUS2000N	2/7/2013	N		Phase1-2013	Surface	0.42	1
Substation #7	SUSDP20	SUS20F00N	1/27/2017	N		WP#3-2017	Surface	0	1
Substation #7	SUSDP23	SUS2300N	2/7/2013	N		Phase1-2013	Surface	0.5	1
Substation #7	SUSDP24	SUS2400N	2/7/2013	N		Phase1-2013	Surface	0	1
Substation #7	DP33	DPS3315N	4/4/2013	N		Phase2-2013	Subsurface	14	16
Substation #7	DP34	DPS3405N	3/13/2013	N		Phase2-2013	Subsurface	4.5	5.5
Substation #7	SUSDP20	DPS2005N	5/30/2013	N		Phase2-2013	Subsurface	4.5	5.5
Substation #7	SUSDP20	DPS2010N	6/12/2013	N		Phase2-2013	Subsurface	9.5	10.5
Substation #7	SUSDP20	DPS20F01N	1/27/2017	N		WP#3-2017	Subsurface	1	2
Substation #7	SUSDP20	DPS20F02-05N	1/27/2017	N		WP#3-2017	Subsurface	2	5
Substation #7	SUSDP23	DPS2305N	5/28/2013	N		Phase2-2013	Subsurface	4.5	5.5
Substation #7	SUSDP23	DPS2310N	6/12/2013	N		Phase2-2013	Subsurface	9.5	10.5
Substation #7	SUSDP23	DPS2315N	6/12/2013	N		Phase2-2013	Subsurface	14.5	15.5
Substation #7	SUSDP24	DPS2405N	5/20/2013	N		Phase2-2013	Subsurface	4.5	5.5
Substation #7	SUSDP24	DPS2405R	5/20/2013	FD	DPS2405N	Phase2-2013	Subsurface	4.5	5.5
Substation #7	SUSDP24	DPS2410N	6/4/2013	N		Phase2-2013	Subsurface	9.5	10.5
Substation #7	SUSDP24	DPS2410R	6/4/2013	FD	DPS2410N	Phase2-2013	Subsurface	9.5	10.5
Substation #7	SUSDP24	DPS2415N	6/4/2013	N		Phase2-2013	Subsurface	14.5	15.5
Transformer Shop	SUS21-1A	SUS211A00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-1B	SUS211B00N	1/27/2017	N		WP#3-2017	Surface	0	1

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Transformer Shop	SUS21-1E	SUS211E00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-1F	SUS211F00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-1G	SUS211G00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-1H	SUS211H00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2D	SUS212D00N	3/23/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2E	SUS212E00N	3/23/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2I	SUS212I00N	3/22/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2J	SUS212J00N	3/22/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2L	SUS212L00N	3/22/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2M	SUS212M00N	3/22/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUS21-2N	SUS212N00N	3/22/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21	SUS2100N	2/7/2013	N		Phase1-2013	Surface (a)	1	1.75
Transformer Shop	SUSDP21	SUS21F00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21-1C	SUS211C00N	1/27/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21-1C	SUS211C00N2	8/24/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21-3G	SUS213G00N	8/28/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21-3M	SUS213M00N	8/28/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21-3Q	SUS213Q00N	8/24/2017	N		WP#3-2017	Surface	0	1
Transformer Shop	SUSDP21-5W	SUS215W00N	1/26/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDP21-6W	SUS216W00N	2/21/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDP22	SUS2200N	6/13/2013	N		Phase1-2013	Surface	0.5	1
Transformer Shop	SUSDPGD21-C3	SUSGD21C300N	7/2/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-C5	SUSGD21C500N	5/31/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-D1	SUSGD21D100N	5/30/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-E1	SUSGD21E100N	5/30/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-F1	SUSGD21F100N	5/30/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-G1	SUSGD21G100N	4/4/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-G2	SUSGD21G200N	4/4/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-H1	SUSGD21H100N	3/14/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-H2	SUSGD21H200N	3/14/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-I1	SUSGD21I100N	2/20/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-I2	SUSGD21I200N	2/20/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-J1	SUSGD21J100N	1/24/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-J2	SUSGD21J200N	1/24/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-K1	SUSGD21K100N	1/24/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-K1.5	SUSGD21K1.500N	1/26/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-K2	SUSGD21K200N	1/24/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-L1	SUSGD21L100N	2/20/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-L2	SUSGD21L200N	2/20/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-M1	SUSGD21M100N	3/14/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-M2	SUSGD21M200N	3/14/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-N1	SUSGD21N100N	4/4/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-N2	SUSGD21N200N	4/4/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-P1	SUSGD21P100N	5/30/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-R1	SUSGD21R100N	1/23/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-R1	SUSGD21R100R	1/23/2018	FD	SUSGD21R100N	WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-R2	SUSGD21R200N	1/23/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-S1	SUSGD21S100N	1/23/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	SUSDPGD21-S2	SUSGD21S200N	1/24/2018	N		WP#3-2018	Surface	0	1
Transformer Shop	DP35	DPS3515N	3/28/2013	N		Phase2-2013	Subsurface	14.5	15.5
Transformer Shop	DP46	DPS4605N	5/22/2013	N		Phase2-2013	Subsurface	4.5	5.5
Transformer Shop	DP46	DPS4610N	6/5/2013	N		Phase2-2013	Subsurface	9.5	10.5
Transformer Shop	DP46	DPS4615N	6/5/2013	N		Phase2-2013	Subsurface	14.5	15.5
Transformer Shop	DP47	DPS4702N	5/28/2013	N		Phase2-2013	Subsurface	1.5	2.5
Transformer Shop	DP47	DPS4710N	6/5/2013	N		Phase2-2013	Subsurface	9.5	10.5
Transformer Shop	DP47	DPS4715N	6/5/2013	N		Phase2-2013	Subsurface	14	15
Transformer Shop	SUSDP21	DPS21F01N	1/27/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21	DPS21F02-05N	1/27/2017	N		WP#3-2017	Subsurface	2	5
Transformer Shop	SUSDP21	DPS21F05-10N	2/2/2017	N		WP#3-2017	Subsurface	5	10
Transformer Shop	SUSDP21-1C	DPS211C01N	8/24/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21-1C	DPS211C02N	8/24/2017	N		WP#3-2017	Subsurface	2	3
Transformer Shop	SUSDP21-1C	DPS211C03N	8/24/2017	N		WP#3-2017	Subsurface	3	4
Transformer Shop	SUSDP21-3A	DPS213A01N	8/25/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21-3A	DPS213A02N	8/25/2017	N		WP#3-2017	Subsurface	2	3
Transformer Shop	SUSDP21-3G	DPS213G01N	8/28/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21-3G	DPS213G02N	8/28/2017	N		WP#3-2017	Subsurface	2	3
Transformer Shop	SUSDP21-3M	DPS213M01N	8/28/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21-3M	DPS213M02N	8/28/2017	N		WP#3-2017	Subsurface	2	3

Table 3-1
Soil Samples Used in the BHHRA
Benning Road Facility RI/FS Project
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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Transformer Shop	SUSDP21-3M	DPS213M03N	8/28/2017	N		WP#3-2017	Subsurface	3	4
Transformer Shop	SUSDP21-3M	DPS213M04N	8/28/2017	N		WP#3-2017	Subsurface	4	5
Transformer Shop	SUSDP21-3T	DPS213T01N	8/25/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21-3T	DPS213T02N	8/25/2017	N		WP#3-2017	Subsurface	2	3
Transformer Shop	SUSDP21-3T	DPS213T03N	8/25/2017	N		WP#3-2017	Subsurface	3	4
Transformer Shop	SUSDP21-3V	DPS213V01N	8/25/2017	N		WP#3-2017	Subsurface	1	2
Transformer Shop	SUSDP21-5W	DPS215W01N	1/26/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDP21-5W	DPS215W02N	1/26/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDP21-6W	DPS216W01N	2/21/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDP21-6W	DPS216W01R	2/21/2018	FD	DPS216W01N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDP22	DPS2203N	5/22/2013	N		Phase2-2013	Subsurface	2.5	3.5
Transformer Shop	SUSDP22	DPS2210N	6/12/2013	N		Phase2-2013	Subsurface	9.5	10.5
Transformer Shop	SUSDP22	DPS2215N	6/12/2013	N		Phase2-2013	Subsurface	14.5	15.5
Transformer Shop	SUSDPGD21-C3	DPSGD21C301N	7/2/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-C3	DPSGD21C302N	7/2/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-C3	DPSGD21C303N	7/2/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-C5	DPSGD21C501N	5/31/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-C5	DPSGD21C502N	5/31/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-C5	DPSGD21C503N	5/31/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-C5	DPSGD21C504N	5/31/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-D1	DPSGD21D101N	5/30/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-D1	DPSGD21D102N	5/30/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-D1	DPSGD21D103N	5/30/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-D1	DPSGD21D104N	5/30/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-E1	DPSGD21E101N	5/30/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-E1	DPSGD21E102N	5/30/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-E1	DPSGD21E103N	5/30/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-E1	DPSGD21E104N	5/30/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-F1	DPSGD21F101N	5/30/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-F1	DPSGD21F102N	5/30/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-F1	DPSGD21F103N	5/30/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-F1	DPSGD21F104N	5/30/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-G1	DPSGD21G101N	4/4/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-G1	DPSGD21G102N	4/4/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-G1	DPSGD21G103N	4/4/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-G1	DPSGD21G104N	4/4/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-G1	DPSGD21G105N	4/4/2018	N		WP#3-2018	Subsurface	5	6
Transformer Shop	SUSDPGD21-G2	DPSGD21G201N	4/4/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-G2	DPSGD21G202N	4/4/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-H1	DPSGD21H101N	3/14/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-H1	DPSGD21H102N	3/14/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-H2	DPSGD21H201N	3/14/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-H2	DPSGD21H202N	3/14/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-I1	DPSGD21I101N	2/20/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-I1	DPSGD21I101R	2/20/2018	FD	DPSGD21I101N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-I1	DPSGD21I102N	2/20/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-I1	DPSGD21I103N	2/20/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-I2	DPSGD21I201N	2/20/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-I2	DPSGD21I202N	2/20/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-J1	DPSGD21J101N	1/24/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-J1	DPSGD21J101R	1/24/2018	FD	DPSGD21J101N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-J1	DPSGD21J102N	1/24/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-J1	DPSGD21J103N	1/24/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-J1	DPSGD21J104N	1/24/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-J1	DPSGD21J105N	1/24/2018	N		WP#3-2018	Subsurface	5	6
Transformer Shop	SUSDPGD21-J2	DPSGD21J201N	1/24/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-J2	DPSGD21J202N	1/24/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-J2	DPSGD21J203N	1/24/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-K1	DPSGD21K101N	1/24/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-K1	DPSGD21K102N	1/24/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-K1	DPSGD21K103N	1/24/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-K1	DPSGD21K104N	1/24/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-K1	DPSGD21K105N	1/24/2018	N		WP#3-2018	Subsurface	5	6
Transformer Shop	SUSDPGD21-K1.5	DPSGD21K1.501N	1/26/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-K1.5	DPSGD21K1.502N	1/26/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-K1.5	DPSGD21K1.503N	1/26/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-K1.5	DPSGD21K1.504N	1/26/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-K2	DPSGD21K201N	1/24/2018	N		WP#3-2018	Subsurface	1	2

Table 3-1
Soil Samples Used in the BHHRA
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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Transformer Shop	SUSDPGD21-K2	DPSGD21K202N	1/24/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-L1	DPSGD21L101N	2/20/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-L1	DPSGD21L102N	2/20/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-L1	DPSGD21L103N	2/20/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-L1	DPSGD21L104N	2/20/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-L2	DPSGD21L201N	2/20/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-L2	DPSGD21L201R	2/20/2018	FD	DPSGD21L201N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-L2	DPSGD21L202N	2/20/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-L2	DPSGD21L203N	2/20/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-L2	DPSGD21L204N	2/20/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-M1	DPSGD21M101N	3/14/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-M1	DPSGD21M101R	3/14/2018	FD	DPSGD21M101N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-M1	DPSGD21M102N	3/14/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-M1	DPSGD21M103N	3/14/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-M1	DPSGD21M104N	3/14/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-M2	DPSGD21M201N	3/14/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-M2	DPSGD21M201R	3/14/2018	FD	DPSGD21M201N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-M2	DPSGD21M202N	3/14/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-M2	DPSGD21M203N	3/14/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-M2	DPSGD21M204N	3/14/2018	N		WP#3-2018	Subsurface	4	5
Transformer Shop	SUSDPGD21-N1	DPSGD21N101N	4/4/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-N1	DPSGD21N102N	4/4/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-N1	DPSGD21N103N	4/4/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-N2	DPSGD21N201N	4/4/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-N2	DPSGD21N201R	4/4/2018	FD	DPSGD21N201N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-N2	DPSGD21N202N	4/4/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-P1	DPSGD21P101N	5/30/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-P1	DPSGD21P101R	5/30/2018	FD	DPSGD21P101N	WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-P1	DPSGD21P102N	5/30/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-R1	DPSGD21R101N	1/23/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-R1	DPSGD21R102N	1/23/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-R1	DPSGD21R103N	1/23/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-R2	DPSGD21R201N	1/23/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-R2	DPSGD21R202N	1/23/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-R2	DPSGD21R203N	1/23/2018	N		WP#3-2018	Subsurface	3	4
Transformer Shop	SUSDPGD21-S1	DPSGD21S101N	1/23/2018	N		WP#3-2018	Subsurface	1	2
Transformer Shop	SUSDPGD21-S1	DPSGD21S102N	1/23/2018	N		WP#3-2018	Subsurface	2	3
Transformer Shop	SUSDPGD21-S2	DPSGD21S201N	1/24/2018	N		WP#3-2018	Subsurface	1	2
Vehicle Refueling	AST3A-1A	AST3A1A00N	8/2/2017	N		WP#3-2017	Surface	0	1
Vehicle Refueling	SUSDP37	SUS37F00N	1/25/2017	N		WP#3-2017	Surface	0	1
Vehicle Refueling	SUSDP39	SUS39F00N	1/25/2017	N		WP#3-2017	Surface	0	1
Vehicle Refueling	DP28	DPS2808N	4/2/2013	N		Phase2-2013	Subsurface	7.5	8.5
Vehicle Refueling	DP29	DPS2910N	4/2/2013	N		Phase2-2013	Subsurface	9	11
Vehicle Refueling	DP38	DPS3805N	5/16/2013	N		Phase2-2013	Subsurface	4.5	5.5
Vehicle Refueling	DP38	DPS3810N	5/22/2013	N		Phase2-2013	Subsurface	9.5	10.5
Vehicle Refueling	DP38	DPS3815N	5/22/2013	N		Phase2-2013	Subsurface	14	15
Vehicle Refueling	SUSDP37	DPS3703N	5/16/2013	N		Phase2-2013	Subsurface	2.5	3.5
Vehicle Refueling	SUSDP37	DPS3710N	5/23/2013	N		Phase2-2013	Subsurface	9.5	10.5
Vehicle Refueling	SUSDP37	DPS3710N2	6/10/2013	N		Phase2-2013	Subsurface	9.5	10.5
Vehicle Refueling	SUSDP37	DPS3715N	5/23/2013	N		Phase2-2013	Subsurface	14.5	15.5
Vehicle Refueling	SUSDP37	DPS37F01N	1/25/2017	N		WP#3-2017	Subsurface	1	2
Vehicle Refueling	SUSDP37	DPS37F02-05N	1/25/2017	N		WP#3-2017	Subsurface	2	5
Vehicle Refueling	SUSDP39	DPS3903N	5/17/2013	N		Phase2-2013	Subsurface	2.5	3.5
Vehicle Refueling	SUSDP39	DPS3910N	5/22/2013	N		Phase2-2013	Subsurface	9.5	10.5
Vehicle Refueling	SUSDP39	DPS3915N	5/22/2013	N		Phase2-2013	Subsurface	14.5	15.5
Vehicle Refueling	SUSDP39	DPS39F01N	1/25/2017	N		WP#3-2017	Subsurface	1	2
Vehicle Refueling	SUSDP39	DPS39F02-05N	1/25/2017	N		WP#3-2017	Subsurface	2	5
Vehicle Refueling	SUSDP39	DPS39F05-10N	1/26/2017	N		WP#3-2017	Subsurface	5	10
Vehicle Refueling	SUSDP39	DPS39F10-15N	1/26/2017	N		WP#3-2017	Subsurface	10	15
Warehouse	SUS05-1D	SUS05ID00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS05-1F	SUS05IF00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS061C	SUS061C00N	3/13/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS061D	SUS061D00N	3/13/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS061E	SUS061E00N	3/13/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS061G	SUS061G00N	3/13/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1A	SUS081A00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1B	SUS081B00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1B	SUS081B00N2	2/3/2017	N		WP#3-2017	Surface	0	1

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Warehouse	SUS08-1C	SUS081C00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1D	SUS081D00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1D	SUS081D00N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUS08-1F	SUS081F00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1G	SUS081G00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1H	SUS081H00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-1H	SUS081H00N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUS08-1H	SUS081H00R2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUS08-2A	SUS082A00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2B	SUS082B00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2F	SUS082F00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2F	SUS082F00R	3/22/2017	FD	SUS082F00N	WP#3-2017	Surface	0	1
Warehouse	SUS08-2H	SUS082H00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2I	SUS082I00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2I	SUS082I00R	3/22/2017	FD	SUS082I00N	WP#3-2017	Surface	0	1
Warehouse	SUS08-2J	SUS082J00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2J	SUS082J00R	3/22/2017	FD	SUS082J00N	WP#3-2017	Surface	0	1
Warehouse	SUS08-2N	SUS082N00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2O	SUS082O00N	3/23/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUS08-2P	SUS082P00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP03	SUS0300N	2/4/2013	N		Phase1-2013	Surface	0.5	1
Warehouse	SUSDP04	SUS0400N	2/4/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP04	SUS04F00N	1/25/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05	SUS0500N	2/4/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP05	SUS05F00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-1C	SUS051C00N2	7/31/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-1C	SUS05IC00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-1E	SUS051E00N2	7/31/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-1E	SUS05IE00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-1G	SUS051G00N2	7/31/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-1G	SUS05IG00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP05-2M	SUS052M00N	2/1/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP06	SUS0600N	2/5/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP06	SUS06F00N	3/13/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP07	SUS0700N	2/5/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP08	SUS0800N	2/5/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP08	SUS0800N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP08	SUS08F00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP08-1E	SUS081E00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP08-1E	SUS081E00N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP08-1E	SUS081E00R	1/24/2017	FD	SUS081E00N	WP#3-2017	Surface	0	1
Warehouse	SUSDP08-2G	SUS082G00N	3/22/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP08-3I	SUS083I00N	8/2/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP08-3K	SUS083K00N	8/3/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP11	SUS1100N	2/5/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP11	SUS11F00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDP11-1A	SUS111A00N	2/22/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP11-1B	SUS111B00N	3/16/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP11-1H	SUS111H00N	3/16/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP11-2A	SUS112A00N	3/16/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP11-2D	SUS112D00N	4/5/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP11-2N	SUS112N00N	4/6/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDP13	SUS1300N	2/5/2013	N		Phase1-2013	Surface	0	1
Warehouse	SUSDP41	SUS41F00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	SUSDPCT16-1C	SUSCT161C00N	2/1/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-1E	SUSCT161E00N	2/1/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-1G	SUSCT161G00N	2/1/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-2E	SUSCT162E00N	2/22/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-2I	SUSCT162I00N	2/22/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-2M	SUSCT162M00N	2/22/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-3Q	SUSCT163Q00N	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-3Q	SUSCT163Q00R	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-3R	SUSCT163R00N	5/31/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-3S	SUSCT163S00N	3/15/2018	N		WP#3-2018	Surface	0	1
Warehouse	SUSDPCT16-4W	SUSCT164W00N	4/6/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1A1	SUSTAIAI00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1A3	SUSTAIA300N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1A7	SUSTAIA700N	1/24/2017	N		WP#3-2017	Surface	0	1

Table 3-1
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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Warehouse	TA1A9	SUSTAIA900N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1C1	SUSTAICI00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1C3	SUSTAIC300N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1C4	SUSTA1C400N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1C4	SUSTAIC400N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1C5	SUSTA1C500N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1C5	SUSTAIC500N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1C7	SUSTAI C700N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1C9	SUSTAIC900N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E1	SUSTA1E100N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1E1	SUSTAIEI00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E10	SUSTA1E1000N	8/8/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E10	SUSTA1E1000R	8/8/2017	FD	SUSTA1E1000N	WP#3-2017	Surface	0	1
Warehouse	TA1-E11	SUSTA1E1100N	1/30/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1-E11	SUSTA1E1100R	1/30/2018	FD	SUSTA1E1100N	WP#3-2018	Surface	0	1
Warehouse	TA1E3	SUSTAIE300N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E4	SUSTAIE400N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E5	SUSTAIE500N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E7	SUSTAI E700N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1E9	SUSTA1E900N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1E9	SUSTAI E900N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1F4	SUSTA1F400N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1F4	SUSTAIF400N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1F5	SUSTAIF500N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1G1	SUSTAIGI00N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1G10	SUSTA1G1000N	8/4/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1G3	SUSTAIG300N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1G5	SUSTAIG500N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1G7	SUSTAIG700N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1G9	SUSTA1G900N2	6/29/2018	N		WP#3-2018	Surface	0	1
Warehouse	TA1G9	SUSTAIG900N	1/24/2017	N		WP#3-2017	Surface	0	1
Warehouse	TA1H9	SUSTA1H0900N	8/4/2017	N		WP#3-2017	Surface	0	1
Warehouse	CT16SO9G	CT16S09G-12	3/1/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	CT16SO9H	CT16S09H01N	8/4/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	CT16SO9H	CT16SO9H02N	8/4/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	CT16SO9I	CT16SO9I01N	8/4/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	CT16SO9I	CT16SO9I02N	8/4/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	CT16SO9I	CT16SO9I04N	8/4/2017	N		WP#3-2017	Subsurface	4	5
Warehouse	DP27	DPS2707N	3/26/2013	N		Phase2-2013	Subsurface	6.5	7.5
Warehouse	DP40	DPS4003N	5/20/2013	N		Phase2-2013	Subsurface	2.5	3.5
Warehouse	DP40	DPS4010N	5/28/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	DP40	DPS4010N2	6/10/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	DP40	DPS4015N	5/28/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	DP42	DPS4205N	5/21/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	DP42	DPS4210N	5/29/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	DP42	DPS4215N	5/29/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SB3	SBS0303N	3/13/2013	N		Phase2-2013	Subsurface	2.5	3.5
Warehouse	SBS0303N-North	SB50303N-NORTH	2/15/2017	N		WP#3-2017	Subsurface	3	3.5
Warehouse	SUSDP03	DPS0305N	5/14/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	SUSDP03	DPS0310N	5/21/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP03	DPS0310N2	6/11/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP03	DPS0310R	5/21/2013	FD	DPS0310N	Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP03	DPS0315N	5/21/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP04	DPS0403N	5/15/2013	N		Phase2-2013	Subsurface	2.5	3.5
Warehouse	SUSDP04	DPS0410N	5/20/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP04	DPS0415N	5/20/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP04	DPS04F01N	1/25/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP04	DPS04F01R	1/25/2017	FD	DPS04F01N	WP#3-2017	Subsurface	1	2
Warehouse	SUSDP04	DPS04F02-05N	1/25/2017	N		WP#3-2017	Subsurface	2	5
Warehouse	SUSDP04	DPS04F10-15N	1/27/2017	N		WP#3-2017	Subsurface	10	15
Warehouse	SUSDP04-1A	DPS041A02N	8/1/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	SUSDP04-1A	DPS041A03N	8/1/2017	N		WP#3-2017	Subsurface	3	4
Warehouse	SUSDP04-1A	DPS041A04N	8/1/2017	N		WP#3-2017	Subsurface	4	5
Warehouse	SUSDP04-1C	DPS041C02N	8/1/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	SUSDP04-1C	DPS041C03N	8/1/2017	N		WP#3-2017	Subsurface	3	4
Warehouse	SUSDP04-1C	DPS041C04N	8/1/2017	N		WP#3-2017	Subsurface	4	5
Warehouse	SUSDP04-1E	DPS041E02N	8/1/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	SUSDP04-1E	DPS041E03N	8/1/2017	N		WP#3-2017	Subsurface	3	4

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Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Warehouse	SUSDP04-1E	DPS041E04N	8/1/2017	N		WP#3-2017	Subsurface	4	5
Warehouse	SUSDP04-1G	DPS041G02N	8/1/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	SUSDP04-1G	DPS041G03N	8/1/2017	N		WP#3-2017	Subsurface	3	4
Warehouse	SUSDP04-1G	DPS041G04N	8/1/2017	N		WP#3-2017	Subsurface	4	5
Warehouse	SUSDP04-1G	DPS041G05N	8/1/2017	N		WP#3-2017	Subsurface	5	6
Warehouse	SUSDP04-2I	DPS042I02N	2/1/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDP05	DPS0505N	5/15/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	SUSDP05	DPS0505N2	6/12/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	SUSDP05	DPS0510N	5/21/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP05	DPS0515N	5/21/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP05	DPS05F01N	1/24/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP05	DPS05F02-05N	1/24/2017	N		WP#3-2017	Subsurface	2	5
Warehouse	SUSDP05-1C	DPS051C01N	7/31/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP05-1E	DPS051E01N	7/31/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP05-1G	DPS051G01N	7/31/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP05-1G	DPS051G02N	7/31/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	SUSDP05-2M	DPS052M01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP06	DPS0605N	5/15/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	SUSDP06	DPS0610N	5/22/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP06	DPS0615N	5/22/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP06	DPS06F01N	3/13/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP06	DPS06F02-05N	3/13/2017	N		WP#3-2017	Subsurface	2	5
Warehouse	SUSDP07	DPS0705N	5/15/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	SUSDP07	DPS0710N	5/22/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP07	DPS0715N	5/22/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP07	DPS0715N2	6/12/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP08	DPS0803N	5/15/2013	N		Phase2-2013	Subsurface	2.5	3.5
Warehouse	SUSDP08	DPS0810N	5/23/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP08	DPS0815N	5/23/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP08	DPS08F01N	1/24/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP08	DPS08F02-05N	1/24/2017	N		WP#3-2017	Subsurface	2	5
Warehouse	SUSDP08	DPS08F05-10N	1/24/2017	N		WP#3-2017	Subsurface	5	10
Warehouse	SUSDP08	DPS08F10-15N	1/24/2017	N		WP#3-2017	Subsurface	10	15
Warehouse	SUSDP08-1E	DPS081E01N	8/2/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP08-1E	DPS081E01R	8/2/2017	FD	DPS081E01N	WP#3-2017	Subsurface	1	2
Warehouse	SUSDP08-2G	DPS082G01N	8/3/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP08-2G	DPS082G01R	8/3/2017	FD	DPS082G01N	WP#3-2017	Subsurface	1	2
Warehouse	SUSDP11	DPS1105N	5/14/2013	N		Phase2-2013	Subsurface	4.5	5.5
Warehouse	SUSDP11	DPS1110N	5/28/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP11	DPS1115N	5/28/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP11	DPS11F01N	1/25/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP11	DPS11F02-05N	1/25/2017	N		WP#3-2017	Subsurface	2	5
Warehouse	SUSDP11	DPS11F05-10N	1/25/2017	N		WP#3-2017	Subsurface	5	10
Warehouse	SUSDP11-1A	DPS111A01N	2/22/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP11-1A	DPS111A02N	2/22/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDP11-1A	DPS111A03N	2/22/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDP11-1A	DPS111A04N	2/22/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDP11-1A	DPS111A05N	2/22/2018	N		WP#3-2018	Subsurface	5	6
Warehouse	SUSDP11-1A	DPS111A06N	3/28/2018	N		WP#3-2018	Subsurface	6	7
Warehouse	SUSDP11-1B	DPS111B01N	3/16/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP11-1B	DPS111B02N	3/16/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDP11-1B	DPS111B03N	3/16/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDP11-1B	DPS111B04N	3/16/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDP11-1B	DPS111B05N	3/16/2018	N		WP#3-2018	Subsurface	5	6
Warehouse	SUSDP11-1H	DPS111H01N	3/16/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP11-1H	DPS111H02N	3/16/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDP11-1H	DPS111H03N	3/16/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDP11-1H	DPS111H04N	3/16/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDP11-1H	DPS111H05N	3/16/2018	N		WP#3-2018	Subsurface	5	6
Warehouse	SUSDP11-2A	DPS112A01N	3/16/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP11-2A	DPS112A02N	3/16/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDP11-2A	DPS112A03N	3/16/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDP11-2A	DPS112A04N	3/16/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDP11-2A	DPS112A05N	3/16/2018	N		WP#3-2018	Subsurface	5	6
Warehouse	SUSDP11-2D	DPS112D01N	4/5/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP11-2N	DPS112N01N	4/6/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDP11-2N	DPS112N02N	4/6/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDP13	DPS1305N	5/20/2013	N		Phase2-2013	Subsurface	4.5	5.5

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3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Warehouse	SUSDP13	DPS1310N	5/29/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP13	DPS1315N	5/29/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP41	DPS41 10N	5/24/2013	N		Phase2-2013	Subsurface	9.5	10.5
Warehouse	SUSDP41	DPS41 15N	5/24/2013	N		Phase2-2013	Subsurface	14.5	15.5
Warehouse	SUSDP41	DPS4103N	5/22/2013	N		Phase2-2013	Subsurface	2.5	3.5
Warehouse	SUSDP41	DPS41F01N	1/24/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	SUSDP41	DPS41F02-05N	1/24/2017	N		WP#3-2017	Subsurface	2	5
Warehouse	SUSDP41	DPS41F05-10N	1/24/2017	N		WP#3-2017	Subsurface	5	10
Warehouse	SUSDP41	DPS41F10-15N	1/24/2017	N		WP#3-2017	Subsurface	10	15
Warehouse	SUSDPCT16-1C	DPCT161C01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-1C	DPCT161C04N	2/1/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDPCT16-1E	DPCT161E01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-1G	DPCT161G01N	2/1/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-1G	DPCT161G02N	2/1/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDPCT16-1G	DPCT161G03N	2/1/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDPCT16-1G	DPCT161G04N	2/1/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDPCT16-2E	DPSCT162E01N	2/22/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-2E	DPSCT162E04N	2/22/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDPCT16-2I	DPSCT162I01N	2/22/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-2M	DPSCT162M01N	2/22/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-2M	DPSCT162M02N	2/22/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDPCT16-2M	DPSCT162M03N	2/22/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDPCT16-2M	DPSCT162M04N	2/22/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDPCT16-3R	DPSCT163R01N	5/31/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-3R	DPSCT163R02N	5/31/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDPCT16-3R	DPSCT163R03N	5/31/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDPCT16-3R	DPSCT163R03R	5/31/2018	FD	DPSCT163R03N	WP#3-2018	Subsurface	3	4
Warehouse	SUSDPCT16-3R	DPSCT163R04N	5/31/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDPCT16-3S	DPSCT163S01N	3/15/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-3S	DPSCT163S02N	3/15/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDPCT16-3S	DPSCT163S03N	3/15/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDPCT16-3S	DPSCT163S04N	3/15/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	SUSDPCT16-4W	DPSCT164W01N	4/6/2018	N		WP#3-2018	Subsurface	1	2
Warehouse	SUSDPCT16-4W	DPSCT164W02N	4/6/2018	N		WP#3-2018	Subsurface	2	3
Warehouse	SUSDPCT16-4W	DPSCT164W03N	4/6/2018	N		WP#3-2018	Subsurface	3	4
Warehouse	SUSDPCT16-4W	DPSCT164W04N	4/6/2018	N		WP#3-2018	Subsurface	4	5
Warehouse	TA1E0	DPSTA1E0001N	8/1/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	TA1E0	DPSTA1E0002N	8/1/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	TA1E0	DPSTA1E0003N	8/1/2017	N		WP#3-2017	Subsurface	3	4
Warehouse	TA1E1	DPSTA1E0101N	7/31/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	TA1E10	DPSTA1E1001N	8/8/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	TA1E9	DPSTA1E0901N	8/3/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	TA1G10	DPSTA1G1001N	8/4/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	TA1G9	DPSTA1G0901N	8/4/2017	N		WP#3-2017	Subsurface	1	2
Warehouse	TA1G9	DPSTA1G0902N	8/4/2017	N		WP#3-2017	Subsurface	2	3
Warehouse	TA1H9	DPSTA1H0901N	8/4/2017	N		WP#3-2017	Subsurface	1	2

Notes:

FD = Field duplicate.
N = Normal sample
Soil samples collected at depths greater than 16 feet bgs were not included in the BHHRA data set.
(a) Sample collected beneath an obstruction (e.g., concrete or pavement). Sample depth measured from top of slab. Sample was collected immediately below slab and is therefore considered surface soil for potential future exposures.

Exposure Areas:

Maintenance: Stores and Fleet Maintenance Area
Offices/Parking: Offices and Parking Lot
Future Park/Green Hypothetical Future Park Land/Green Space
Salvage: Salvage Yard and Waste Storage Area
Substation #7: Substation #7
Transformer Shop: Transformer Shop
Vehicle Refueling: Vehicle Refueling Area
Warehouse: Warehouse and Laydown Area

Table 3-2
Background Soil Samples
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)
Background	SOBACK01	SOBACK0100N	2/28/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK01	SOBACK0103N	2/28/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK02	SOBACK0200N	2/28/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK02	SOBACK0203N	2/28/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK03	SOBACK0300N	3/2/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK03	SOBACK0303N	3/2/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK04/ DPBACK04	SOBACK0400N	4/5/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK04/ DPBACK04	SOBACK0403N	4/5/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK05/ DPBACK15	SOBACK0500N	4/5/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK05/ DPBACK15	SOBACK0503N	4/5/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK06	SOBACK0600N	2/28/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK06	SOBACK0603N	2/28/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK07	SOBACK0700N	2/27/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK07	SOBACK0703N	2/27/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK08/ DPBACK12	SOBACK0800N	4/5/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK08/ DPBACK12	SOBACK0803N	4/5/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK09	SOBACK0900N	3/6/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK09	SOBACK0903N	3/6/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK11	SOBACK1100N	4/7/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK11	SOBACK1103N	4/7/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK12/DPBACK09	SOBACK1200N	4/4/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK12/DPBACK09	SOBACK1203N	4/4/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK13	SOBACK1300N	4/5/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK13	SOBACK1303N	4/5/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK14	SOBACK1400N	3/3/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK14	SOBACK1400R	3/3/2017	FD	SOBACK1400N	WP#3-2017-BACK	Surface	0	1
Background	SOBACK14	SOBACK1403N	3/3/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK15	SOBACK1500N	2/27/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK15	SOBACK1503N	2/27/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK16	SOBACK1600N	2/27/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK16	SOBACK1600R	2/27/2017	FD	SOBACK1600N	WP#3-2017-BACK	Surface	0	1
Background	SOBACK16	SOBACK1603N	2/27/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK17/ DPBACK05	SOBACK1700N	2/28/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK17/ DPBACK05	SOBACK1703N	2/28/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SOBACK18/ DPBACK13	SOBACK1800N	4/5/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SOBACK18/ DPBACK13	SOBACK1803N	4/5/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SU-BK-01	SU-BK-0100N	4/4/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SU-BK-01	SU-BK-0103N	4/4/2017	N		WP#3-2017-BACK	Subsurface	3	4
Background	SU-BK-02	SU-BK-0200N	4/4/2017	N		WP#3-2017-BACK	Surface	0	1
Background	SU-BK-02	SU-BK-0203N	4/4/2017	N		WP#3-2017-BACK	Subsurface	3	4

Notes:

Soil samples collected at depths greater than 16 feet bgs were not included in the BHHRA data set.

FD = Field duplicate.

N = Normal sample

Table 3-3
Groundwater Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Aquifer	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Start Depth (feet)	End Depth (feet)
Anacostia Park Property	UPPER	KMY-DU01	DPWNPS0108-12N	4/20/2017	N		WP#3-2017	8	12
Anacostia Park Property	UPPER	KMY-DU02	DPWNPS0210-14N	4/21/2017	N		WP#3-2017	10	14
Anacostia Park Property	UPPER	KMY-DU03	DPWNPS0315-19N	4/21/2017	N		WP#3-2017	15	19
Future Park/Green	UPPER	DP36	DPW3612-17N	5/20/2013	N		Phase2-2013	12	17
Future Park/Green	UPPER	MW01A	MW01AN	11/5/2014	N		Phase3-2014	10	35
Future Park/Green	UPPER	MW01A	MW01A122216N	12/22/2016	N		WP#3-2016	10	35
Future Park/Green	UPPER	MW01A	MW01A122216R	12/22/2016	FD	MW01A122216N	WP#3-2016	10	35
Future Park/Green	UPPER	MW02A	MW02AN	11/5/2014	N		Phase3-2014	8	28
Future Park/Green	UPPER	MW02A	MW02AN2	12/19/2014	N		Phase3-2014	8	28
Future Park/Green	UPPER	MW02A	MW02A122216N	12/22/2016	N		WP#3-2016	8	28
Future Park/Green	UPPER	MW03A	MW03AN	11/4/2014	N		Phase3-2014	10	25
Future Park/Green	UPPER	MW03A	MW03A122116N	12/21/2016	N		WP#3-2016	10	25
Future Park/Green	UPPER	MW04A	MW04AN	11/4/2014	N		Phase3-2014	6	26
Future Park/Green	UPPER	MW04A	MW04AN2	12/19/2014	N		Phase3-2014	6	26
Future Park/Green	UPPER	MW04A	MW04A122116N	12/21/2016	N		WP#3-2016	6	26
Future Park/Green	UPPER	SUSDP01	DPW0112-15N	5/20/2013	N		Phase2-2013	12	15
Future Park/Green	UPPER	SUSDP01	DPW0112-15N2	6/13/2013	N		Phase2-2013	12	15
Future Park/Green	UPPER	SUSDP02	DPW0212-17N	5/20/2013	N		Phase2-2013	12	17
Future Park/Green	UPPER	SUSDP02	DPW0212-17N2	6/13/2013	N		Phase2-2013	12	17
Future Park/Green	UPPER	TA19A1	DPWTA19A115-20N	3/20/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19A2	DPWTA19A215-20N	3/20/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19A3	DPWTA19A315-20N	3/20/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19B3	DPWTA19B315-20N	2/7/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19C1	DPWTA19C115-20N	2/8/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19C2	DPWTA19C215-20N	2/7/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19C3	DPWTA19C315-20N	2/7/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19D1	DPWTA19D115-20N	3/3/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19D3	DPWTA19D315-20N	3/8/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19E1	DPWTA19E115-20N	2/7/2017	N		WP#3-2017	15	20
Future Park/Green	UPPER	TA19E2	DPWTA19E215-20N	2/7/2017	N		WP#3-2017	15	20
Future Park/Green	LOWER (a)	MW01B	MW01B122216N	12/22/2016	N		WP#3-2016	40	52
Future Park/Green	LOWER (a)	MW01B	MW01BN	11/5/2014	N		Phase3-2014	40	52
Future Park/Green	LOWER (a)	MW02B	MW02B122216N	12/22/2016	N		WP#3-2016	38	53
Future Park/Green	LOWER (a)	MW02B	MW02BN	11/5/2014	N		Phase3-2014	38	53
Future Park/Green	LOWER (a)	MW03B	MW03B122116N	12/21/2016	N		WP#3-2016	40	50
Future Park/Green	LOWER (a)	MW03B	MW03BN	11/4/2014	N		Phase3-2014	40	50
Future Park/Green	LOWER (a)	MW04B	MW04B122116N	12/21/2016	N		WP#3-2016	34	44
Future Park/Green	LOWER (a)	MW04B	MW04BN	11/4/2014	N		Phase3-2014	34	44
Maintenance	UPPER	DP45	DPW4515-20N	6/4/2013	N		Phase2-2013	15	20
Maintenance	UPPER	DP56	DPW5615-20N	2/3/2017	N		WP#3-2017	15	20
Maintenance	UPPER	DP57	DPW5715-20N	2/3/2017	N		WP#3-2017	15	20
Maintenance	UPPER	DP57	DPW5715-20R	2/3/2017	FD	DPW5715-20N	WP#3-2017	15	20
Maintenance	UPPER	DP58	DPW5815-20N	2/6/2017	N		WP#3-2017	15	20
Maintenance	UPPER	DP59	DPW5915-20N	2/3/2017	N		WP#3-2017	15	20
Maintenance	UPPER	DP60	DPW6015-20N	2/6/2017	N		WP#3-2017	15	20
Maintenance	UPPER	DPD5	DPWD525-30N	4/18/2014	N		Phase3-2014	25	30
Maintenance	UPPER	DPD6	DPWD630-35N	4/17/2014	N		Phase3-2014	30	35
Maintenance	UPPER	MW13A	MW13AN	11/3/2014	N		Phase3-2014	8	20
Maintenance	UPPER	MW13A	MW13A122016N	12/20/2016	N		WP#3-2016	8	20
Maintenance	UPPER	SUSDP15	DPW1520-25N	6/6/2013	N		Phase2-2013	20	25
Maintenance	UPPER	SUSDP16	DPW1615-20N	6/10/2013	N		Phase2-2013	15	20
Maintenance	UPPER	SUSDP16	DPW1615-20R	6/10/2013	FD	DPW1615-20N	Phase2-2013	15	20
Maintenance	UPPER	SUSDP17	DPW1713-18N	6/11/2013	N		Phase2-2013	13	18
Maintenance	UPPER	SUSDP18	DPW1815-20N	6/4/2013	N		Phase2-2013	15	20
Maintenance	UPPER	SUSDP52	DPW5215-20N	2/3/2017	N		WP#3-2017	15	20
Offices/Parking	UPPER	DP55	DPW5515-20N	2/2/2017	N		WP#3-2017	15	20
Offices/Parking	UPPER	DP55	DPW5515-20R	2/2/2017	FD	DPW5515-20N	WP#3-2017	15	20
Offices/Parking	UPPER	DPA2	DPWA220-25N	4/17/2014	N		Phase3-2014	20	25
Offices/Parking	UPPER	DPA2	DPWA220-25R	4/17/2014	FD	DPWA220-25N	Phase3-2014	20	25
Offices/Parking	UPPER	DPA3	DPWA325-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPA4	DPWA425-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPA5	DPWA525-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPA5	DPWA525-30R	4/16/2014	FD	DPWA525-30N	Phase3-2014	25	30
Offices/Parking	UPPER	DPB10	DPWB1025-30N	4/17/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPB11	DPWB1125-30N	4/17/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPB12	DPWB1225-30N	4/17/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPB2	DPWB220-25N	4/17/2014	N		Phase3-2014	20	25
Offices/Parking	UPPER	DPB3	DPWB325-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPB5	DPWB525-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPB6	DPWB625-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPB7	DPWB730-35N	4/16/2014	N		Phase3-2014	30	35
Offices/Parking	UPPER	DPB9	DPWB925-30N	4/17/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPC3	DPWC325-30N	4/16/2014	N		Phase3-2014	25	30

Table 3-3
Groundwater Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Aquifer	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Start Depth (feet)	End Depth (feet)
Offices/Parking	UPPER	DPC4	DPWC425-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPC5	DPWC525-30N	4/16/2014	N		Phase3-2014	25	30
Offices/Parking	UPPER	DPC7	DPWC730-35N	4/17/2014	N		Phase3-2014	30	35
Offices/Parking	UPPER	DPC8	DPWC830-35N	4/17/2014	N		Phase3-2014	30	35
Offices/Parking	UPPER	DPC9	DPWC930-35N	4/18/2014	N		Phase3-2014	30	35
Offices/Parking	UPPER	DPD7	DPWD730-35N	4/17/2014	N		Phase3-2014	30	35
Offices/Parking	UPPER	MW09A	MW09AN	11/3/2014	N		Phase3-2014	18	38
Offices/Parking	UPPER	MW09A	MW09AN2	12/19/2014	N		Phase3-2014	18	38
Offices/Parking	UPPER	MW09A	MW09A122116N	12/21/2016	N		WP#3-2016	18	38
Offices/Parking	UPPER	MW12A	MW12AN	11/3/2014	N		Phase3-2014	9	29
Offices/Parking	UPPER	MW12A	MW12AN2	12/19/2014	N		Phase3-2014	9	29
Offices/Parking	UPPER	MW12A	MW12A122016N	12/20/2016	N		WP#3-2016	9	29
Offices/Parking	UPPER	SUSDP09	DPW0925-30N	6/11/2013	N		Phase2-2013	25	30
Offices/Parking	UPPER	SUSDP14	DPW1423-28N	6/6/2013	N		Phase2-2013	23	28
Offices/Parking	UPPER	SUSDP19	DPW1915-20N	6/5/2013	N		Phase2-2013	15	20
Salvage	UPPER	DP26	DPW26(25-30)N	3/29/2013	N		Phase2-2013	25	30
Salvage	UPPER	DP61	DPW6115-20N	2/6/2017	N		WP#3-2017	15	20
Salvage	UPPER	DP62	DPW6215-20N	2/6/2017	N		WP#3-2017	15	20
Salvage	UPPER	DP62	DPW6215-20R	2/6/2017	FD	DPW6215-20N	WP#3-2017	15	20
Salvage	UPPER	DP63	DPW6315-20N	2/6/2017	N		WP#3-2017	15	20
Salvage	UPPER	SUSDP10	DPW1015-20N	6/10/2013	N		Phase2-2013	15	20
Salvage	UPPER	SUSDP12	DPW1215-20N	6/13/2013	N		Phase2-2013	15	20
Salvage	UPPER	SUSDP43	DPW4315-20N	6/6/2013	N		Phase2-2013	15	20
Salvage	UPPER	SUSDP44	DPW4413-18N	6/10/2013	N		Phase2-2013	13	18
Substation #7	UPPER	DP33	DPW33(27-32)N	4/4/2013	N		Phase2-2013	27	32
Substation #7	UPPER	MW14A	MW14AN	11/3/2014	N		Phase3-2014	7	27
Substation #7	UPPER	MW14A	MW14A122016N	12/20/2016	N		WP#3-2016	7	27
Substation #7	UPPER	MW15A	MW15AN	11/3/2014	N		Phase3-2014	28	38
Substation #7	UPPER	MW15A	MW15A122116N	12/21/2016	N		WP#3-2016	28	38
Substation #7	UPPER	SUSDP20	DPW2015-20N	6/12/2013	N		Phase2-2013	13	20
Substation #7	UPPER	SUSDP23	DPW2323-28N	6/12/2013	N		Phase2-2013	23	28
Substation #7	UPPER	SUSDP24	DPW2415-20N	6/4/2013	N		Phase2-2013	15	20
Substation #7	UPPER	SUSDP24	DPW2415-20R	6/4/2013	FD	DPW2415-20N	Phase2-2013	15	20
Transformer Shop	UPPER	DP35	DPW3515N	3/28/2013	N		Phase2-2013	14	16
Transformer Shop	UPPER	DP46	DPW4615-20N	6/5/2013	N		Phase2-2013	15	20
Transformer Shop	UPPER	DP47	DPW4710-15N	6/5/2013	N		Phase2-2013	10	15
Transformer Shop	UPPER	DP54	DPW5415-20N	2/2/2017	N		WP#3-2017	15	20
Transformer Shop	UPPER	SUSDP22	DPW2215-20N	6/12/2013	N		Phase2-2013	15	20
Vehicle Refueling	UPPER	DP28	DPW2821N	4/2/2013	N		Phase2-2013	20	22
Vehicle Refueling	UPPER	DP28	DPW2821R	4/2/2013	FD	DPW2821N	Phase2-2013	20	22
Vehicle Refueling	UPPER	DP38	DPW3815-20N	5/23/2013	N		Phase2-2013	15	20
Vehicle Refueling	UPPER	MW06A	MW06AN	11/4/2014	N		Phase3-2014	8	28
Vehicle Refueling	UPPER	MW06A	MW06AR	11/4/2014	FD	MW06AN	Phase3-2014	8	28
Vehicle Refueling	UPPER	MW06A	MW06A122116N	12/21/2016	N		WP#3-2016	8	28
Vehicle Refueling	UPPER	MW06A	MW06A122116R	12/21/2016	FD	MW06A122116N	WP#3-2016	8	28
Vehicle Refueling	UPPER	SUSDP37	DPW3713-18N	5/23/2013	N		Phase2-2013	13	18
Vehicle Refueling	UPPER	SUSDP37	DPW3725-30N	5/23/2013	N		Phase2-2013	25	30
Vehicle Refueling	UPPER	SUSDP39	DPW3913-18N	5/22/2013	N		Phase2-2013	13	18
Warehouse	UPPER	DP30	DPW3028N	4/3/2013	N		Phase2-2013	27	29
Warehouse	UPPER	DP31	DPW3120N	4/1/2013	N		Phase2-2013	19.5	20.5
Warehouse	UPPER	DP40	DPW4015-20N	5/28/2013	N		Phase2-2013	15	20
Warehouse	UPPER	DP42	DPW4220-25N	5/29/2013	N		Phase2-2013	20	25
Warehouse	UPPER	DPA1	DPWA120-25N	4/17/2014	N		Phase3-2014	20	25
Warehouse	UPPER	MW05A	MW05AN	11/4/2014	N		Phase3-2014	10	20
Warehouse	UPPER	MW05A	MW05ANB	11/4/2014	FD	MW05AN	Phase3-2014	10	20
Warehouse	UPPER	MW05A	MW05A122116N	12/21/2016	N		WP#3-2016	10	20
Warehouse	UPPER	MW07A	MW07AN	11/5/2014	N		Phase3-2014	8	28
Warehouse	UPPER	MW07A	MW07AR	11/5/2014	FD	MW07AN	Phase3-2014	8	28
Warehouse	UPPER	MW07A	MW07AN2	12/19/2014	N		Phase3-2014	8	28
Warehouse	UPPER	MW07A	MW07AN2 BACKUP	12/19/2014	N		Phase3-2014	8	28
Warehouse	UPPER	MW07A	MW07A122016N	12/20/2016	N		WP#3-2016	8	28
Warehouse	UPPER	MW08A	MW08AN	11/10/2014	N		Phase3-2014	10	25
Warehouse	UPPER	MW08A	MW08A122116N	12/21/2016	N		WP#3-2016	10	25
Warehouse	UPPER	MW10A	MW10AN	11/4/2014	N		Phase3-2014	10	30
Warehouse	UPPER	MW11A	MW11AN	11/4/2014	N		Phase3-2014	27	42

Table 3-3
Groundwater Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Aquifer	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Start Depth (feet)	End Depth (feet)
Warehouse	UPPER	MW11A	MW11AN2	12/19/2014	N		Phase3-2014	27	42
Warehouse	UPPER	MW11A	MW11A122216N	12/22/2016	N		WP#3-2016	27	42
Warehouse	UPPER	SUSDP03	DPW0310-15N	5/21/2013	N		Phase2-2013	10	15
Warehouse	UPPER	SUSDP04	DPW0415-20N	5/20/2013	N		Phase2-2013	15	20
Warehouse	UPPER	SUSDP05	DPW0514-19N	5/21/2013	N		Phase2-2013	14	19
Warehouse	UPPER	SUSDP05	DPW0514-19R	5/21/2013	FD	DPW0514-19N	Phase2-2013	14	19
Warehouse	UPPER	SUSDP06	DPW0614.5-19.5N	5/23/2013	N		Phase2-2013	14.5	19.5
Warehouse	UPPER	SUSDP07	DPW0720-25N	5/22/2013	N		Phase2-2013	20	25
Warehouse	UPPER	SUSDP08	DPW0815-25N	5/24/2013	N		Phase2-2013	15	25
Warehouse	UPPER	SUSDP11	DPW1110-15N	5/28/2013	N		Phase2-2013	10	15
Warehouse	UPPER	SUSDP13	DPW1310-15N	5/29/2013	N		Phase2-2013	10	15
Warehouse	UPPER	SUSDP41	DPW41 15-25N	5/24/2013	N		Phase2-2013	15	25
Warehouse	LOWER (a)	MW08B	MW08B122116N	12/21/2016	N		WP#3-2016	50	60
Warehouse	LOWER (a)	MW08B	MW08BN	11/5/2014	N		Phase3-2014	50	60
Warehouse	LOWER (a)	MW08B	MW08BN2	12/19/2014	N		Phase3-2014	50	60
Warehouse	LOWER (a)	MW08B	MW08BR	11/5/2014	FD	MW08BN	Phase3-2014	50	60
Warehouse	LOWER (a)	MW11B	MW11B122216N	12/22/2016	N		WP#3-2016	50	62
Warehouse	LOWER (a)	MW11B	MW11BN	11/4/2014	N		Phase3-2014	50	62

Notes:
FD = Field duplicate.
N = Normal sample
(a) Data from lower aquifer used only in the evaluation of groundwater migration to surface water. Data collected in 2016 were used where available. Otherwise, data collected in 2014 was used.such that for each chemical and well combination, the most recent data point was used.

Exposure Areas:

Maintenance: Stores and Fleet Maintenance Area
Offices/Parking: Offices and Parking Lot
Future Park/Green Hypothetical Future Park Land/Green Space
Salvage: Salvage Yard and Waste Storage Area
Substation #7: Substation #7
Transformer Shop: Transformer Shop
Vehicle Refueling: Vehicle Refueling Area
Warehouse: Warehouse and Laydown Area

Table 3-4
Background Groundwater Samples
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Aquifer	Start Depth (feet)	End Depth (feet)
Background	DPBACK10	DPWBACK1016-20N	8/30/2017	N		WP#3-2017-BACK	UPPER	16	20
Background	DPBACK14	DPWBACK1415-19N	3/8/2017	N		WP#3-2017-BACK	UPPER	15	19
Background	DPBACK16	DPWBACK1620-24N	8/29/2017	N		WP#3-2017-BACK	UPPER	20	24
Background	SOBACK04/ DPBACK04	DPWBACK0420-24N	8/22/2017	N		WP#3-2017-BACK	UPPER	20	24
Background	SOBACK05/ DPBACK15	DPWBACK1524-28N	8/28/2017	N		WP#3-2017-BACK	UPPER	24	28
Background	SOBACK08/ DPBACK12	DPWBACK1221-25N	4/18/2017	N		WP#3-2017-BACK	UPPER	21	25
Background	SOBACK10/DPBACK01	DPWBACK0105-09N	3/7/2017	N		WP#3-2017-BACK	UPPER	5	9
Background	SOBACK12/DPBACK09	DPWBACK0916-20N	4/18/2017	N		WP#3-2017-BACK	UPPER	16	20
Background	SOBACK17/ DPBACK05	DPWBACK0513-17N	3/2/2017	N		WP#3-2017-BACK	UPPER	13	17
Background	SOBACK17/ DPBACK05	DPWBACK0513-17R	3/2/2017	FD	DPWBACK0513-17N	WP#3-2017-BACK	UPPER	13	17
Background	SOBACK18/ DPBACK13	DPWBACK1306-10N	4/19/2017	N		WP#3-2017-BACK	UPPER	6	10

Notes:
FD = Field duplicate.
N = Normal sample

Table 3-5
Surface Sediment Samples and Identification of Fringe Sediment Samples used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Selected for HHRA?	Sample Date	Sample Type	Parent Sample	Task Code	Start Depth (feet)	End Depth (feet)
Waterside	SED1.5B	SED1.5B00N	No (a)	11/6/2013	N		Phase2-2013	0	0.5
Waterside	SED1.5C	SED1.5C00AN	Yes	6/21/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED1.5C	SED1.5C00AR	Yes	6/21/2017	FD	SED1.5C00AN	WP#3-2017 Waterside	0	0.33
Waterside	SED10A	SED10A00N	No (b)	11/11/2013	N		Phase2-2013	0	0.5
Waterside	SED10B	SED10B00N	No (a)	11/11/2013	N		Phase2-2013	0	0.5
Waterside	SED10C	SED10C00N	Yes	11/11/2013	N		Phase2-2013	0	0.5
Waterside	SED1A	SED1A00N	No (b)	11/6/2013	N		Phase2-2013	0	0.5
Waterside	SED1B	SED1B00N	No (a)	11/6/2013	N		Phase2-2013	0	0.5
Waterside	SED1C	SED1C00N	Yes	11/7/2013	N		Phase2-2013	0	0.5
Waterside	SED2.5B	SED2.5B00N	Yes	11/7/2013	N		Phase2-2013	0	0.5
Waterside	SED2A	SED2A00N	No (a)	11/6/2013	N		Phase2-2013	0	0.5
Waterside	SED2B	SED2B00N	No (a)	11/5/2013	N		Phase2-2013	0	0.5
Waterside	SED2C	SED2C00N	Yes	11/6/2013	N		Phase2-2013	0	0.5
Waterside	SED3.5B	SED3.5B00N	No (a)	11/12/2013	N		Phase2-2013	0	0.5
Waterside	SED3A	SED3A00N	No (b)	11/7/2013	N		Phase2-2013	0	0.5
Waterside	SED3B	SED3B00N	No (a)	11/8/2013	N		Phase2-2013	0	0.5
Waterside	SED3C	SED3C00N	No (a)	11/7/2013	N		Phase2-2013	0	0.5
Waterside	SED3C	SED3C00R	No (a)	11/7/2013	FD	SED3C00N	Phase2-2013	0	0.5
Waterside	SED4.5B	SED4.5B00N	No (a)	11/8/2013	N		Phase2-2013	0	0.5
Waterside	SED4A	SED4A00N	No (b)	11/12/2013	N		Phase2-2013	0	0.5
Waterside	SED4B	SED4B00N	No (a)	11/12/2013	N		Phase2-2013	0	0.5
Waterside	SED4B	SED4B00R	No (a)	11/12/2013	FD	SED4B00N	Phase2-2013	0	0.5
Waterside	SED4C	SED4C00N	Yes	11/12/2013	N		Phase2-2013	0	0.5
Waterside	SED5.5B	SED5.5B00N	No (a)	11/12/2013	N		Phase2-2013	0	0.5
Waterside	SED5A	SED5A00N	No (b)	11/8/2013	N		Phase2-2013	0	0.5
Waterside	SED5B	SED5B00AN	No (a)	6/20/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED5B	SED5B00N	No (a)	11/8/2013	N		Phase2-2013	0	0.5
Waterside	SED5C	SED5C00N	No (a)	11/11/2013	N		Phase2-2013	0	0.5
Waterside	SED6.5D	SED6.5D00EN	Yes	6/9/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED6.5D	SED6.5D00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED6.5E	SED6.5E00EN	Yes	6/8/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED6.5E	SED6.5E00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED6A	SED6A00EN	No (b)	6/8/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED6A	SED6A00N	No (b)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED6B	SED6B00EN	No (a)	6/8/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED6B	SED6B00N	No (a)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED6B	SED6B00R	No (a)	11/13/2013	FD	SED6B00N	Phase2-2013	0	0.5
Waterside	SED6C	SED6C00EN	Yes	6/7/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED6C	SED6C00N	Yes	11/14/2013	N		Phase2-2013	0	0.5
Waterside	SED7.5D	SED7.5D00EN	Yes	6/9/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7.5D	SED7.5D00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED7.5E	SED7.5E00EN	Yes	6/8/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7.5E	SED7.5E00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED7A	SED7A00EN	No (b)	6/9/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7A	SED7A00N	No (b)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED7B	SED7B00EN	No (a)	6/7/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7B	SED7B00N	No (a)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED7B	SED7B00R	No (a)	11/13/2013	FD	SED7B00N	Phase2-2013	0	0.5
Waterside	SED7D	SED7D00EN	Yes	6/9/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7D	SED7D00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED7E	SED7E00AN	Yes	6/22/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7E	SED7E00EN	Yes	6/8/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7E	SED7E00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED7F	SED7F00EN	Yes	6/8/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED7F	SED7F00N	Yes	11/25/2013	N		Phase2-2013	0	0.5
Waterside	SED7G	SED7G00N	Yes	1/30/2014	N		Phase2-2013	0	0.5
Waterside	SED8.5B	SED8.5B00N	No (a)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED8A	SED8A00EN	No (b)	6/9/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED8A	SED8A00N	No (b)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED8B	SED8B00EN	No (a)	6/9/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED8B	SED8B00N	No (a)	11/13/2013	N		Phase2-2013	0	0.5
Waterside	SED8C	SED8C00EN	Yes	6/7/2017	N		WP#3-2017 Waterside	0	0.33
Waterside	SED8C	SED8C00N	Yes	11/14/2013	N		Phase2-2013	0	0.5
Waterside	SED8C	SED8C00R	Yes	11/14/2013	FD	SED8C00N	Phase2-2013	0	0.5
Waterside	SED9.5B	SED9.5B00N	Yes	11/11/2013	N		Phase2-2013	0	0.5
Waterside	SED9A	SED9A00N	No (b)	11/11/2013	N		Phase2-2013	0	0.5

Table 3-5
Surface Sediment Samples and Identification of Fringe Sediment Samples used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Selected for HHRA?	Sample Date	Sample Type	Parent Sample	Task Code	Start Depth (feet)	End Depth (feet)
Waterside	SED9B	SED9B00N	No (a)	11/11/2013	N		Phase2-2013	0	0.5
Waterside	SED9C	SED9C00N	Yes	11/11/2013	N		Phase2-2013	0	0.5
Waterside	WSED1	WSED100N	No (a)	11/15/2013	N		Phase2-2013	0	0.5
Waterside	WSED1	WSED100R	No (a)	11/15/2013	FD	WSED100N	Phase2-2013	0	0.5
Waterside	WSED2	WSED200N	No (a)	11/15/2013	N		Phase2-2013	0	0.5
Waterside	R5-03	RI-R5-03-SS	Yes	7/25/2014	N		DOEE_Phase1	0	0.5
Waterside	R5-04	RI-R5-04-SS	No (a)	7/28/2014	N		DOEE_Phase1	0	0.5
Waterside	R5-05	RI-R5-05-SS	Yes	7/30/2014	N		DOEE_Phase1	0	0.5
Waterside	R5-06	RI-R5-06-SS	No (a)	4/30/2015	N		DOEE_Phase1	0	0.5
Waterside	R5-08	P2-R5-08-SS	No (a)	6/9/2016	N		DOEE_Phase2	0	0.5
Waterside	R5-09	P2-R5-09-SS	Yes	6/28/2016	N		DOEE_Phase2	0	0.5
Waterside	R6-01	RI-R6-01-SS	No (a)	8/5/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-02	RI-R6-02-SS	No (a)	7/28/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-03	RI-R6-03-SS	No (a)	7/28/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-04	RI-R6-04-SS	Yes	7/28/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-04	RI-R6-80-SS	Yes	7/28/2014	FD	RI-R6-04-SS	DOEE_Phase1	0	0.5
Waterside	R6-05	RI-R6-05-SS	Yes	8/4/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-06	RI-R6-06-SS	Yes	8/4/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-06	RI-R6-100-SS	Yes	8/4/2014	FD	RI-R6-06-SS	DOEE_Phase1	0	0.5
Waterside	R6-07	RI-R6-07-SS	No (b)	7/30/2014	N		DOEE_Phase1	0	0.5
Waterside	R6-18	RI-R6-18-SS	Yes	4/30/2015	N		DOEE_Phase1	0	0.5
Waterside	R6-21	RI-R6-21-SS	Yes	4/29/2015	N		DOEE_Phase1	0	0.5
Waterside	R6-22	RI-R6-22-SS	Yes	4/30/2015	N		DOEE_Phase1	0	0.5
Waterside	R6-23	RI-R6-23-SS	Yes	4/30/2015	N		DOEE_Phase1	0	0.5
Waterside	R6-30	P2-R6-30-SS	Yes	6/9/2016	N		DOEE_Phase2	0	0.5
Waterside	R6-30	P2-R6-40-SS	Yes	6/9/2016	FD	P2-R6-30-SS	DOEE_Phase2	0	0.5
Waterside	R6-31	P2-R6-31-SS	Yes	6/28/2016	N		DOEE_Phase2	0	0.5
Waterside	R6-32	P2-R6-32-SS	Yes	6/28/2016	N		DOEE_Phase2	0	0.5
Waterside	R6-33	P2-R6-33-SS	Yes	6/28/2016	N		DOEE_Phase2	0	0.5

Notes:
N = Normal sample
FD = Field duplicate

(a) - Not located within fringe sediment area (mean low tide minus one).
(b) - Within fringe sediment area, but on bank opposite Pepco.

Table 3-6
Background Surface Sediment Samples
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Source	Sample Date	Sample Type	Parent Sample	Depth Interval (feet)
Background	SEDBACK1	SEDBACK100N	Pepco Phase I	12/3/2013	N		0-0.5
Background	SEDBACK2	SEDBACK200N	Pepco Phase I	12/3/2013	N		0-0.5
Background	SEDBACK2	SEDBACK200R	Pepco Phase I	12/3/2013	FD	SEDBACK200N	0-0.5
Background	SEDBACK3	SEDBACK300N	Pepco Phase I	11/15/2013	N		0-0.5
Background	SEDBACK4	SEDBACK400N	Pepco Phase I	11/14/2013	N		0-0.5
Background	SEDBACK5	SEDBACK500N	Pepco Phase I	11/14/2013	N		0-0.5
Background	SEDBACK5	SEDBACK500R	Pepco Phase I	11/14/2013	FD	SEDBACK500N	0-0.5
Background	SEDBACK6	SEDBACK600N	Pepco Phase I	11/15/2013	N		0-0.5
Background	SEDBACK16	SEDBACK1600N	Pepco Phase II	6/12/2017	N		0-0.33
Background	SEDBACK17	SEDBACK1700N	Pepco Phase II	6/12/2017	N		0-0.33
Background	SEDBACK18	SEDBACK1800N	Pepco Phase II	6/12/2017	N		0-0.33
Background	SEDBACK19	SEDBACK1900N	Pepco Phase II	6/13/2017	N		0-0.33
Background	SEDBACK19	SEDBACK1900R	Pepco Phase II	6/13/2017	FD	SEDBACK1900N	0-0.33
Background	SEDBACK20	SEDBACK2000N	Pepco Phase II	6/13/2017	N		0-0.33
Background	SEDBACK20	SEDBACK2000R	Pepco Phase II	6/13/2017	FD	SEDBACK2000N	0-0.33
Background	R6-13	RI-R6-13-SS	DOEE Phase I	7/31/2014	N		0-0.5
Background	R6-14	RI-R6-14-SS	DOEE Phase I	7/31/2014	N		0-0.5
Background	R6-15	RI-R6-15-SS	DOEE Phase I	7/31/2014	N		0-0.5
Background	R6-16	RI-R6-16-SS	DOEE Phase I	7/31/2014	N		0-0.5
Background	R6-17	RI-R6-17-SS	DOEE Phase I	7/31/2014	N		0-0.5
Background	R7-01	RI-R7-01-SS	DOEE Phase I	8/1/2014	N		0-0.5
Background	R7-02	RI-R7-02-SS	DOEE Phase I	8/1/2014	N		0-0.5
Background	R7-03	RI-R7-03-SS	DOEE Phase I	8/1/2014	N		0-0.5
Background	R7-04	RI-R7-04-SS	DOEE Phase I	8/1/2014	N		0-0.5
Background	R7-05	RI-R7-05-SS	DOEE Phase I	8/6/2014	N		0-0.5
Background	R7-06	RI-R7-06-SS	DOEE Phase I	8/6/2014	N		0-0.5
Background	R7-07	RI-R7-07-SS	DOEE Phase I	8/6/2014	N		0-0.5
Background	R7-08	RI-R7-08-SS	DOEE Phase I	8/6/2014	N		0-0.5
Background	R7-09	RI-R7-09-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-10	RI-R7-10-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-11	RI-R7-11-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-12	RI-R7-12-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-13	RI-R7-13-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-14	RI-R7-14-SS	DOEE Phase I	8/8/2014	N		0-0.5
Background	R7-15	RI-R7-15-SS	DOEE Phase I	8/8/2014	N		0-0.5
Background	R7-16	RI-R7-16-SS	DOEE Phase I	8/8/2014	N		0-0.5
Background	R7-17	RI-R7-17-SS	DOEE Phase I	8/8/2014	N		0-0.5
Background	R7-18	RI-R7-18-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-19	RI-R7-19-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-20	RI-R7-20-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-20	RI-R7-20-SS	DOEE Phase I	8/7/2014	FD	RI-R7-20-SS	0-0.5
Background	R7-21	RI-R7-21-SS	DOEE Phase I	8/7/2014	N		0-0.5
Background	R7-22	RI-R7-22-SS	DOEE Phase I	8/11/2014	N		0-0.5
Background	R7-23	RI-R7-23-SS	DOEE Phase I	8/6/2014	N		0-0.5
Background	R6-51	P2-R6-51-SS	DOEE Phase II	6/9/2016	N		0-0.5
Background	R7-27	P2-R7-27-SS	DOEE Phase II	6/9/2016	N		0-0.5
Background	R7-28	P2-R7-28-SS	DOEE Phase II	6/24/2016	N		0-0.5
Background	R7-32	P2-R7-32-SS	DOEE Phase II	6/9/2016	N		0-0.5
Background	R7-34	P2-R7-34-SS	DOEE Phase II	6/24/2016	N		0-0.5
Background	R7-35	P2-R7-35-SC-0.00-0.50	DOEE Phase II	7/22/2016	N		0-0.5
Background	R7-38	P2-R7-38-SS	DOEE Phase II	6/24/2016	N		0-0.5
Background	R7-39	P2-R7-39-SS	DOEE Phase II	6/24/2016	N		0-0.5
Background	R7-41	P2-R7-41-SS	DOEE Phase II	6/9/2016	N		0-0.5
Background	R7-42	P2-R7-42-SS	DOEE Phase II	6/9/2016	N		0-0.5

Notes:
DOEE = Department of Energy and Environment
N = Normal sample
FD = Field duplicate
Sources:
Pepco collected Site-specific background sediment samples during the Phase I and Phase II field investigations.
Sediment samples were collected by Tetra Tech on behalf of DOEE to support Phase I and Phase II of the Anacostia River Sediment Project.

Table 3-7
Surface Water Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Sample Type	Parent Sample	Task Code	Sample Depth (feet)
Background	SUWBACK1	SUWBACK1N	10/3/2013	N		Phase2-2013	0.5
Background	SUWBACK11	SUWBACK11N	9/25/2013	N		Phase2-2013	6.1
Background	SUWBACK12	SUWBACK12N	9/25/2013	N		Phase2-2013	1.8
Background	SUWBACK13	SUWBACK13N	9/25/2013	N		Phase2-2013	11.9
Background	SUWBACK15	SUWBACK15N	9/25/2013	N		Phase2-2013	5.15
Background	SUWBACK2	SUWBACK2N	10/3/2013	N		Phase2-2013	0.5
Background	SUWBACK3	SUWBACK3N	9/26/2013	N		Phase2-2013	1.5
Background	SUWBACK4	SUWBACK4N	9/26/2013	N		Phase2-2013	7.6
Background	SUWBACK5	SUWBACK5N	9/26/2013	N		Phase2-2013	5.1
Background	SUWBACK6	SUWBACK6N	9/26/2013	N		Phase2-2013	1.8
Waterside Area	SUW10B	SUW10BN	9/26/2013	N		Phase2-2013	7.3
Waterside Area	SUW1B	SUW1BN	9/23/2013	N		Phase2-2013	12.8
Waterside Area	SUW2B	SUW2BN	9/23/2013	N		Phase2-2013	5.3
Waterside Area	SUW3C	SUW3CN	9/23/2013	N		Phase2-2013	5.8
Waterside Area	SUW4B	SUW4BN	9/24/2013	N		Phase2-2013	5.7
Waterside Area	SUW5C	SUW5CN	9/24/2013	N		Phase2-2013	3.6
Waterside Area	SUW6B	SUW6BN	9/24/2013	N		Phase2-2013	9.8
Waterside Area	SUW6B	SUW6BR	9/24/2013	FD	SUW6BN	Phase2-2013	9.8
Waterside Area	SUW7B	SUW7BN	9/24/2013	N		Phase2-2013	5.6
Waterside Area	SUW8B	SUW8BN	9/24/2013	N		Phase2-2013	7.9
Waterside Area	SUW9C	SUW9CN	9/25/2013	N		Phase2-2013	1.8

Notes:
N = Normal sample
FD = Field duplicate

Table 3-8
Fish Tissue Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample ID	Species	Sample Date	Sample Type	Task Code
Adjacent to Benning Road Facility (a)					
Upper Tidal Anacostia (a)	UABB01	Brown bullhead	9/26/2013	N	USFWS/Pinkney
	UABC01	Blue catfish	9/26/2013	N	USFWS/Pinkney
	UACA01	Carp	9/26/2013	N	USFWS/Pinkney
	UACC01	Channel catfish	9/26/2013	N	USFWS/Pinkney
	UALB01	Largemouth bass	9/26/2013	N	USFWS/Pinkney
	UANS01	Northern snakehead	9/26/2013	N	USFWS/Pinkney
	UASF01	Sunfish	9/23/2013	N	USFWS/Pinkney
Other Areas					
Lower Tidal Anacostia	LAAE01	American eel	9/26/2013	N	USFWS/Pinkney
	LABC01	Blue catfish	9/26/2013	N	USFWS/Pinkney
	LACA01	Carp	9/26/2013	N	USFWS/Pinkney
	LACC01	Channel catfish	9/26/2013	N	USFWS/Pinkney
	LALB01	Largemouth bass	9/26/2013	N	USFWS/Pinkney
	LASF01	Sunfish	9/26/2013	N	USFWS/Pinkney
Lower Potomac	LPAE01	American eel	9/23/2013	N	USFWS/Pinkney
	LPAE02	American eel	9/23/2013	N	USFWS/Pinkney
	LPAS01	American shad	4/30/2013	N	USFWS/Pinkney
	LPBB01	Brown bullhead	9/23/2013	N	USFWS/Pinkney
	LPBC01	Blue catfish	9/30/2013	N	USFWS/Pinkney
	LPCA01	Carp	9/23/2013 (M) 9/26/2016 (O)	N	USFWS/Pinkney
	LPCC01	Channel catfish	9/23/2013	N	USFWS/Pinkney
	LPLB01	Largemouth bass	9/23/2013	N	USFWS/Pinkney
	LPSF01	Sunfish	9/23/2013 (M) 9/26/2016 (O)	N	USFWS/Pinkney
Upper Potomac	UPAE01	American eel	9/24/2013	N	USFWS/Pinkney
	UPBB01	Brown bullhead	9/24/2013	N	USFWS/Pinkney
	UPCA01	Carp	9/24/2013	N	USFWS/Pinkney
	UPCC01	Channel catfish	9/24/2013	N	USFWS/Pinkney
	UPLB01	Largemouth bass	9/24/2013	N	USFWS/Pinkney
	UPNS01	Northern snakehead	5/13/2013	N	USFWS/Pinkney
	UPSB01	Striped bass	5/9/2013	N	USFWS/Pinkney
	UPSF01	Sunfish	9/24/2013	N	USFWS/Pinkney
	UPWP01	White perch	5/9/2013	N	USFWS/Pinkney
Upstream Non-Tidal Anacostia - Indian Creek	P2-IC-008-GTA	Largemouth bass	8/3/2016	N	DOEE_Phase2
	P2-IC-009-GT1A	Largemouth bass	8/3/2016	N	DOEE_Phase2
	P2-IC-009-GT2A	Largemouth bass	8/3/2016	N	DOEE_Phase2
	P2-IC-010-GT1A	Striped bass	8/12/2016	N	DOEE_Phase2
	P2-IC-010-GT2A	Striped bass	8/12/2016	N	DOEE_Phase2
	P2-IC-010-GT3A	Striped bass	8/12/2016	N	DOEE_Phase2
Upstream Non-Tidal Anacostia - Northeast Branch	P2-NEB-007-GTA	Largemouth bass	8/3/2016	N	DOEE_Phase2
	P2-NEB-011-GTA	Largemouth bass	8/3/2016	N	DOEE_Phase2
	P2-NEB-012-GTA	Largemouth bass	8/3/2016	N	DOEE_Phase2

Table 3-8
Fish Tissue Samples Used in the BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample ID	Species	Sample Date	Sample Type	Task Code
Upstream Non-Tidal Anacostia - Northwest Branch	P2-NWB-001-GT1A	Largemouth bass	8/8/2016	N	DOEE_Phase2
	P2-NWB-001-GT2A	Largemouth bass	8/8/2016	N	DOEE_Phase2
	P2-NWB-002-GT1A	Largemouth bass	8/9/2016	N	DOEE_Phase2
	P2-NWB-200-GTA	Largemouth Bass	8/9/2016	FD (b)	DOEE_Phase2
	P2-NWB-002-GT2A	Largemouth bass	8/9/2016	N	DOEE_Phase2
	P2-NWB-002-GT3A	Largemouth bass	8/9/2016	N	DOEE_Phase2
	P2-NWB-003-GTA	Northern snakehead	8/16/2016	N	DOEE_Phase2
	P2-NWB-004-GT1A	Largemouth bass	8/12/2016	N	DOEE_Phase2
	P2-NWB-004-GT2A	Largemouth bass	8/12/2016	N	DOEE_Phase2
	P2-NWB-013-GT1A	Largemouth bass	8/10/2016	N	DOEE_Phase2
	P2-NWB-013-GT2A	Largemouth bass	8/10/2016	N	DOEE_Phase2
	P2-NWB-013-GT3A	Largemouth bass	8/10/2016	N	DOEE_Phase2
	P2-NWB-014-GTA	Smallmouth bass	8/4/2016	N	DOEE_Phase2
	P2-NWB-015-GTA	Smallmouth bass	8/5/2016	N	DOEE_Phase2
	P2-NWB-016-GTA	Smallmouth bass	8/4/2016	N	DOEE_Phase2
	P2-NWB-017-GTA	Smallmouth bass	8/4/2016	N	DOEE_Phase2
	P2-NWB-018-GT1A	Smallmouth bass	8/4/2016	N	DOEE_Phase2
	P2-NWB-018-GT2A	Smallmouth bass	8/4/2016	N	DOEE_Phase2
Upstream Non-Tidal Anacostia - Paint Branch	P2-PB-005-GT1A	Largemouth bass	8/15/2016	N	DOEE_Phase2
	P2-PB-005-GT2A	Largemouth bass	8/15/2016	N	DOEE_Phase2
	P2-PB-006-GTA	Largemouth bass	8/3/2016	N	DOEE_Phase2

Notes:
FD = Field Duplicate
M = Metals
N = Normal sample
O = Organics

(a) - The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.
(b) - Duplicate of P2-NWB-002-GT1A.

Table 3-9
Sediment and Soil Screening Levels
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CAS Number	Chemical	Sediment Residential RSL (a) (mg/kg)		Soil Industrial RSL (a) mg/kg	
79-00-5	1,1,2-Trichloroethane	0.15		0.63	
92-52-4	1,1'-Biphenyl	4.7		20	
87-61-6	1,2,3-Trichlorobenzene	6.3		93	
95-94-3	1,2,4,5-Tetrachlorobenzene	2.3		35	
107-06-2	1,2-Dichloroethane	0.46		2	
DFTEQ-HH	2,3,7,8-TCDD-TEQ	0.0000048	(b)	0.000022	(b)
78-93-3	2-Butanone	2700		19000	
91-57-6	2-Methylnaphthalene	24		300	
95-48-7	2-Methylphenol	320		4100	
72-54-8	4,4'-DDD	0.19		2.5	
72-55-9	4,4'-DDE	2		9.3	
50-29-3	4,4'-DDT	1.9		8.5	
108-10-1	4-Methyl-2-pentanone	3300		14000	
106-44-5	4-Methylphenol	630		8200	
83-32-9	Acenaphthene	360		4500	
208-96-8	Acenaphthylene	360	(c)	4500	(c)
67-64-1	Acetone	6100		67000	
98-86-2	Acetophenone	780		12000	
309-00-2	Aldrin	0.039		0.18	
7429-90-5	Aluminum	7700		110000	
120-12-7	Anthracene	1800		23000	
7440-36-0	Antimony	3.1		47	
7440-38-2	Arsenic	0.68		3	
7440-39-3	Barium	1500		22000	
100-52-7	Benzaldehyde	170		820	
56-55-3	Benzo(a)anthracene	1.1		21	
50-32-8	Benzo(a)pyrene	0.11		2.1	
205-99-2	Benzo(b)fluoranthene	1.1		21	
191-24-2	Benzo(g,h,i)perylene	180	(d)	2300	(d)
207-08-9	Benzo(k)fluoranthene	11		210	
65-85-0	Benzoic Acid	25000		330000	
7440-41-7	Beryllium	16		230	
319-85-7	beta-BHC	0.3		1.3	
117-81-7	bis-(2-Ethylhexyl)phthalate	39		160	
85-68-7	Butylbenzylphthalate	290		1200	
7440-43-9	Cadmium	7.1		98	
7440-70-2	Calcium	EN		EN	
105-60-2	Caprolactam	3100		40000	
86-74-8	Carbazole	240	(e)	3000	(e)
7440-47-3	Chromium, total/trivalent	12,000		180,000	
18540-29-9	Chromium, hexavalent	0.3		6.3	
218-01-9	Chrysene	110		2100	
5103-71-9	cis-Chlordane	1.7	(f)	7.7	(f)
12789-03-6	Chlordane (Technical)	1.7	(f)	7.7	(f)
7440-48-4	Cobalt	2.3		35	
7440-50-8	Copper	310		4700	
57-12-5	Cyanide	2.3		15	
110-82-7	Cyclohexane	650		2700	
319-86-8	delta-BHC	0.086	(g)	0.36	(g)
53-70-3	Dibenzo(a,h)anthracene	0.11		2.1	

Table 3-9
Sediment and Soil Screening Levels
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CAS Number	Chemical	Sediment Residential RSL (a) (mg/kg)		Soil Industrial RSL (a) mg/kg	
132-64-9	Dibenzofuran	7.3		100	
60-57-1	Dieldrin	0.034		0.14	
C10C20	Diesel Range Organics (C10-C20)	96	(h)	440	(h)
84-66-2	Diethylphthalate	5100		66000	
131-11-3	Dimethylphthalate	5100	(i)	66000	(i)
84-74-2	Di-n-butylphthalate	630		8200	
117-84-0	Di-n-octylphthalate	63		820	
959-98-8	Endosulfan I	47	(j)	700	(j)
33213-65-9	Endosulfan II	47	(j)	700	(j)
1031-07-8	Endosulfan Sulfate	47	(j)	700	(j)
72-20-8	Endrin	1.9		25	
7421-93-4	Endrin aldehyde	1.9	(k)	25	(k)
53494-70-5	Endrin ketone	1.9	(k)	25	(k)
100-41-4	Ethylbenzene	5.8		25	
206-44-0	Fluoranthene	240		3000	
86-73-7	Fluorene	240		3000	
58-89-9	gamma-BHC (Lindane)	0.57		2.5	
8006-61-9	Gasoline Range Organics (C6-C10)	8.2	(l)	42	(l)
76-44-8	Heptachlor	0.13		0.63	
1024-57-3	Heptachlor Epoxide	0.07		0.33	
193-39-5	Indeno(1,2,3-cd)pyrene	1.1		21	
7439-89-6	Iron	5500		82000	
78-59-1	Isophorone	570		2400	
98-82-8	Isopropylbenzene	190		990	
7439-92-1	Lead	400		800	
XYLMP	m, p-Xylene	55	(m)	240	(m)
7439-95-4	Magnesium	EN		EN	
7439-96-5	Manganese	180	(n)	2600	(n)
7439-97-6	Mercury	2.3	(o)	35	(o)
72-43-5	Methoxychlor	32		410	
108-87-2	Methylcyclohexane	650	(p)	2700	(p)
75-09-2	Methylene Chloride	35		320	
91-20-3	Naphthalene	3.8		17	
7440-02-0	Nickel	150		2200	
C20C36	Oil Range Organics (C20-C36)	23000	(q)	350000	(q)
95-47-6	o-Xylene	65		280	
1336-36-3	Total PCBs	0.12	(r)	0.97	(r)
85-01-8	Phenanthrene	1800	(s)	23000	(s)
108-95-2	Phenol	1900		25000	
7440-09-7	Potassium	EN		EN	
129-00-0	Pyrene	180		2300	
7782-49-2	Selenium	39		580	
7440-22-4	Silver	39		580	
7440-23-5	Sodium	EN		EN	
127-18-4	Tetrachloroethylene	8.1		39	
7440-28-0	Thallium	0.078		1.2	
108-88-3	Toluene	490		4700	
5103-74-2	trans-Chlordane	1.7	(f)	7.7	(f)
7440-62-2	Vanadium	39		580	
1330-20-7	Xylenes (total)	58		250	
7440-66-6	Zinc	2300		35000	

Table 3-9
Sediment and Soil Screening Levels
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CAS Number	Chemical	Sediment Residential RSL (a) (mg/kg)	Soil Industrial RSL (a) mg/kg

Notes:
CAS - Chemical Abstracts Service.
EN - Essential Nutrient.
NA - Not Available; no appropriate surrogate.
RSL - Regional Screening Level.
USEPA - United States Environmental Protection Agency.

(a) USEPA Regional Screening Level Table. (Target Risk =1E-06; Target Hazard Quotient=0.1). November 2018.
https://www.epa.gov/risk/regional-screening-levels-rsls
Residential value used for sediment, industrial value used for soil.
(b) - Value for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).
(c) - Value for acenaphthene
(d) - Value for pyrene.
(e) - Value for fluorene.
(f) - Value for chlordane.
(g) - Value for alpha-BHC.
(h) - Value for total petroleum hydrocarbons (aliphatic medium). THQ of 1 used to account for uncertainty in toxicity data.
(i) - Value for diethylphthalate.
(j) - Value for endosulfan.
(k) - Value for endrin.
(l) - Value for total petroleum hydrocarbons (aromatic low).
(m) - Value for m-xylenes.
(n) - Value for manganese, non-diet.
(o) - Value for mercuric chloride.
(p) - Value for cyclohexane.
(q) - Value for total petroleum hydrocarbons (aliphatic high).
(r) - Value for Aroclor-1254.
(s) - Value for anthracene.

Table 3-10
Groundwater Screening Levels for the Volatilization to Excavation Trench Air Pathway
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CAS Number	Chemical	Tapwater RSL (a) (ug/L)	
75-35-4	1,1-Dichloroethene	28	
78-93-3	2-Butanone	560	
591-78-6	2-Hexanone	3.8	
108-10-1	4-Methyl-2-pentanone	630	
67-64-1	Acetone	1400	
71-43-2	Benzene	0.46	
75-27-4	Bromodichloromethane	0.13	
75-65-0	Butyl alcohol, tert-	14	(b)
75-15-0	Carbon Disulfide	81	
108-90-7	Chlorobenzene	7.8	
67-66-3	Chloroform	0.22	
74-87-3	Chloromethane	19	
156-59-2	cis-1,2-Dichloroethylene	3.6	
124-48-1	Dibromochloromethane	0.87	
108-20-3	Diisopropyl ether	150	
XYLMP	m, p-Xylene	19	(c)
1634-04-4	Methyl tert-Butyl Ether (MTBE)	14	
75-09-2	Methylene Chloride	11	
91-20-3	Naphthalene	0.17	
95-47-6	o-Xylene	19	(c)
994-05-8	Tertiary-Amyl Methyl Ether	41	(d)
127-18-4	Tetrachloroethylene	4.1	
108-88-3	Toluene	110	
156-60-5	trans-1,2-Dichloroethene	36	
79-01-6	Trichloroethene	0.28	
75-01-4	Vinyl Chloride	0.019	
1330-20-7	Xylenes (total)	19	

Notes:
CAS - Chemical Abstracts Service.
RSL - Regional Screening Level.
USEPA - United States Environmental Protection Agency.

(a) USEPA Regional Screening Level Table.
(Target Risk =1E-06; Target Hazard Quotient=0.1). November 2018. Value for tapwater.
https://www.epa.gov/risk/regional-screening-levels-rsls
(b) - Value for Methyl tert-Butyl Ether.
(c) - Value for xylenes.
(d) - Value for isopropanol.

Table 3-11
Surface Water Screening Levels
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CAS Number	Chemical	DOEE Class D Surface Water Criteria (a) (ug/L)	NRWQC, Human Health, Organism only (b) (ug/L)	Tapwater RSL (c) (ug/L)	Selected (d) (ug/L)	
71-55-6	1,1,1-Trichloroethane	NA	200000	800	200000	NRWQC
79-34-5	1,1,2,2-Tetrachloroethane	4	3	0.076	4	DOEE
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NA	NA	1000	1000	RSL
79-00-5	1,1,2-Trichloroethane	16	8.9	0.041	16	DOEE
92-52-4	1,1'-Biphenyl	NA	NA	0.083	0.083	RSL
75-34-3	1,1-Dichloroethane	NA	NA	2.8	2.8	RSL
75-35-4	1,1-Dichloroethene	7100	20000	28	7100	DOEE
87-61-6	1,2,3-Trichlorobenzene	NA	NA	0.7	0.7	RSL
95-94-3	1,2,4,5-Tetrachlorobenzene	1.1	0.03	0.17	1.1	DOEE
120-82-1	1,2,4-Trichlorobenzene	70	0.076	0.4	70	DOEE
96-12-8	1,2-Dibromo-3-chloropropane	NA	NA	0.00033	0.00033	RSL
106-93-4	1,2-Dibromoethane	NA	NA	0.0075	0.0075	RSL
95-50-1	1,2-Dichlorobenzene	1300	3000	30	1300	DOEE
107-06-2	1,2-Dichloroethane	37	650	0.17	37	DOEE
78-87-5	1,2-Dichloropropane	15	31	0.82	15	DOEE
541-73-1	1,3-Dichlorobenzene	960	10	0.48 (g)	960	DOEE
106-46-7	1,4-Dichlorobenzene	190	900	0.48	190	DOEE
123-91-1	1,4-Dioxane	NA	NA	0.46	0.46	RSL
90-12-0	1-Methylnaphthalene	NA	NA	1.1	1.1	RSL
108-60-1	2,2'-oxybis(1-Chloropropane)	65000	4000	71	65000	DOEE
58-90-2	2,3,4,6-Tetrachlorophenol	NA	NA	24	24	RSL
1746-01-6	2,3,7,8-TCDD	0.000000051	5.1E-09	0.00000012	0.000000051	DOEE
DFTEQ-HH	2,3,7,8-TCDD-TEQ	0.000000051 (z)	5.1E-09 (z)	0.00000012 (z)	0.000000051	DOEE
95-95-4	2,4,5-Trichlorophenol	3600	600	120	3600	DOEE
88-06-2	2,4,6-Trichlorophenol	2.4	2.8	1.2	2.4	DOEE
120-83-2	2,4-Dichlorophenol	290	60	4.6	290	DOEE
105-67-9	2,4-Dimethylphenol	850	3000	36	850	DOEE
51-28-5	2,4-Dinitrophenol	5300	300	3.9	5300	DOEE
121-14-2	2,4-Dinitrotoluene	3.4	1.7	0.24	3.4	DOEE
606-20-2	2,6-Dinitrotoluene	NA	NA	0.049	0.049	RSL
78-93-3	2-Butanone	NA	NA	560	560	RSL
91-58-7	2-Chloronaphthalene	1600	1000	75	1600	DOEE
95-57-8	2-Chlorophenol	150	800	9.1	150	DOEE
591-78-6	2-Hexanone	NA	NA	3.8	3.8	RSL
91-57-6	2-Methylnaphthalene	NA	NA	3.6	3.6	RSL
95-48-7	2-Methylphenol	NA	NA	93	93	RSL
88-74-4	2-Nitroaniline	NA	NA	19	19	RSL
88-75-5	2-Nitrophenol	NA	NA	580 (h)	580	RSL
91-94-1	3,3'-Dichlorobenzidine	0.028	0.15	0.13	0.028	DOEE
99-09-2	3-Nitroaniline	NA	NA	3.8 (i)	3.8	RSL
72-54-8	4,4'-DDD	0.00031	0.00012	0.0063	0.00031	DOEE
72-55-9	4,4'-DDE	0.00022	0.000018	0.046	0.00022	DOEE
50-29-3	4,4'-DDT	0.00022	0.00003	0.23	0.00022	DOEE
534-52-1	4,6-Dinitro-2-methylphenol	280	30	0.15	280	DOEE
101-55-3	4-Bromophenyl-phenylether	NA	NA	NA	NA	
59-50-7	4-Chloro-3-methylphenol	NA	2000	140	2000	NRWQC
106-47-8	4-Chloroaniline	NA	NA	0.37	0.37	RSL
7005-72-3	4-Chlorophenyl-phenylether	NA	NA	NA	NA	
108-10-1	4-Methyl-2-pentanone	NA	NA	630	630	RSL
106-44-5	4-Methylphenol	NA	NA	190	190	RSL
100-01-6	4-Nitroaniline	NA	NA	3.8	3.8	RSL
100-02-7	4-Nitrophenol	NA	NA	580 (h)	580	RSL
83-32-9	Acenaphthene	990	90	53	990	DOEE
208-96-8	Acenaphthylene	NA	NA	53 (j)	53	RSL
67-64-1	Acetone	NA	NA	1400	1400	RSL
98-86-2	Acetophenone	NA	NA	190	190	RSL
309-00-2	Aldrin	0.00005	0.00000077	0.00092	0.00005	DOEE
319-84-6	alpha-BHC	0.0049	0.00039	0.0072	0.0049	DOEE
7429-90-5	Aluminum	NA	NA	2000	2000	RSL
120-12-7	Anthracene	40000	400	180	40000	DOEE
7440-36-0	Antimony	640	640	0.78	640	DOEE
7440-38-2	Arsenic	0.14	0.14	0.052	0.14	DOEE
1912-24-9	Atrazine	NA	NA	0.3	0.3	RSL
7440-39-3	Barium	NA	NA	380	380	RSL
100-52-7	Benzaldehyde	NA	NA	19	19	RSL
71-43-2	Benzene	51	16	0.46	51	DOEE
56-55-3	Benzo(a)anthracene	0.018	0.0013	0.03	0.018	DOEE
50-32-8	Benzo(a)pyrene	0.018	0.00013	0.025	0.018	DOEE
205-99-2	Benzo(b)fluoranthene	0.018	0.0013	0.25	0.018	DOEE
191-24-2	Benzo(g,h,i)perylene	NA	NA	12 (k)	12	RSL
207-08-9	Benzo(k)fluoranthene	0.018	0.013	2.5	0.018	DOEE

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CAS Number	Chemical	DOEE Class D Surface Water Criteria (a) (ug/L)		NRWQC, Human Health, Organism only (b) (ug/L)		Tapwater RSL (c) (ug/L)		Selected (d) (ug/L)	
65-85-0	Benzoic Acid	NA		NA		7500		7500	RSL
7440-41-7	Beryllium	NA		NA		2.5		2.5	RSL
319-85-7	beta-BHC	0.017		0.014		0.025		0.017	DOEE
111-91-1	bis-(2-chloroethoxy)methane	NA		NA		5.9		5.9	RSL
111-44-4	bis-(2-Chloroethyl)ether	0.53		2.2		0.014		0.53	DOEE
117-81-7	bis-(2-Ethylhexyl)phthalate	2.2		0.37		5.6		2.2	DOEE
74-97-5	Bromochloromethane	NA		NA		8.3		8.3	RSL
75-27-4	Bromodichloromethane	17		27		0.13		17	DOEE
75-25-2	Bromoform	140		120		3.3		140	DOEE
74-83-9	Bromomethane	1500		10000		0.75		1500	DOEE
75-65-0	Butyl alcohol, tert-	NA		NA		14	(ac)	14	RSL
85-68-7	Butylbenzylphthalate	1900		0.1		16		1900	DOEE
7440-43-9	Cadmium	NA		NA		0.92		0.92	RSL
7440-70-2	Calcium	EN		EN		EN		EN	
105-60-2	Caprolactam	NA		NA		990		990	RSL
86-74-8	Carbazole	NA		NA		29	(aa)	29	RSL
75-15-0	Carbon Disulfide	NA		NA		81		81	RSL
56-23-5	Carbon Tetrachloride	1.6		5		0.46		1.6	DOEE
108-90-7	Chlorobenzene	1600		800		7.8		1600	DOEE
75-00-3	Chloroethane	NA		NA		2100		2100	RSL
67-66-3	Chloroform	470		2000		0.22		470	DOEE
74-87-3	Chloromethane	NA		NA		19		19	RSL
18540-29-9	Chromium, hexavalent	NA		NA		0.035		0.035	RSL
7440-47-3	Chromium, total/trivalent	NA		NA		2200		2200	RSL
218-01-9	Chrysene	0.018		0.13		25		0.018	DOEE
156-59-2	cis-1,2-Dichloroethylene	10000	(e)	4000	(e)	3.6		10000	DOEE
10061-01-5	cis-1,3-Dichloropropene	21	(f)	12	(f)	0.47	(f)	21	DOEE
5103-71-9	cis-Chlordane	0.00081		0.00032		0.02	(l)	0.00081	DOEE
7440-48-4	Cobalt	NA		NA		0.6		0.6	RSL
7440-50-8	Copper	NA		NA		80		80	RSL
57-12-5	Cyanide	NA		400		0.15		400	NRWQC
110-82-7	Cyclohexane	NA		NA		1300		1300	RSL
319-86-8	delta-BHC	NA		NA		0.0072	(m)	0.0072	RSL
53-70-3	Dibenzo(a,h)anthracene	0.018		0.00013		0.025		0.018	DOEE
132-64-9	Dibenzofuran	NA		NA		0.79		0.79	RSL
132-65-0	Dibenzothiophene	NA		NA		6.5		6.5	RSL
124-48-1	Dibromochloromethane	13		21		0.87		13	DOEE
75-71-8	Dichlorodifluoromethane	NA		NA		20		20	RSL
60-57-1	Dieldrin	0.000054		0.0000012		0.0018		0.000054	DOEE
C10C20	Diesel Range Organics (C10-C20)	NA		NA		100	(n)	100	RSL
84-66-2	Diethylphthalate	44000		600		1500		44000	DOEE
108-20-3	Diisopropyl ether	NA		NA		150		150	RSL
131-11-3	Dimethylphthalate	1100000		2000		1500	(o)	1100000	DOEE
84-74-2	Di-n-butylphthalate	4500		30		90		4500	DOEE
117-84-0	Di-n-octylphthalate	NA		NA		20		20	RSL
959-98-8	Endosulfan I	89		30		10	(p)	89	DOEE
33213-65-9	Endosulfan II	89		40		10	(p)	89	DOEE
1031-07-8	Endosulfan Sulfate	89		40		10	(p)	89	DOEE
72-20-8	Endrin	0.06		0.03		0.23		0.06	DOEE
7421-93-4	Endrin aldehyde	0.3		1		0.23	(q)	0.3	DOEE
53494-70-5	Endrin ketone	NA		NA		0.23	(q)	0.23	RSL
100-41-4	Ethylbenzene	2100		130		1.5		2100	DOEE
637-92-3	Ethyl-Tert-Butyl-Ether	NA		NA		NA		NA	
206-44-0	Fluoranthene	140		20		80		140	DOEE
86-73-7	Fluorene	5300		70		29		5300	DOEE
58-89-9	gamma-BHC (Lindane)	1.8		4.4		0.042		1.8	DOEE
8006-61-9	Gasoline Range Organics (C6-C10)	NA		NA		3.3	(r)	3.3	RSL
76-44-8	Heptachlor	0.000079		0.0000059		0.0014		0.000079	DOEE
1024-57-3	Heptachlor Epoxide	0.000039		0.000032		0.0014		0.000039	DOEE
118-74-1	Hexachlorobenzene	0.00029		0.000079		0.0098		0.00029	DOEE
87-68-3	Hexachlorobutadiene	18		0.01		0.14		18	DOEE
77-47-4	Hexachlorocyclo-pentadiene	1100		4		0.041		1100	DOEE
67-72-1	Hexachloroethane	3.3		0.1		0.33		3.3	DOEE
193-39-5	Indeno(1,2,3-cd)pyrene	0.018		0.0013		0.25		0.018	DOEE
7439-89-6	Iron	EN		EN		1400		EN	
78-59-1	Isophorone	960		1800		78		960	DOEE
98-82-8	Isopropylbenzene	NA		NA		45		45	RSL
7439-92-1	Lead	NA		NA		15		15	RSL
XYLMP	m, p-Xylene	NA		NA		19	(s)	19	RSL
7439-95-4	Magnesium	EN		EN		EN		EN	
7439-96-5	Manganese	100		100		43		100	DOEE
7439-97-6	Mercury	0.15		NA		0.57	(t)	0.15	DOEE
72-43-5	Methoxychlor	NA		0.02		3.7		0.02	NRWQC
79-20-9	Methyl Acetate	NA		NA		2000		2000	RSL
1634-04-4	Methyl tert-Butyl Ether (MTBE)	NA		NA		14		14	RSL

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CAS Number	Chemical	DOEE Class D Surface Water Criteria (a) (ug/L)		NRWQC, Human Health, Organism only (b) (ug/L)		Tapwater RSL (c) (ug/L)		Selected (d) (ug/L)	
108-87-2	Methylcyclohexane	NA		NA		1300	(u)	1300	RSL
75-09-2	Methylene Chloride	590		1000		11		590	DOEE
91-20-3	Naphthalene	NA		NA		0.17		0.17	RSL
7440-02-0	Nickel	4600		4600		39		4600	DOEE
98-95-3	Nitrobenzene	690		600		0.14		690	DOEE
621-64-7	N-Nitroso-di-n-propylamine	0.51		0.51		0.011		0.51	DOEE
86-30-6	N-Nitrosodiphenylamine	6		6		12		6	DOEE
111-84-2	Nonane	NA		NA		0.53		0.53	RSL
C20C36	Oil Range Organics (C20-C36)	NA		NA		6000	(v)	6000	RSL
95-47-6	o-Xylene	NA		NA		19		19	RSL
87-86-5	Pentachlorophenol	3		0.04		0.041		3	DOEE
85-01-8	Phenanthrene	NA		NA		180	(x)	180	RSL
108-95-2	Phenol	860000		300000		580		860000	DOEE
7440-09-7	Potassium	EN		EN		EN		EN	
129-00-0	Pyrene	4000		30		12		4000	DOEE
7782-49-2	Selenium	4200		4200		10		4200	DOEE
7440-22-4	Silver	65000		NA		9.4		65000	DOEE
7440-23-5	Sodium	EN		EN		EN		EN	
100-42-5	Styrene	NA		NA		120		120	RSL
994-05-8	Tertiary-Amyl Methyl Ether	NA		NA		41	(ab)	41	RSL
127-18-4	Tetrachloroethylene	3.3		29		4.1		3.3	DOEE
7440-28-0	Thallium	0.47		0.47		0.02		0.47	DOEE
108-88-3	Toluene	15000		520		110		15000	DOEE
1336-36-3	Total PCBs	0.000064		0.000064		0.044	(w)	0.000064	DOEE
8001-35-2	Toxaphene	0.00028		0.00071		0.071		0.00028	DOEE
156-60-5	trans-1,2-Dichloroethene	10000		4000		36		10000	DOEE
10061-02-6	trans-1,3-Dichloropropene	21	(f)	12	(f)	0.47	(f)	21	DOEE
5103-74-2	trans-Chlordane	0.00081		0.00032		0.02	(l)	0.00081	DOEE
79-01-6	Trichloroethene	30		7		0.28		30	DOEE
75-69-4	Trichlorofluoromethane	NA		NA		520		520	RSL
7440-62-2	Vanadium	NA		NA		8.6		8.6	RSL
75-01-4	Vinyl Chloride	2.4		1.6		0.019		2.4	DOEE
1330-20-7	Xylenes (total)	NA		NA		19		19	RSL
7440-66-6	Zinc	26000		26000		600		26000	DOEE

See next page for notes.

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Surface Water Screening Levels
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CAS Number	Chemical	DOEE Class D Surface Water Criteria (a) (ug/L)	NRWQC, Human Health, Organism only (b) (ug/L)	Tapwater RSL (c) (ug/L)	Selected (d) (ug/L)

Notes:
CAS - Chemical Abstracts Service.
DOEE - District Department of Energy and Environment.
EN - Essential Nutrient.
NA - Not Available from this source.
NRWQC - National Recommended Water Quality Criteria.
RSL - Regional Screening Level.
USEPA - United States Environmental Protection Agency.

(a) - DOEE, Title 21 of the District of Columbia Municipal Regulations, Chapter 11, Water Quality Standards. Rule 21-1104, Standards. Effective 11/1/2013.
https://www.dcregs.dc.gov/Common/DCMR/SectionList.aspx?SectionNumber=21-1104
(b) - USEPA, National Recommended Water Quality Criteria for Priority Pollutants. Value for Human Health for the consumption of organisms. Accessed 8/2018.
https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table.
(c) USEPA Regional Screening Level Table. (Target Risk =1E-06; Target Hazard Quotient=0.1). November 2018. Value for tapwater.
https://www.epa.gov/risk/regional-screening-levels-rsls
(d) Selected screening level is the lower of the DOEE criteria, where available. If a DOEE criteria is not available, the NRWQC is used.
Where neither is available, the tapwater RSL is selected.
(e) Value for trans-1,2-Dichloroethene.
(f) - Value for 1,3-dichloropropene.
(g) - Value for 1,4-dichlororobenzene.
(h) - Value for phenol.
(i) - Value for 4-nitroaniline.
(j) - Value for acenaphthene
(k) - Value for pyrene.
(l) - Value for chlordane.
(m) - Value for alpha-BHC.
(n) - Value for total petroleum hydrocarbons (aliphatic medium). THQ of 1 used to account for uncertainty in toxicity data.
(o) Value for diethylphthalate.
(p) - Value for endosulfan.
(q) - Value for endrin.
(r) - Value for total petroleum hydrocarbons (aromatic low).
(s) - Value for m-xylenes.
(t) - Value for mercuric chloride.
(u) - Value for cyclohexane.
(v) - Value for total petroleum hydrocarbons (aliphatic high).
(w) - Value for polychlorinated biphenyls, low risk.
(x) - Value for anthracene.
(y) - Value for benzo(a)pyrene.
(z) - Value for 2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).
(aa) - Value for fluorene.
(ab) - Value for isopropanol.
(ac) - Value for methyl tert-Butyl Ether (MTBE).

Table 3-12
Fish Tissue Screening Levels
Benning Road Facility RI/FS Project
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Chemical	CAS	Fish Tissue RSL (a) (mg/kg)		Notes/Surrogates
Dioxins				
2,3,7,8-TCDD-TEQ	DFTEQ-HH	3.20E-08	c	2,3,7,8-tetrachlorodibenzo(p)dioxin
Metals				
Aluminum	7429-90-5	1.54E+02	nc	
Arsenic	7440-38-2	2.77E-03	c	
Barium	7440-39-3	3.09E+01	nc	
Cadmium	7440-43-9	1.54E-01	nc	
Calcium	7440-70-2	EN		Essential nutrient
Chromium	7440-47-3	2.32E+02	nc	Trivalent chromium (b)
Cobalt	7440-48-4	4.63E-02	nc	
Copper	7440-50-8	6.18E+00	nc	
Iron	7439-89-6	1.08E+02	nc	Essential nutrient
Lead	7439-92-1	NSL		
Magnesium	7439-95-4	EN		Essential nutrient
Manganese	7439-96-5	2.16E+01	nc	
Mercury	7439-97-6	1.54E-02	nc	methyl mercury
Nickel	7440-02-0	3.09E+00	nc	Soluble salts
Potassium	7440-09-7	EN		Essential nutrient
Selenium	7782-49-2	7.72E-01	nc	
Sodium	7440-23-5	EN		Essential nutrient
Thallium	7440-28-0	1.54E-03	nc	Soluble salts
Vanadium	7440-62-2	7.79E-01	nc	
Zinc	7440-66-6	4.63E+01	nc	
Pesticides				
1,2,3,4-Tetrachlorobenzene	634-66-2	4.63E-02	nc	1,2,4,5-TETRACHLOROBENZENE
1,2,4,5-Tetrachlorobenzene	95-94-3	4.63E-02	nc	
2,4'-DDD	53-19-0	NSL		No appropriate surrogate (c)
2,4'-DDE	3424-82-6	NSL		No appropriate surrogate (c)
2,4'-DDT	789-02-6	NSL		No appropriate surrogate (c)
4,4'-DDD	72-54-8	4.63E-03	c	
4,4'-DDE	72-55-9	1.22E-02	c	
4,4'-DDT	50-29-3	1.22E-02	c	
Aldrin	309-00-2	2.45E-04	c	
Alpha-BHC	319-84-6	6.60E-04	c	
alpha-Chlordane	5103-71-9	1.19E-02	c	Chlordane (d)
beta-BHC	319-85-7	2.31E-03	c	
Chlordane	CHLORDANE_ALL	1.19E-02	c	
Chlorpyrifos	2921-88-2	1.54E-01	nc	
cis-Nonachlor	5103-73-1	1.19E-02	c	Chlordane (d)
delta-BHC	319-86-8	6.60E-04	c	Alpha-BHC
Dieldrin	60-57-1	2.60E-04	c	
Endosulfan II	33213-65-9	9.27E-01	nc	Endosulfan
Endrin	72-20-8	4.63E-02	nc	
gamma-Chlordane	5566-34-7	1.19E-02	c	Chlordane (d)
gamma-BHC (Lindane)	58-89-9	3.78E-03	c	
Hepatchlor	76-44-8	9.24E-04	c	
Heptachlor epoxide	1024-57-3	4.57E-04	c	
Hexachlorobenzene	118-74-1	2.60E-03	c	
Mirex	2385-85-5	2.31E-04	c	
Oxychlordane	27304-13-8	1.19E-02	c	Chlordane (d)
Pentachloroanisole	1825-21-4	NSL		
trans-Nonachlor	39765-80-5	1.19E-02	c	Chlordane (d)
Semivolatile Organic Compounds				
2,3,5-Trimethylnaphthalene	2245-38-7	NSL		
1-Methylnaphthalene	90-12-0	1.43E-01	c	
1-Methylphenanthrene	832-69-9	4.63E+01	nc	Anthracene
2,6-Dimethylnaphthalene	581-42-0	6.18E-01	nc	2-Methylnaphthalene
2-Methylnaphthalene	91-57-6	6.18E-01	nc	
Acenaphthene	83-32-9	9.27E+00	nc	
Acenaphthylene	208-96-8	9.27E+00	nc	Acenaphthene
Anthracene	120-12-7	4.63E+01	nc	
Benzo(a)anthracene	56-55-3	4.16E-02	c	
Benzo(a)pyrene	50-32-8	4.16E-03	c	
Benzo(b)fluoranthene	205-99-2	4.16E-02	c	
Benzo(k)fluoranthene	207-08-9	4.16E-01	c	

Table 3-12
Fish Tissue Screening Levels
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical	CAS	Fish Tissue RSL (a) (mg/kg)		Notes/Surrogates
Benzoic Acid	65-85-0	6.18E+02	nc	
Biphenyl	92-52-4	5.20E-01	c	
C1-dibenzothiophenes	DBZTPC1	NSL		
C1-fluoranthenes/pyrenes	FLPYC1	NSL		
C1-fluorenes	FLUORC1	NSL		
C1-naphthalenes	NPHC1	NSL		
C1-phenanthrenes/anthracenes	PHANC1	NSL		
C2-dibenzothiophenes	DBZTPC2	NSL		
C2-fluorenes	FLUORC2	NSL		
C2-naphthalenes	NPHC2	NSL		
C2-phenanthrenes/anthracenes	PHANC2	NSL		
C3-dibenzothiophenes	DBZTPC3	NSL		
C3-fluorenes	FLUORC3	NSL		
C3-naphthalenes	NPHC3	NSL		
C3-phenanthrenes/anthracenes	PHANC3	NSL		
C4-naphthalenes	NPHC4	NSL		
C4-phenanthrenes/anthracenes	PHANC4	NSL		
Chrysene	218-01-9	4.16E+00	c	
Dibenzo(a,h)anthracene	53-70-3	4.16E-03	c	
Dibenzothiophene	132-65-0	1.54E+00	nc	
Diethylphthalate	84-66-2	1.24E+02	nc	
Di-n-octylphthalate	117-84-0	1.54E+00	nc	
Fluoranthene	206-44-0	6.18E+00	nc	
Fluorene	86-73-7	6.18E+00	nc	
Indeno(1,2,3-cd)pyrene	193-39-5	4.16E-02	c	
Naphthalene	91-20-3	3.09E+00	nc	
Perylene	198-55-0	4.63E+00	nc	Pyrene
Phenanthrene	85-01-8	4.63E+01	nc	Anthracene
Phenol	108-95-2	4.63E+01	nc	
Pyrene	129-00-0	4.63E+00	nc	
Polybrominated Diphenyl Ethers				
Total PBDEs	RA_TOT_PBDE	NSL		
Polychlorinated Biphenyls				
Total PCBs	1336-36-3	2.08E-03	c	Aroclor 1254/PCB High Risk
PCB-TEQ	PCB-TEQ	3.20E-08	c	2,3,7,8-tetrachlorodibenzo(p)dioxin

Notes:
c - Value is based on carcinogenic effects.
CAS - Chemical Abstracts Service.
EN - Essential nutrient.
mg/kg - milligram per kilogram.
nc - Value is based on noncarcinogenic effects.
NSL - No Screening Level.
PBDE - Polybrominated Diphenyl Ether.
PCB - Polychlorinated Biphenyl.
RSL - Regional Screening Level.
(a) Fish tissue screening levels are equal to the USEPA Regional Screening Levels (RSLs) for fish tissue, calculated using USEPA's RSL calculator based on a fish ingestion rate of 54 g/day, a target risk level of 1x10-6 for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Accessed on July 2018.
(b) Hexavalent chromium was not identified as a constituent of concern associated with sites along the Anacostia River Therefore chromium was evaluated as trivalent chromium. See Table 3.2 in Remedial Investigation Work Plan: Anacostia River Sediment Project, Washington D.C., prepared for the Department of Energy and the Environment. June 2014.
(c) Letter from Superfund Technical Support Center to Marian Olsen dated February 25, 2015. Approval of Surrogates for Multiple Chemicals. 2,4'-DDT, 2,4'-DDD and 2,4'-DDE.
(d) Letter from Superfund Technical Support Center to Marian Olsen dated April 9, 2015. Approval of Surrogates for Multiple Chemicals. Cis- and trans-nonachlor and oxychlordane.

Table 3-13
Occurrence, Distribution and Selection of Chemicals of Potential Concern in On-Site Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point (6)	Cas Number	Chemical	Maximum (1) Concentration	Units	Location of Maximum Concentration	Detection Frequency	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Pepco	**Dioxins and Furans**								
Site	DFTEQ-HH	2,3,7,8-TCDD-TEQ	4.84E-04	mg/kg	SUS10-2B (0 - 1 ft)	81 / 81	2.20E-05	**Y**	**ASL**
	Inorganics								
	7429-90-5	Aluminum	3.70E+04 J	mg/kg	SUSDP08-1E (0 - 1 ft)	119 / 119	1.10E+05	N	BSL
	7440-36-0	Antimony	1.10E+01	mg/kg	TA1E1 (0 - 1 ft)	85 / 118	4.70E+01	N	BSL
	7440-38-2	Arsenic	1.90E+02 J	mg/kg	SUSDP08-1E (0 - 1 ft)	119 / 119	3.00E+00	**Y**	**ASL**
	7440-39-3	Barium	2.40E+03	mg/kg	DP42 (9.5 - 10.5 ft)	119 / 119	2.20E+04	N	BSL
	7440-41-7	Beryllium	1.90E+00 J-	mg/kg	SUSDP43 (3.5 - 4.5 ft)	119 / 119	2.30E+02	N	BSL
	7440-43-9	Cadmium	7.10E+00 J	mg/kg	SUSDP01 (0.33 - 1 ft)	111 / 119	9.80E+01	N	BSL
	7440-70-2	Calcium	1.50E+05	mg/kg	SUSDP23 (0.5 - 1 ft)	119 / 119	EN	N	EN
	7440-47-3	Chromium, Total	4.00E+02 J	mg/kg	SUSDP08-1E (0 - 1 ft)	130 / 130	1.80E+05	N	BSL
	18540-29-9	Chromium, Hexavalent	6.00E-01	mg/kg	SUS08-1D (0 - 1 ft)	3 / 11	6.30E+00	N	BSL
	7440-48-4	Cobalt	2.40E+02	mg/kg	TA1G9 (0 - 1 ft)	119 / 119	3.50E+01	**Y**	**ASL**
	7440-50-8	Copper	2.70E+03 J	mg/kg	SUSDP08-1E (0 - 1 ft)	119 / 119	4.70E+03	N	BSL
	7439-89-6	Iron	7.80E+04	mg/kg	TA1E1 (0 - 1 ft)	119 / 119	8.20E+04	N	BSL
	7439-92-1	Lead	5.40E+03	mg/kg	SUSDP19 (9.5 - 10.5 ft)	119 / 119	8.00E+02	N	BSL
	7439-95-4	Magnesium	7.60E+04	mg/kg	SUSDP23 (0.5 - 1 ft)	119 / 119	EN	N	EN
	7439-96-5	Manganese	6.60E+03	mg/kg	SUSDP08-1E (0 - 1 ft)	119 / 119	2.60E+03	**Y**	**ASL**
	7439-97-6	Mercury	2.20E+00	mg/kg	DP42 (14.5 - 15.5 ft)	102 / 119	3.50E+01	N	BSL
	7440-02-0	Nickel	8.00E+03	mg/kg	TA1G9 (0 - 1 ft)	119 / 119	2.20E+03	**Y**	**ASL**
	7440-09-7	Potassium	2.40E+03	mg/kg	SUS08-1G (0 - 1 ft)	119 / 119	EN	N	EN
	7782-49-2	Selenium	9.10E+00	mg/kg	TA1E1 (0 - 1 ft)	103 / 119	5.80E+02	N	BSL
	7440-22-4	Silver	6.10E-01	mg/kg	TA1C5 (0 - 1 ft)	89 / 119	5.80E+02	N	BSL
	7440-23-5	Sodium	1.30E+03	mg/kg	TA1G9 (0 - 1 ft)	114 / 119	EN	N	EN
	7440-28-0	Thallium	1.60E+00	mg/kg	DP42 (9.5 - 10.5 ft)	88 / 119	1.20E+00	**Y**	**ASL**
	7440-62-2	Vanadium	4.20E+04	mg/kg	TA1E1 (0 - 1 ft)	125 / 125	5.80E+02	**Y**	**ASL**
	7440-66-6	Zinc	3.00E+03 J	mg/kg	SUSDP08-1E (0 - 1 ft)	119 / 119	3.50E+04	N	BSL
	PCBs								
	1336-36-3	Total PCBs	8.80E+03	mg/kg	SUSDP21-3G (0 - 1 ft)	463 / 579	9.70E-01	**Y**	**ASL**
	Pesticides								
	72-54-8	4,4'-DDD	2.30E-03 J	mg/kg	SUSDP19 (1.5 - 2.5 ft)	13 / 25	2.50E+00	N	BSL
	72-55-9	4,4'-DDE	5.80E-02	mg/kg	SUSDP08 (2.5 - 3.5 ft)	15 / 25	9.30E+00	N	BSL
	50-29-3	4,4'-DDT	8.30E-02	mg/kg	SUSDP18 (0 - 1 ft)	15 / 24	8.50E+00	N	BSL
	309-00-2	Aldrin	5.00E-03 J	mg/kg	SUSDP10 (0.5 - 1 ft)	6 / 24	1.80E-01	N	BSL
	319-85-7	beta-BHC	2.30E-03 J	mg/kg	SUSDP10 (0.5 - 1 ft)	3 / 25	1.30E+00	N	BSL
	5103-71-9	cis-Chlordane	6.50E-03	mg/kg	SUSDP08 (2.5 - 3.5 ft)	10 / 25	7.70E+00	N	BSL
	319-86-8	delta-BHC	7.50E-03 J	mg/kg	SUSDP10 (0.5 - 1 ft)	4 / 25	3.60E-01	N	BSL
	60-57-1	Dieldrin	9.40E-03 J	mg/kg	SUSDP18 (0 - 1 ft)	10 / 25	1.40E-01	N	BSL
	959-98-8	Endosulfan I	1.40E-03 J	mg/kg	SUSDP08 (0 - 1 ft)	4 / 25	7.00E+02	N	BSL
	33213-65-9	Endosulfan II	1.50E-02	mg/kg	SUSDP18 (0 - 1 ft)	8 / 24	7.00E+02	N	BSL
	1031-07-8	Endosulfan Sulfate	7.20E-03 J	mg/kg	SUSDP10 (0.5 - 1 ft)	17 / 24	7.00E+02	N	BSL
	72-20-8	Endrin	2.60E-02	mg/kg	SUSDP08 (0 - 1 ft)	14 / 24	2.50E+01	N	BSL

Table 3-13
Occurrence, Distribution and Selection of Chemicals of Potential Concern in On-Site Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point (6)	Cas Number	Chemical	Maximum (1) Concentration		Units	Location of Maximum Concentration	Detection Frequency	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	7421-93-4	Endrin aldehyde	2.20E-03	J	mg/kg	SUSDP19 (1.5 - 2.5 ft)	5 / 24	2.50E+01	N	BSL
	53494-70-5	Endrin ketone	1.20E-02		mg/kg	SUS25 (0.5 - 1 ft)	5 / 24	2.50E+01	N	BSL
	58-89-9	gamma-BHC (Lindane)	2.90E-03	J	mg/kg	SUSDP19 (1.5 - 2.5 ft)	8 / 25	2.50E+00	N	BSL
	76-44-8	Heptachlor	2.90E-03	J	mg/kg	SUSDP10 (0.5 - 1 ft)	4 / 25	6.30E-01	N	BSL
	1024-57-3	Heptachlor Epoxide	2.20E-02	J	mg/kg	SUSDP49 (0 - 1 ft)	14 / 25	3.30E-01	N	BSL
	72-43-5	Methoxychlor	3.60E-02	J	mg/kg	SUSDP19 (1.5 - 2.5 ft)	12 / 24	4.10E+02	N	BSL
	5103-74-2	trans-Chlordane	1.50E-02		mg/kg	SUSDP11 (0 - 1 ft), SUSDP08 (2.5 - 3.5 ft)	10 / 25	7.70E+00	N	BSL
	Petroleum Compounds									
	C10C20	Diesel Range Organics (C10-C20)	1.10E+04		mg/kg	SUSDPCT16-2M (2 - 3 ft)	71 / 181	4.40E+02	**Y**	**ASL**
	8006-61-9	Gasoline Range Organics (C6-C10)	3.80E+01		mg/kg	SB3 (2.5 - 3.5 ft)	8 / 143	4.20E+01	N	BSL
	C20C36	Oil Range Organics (C20-C36)	1.70E+04		mg/kg	SB3 (2.5 - 3.5 ft)	123 / 181	3.50E+05	N	BSL
	SVOCs									
	92-52-4	1,1'-Biphenyl	3.20E-02	J	mg/kg	DP26 (3.5 - 4.5 ft)	5 / 19	2.00E+01	N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	9.60E-03	J	mg/kg	SUSDP18 (0 - 1 ft)	1 / 19	3.50E+01	N	BSL
	91-57-6	2-Methylnaphthalene	1.20E-01		mg/kg	DP27 (6.5 - 7.5 ft)	12 / 19	3.00E+02	N	BSL
	95-48-7	2-Methylphenol	1.30E-02	J	mg/kg	SUSDP09 (0 - 1 ft)	1 / 19	4.10E+03	N	BSL
	106-44-5	4-Methylphenol	2.60E-02	J	mg/kg	SUSDP09 (0 - 1 ft)	2 / 19	8.20E+03	N	BSL
	83-32-9	Acenaphthene	2.40E+02		mg/kg	SUSDP43-3P (1 - 2 ft)	360 / 519	4.50E+03	N	BSL
	208-96-8	Acenaphthylene	9.50E+00		mg/kg	SUSDP19-4N (3 - 4 ft)	350 / 519	4.50E+03	N	BSL
	98-86-2	Acetophenone	5.30E-02	J	mg/kg	SUSDP02 (0.33 - 0.83 ft)	6 / 19	1.20E+04	N	BSL
	120-12-7	Anthracene	4.80E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	416 / 519	2.30E+04	N	BSL
	100-52-7	Benzaldehyde	1.70E-01	J	mg/kg	SUSDP02 (0.33 - 0.83 ft)	10 / 19	8.20E+02	N	BSL
	56-55-3	Benzo(a)anthracene	7.20E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	446 / 519	2.10E+01	**Y**	**ASL**
	50-32-8	Benzo(a)pyrene	6.40E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	432 / 519	2.10E+00	**Y**	**ASL**
	205-99-2	Benzo(b)fluoranthene	5.10E+02		mg/kg	SUSDP43-3P (1 - 2 ft)	438 / 519	2.10E+01	**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	3.80E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	430 / 519	2.30E+03	N	BSL
	207-08-9	Benzo(k)fluoranthene	5.70E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	422 / 519	2.10E+02	**Y**	**ASL**
	117-81-7	bis-(2-Ethylhexyl)phthalate	2.30E-01	J	mg/kg	SUSDP02 (0.33 - 0.83 ft)	15 / 19	1.60E+02	N	BSL
	85-68-7	Butylbenzylphthalate	1.30E-01	J	mg/kg	SUSDP01 (0.33 - 1 ft), SUSDP02 (0.33 - 0.83 ft)	11 / 19	1.20E+03	N	BSL
	86-74-8	Carbazole	2.60E-01		mg/kg	SUSDP19 (0.83 - 1 ft)	11 / 19	3.00E+03	N	BSL
	218-01-9	Chrysene	6.20E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	446 / 519	2.10E+03	**Y**	**cPAH (7)**
	84-74-2	Di-n-butylphthalate	3.20E-01		mg/kg	SUSDP02 (0.33 - 0.83 ft)	2 / 19	8.20E+03	N	BSL
	53-70-3	Dibenzo(a,h)anthracene	1.00E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	379 / 519	2.10E+00	**Y**	**ASL**
	132-64-9	Dibenzofuran	1.20E-01	J	mg/kg	SUSDP19 (0.83 - 1 ft)	8 / 19	1.00E+02	N	BSL
	84-66-2	Diethylphthalate	2.80E-02	J	mg/kg	DP32 (9.5 - 10.5 ft)	7 / 19	6.60E+04	N	BSL
	131-11-3	Dimethylphthalate	2.10E-01		mg/kg	SUSDP11 (0 - 1 ft)	2 / 19	6.60E+04	N	BSL
	206-44-0	Fluoranthene	1.50E+03		mg/kg	SUSDP43-3P (1 - 2 ft), SUSDP19-6W (2 - 3 ft)	456 / 519	3.00E+03	N	BSL
	86-73-7	Fluorene	2.70E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	365 / 519	3.00E+03	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	3.80E+02		mg/kg	SUSDP19-6W (2 - 3 ft)	432 / 519	2.10E+01	**Y**	**ASL**

Table 3-13
Occurrence, Distribution and Selection of Chemicals of Potential Concern in On-Site Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point [6]	Cas Number	Chemical	Maximum [1] Concentration		Units	Location of Maximum Concentration	Detection Frequency	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	91-20-3	Naphthalene	1.30E+02		mg/kg	SUSDP43-3P (1 - 2 ft)	341 / 519	1.70E+01	**Y**	**ASL**
	85-01-8	Phenanthrene	1.70E+03		mg/kg	SUSDP43-3P (1 - 2 ft)	445 / 519	2.30E+04	N	BSL
	108-95-2	Phenol	1.10E-01		mg/kg	SUSDP02 (0.33 - 0.83 ft)	4 / 21	2.50E+04	N	BSL
	129-00-0	Pyrene	1.20E+03		mg/kg	SUSDP19-6W (2 - 3 ft)	456 / 519	2.30E+03	N	BSL
	VOCs									
	79-00-5	1,1,2-Trichloroethane	6.30E-03		mg/kg	SUSDP15 (0.17 - 1 ft)	1 / 74	6.30E-01	N	BSL
	87-61-6	1,2,3-Trichlorobenzene	2.10E-03	J	mg/kg	SUSDP04 (0 - 1 ft)	1 / 74	9.30E+01	N	BSL
	107-06-2	1,2-Dichloroethane	2.30E-03	J	mg/kg	SUSDP15 (0.17 - 1 ft)	1 / 74	2.00E+00	N	BSL
	78-93-3	2-Butanone	1.20E-02		mg/kg	SUSDP12 (14.5 - 15.5 ft)	1 / 69	1.90E+04	N	BSL
	108-10-1	4-Methyl-2-pentanone	2.10E-03	J	mg/kg	SUSDP15 (0.17 - 1 ft)	1 / 74	1.40E+04	N	BSL
	67-64-1	Acetone	5.80E-02		mg/kg	SUSDP12 (14.5 - 15.5 ft)	14 / 70	6.70E+04	N	BSL
	110-82-7	Cyclohexane	2.30E-03	J	mg/kg	SUSDP12 (14.5 - 15.5 ft)	1 / 74	2.70E+03	N	BSL
	100-41-4	Ethylbenzene	3.10E-03	J	mg/kg	SUSDP02 (0.33 - 0.83 ft)	2 / 74	2.50E+01	N	BSL
	98-82-8	Isopropylbenzene	7.70E-04	J	mg/kg	SUSDP39 (2.5 - 3.5 ft)	1 / 74	9.90E+02	N	BSL
	108-87-2	Methylcyclohexane	6.10E-03		mg/kg	SUSDP12 (14.5 - 15.5 ft)	1 / 74	2.70E+03	N	BSL
	75-09-2	Methylene Chloride	1.20E-03	J	mg/kg	SUSDP10 (14.5 - 15.5 ft)	1 / 74	3.20E+02	N	BSL
	XYLMP	m, p-Xylene	2.00E-02		mg/kg	SUSDP02 (0.33 - 0.83 ft)	4 / 74	2.40E+02	N	BSL
	95-47-6	o-Xylene	1.30E-02		mg/kg	SUSDP02 (0.33 - 0.83 ft)	4 / 74	2.80E+02	N	BSL
	127-18-4	Tetrachloroethylene	4.20E-03	J	mg/kg	SUSDP39 (2.5 - 3.5 ft)	2 / 74	3.90E+01	N	BSL
	108-88-3	Toluene	1.40E-03	J	mg/kg	SUSDP02 (0.33 - 0.83 ft)	2 / 74	4.70E+03	N	BSL
	1330-20-7	Xylenes (total)	3.30E-02		mg/kg	SUSDP02 (0.33 - 0.83 ft)	4 / 69	2.50E+02	N	BSL

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.
(2) Lab Reporting Detection Limits (RDLs) are shown where the frequency of detection is less than 100%.
(3) Maximum detected concentration used for screening, except for lead for which the mean detected concentration is used.
(4) Screening levels are equal to the USEPA Regional Screening Level (RSL) for industrial soil based on a target risk level of 1x10-6 for carcinogens and a target hazard quotient of 0.1 for noncarcinogens (November 2018)
See Table 3-9 for screening levels and surrogates used.
Although iron has a USEPA RSL for soil, iron is considered an essential nutrient and is not further evaluated.
The average concentration of lead is used for comparison to the screening level, consistent with USEPA guidance.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN)
(6) Soil data represent the 0 to 16 feet depth interval.
(7) All seven potentially carcinogenic PAH compounds were retained as COPCs if one or more was identified as a COPC.

Definitions:

PCB - Polychlorinated Biphenyl
SVOC - Semivolatile Organic Compound
TCDD-TEQ - Dioxin Toxic Equivalence
VOC - Volatile Organic Compound
CAS - Chemical Abstracts Service
cPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
mg/kg - milligrams per kilogram

Table 3-14
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Groundwater for the Volatilization to Excavation Trench Air Pathway
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Cas Number	Chemical	Minimum [1] Concentration	Maximum [1] Concentration	Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits [2]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
Upper													
Zone	75-35-4	1,1-Dichloroethene	7.20E-01 J	7.20E-01 J	7.20E-01	ug/L	MW09A	1 / 114	1 - 1	7.20E-01	2.80E+01	N	BSL
	78-93-3	2-Butanone	7.40E-01 J	2.10E+01	7.50E+00	ug/L	MW09A	6 / 91	5 - 5	2.10E+01	5.60E+02	N	BSL
	591-78-6	2-Hexanone	4.70E-01 J	4.70E-01 J	4.70E-01	ug/L	MW09A	1 / 91	5 - 5	4.70E-01	3.80E+00	N	BSL
	108-10-1	4-Methyl-2-pentanone	6.40E-01 J	6.40E-01 J	6.40E-01	ug/L	MW09A	1 / 91	5 - 5	6.40E-01	6.30E+02	N	BSL
	67-64-1	Acetone	2.70E+00 J	7.30E+01	8.10E+00	ug/L	DP58 (15 - 20 ft)	33 / 91	5 - 5	7.30E+01	1.40E+03	N	BSL
	71-43-2	Benzene	2.10E-01 J	2.70E-01 J	2.50E-01	ug/L	MW09A	3 / 91	1 - 1	2.70E-01	4.60E-01	N	BSL
	75-27-4	Bromodichloromethane	3.60E-01 J	2.60E+00	1.50E+00	ug/L	DP60 (15 - 20 ft)	2 / 91	1 - 1	2.60E+00	1.30E-01	**Y**	**ASL**
	75-65-0	Butyl alcohol, tert-	1.10E+02 J-	1.10E+02 J-	1.10E+02	ug/L	DP58 (15 - 20 ft)	1 / 34	40 - 800	1.10E+02	1.40E+01	**Y**	**ASL**
	75-15-0	Carbon Disulfide	4.60E-01 J	1.50E+00	8.90E-01	ug/L	DP58 (15 - 20 ft)	9 / 91	1 - 1	1.50E+00	8.10E+01	N	BSL
	67-66-3	Chloroform	2.20E-01 J	1.50E+01	1.80E+00	ug/L	DP60 (15 - 20 ft)	18 / 91	1 - 1	1.50E+01	2.20E-01	**Y**	**ASL**
	156-59-2	cis-1,2-Dichloroethylene	3.40E-01 J	2.30E+01	6.40E+00	ug/L	DPB7	26 / 114	1 - 1	2.30E+01	3.60E+00	N	NIT
	108-20-3	Diisopropyl ether	2.90E-01 J	6.30E-01 J	4.20E-01	ug/L	TA19C1 (15 - 20 ft)	3 / 34	1 - 20	6.30E-01	1.50E+02	N	BSL
	XYLMP	m, p-Xylene	2.70E-01 J	5.60E-01 J	4.40E-01	ug/L	SUSDP06 (14.5 - 19.5 ft)	4 / 91	1 - 2	5.60E-01	1.90E+01	N	BSL
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	2.10E-01 IJ	4.80E+01	4.70E+00	ug/L	DP45 (15 - 20 ft)	51 / 91	1 - 1	4.80E+01	1.40E+01	**Y**	**ASL**
	75-09-2	Methylene Chloride	2.00E-01 J	4.90E-01 J	3.10E-01	ug/L	SUSDP02 (12 - 17 ft)	5 / 91	1 - 1	4.90E-01	1.10E+01	N	BSL
	95-47-6	o-Xylene	1.10E-01 J	2.40E-01 J	1.60E-01	ug/L	SUSDP06 (14.5 - 19.5 ft)	4 / 91	1 - 1	2.40E-01	1.90E+01	N	BSL
	994-05-8	Tertiary-Amyl Methyl Ether	2.00E-01 J	1.30E+00 J	5.50E-01	ug/L	DP57 (15 - 20 ft)	4 / 34	1 - 20	1.30E+00	4.10E+01	N	BSL
	127-18-4	Tetrachloroethylene	1.80E-01 J	4.70E+02	5.80E+01	ug/L	DPB7	54 / 114	1 - 1	4.70E+02	4.10E+00	**Y**	**ASL**
	108-88-3	Toluene	1.50E-01 J	2.10E+00	4.30E-01	ug/L	SUSDP06 (14.5 - 19.5 ft)	33 / 91	1 - 1	2.10E+00	1.10E+02	N	BSL
	156-60-5	trans-1,2-Dichloroethene	2.20E-01 J	2.20E-01 J	2.20E-01	ug/L	MW09A	1 / 114	1 - 1	2.20E-01	3.60E+01	N	BSL
	79-01-6	Trichloroethene	1.70E-01 J	4.10E+01	9.10E+00	ug/L	MW09A	28 / 114	1 - 1	4.10E+01	2.80E-01	**Y**	**ASL**
	75-01-4	Vinyl Chloride	5.30E+00	5.30E+00	5.30E+00	ug/L	MW09A	1 / 114	1 - 1	5.30E+00	1.90E-02	**Y**	**ASL**
	1330-20-7	Xylenes (total)	1.10E-01	8.00E-01	4.00E-01	ug/L	SUSDP06 (14.5 - 19.5 ft)	6 / 91	1 - 2	8.00E-01	1.90E+01	N	BSL

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.

(2) Lab Reporting Detection Limits (RDLs) are shown where the frequency of detection is less than 100%.

(3) Maximum detected concentration used for screening.

(4) Screening levels are equal to the USEPA Regional Screening Level (RSL) for tapwater based on a target risk level of $1x10^{6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens (November 2018).
See Table 3-10 for screening levels and surrogates used.

(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL), No Inhalation Toxicity Data (NIT)

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
PCB TEQ - Polychlorinated Biphenyl Toxicity Equivalence
TCDD TEQ - Dioxin Toxic Equivalence

Table 3-15
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment

Exposure Point (6)	Cas Number	Chemical	Minimum (1) Concentration	Maximum (1) Concentration	Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits (2)	Concentration Used for Screening (3)	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Pepco Waterside Area	**Dioxins and Furans**												
	DFTEQ-HH	2,3,7,8-TCDD-TEQ	7.12E-07	7.07E-04	7.25E-05	mg/kg	SED7F (0 - 0.5 ft)	24 / 24	-	7.07E-04	4.80E-06	**Y**	**ASL**
	Inorganics												
	7429-90-5	Aluminum	2.40E+03	1.55E+04	8.07E+03	mg/kg	R6-04 (0 - 0.5 ft)	41 / 41	-	1.55E+04	7.70E+03	**Y**	**ASL**
	7440-36-0	Antimony	2.70E-01 J-	4.30E+01	1.93E+00	mg/kg	SED7F (0 - 0.33 ft)	41 / 41	-	4.30E+01	3.10E+00	**Y**	**ASL**
	7440-38-2	Arsenic	1.90E+00	1.70E+01 J-	5.56E+00	mg/kg	SED7.5E (0 - 0.5 ft) SED7.5E (0 - 0.33 ft)	41 / 41	-	1.70E+01	6.80E-01	**Y**	**ASL**
	7440-39-3	Barium	1.70E+01	1.50E+02 J-	8.14E+01	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	1.50E+02	1.50E+03	N	BSL
	7440-41-7	Beryllium	1.50E-01	2.20E+00	1.01E+00	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	2.20E+00	1.60E+01	N	BSL
	7440-43-9	Cadmium	3.50E-01	5.20E+00 J-	1.64E+00	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	5.20E+00	7.10E+00	N	BSL
	7440-70-2	Calcium	1.40E+03 J-	1.70E+04	3.43E+03	mg/kg	SED7G (0 - 0.5 ft)	41 / 41	-	1.70E+04	EN	N	EN
	7440-47-3	Chromium	1.80E+01 J+	8.00E+01 J-	3.82E+01	mg/kg	SED7.5D (0 - 0.5 ft)	41 / 41	-	8.00E+01	1.20E+04	N	BSL
	7440-48-4	Cobalt	4.90E+00	3.20E+01 J-	1.51E+01	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	3.20E+01	2.30E+00	**Y**	**ASL**
	7440-50-8	Copper	2.10E+01	2.40E+02	7.05E+01	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	2.40E+02	3.10E+02	N	BSL
	57-12-5	Cyanide	1.80E-01 J	4.90E+00	1.01E+00	mg/kg	R6-18 (0 - 0.5 ft)	11 / 13	0.14 - 0.17	4.90E+00	2.30E+00	**Y**	**ASL**
	7439-89-6	Iron	7.50E+03	3.30E+04	1.96E+04	mg/kg	SED6C (0 - 0.33 ft)	41 / 41	-	3.30E+04	5.50E+03	N	EN
	7439-92-1	Lead	3.60E+01 J	3.20E+02	9.07E+01	mg/kg	SED7F (0 - 0.5 ft)	41 / 41	-	9.07E+01	4.00E+02	N	BSL
	7439-95-4	Magnesium	1.80E+03 J	1.20E+04	3.27E+03	mg/kg	SED7G (0 - 0.5 ft)	41 / 41	-	1.20E+04	EN	N	EN
	7439-96-5	Manganese	8.60E+01	4.30E+02	2.10E+02	mg/kg	SED6C (0 - 0.33 ft)	41 / 41	-	4.30E+02	1.80E+02	**Y**	**ASL**
	7439-97-6	Mercury	4.10E-02	6.90E-01 J	2.18E-01	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	6.90E-01	2.30E+00	N	BSL
	7440-02-0	Nickel	1.50E+01	1.60E+02 J-	5.07E+01	mg/kg	SED7F (0 - 0.5 ft)	41 / 41	-	1.60E+02	1.50E+02	**Y**	**ASL**
	7440-09-7	Potassium	2.30E+02	1.90E+03	9.64E+02	mg/kg	R6-18 (0 - 0.5 ft)	41 / 41	-	1.90E+03	EN	N	EN
	7782-49-2	Selenium	3.40E-02 J	2.75E+00 J	9.52E-01	mg/kg	R6-30 (0 - 0.5 ft)	41 / 41	-	2.75E+00	3.90E+01	N	BSL
	7440-22-4	Silver	8.30E-02	3.50E+00 J-	6.94E-01	mg/kg	SED7F (0 - 0.5 ft)	41 / 41	-	3.50E+00	3.90E+01	N	BSL
	7440-23-5	Sodium	7.40E+01	4.20E+02	1.78E+02	mg/kg	SED7G (0 - 0.5 ft)	41 / 41	-	4.20E+02	EN	N	EN
	7440-28-0	Thallium	3.70E-02 J	6.30E-01	2.10E-01	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	6.30E-01	7.80E-02	**Y**	**ASL**
	7440-62-2	Vanadium	2.10E+01	4.40E+02	8.70E+01	mg/kg	SED7F (0 - 0.5 ft)	41 / 41	-	4.40E+02	3.90E+01	**Y**	**ASL**
	7440-66-6	Zinc	9.70E+01 J+	6.30E+02	2.69E+02	mg/kg	SED7F (0 - 0.5 ft)	41 / 41	-	6.30E+02	2.30E+03	N	BSL
	Pesticides												
	72-54-8	4,4'-DDD	1.90E-03 J	1.20E-02 J	4.60E-03	mg/kg	SED7F (0 - 0.5 ft)	28 / 28	-	1.20E-02	1.90E-01	N	BSL
	72-55-9	4,4'-DDE	2.80E-03 J	3.00E-02 J	8.27E-03	mg/kg	SED8C (0 - 0.5 ft)	27 / 28	0.0013 - 0.0013	3.00E-02	2.00E+00	N	BSL
	50-29-3	4,4'-DDT	8.60E-04 J	7.00E-02	8.70E-03	mg/kg	R6-05 (0 - 0.5 ft)	17 / 28	0.000044 - 0.0013	7.00E-02	1.90E+00	N	BSL
	309-00-2	Aldrin	1.30E-04 J	7.60E-04 J	4.57E-04	mg/kg	SED8C (0 - 0.5 ft)	16 / 28	0.000041 - 0.0013	7.60E-04	3.90E-02	N	BSL
	319-85-7	beta-BHC	5.00E-04 J	3.90E-03 J	1.37E-03	mg/kg	R6-05 (0 - 0.5 ft)	7 / 28	0.000087 - 0.0013	3.90E-03	3.00E-01	N	BSL
	5103-71-9	cis-Chlordane	1.70E-03 J	1.60E-02	8.20E-03	mg/kg	SED8C (0 - 0.33 ft)	15 / 15	-	1.60E-02	1.70E+00	N	BSL
	319-86-8	delta-BHC	3.00E-04 J	5.50E-03 J	1.50E-03	mg/kg	SED7F (0 - 0.5 ft)	11 / 28	0.000053 - 0.0013	5.50E-03	8.60E-02	N	BSL
	60-57-1	Dieldrin	4.10E-04 J	1.40E-02 J	2.80E-03	mg/kg	R6-04 (0 - 0.5 ft)	20 / 28	0.00004 - 0.0012	1.40E-02	3.40E-02	N	BSL
	959-98-8	Endosulfan I	3.70E-04 J	1.50E-03 J	8.50E-04	mg/kg	SED7G (0 - 0.5 ft)	5 / 28	0.000025 - 0.0013	1.50E-03	4.70E+01	N	BSL
	33213-65-9	Endosulfan II	2.30E-04 J	6.80E-03	1.90E-03	mg/kg	R6-04 (0 - 0.5 ft)	16 / 28	0.00012 - 0.0013	6.80E-03	4.70E+01	N	BSL
	1031-07-8	Endosulfan Sulfate	2.50E-04 J	1.10E-02	2.76E-03	mg/kg	R6-05 (0 - 0.5 ft)	16 / 27	0.00005 - 0.0012	1.10E-02	4.70E+01	N	BSL
	72-20-8	Endrin	3.60E-04 J	2.20E-02 J	5.50E-03	mg/kg	SED7F (0 - 0.5 ft)	19 / 28	0.00073 - 0.0013	2.20E-02	1.90E+00	N	BSL

Table 3-15
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment

Exposure Point (6)	Cas Number	Chemical	Minimum (1) Concentration	Maximum (1) Concentration	Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits (2)	Concentration Used for Screening (3)	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Pepco Waterside Area	7421-93-4	Endrin aldehyde	1.70E-04 J	1.50E-03 J	8.30E-04	mg/kg	R6-05 (0 - 0.5 ft)	13 / 28	0.000082 - 0.0013	1.50E-03	1.90E+00	N	BSL
	53494-70-5	Endrin ketone	1.80E-03 J	8.00E-03 J	3.60E-03	mg/kg	SED7F (0 - 0.5 ft)	5 / 14	0.00073 - 0.0013	8.00E-03	1.90E+00	N	BSL
	58-89-9	gamma-BHC (Lindane)	1.10E-04 J	1.60E-03 J	5.30E-04	mg/kg	SED7G (0 - 0.5 ft)	14 / 28	0.000074 - 0.0013	1.60E-03	5.70E-01	N	BSL
	12789-03-6	Chlordane (Technical)	4.20E-02 J	8.40E-02	5.80E-02	mg/kg	R6-04 (0 - 0.5 ft)	8 / 9	0.00015 - 0.00015	8.40E-02	1.70E+00	N	BSL
	76-44-8	Heptachlor	4.80E-04 J	3.30E-03 J	1.14E-03	mg/kg	R6-04 (0 - 0.5 ft)	15 / 28	0.000034 - 0.0013	3.30E-03	1.30E-01	N	BSL
	1024-57-3	Heptachlor Epoxide	4.40E-04 J	6.50E-03 J	1.90E-03	mg/kg	R6-05 (0 - 0.5 ft)	27 / 28	0.000047 - 0.000047	6.50E-03	7.00E-02	N	BSL
	72-43-5	Methoxychlor	7.00E-03 J	2.30E-02 J	1.50E-02	mg/kg	SED7F (0 - 0.5 ft)	6 / 14	0.00073 - 0.0012	2.30E-02	3.20E+01	N	BSL
	5103-74-2	trans-Chlordane	1.90E-03	1.40E-02	9.40E-03	mg/kg	SED6C (0 - 0.33 ft)	11 / 15	0.00073 - 0.0012	1.40E-02	1.70E+00	N	BSL
	SVOCs												
	91-57-6	2-Methylnaphthalene	9.20E-03 J	7.40E-02	5.00E-02	mg/kg	SED6.5E (0 - 0.5 ft)	5 / 6	0.27 - 0.27	7.40E-02	2.40E+01	N	BSL
	106-44-5	4-Methylphenol	5.50E-02 J	1.10E-01 J	8.30E-02	mg/kg	SED7G (0 - 0.5 ft)	2 / 6	0.3 - 1.3	1.10E-01	6.30E+02	N	BSL
	83-32-9	Acenaphthene	8.90E-03 J	4.30E-01	6.08E-02	mg/kg	R6-05 (0 - 0.5 ft)	26 / 32	0.032 - 0.27	4.30E-01	3.60E+02	N	BSL
	208-96-8	Acenaphthylene	1.70E-02 J	1.20E-01	6.10E-02	mg/kg	R5-03 (0 - 0.5 ft)	29 / 32	0.15 - 0.24	1.20E-01	3.60E+02	N	BSL
	98-86-2	Acetophenone	2.70E-02 J	4.40E-02 J	3.40E-02	mg/kg	SED6.5E (0 - 0.5 ft)	3 / 6	0.32 - 1.3	4.40E-02	7.80E+02	N	BSL
	120-12-7	Anthracene	4.70E-02 J	8.60E-01	1.43E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	8.60E-01	1.80E+03	N	BSL
	100-52-7	Benzaldehyde	5.70E-02 J	1.90E-01 J	9.40E-02	mg/kg	SED7G (0 - 0.5 ft)	4 / 6	0.3 - 1.3	1.90E-01	1.70E+02	N	BSL
	56-55-3	Benzo(a)anthracene	1.60E-01	2.30E+00	5.90E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	2.30E+00	1.10E+00	**Y**	**ASL**
	50-32-8	Benzo(a)pyrene	1.60E-01	2.00E+00	6.50E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	2.00E+00	1.10E-01	**Y**	**ASL**
	205-99-2	Benzo(b)fluoranthene	2.90E-01	2.60E+00	9.70E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	2.60E+00	1.10E+00	**Y**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	1.70E-01	1.70E+00	7.10E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	1.70E+00	1.80E+02	N	BSL
	207-08-9	Benzo(k)fluoranthene	9.60E-02 J	9.60E-01	3.55E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	9.60E-01	1.10E+01	**Y**	**cPAH (7)**
	65-85-0	Benzoic acid	7.50E-01 J	1.20E+00 J	1.00E+00	mg/kg	R6-18 (0 - 0.5 ft) R6-04 (0 - 0.5 ft)	7 / 13	0.13 - 0.7	1.20E+00	2.50E+04	N	BSL
	117-81-7	bis-(2-Ethylhexyl)phthalate	5.50E-01	1.00E+01	1.95E+00	mg/kg	R6-21 (0 - 0.5 ft)	19 / 19	-	1.00E+01	3.90E+01	N	BSL
	85-68-7	Butylbenzylphthalate	5.90E-02 J	2.50E+00	3.30E-01	mg/kg	R6-32 (0 - 0.5 ft)	11 / 19	0.052 - 1.3	2.50E+00	2.90E+02	N	BSL
	105-60-2	Caprolactam	3.90E-01 J	3.90E-01 J	3.90E-01	mg/kg	SED8C (0 - 0.5 ft)	1 / 6	1 - 6.8	3.90E-01	3.10E+03	N	BSL
	86-74-8	Carbazole	6.00E-02 J	2.50E-01	1.10E-01	mg/kg	SED7G (0 - 0.5 ft)	6 / 6	-	2.50E-01	2.40E+02	N	BSL
	218-01-9	Chrysene	2.70E-01	2.40E+00	8.76E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	2.40E+00	1.10E+02	**Y**	**cPAH (7)**
	53-70-3	Dibenzo(a,h)anthracene	4.00E-02 J	4.70E-01	1.50E-01	mg/kg	R6-05 (0 - 0.5 ft)	30 / 32	0.037 - 0.13	4.70E-01	1.10E-01	**Y**	**ASL**
	132-64-9	Dibenzofuran	4.20E-02 J	1.10E-01 J	7.60E-02	mg/kg	SED7G (0 - 0.5 ft)	2 / 6	0.3 - 1.3	1.10E-01	7.30E+00	N	BSL
	84-66-2	Diethylphthalate	4.80E-02 J	1.20E-01 J	8.40E-02	mg/kg	SED8C (0 - 0.5 ft)	2 / 19	0.034 - 1.3	1.20E-01	5.10E+03	N	BSL
	84-74-2	Di-n-butylphthalate	2.30E-02 J	5.60E-02 J	4.00E-02	mg/kg	R6-32 (0 - 0.5 ft)	3 / 19	0.039 - 1.3	5.60E-02	6.30E+02	N	BSL
	117-84-0	Di-n-octylphthalate	1.50E-01 J	4.00E-01 J	3.00E-01	mg/kg	R6-18 (0 - 0.5 ft)	4 / 19	0.033 - 1.3	4.00E-01	6.30E+01	N	BSL
	206-44-0	Fluoranthene	3.20E-01	6.00E+00	1.40E+00	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	6.00E+00	2.40E+02	N	BSL
	86-73-7	Fluorene	2.20E-02 J	4.10E-01	7.20E-02	mg/kg	R6-05 (0 - 0.5 ft)	27 / 32	0.059 - 0.27	4.10E-01	2.40E+02	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	1.20E-01	1.40E+00	5.70E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	1.40E+00	1.10E+00	**Y**	**ASL**
	91-20-3	Naphthalene	1.30E-02 J	1.30E-01	4.60E-02	mg/kg	R6-05 (0 - 0.5 ft)	21 / 32	0.0058 - 0.27	1.30E-01	3.80E+00	N	BSL
	85-01-8	Phenanthrene	1.90E-01 J	4.40E+00	6.18E-01	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	4.40E+00	1.80E+03	N	BSL
	108-95-2	Phenol	3.40E-02 J	4.10E-02 J	3.80E-02	mg/kg	R6-31 (0 - 0.5 ft)	2 / 19	0.0073 - 0.27	4.10E-02	1.90E+03	N	BSL
	129-00-0	Pyrene	3.40E-01	4.00E+00	1.10E+00	mg/kg	R6-05 (0 - 0.5 ft)	32 / 32	-	4.00E+00	1.80E+02	N	BSL

Table 3-15
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Surface Sediment

Exposure Point (6)	Cas Number	Chemical	Minimum (1) Concentration	Maximum (1) Concentration	Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits (2)	Concentration Used for Screening (3)	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Pepco Waterside Area	**VOCs**												
	78-93-3	2-Butanone	1.20E-02	1.20E-02	1.20E-02	mg/kg	SED2C (0 - 0.5 ft)	1 / 6	0.0058 - 0.014	1.20E-02	2.70E+03	N	BSL
	67-64-1	Acetone	5.50E-02	5.50E-02	5.50E-02	mg/kg	SED2C (0 - 0.5 ft)	1 / 6	0.023 - 0.057	5.50E-02	6.10E+03	N	BSL
	TPH												
	C10C20	Diesel Range Organics (C10-C20)	4.80E+01	2.20E+02 J	9.10E+01	mg/kg	SED7E (0 - 0.33 ft)	11 / 11	-	2.20E+02	9.60E+01	**Y**	**ASL**
	C20C36	Oil Range Organics (C20-C36)	4.20E+02	1.10E+03	6.60E+02	mg/kg	SED7E (0 - 0.33 ft)	11 / 11	-	1.10E+03	2.30E+04	N	BSL
	PCBs												
	1336-36-3	Total PCBs	2.20E-02	1.90E+00	4.47E-01	mg/kg	SED7.5E (0 - 0.5 ft)	41 / 41	-	1.90E+00	1.20E-01	**Y**	**ASL**

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.
(2) Lab Reporting Detection Limits (RDLs) are shown where the frequency of detection is less than 100%.
(3) Maximum detected concentration used for screening, except for lead for which the mean detected concentration is used.
(4) Sediment screening levels are equal to the USEPA Regional Screening Levels (RSLs) for residential soil based on a target risk level of 1x10^{-6} for carcinogens and a target hazard quotient of 0.1 for noncarcinogens (November 2018). See Table 3-9 for screening levels and surrogates used. Although iron has a USEPA RSL for soil, iron is considered an essential nutrient and is not further evaluated.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN)
(6) Sediment data represent fringe sediment from the 0 to 0.5 foot below ground surface depth interval.
(7) All seven potentially carcinogenic PAH compounds were retained as COPCs if one or more was identified as a COPC.

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
cPAH - Carcinogenic Polycyclic Aromatic Hydrocarbon
EN - Essential Nutrient
ft - Feet
mg/kg - milligrams per kilogram
PAH - Polycyclic Aromatic Hydrocarbon
PCB - Polychlorinated Biphenyl
SVOC - Semivolatile Organic Compound
TCDD-TEQ - Dioxin Toxic Equivalence
TPH - Total Petroleum Hydrocarbon
VOC - Volatile Organic Compound

Table 3-16
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Surface Water
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Cas Number	Chemical	Minimum (1) Concentration	Maximum (1) Concentration	Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits (2)	Concentration Used for Screening (3)	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Pepco Waterside Area	**Dioxins and Furans**												
	DFTEQ-HH	2,3,7,8-TCDD-TEQ	2.40E-07	6.12E-07	4.08E-07	ug/L	SUW3C	5 / 5	-	6.12E-07	5.10E-08	**Y**	**ASL**
	Inorganics												
	7429-90-5	Aluminum	2.30E+02	5.70E+02	3.90E+02	ug/L	SUW3C	10 / 10	-	5.70E+02	2.00E+03	N	BSL
	7440-36-0	Antimony	5.40E-01 J	8.10E-01 J	6.20E-01	ug/L	SUW6B	10 / 10	-	8.10E-01	6.40E+02	N	BSL
	7440-38-2	Arsenic	4.80E-01 J	1.20E+00 J	7.80E-01	ug/L	SUW4B SUW6B	10 / 10	-	1.20E+00	1.40E-01	**Y**	**ASL**
	7440-39-3	Barium	3.30E+01	4.10E+01	3.70E+01	ug/L	SUW1B	10 / 10	-	4.10E+01	3.80E+02	N	BSL
	7440-41-7	Beryllium	3.80E-02 J	1.00E-01 J	6.50E-02	ug/L	SUW3C	10 / 10	-	1.00E-01	2.50E+00	N	BSL
	7440-70-2	Calcium	1.40E+04	1.90E+04	1.60E+04	ug/L	SUW1B	10 / 10	-	1.90E+04	EN	N	EN
	7440-47-3	Chromium	2.30E+00	3.60E+00	3.00E+00	ug/L	SUW3C SUW6B	10 / 10	-	3.60E+00	2.20E+03	N	BSL
	7440-48-4	Cobalt	8.00E-01	1.10E+00	9.80E-01	ug/L	SUW10B SUW3C SUW6B	10 / 10	-	1.10E+00	6.00E-01	**Y**	**ASL**
	7440-50-8	Copper	2.90E+00	5.80E+00	4.00E+00	ug/L	SUW4B	10 / 10	-	5.80E+00	8.00E+01	N	BSL
	7439-89-6	Iron	7.40E+02	1.40E+03	1.10E+03	ug/L	SUW3C	10 / 10	-	1.40E+03	EN	N	EN
	7439-92-1	Lead	2.10E+00	3.20E+00	2.70E+00	ug/L	SUW4B	10 / 10	-	3.20E+00	1.50E+01	N	BSL
	7439-95-4	Magnesium	3.80E+03	5.70E+03	4.70E+03	ug/L	SUW1B	10 / 10	-	5.70E+03	EN	N	EN
	7439-96-5	Manganese	1.20E+02	1.70E+02	1.40E+02	ug/L	SUW10B	10 / 10	-	1.70E+02	1.00E+02	**Y**	**ASL**
	7440-02-0	Nickel	2.40E+00	3.20E+00	2.80E+00	ug/L	SUW3C SUW4B	10 / 10	-	3.20E+00	4.60E+03	N	BSL
	7440-09-7	Potassium	3.10E+03	3.80E+03	3.40E+03	ug/L	SUW1B	10 / 10	-	3.80E+03	EN	N	EN
	7782-49-2	Selenium	5.00E-01 J	8.60E-01 J	6.80E-01	ug/L	SUW2B	2 / 10	5 - 5	8.60E-01	4.20E+03	N	BSL
	7440-23-5	Sodium	1.50E+04	1.90E+04	1.70E+04	ug/L	SUW1B SUW7B	10 / 10	-	1.90E+04	EN	N	EN
	7440-28-0	Thallium	1.50E-02 J	1.10E-01 J	4.90E-02	ug/L	SUW1B	10 / 10	-	1.10E-01	4.70E-01	N	BSL
	7440-62-2	Vanadium	1.40E+00	2.70E+00	2.20E+00	ug/L	SUW6B	10 / 10	-	2.70E+00	8.60E+00	N	BSL
	7440-66-6	Zinc	6.90E+00	3.10E+01	1.20E+01	ug/L	SUW1B	10 / 10	-	3.10E+01	2.60E+04	N	BSL

Table 3-16
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Surface Water
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Cas Number	Chemical	Minimum (1) Concentration		Maximum (1) Concentration		Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits (2)	Concentration Used for Screening (3)	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
	Pesticides														
	50-29-3	4,4'-DDT	1.10E-03	J	1.60E-03		1.30E-03	ug/L	SUW1B	5 / 5	-	1.60E-03	2.20E-04	**Y**	**ASL**
	SVOCs														
	91-57-6	2-Methylnaphthalene	1.60E-02	J	1.60E-02	J	1.60E-02	ug/L	SUW3C	1 / 5	0.19 - 0.22	1.60E-02	3.60E+00	N	BSL
	120-12-7	Anthracene	1.80E-02	J	1.80E-02	J	1.80E-02	ug/L	SUW4B	1 / 10	0.19 - 0.27	1.80E-02	4.00E+04	N	BSL
	117-81-7	bis-(2-Ethylhexyl)phthalate	1.40E+00	J	2.20E+00		1.90E+00	ug/L	SUW10B SUW6B	3 / 5	1.9 - 1.9	2.20E+00	2.20E+00	N	BSL
	85-68-7	Butylbenzylphthalate	8.60E-01	J	8.60E-01	J	8.60E-01	ug/L	SUW6B	1 / 5	0.96 - 1.1	8.60E-01	1.90E+03	N	BSL
	86-74-8	Carbazole	3.70E-02	J	3.70E-02	J	3.70E-02	ug/L	SUW3C	1 / 5	0.19 - 0.22	3.70E-02	2.90E+01	N	BSL
	84-74-2	Di-n-butylphthalate	5.10E-01	J	5.10E-01	J	5.10E-01	ug/L	SUW6B	1 / 5	0.96 - 1.1	5.10E-01	4.50E+03	N	BSL
	206-44-0	Fluoranthene	1.90E-02	J	3.60E-02	J	3.00E-02	ug/L	SUW3C	6 / 10	0.19 - 0.21	3.60E-02	1.40E+02	N	BSL
	129-00-0	Pyrene	2.10E-02	J	3.80E-02	J	3.00E-02	ug/L	SUW1B	4 / 10	0.19 - 0.21	3.80E-02	4.00E+03	N	BSL
	VOCs														
	75-15-0	Carbon Disulfide	4.00E-01	J	4.00E-01	J	4.00E-01	ug/L	SUW6B	1 / 5	1 - 1	4.00E-01	8.10E+01	N	BSL
	108-88-3	Toluene	1.50E-01	J	1.50E-01	J	1.50E-01	ug/L	SUW10B	1 / 5	1 - 1	1.50E-01	1.50E+04	N	BSL
	PCBs														
	PCB	Total PCBs (7)	Not detected		Not detected		Not detected	ug/L	NA	0/10	-	9.40E-03	6.40E-05	**Y**	**ASL**

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration only.
(2) Lab Reporting Detection Limits (RDLs) are shown where the frequency of detection is less than 100%.
(3) Maximum detected concentration used for screening.
(4) Surface water screening levels were selected based on the following hierarchy:
1. District Department of the Environment. Title 21 of the District of Columbia Municipal Regulations, Chapter 11, Water Quality Standards. Effective November 1, 2013.
2. USEPA National Recommended Water Quality Criteria for Priority Pollutants. Value for Human Health for the consumption of organisms. 2009.
3. USEPA Regional Screening Level (RSL) for Tapwater based on a target risk level of $1x10^{-6}$ for carcinogens and target hazard quotient of 0.1 for noncarcinogens (November 2018).
See Table 3-11 for surface water screening levels and surrogates used.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN)
(6) PCBs was not detected in surface water via Method 8082; the lowest reporting limit of 0.0094 ug/L was used for screening.

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
EN - Essential Nutrient.
ug/L - microgram per liter
NA - Not Available
PCB - Polychlorinated biphenyl
SVOC - Semivolatile organic compound
TCDD-TEQ - Dioxin Toxic Equivalence
VOC - Volatile organic compound

Table 3-17
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upper Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
Upper Anacostia[8]	**Inorganics**												
	7429-90-5	Aluminum	1.40E+00	1.50E+00	1.45E+00	mg/kg	Sunfish	2 / 7	0.4 - 0.5	1.50E+00	1.54E+02	N	BSL
	7440-39-3	Barium	1.61E-02	1.92E-01	7.04E-02	mg/kg	Brown bullhead	7 / 7	--	1.92E-01	3.09E+01	N	BSL
	7440-70-2	Calcium	1.31E+02	5.08E+02	2.62E+02	mg/kg	Carp	7 / 7	--	5.08E+02	EN	N	EN
	7440-48-4	Cobalt	7.00E-03	1.90E-02	1.26E-02	mg/kg	Brown bullhead	5 / 7	0.004 - 0.004	1.90E-02	4.63E-02	N	BSL
	7440-50-8	Copper	1.55E-01	7.77E-01	2.81E-01	mg/kg	Carp	7 / 7	--	7.77E-01	6.18E+00	N	BSL
	7439-89-6	Iron	2.30E+00	3.52E+01	8.10E+00	mg/kg	Carp	7 / 7	--	3.52E+01	1.08E+02	N	BSL
	7439-92-1	Lead	5.00E-03	2.10E-02	1.20E-02	mg/kg	Brown bullhead	5 / 7	0.004 - 0.004	2.10E-02	NSL	N	NSL
	7439-95-4	Magnesium	2.24E+02	2.84E+02	2.49E+02	mg/kg	Largemouth bass	7 / 7	--	2.84E+02	EN	N	EN
	7439-96-5	Manganese	9.57E-02	5.83E-01	2.32E-01	mg/kg	Sunfish	7 / 7	--	5.83E-01	2.16E+01	N	BSL
	7439-97-6	Mercury	3.30E-02	2.36E-01	1.08E-01	mg/kg	Largemouth bass	7 / 7	--	2.36E-01	1.54E-02	**Y**	**ASL**
	7440-02-0	Nickel	1.10E-01	1.70E-01	1.30E-01	mg/kg	Sunfish	3 / 7	0.04 - 0.05	1.70E-01	3.09E+00	N	BSL
	7782-49-2	Selenium	2.60E-01	5.40E-01	3.45E-01	mg/kg	Carp	4 / 7	0.18 - 0.19	5.40E-01	7.72E-01	N	BSL
	7440-23-5	Sodium	3.51E+02	7.20E+02	5.21E+02	mg/kg	Sunfish	7 / 7	--	7.20E+02	EN	N	EN
	7440-66-6	Zinc	4.68E+00	1.28E+01	7.89E+00	mg/kg	Carp	7 / 7	--	1.28E+01	4.63E+01	N	BSL
	Pesticides												
	634-66-2	1,2,3,4-Tetrachlorobenzene	8.70E-05	1.46E-04	1.20E-04	mg/kg	Sunfish	3 / 7	0.000048 - 0.0000494	1.46E-04	4.63E-02	N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	2.84E-04	1.18E-03	5.45E-04	mg/kg	Carp	6 / 7	0.0000487 - 0.0000487	1.18E-03	4.63E-02	N	BSL
	53-19-0	2,4'-DDD	1.69E-04	2.66E-03	9.02E-04	mg/kg	Carp	6 / 7	0.0000502 - 0.0000502	2.66E-03	NSL	N	NSL
	3424-82-6	2,4'-DDE	1.33E-04	1.09E-02	5.19E-03	mg/kg	Channel catfish	6 / 7	0.0000494 - 0.0000494	1.09E-02	NSL	N	NSL
	789-02-6	2,4'-DDT	1.12E-04	1.83E-03	6.34E-04	mg/kg	Carp	7 / 7	--	1.83E-03	NSL	N	NSL
	72-54-8	4,4'-DDD	9.20E-04	2.19E-02	5.47E-03	mg/kg	Carp	7 / 7	--	2.19E-02	4.63E-03	**Y**	**ASL**
	72-55-9	4,4'-DDE	3.46E-03	4.43E-02	1.56E-02	mg/kg	Carp	7 / 7	--	4.43E-02	1.22E-02	**Y**	**ASL**
	50-29-3	4,4'-DDT	2.10E-04	1.25E-03	5.28E-04	mg/kg	Channel catfish	4 / 7	0.000048 - 0.0000502	1.25E-03	1.22E-02	N	BSL
	309-00-2	Aldrin	5.60E-05	3.82E-04	1.84E-04	mg/kg	Northern snakehead	5 / 7	0.0000494 - 0.0000502	3.82E-04	2.45E-04	**Y**	**ASL**
	319-84-6	Alpha-BHC	5.40E-05	1.42E-04	1.05E-04	mg/kg	Blue catfish	7 / 7	--	1.42E-04	6.60E-04	N	BSL
	5103-71-9	alpha-Chlordane	1.23E-03	3.10E-02	9.58E-03	mg/kg	Carp	7 / 7	--	3.10E-02	1.19E-02	**Y**	**ASL**
	319-85-7	beta-BHC	5.18E-04	8.94E-04	6.66E-04	mg/kg	Blue catfish	7 / 7	--	8.94E-04	2.31E-03	N	BSL
	2921-88-2	Chlorpyrifos	1.17E-04	8.24E-04	4.71E-04	mg/kg	Carp	2 / 7	0.0000434 - 0.0000502	8.24E-04	1.54E-01	N	BSL
	5103-73-1	cis-Nonachlor	1.29E-03	1.29E-02	4.13E-03	mg/kg	Carp	7 / 7	--	1.29E-02	1.19E-02	**Y**	**ASL**
	319-86-8	delta-BHC	7.00E-05	7.00E-05	7.00E-05	mg/kg	Carp	1 / 7	0.0000434 - 0.0000502	7.00E-05	6.60E-04	N	BSL
	60-57-1	Dieldrin	1.03E-03	8.49E-03	2.89E-03	mg/kg	Carp	7 / 7	--	8.49E-03	2.60E-04	**Y**	**ASL**
	72-20-8	Endrin	4.40E-05	2.80E-04	1.40E-04	mg/kg	Carp	3 / 7	0.000048 - 0.0000494	2.80E-04	4.63E-02	N	BSL
	5566-34-7	gamma-Chlordane	2.17E-04	9.19E-03	3.47E-03	mg/kg	Channel catfish	7 / 7	--	9.19E-03	1.19E-02	**Y**	Chlordane (5)
	58-89-9	gamma-BHC (Lindane)	6.00E-05	8.20E-05	7.30E-05	mg/kg	Channel catfish	3 / 7	0.0000483 - 0.0000502	8.20E-05	3.78E-03	N	BSL
	1024-57-3	Heptachlor epoxide	3.57E-04	3.69E-03	1.31E-03	mg/kg	Carp	7 / 7	--	3.69E-03	4.57E-04	**Y**	**ASL**
	118-74-1	Hexachlorobenzene	1.26E-04	9.99E-04	3.11E-04	mg/kg	Carp	7 / 7	--	9.99E-04	2.60E-03	N	BSL
	2385-85-5	Mirex	5.10E-05	5.41E-04	2.27E-04	mg/kg	Carp	5 / 7	0.0000494 - 0.0000502	5.41E-04	2.31E-04	**Y**	**ASL**
	27304-13-8	Oxychlordane	6.35E-04	4.82E-03	1.82E-03	mg/kg	Carp	7 / 7	--	4.82E-03	1.19E-02	**Y**	Chlordane (5)
	1825-21-4	Pentachloroanisole	6.90E-05	8.15E-04	2.60E-04	mg/kg	Carp	7 / 7	--	8.15E-04	NSL	N	NSL
	39765-80-5	trans-Nonachlor	2.94E-03	3.00E-02	1.07E-02	mg/kg	Carp	7 / 7	--	3.00E-02	1.19E-02	**Y**	Chlordane (5)

Table 3-17
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upper Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Semivolatile Organic Compounds												
Upper Anacostia[8]	2245-38-7	2,3,5-Trimethylnaphthalene	1.07E-03	7.59E-03	3.67E-03	mg/kg	Carp	6 / 7	0.000988 - 0.000988	7.59E-03	NSL	N	NSL
	90-12-0	1-Methylnaphthalene	1.01E-03	1.88E-02	5.70E-03	mg/kg	Carp	6 / 7	0.000988 - 0.000988	1.88E-02	1.43E-01	N	BSL
	581-42-0	2,6-Dimethylnaphthalene	1.12E-03	1.15E-02	4.71E-03	mg/kg	Carp	6 / 7	0.000988 - 0.000988	1.15E-02	6.18E-01	N	BSL
	91-57-6	2-Methylnaphthalene	7.00E-04	2.33E-02	6.33E-03	mg/kg	Carp	7 / 7	--	2.33E-02	6.18E-01	N	BSL
	83-32-9	Acenaphthene	1.38E-03 J+	7.80E-03	3.25E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	7.80E-03	9.27E+00	N	BSL
	208-96-8	Acenaphthylene	4.00E-04 J	2.70E-03	1.37E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	2.70E-03	9.27E+00	N	BSL
	120-12-7	Anthracene	1.34E-03	5.80E-03	3.10E-03	mg/kg	Carp	4 / 7	0.000974 - 0.00101	5.80E-03	4.63E+01	N	BSL
	92-52-4	Biphenyl	1.02E-03	4.00E-03	1.99E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	4.00E-03	5.20E-01	N	BSL
	DBZTPC1	C1-dibenzothiophenes	1.87E-03	2.15E-03	1.98E-03	mg/kg	Carp	3 / 7	0.000974 - 0.00101	2.15E-03	NSL	N	NSL
	FLPYC1	C1-fluoranthenes/pyrenes	1.10E-03	4.70E-03	2.45E-03	mg/kg	Carp	3 / 7	0.000869 - 0.00101	4.70E-03	NSL	N	NSL
	FLUORC1	C1-fluorenes	1.22E-03	1.02E-02	4.28E-03	mg/kg	Carp	6 / 7	0.00101 - 0.00101	1.02E-02	NSL	N	NSL
	NPHC1	C1-naphthalenes	1.17E-03	4.21E-02	1.13E-02	mg/kg	Carp	7 / 7	--	4.21E-02	NSL	N	NSL
	PHANC1	C1-phenanthrenes/anthracenes	5.00E-04 J	3.10E-03	1.66E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	3.10E-03	NSL	N	NSL
	DBZTPC2	C2-dibenzothiophenes	1.31E-03	1.31E-03	1.31E-03	mg/kg	Brown bullhead	1 / 7	0.000869 - 0.00101	1.31E-03	NSL	N	NSL
	FLUORC2	C2-fluorenes	1.15E-03	6.80E-03	2.91E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	6.80E-03	NSL	N	NSL
	NPHC2	C2-naphthalenes	1.01E-03	3.76E-02	1.32E-02	mg/kg	Carp	7 / 7	--	3.76E-02	NSL	N	NSL
	PHANC2	C2-phenanthrenes/anthracenes	5.00E-04 J	3.30E-03	1.53E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	3.30E-03	NSL	N	NSL
	DBZTPC3	C3-dibenzothiophenes	9.90E-04	9.90E-04	9.90E-04	mg/kg	Brown bullhead	1 / 7	0.000869 - 0.00101	9.90E-04	NSL	N	NSL
	FLUORC3	C3-fluorenes	1.00E-03	3.80E-03	2.07E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	3.80E-03	NSL	N	NSL
	NPHC3	C3-naphthalenes	1.60E-03	2.26E-02	9.10E-03	mg/kg	Carp	7 / 7	--	2.26E-02	NSL	N	NSL
	PHANC3	C3-phenanthrenes/anthracenes	1.05E-03	8.80E-03	3.97E-03	mg/kg	Carp	5 / 7	0.000988 - 0.00101	8.80E-03	NSL	N	NSL
	NPHC4	C4-naphthalenes	2.26E-03	1.22E-02	5.43E-03	mg/kg	Carp	6 / 7	0.000988 - 0.000988	1.22E-02	NSL	N	NSL
	PHANC4	C4-phenanthrenes/anthracenes	9.80E-04	9.80E-04	9.80E-04	mg/kg	Brown bullhead	1 / 7	0.000869 - 0.00101	9.80E-04	NSL	N	NSL
	218-01-9	Chrysene	1.28E-03	1.31E-03	1.30E-03	mg/kg	Brown bullhead	3 / 7	0.000974 - 0.00101	1.31E-03	4.16E+00	N	BSL
	132-65-0	Dibenzothiophene	9.60E-04	1.69E-03	1.30E-03	mg/kg	Carp	3 / 7	0.000974 - 0.00101	1.69E-03	1.54E+00	N	BSL
	206-44-0	Fluoranthene	1.29E-03 J+	6.96E-03	3.57E-03	mg/kg	Brown bullhead	6 / 7	0.000988 - 0.000988	6.96E-03	6.18E+00	N	BSL
	86-73-7	Fluorene	1.30E-03 J+	7.20E-03 J+	3.10E-03	mg/kg	Carp	6 / 7	0.000988 - 0.000988	7.20E-03	6.18E+00	N	BSL
	91-20-3	Naphthalene	2.40E-03	1.08E-02	4.45E-03	mg/kg	Carp	7 / 7	--	1.08E-02	3.09E+00	N	BSL
	85-01-8	Phenanthrene	1.83E-03 J+	1.05E-02	4.51E-03	mg/kg	Carp	6 / 7	0.000988 - 0.000988	1.05E-02	4.63E+01	N	BSL
	129-00-0	Pyrene	1.15E-03	3.37E-03	2.44E-03	mg/kg	Brown bullhead	3 / 7	0.000974 - 0.00101	3.37E-03	4.63E+00	N	BSL
	Polybrominated Diphenyl Ethers												
	RA_TOT_PBDE	Total PBDEs	6.57E-03	9.94E-02	3.11E-02	mg/kg	Carp	7 / 7	--	9.94E-02	NSL	N	NSL

Table 3-17
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upper Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
Upper Anacostia[8]	**Polychlorinated Biphenyls**												
	1336-36-3	Total PCBs (Congeners)	4.16E-02	6.81E-01	1.92E-01	mg/kg	Carp	7 / 7	--	6.81E-01	2.08E-03	Y	ASL
	PCB-TEQ	PCB-TEQ	1.17E-07	5.33E-06	1.30E-06	mg/kg	Largemouth bass	7 / 7	--	5.33E-06	3.20E-08	Y	ASL

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.
(2) Average of detected results.
(3) Maximum detected concentration used for screening.
(4) Fish tissue screening levels are equal to the USEPA Regional Screening Levels (RSLs) for fish tissue, calculated using USEPA's RSL calculator based on a target risk level of $1x10^{-6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Accessed July 2018. See Table 3-12 for screening levels and surrogates used.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN); No Screening Level (NSL)
(6) All chlordane isomer compounds were retained as COPCs if one or more was identified as a COPC.
(7) Range of detection limits for constituents with nondetects. Presented with minimum followed by maximum nondetect concentration.
(8) The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
EN - Essential Nutrient
mg/kg - milligrams per kilogram
NSL - No Screening Level
PBDE - Polybrominated diphenyl ethers
PCB - Polychlorinated Biphenyl
TEQ - Toxicity Equivalence

Table 3-18
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Lower Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [6]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Inorganics												
	7429-90-5	Aluminum	4.00E-01	1.90E+00	1.15E+00	mg/kg	American eel	2 / 6	0.4 - 0.6	1.90E+00	1.54E+02	N	BSL
Lower Anacostia	7440-38-2	Arsenic	2.45E-01	2.45E-01	2.45E-01	mg/kg	Carp	1 / 6	0.091 - 0.245	2.45E-01	2.77E-03	**Y**	**ASL**
	7440-39-3	Barium	1.18E-02	1.14E+00	2.14E-01	mg/kg	American eel	6 / 6	--	1.14E+00	3.09E+01	N	BSL
	7440-43-9	Cadmium	1.60E-02	1.60E-02	1.60E-02	mg/kg	American eel	1 / 6	0.004 - 0.006	1.60E-02	1.54E-01	N	BSL
	7440-70-2	Calcium	7.10E+01	5.80E+03	1.15E+03	mg/kg	American eel	6 / 6	--	5.80E+03	EN	N	EN
	7440-47-3	Chromium	8.00E-02	8.00E-02	8.00E-02	mg/kg	American eel	1 / 6	0.04 - 0.06	8.00E-02	2.32E+02	N	BSL
	7440-48-4	Cobalt	6.00E-03	3.20E-02	1.45E-02	mg/kg	American eel	4 / 6	0.004 - 0.004	3.20E-02	4.63E-02	N	BSL
	7440-50-8	Copper	1.72E-01	5.03E-01	2.90E-01	mg/kg	Carp	6 / 6	--	5.03E-01	6.18E+00	N	BSL
	7439-89-6	Iron	1.70E+00	9.80E+00	4.18E+00	mg/kg	Carp	6 / 6	--	9.80E+00	1.08E+02	N	BSL
	7439-92-1	Lead	5.00E-03	3.70E-01	8.24E-02	mg/kg	American eel	5 / 6	0.004 - 0.004	3.70E-01	NSL	N	NSL
	7439-95-4	Magnesium	2.30E+02	3.00E+02	2.52E+02	mg/kg	American eel	6 / 6	--	3.00E+02	EN	N	EN
	7439-96-5	Manganese	1.00E-01	4.56E+00	9.49E-01	mg/kg	American eel	6 / 6	--	4.56E+00	2.16E+01	N	BSL
	7439-97-6	Mercury	2.50E-02	1.10E-01	7.20E-02	mg/kg	Largemouth bass	6 / 6	--	1.10E-01	1.54E-02	**Y**	**ASL**
	7440-02-0	Nickel	5.00E-02	1.00E-01	7.00E-02	mg/kg	Sunfish	3 / 6	0.04 - 0.06	1.00E-01	3.09E+00	N	BSL
	7782-49-2	Selenium	2.60E-01	3.90E-01	3.28E-01	mg/kg	Carp	4 / 6	0.18 - 0.19	3.90E-01	7.72E-01	N	BSL
	7440-23-5	Sodium	4.10E+02	7.10E+02	5.48E+02	mg/kg	American eel	6 / 6	--	7.10E+02	EN	N	EN
	7440-66-6	Zinc	3.87E+00	3.60E+01	1.42E+01	mg/kg	Carp	6 / 6	--	3.60E+01	4.63E+01	N	BSL
	Pesticides							X (d)					
	634-66-2	1,2,3,4-Tetrachlorobenzene	5.60E-05	4.32E-04	2.47E-04	mg/kg	Carp	3 / 6	0.0000494 - 0.000432	4.32E-04	4.63E-02	N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	5.98E-04	4.95E-03	1.69E-03	mg/kg	American eel	5 / 6	0.0000502 - 0.0000502	4.95E-03	4.63E-02	N	BSL
	53-19-0	2,4'-DDD	2.49E-04	8.53E-03	2.36E-03	mg/kg	Carp	6 / 6	--	8.53E-03	NSL	N	NSL
	3424-82-6	2,4'-DDE	1.19E-03	2.78E-02	9.89E-03	mg/kg	Carp	4 / 6	0.00005 - 0.0001	2.78E-02	NSL	N	NSL
	789-02-6	2,4'-DDT	4.22E-04	2.80E-03	1.01E-03	mg/kg	Carp	5 / 6	0.0001 - 0.0001	2.80E-03	NSL	N	NSL
	72-54-8	4,4'-DDD	9.50E-04	3.32E-02	1.08E-02	mg/kg	American eel	6 / 6	--	3.32E-02	4.63E-03	**Y**	**ASL**
	72-55-9	4,4'-DDE	2.96E-03	1.01E-01	3.63E-02	mg/kg	American eel	6 / 6	--	1.01E-01	1.22E-02	**Y**	**ASL**
	50-29-3	4,4'-DDT	5.00E-05	4.57E-03	1.28E-03	mg/kg	American eel	6 / 6	--	4.57E-03	1.22E-02	N	BSL
	309-00-2	Aldrin	7.30E-05	6.17E-04 J+	2.77E-04	mg/kg	Carp	4 / 6	0.0000472 - 0.0001	6.17E-04	2.45E-04	**Y**	**ASL**
	319-84-6	Alpha-BHC	1.56E-04	6.36E-04	3.22E-04	mg/kg	Blue catfish	4 / 6	0.0000494 - 0.0001	6.36E-04	6.60E-04	N	BSL
	5103-71-9	alpha-Chlordane	9.57E-04	5.27E-02	1.89E-02	mg/kg	American eel	6 / 6	--	5.27E-02	1.19E-02	**Y**	**ASL**
	319-85-7	beta-BHC	6.70E-05	8.56E-04	4.95E-04	mg/kg	Channel catfish	6 / 6	--	8.56E-04	2.31E-03	N	BSL
	2921-88-2	Chlorpyrifos	1.52E-04	1.79E-03	7.71E-04	mg/kg	American eel	4 / 6	0.0000472 - 0.0000478	1.79E-03	1.54E-01	N	BSL
	5103-73-1	cis-Nonachlor	1.09E-03	2.60E-02	8.54E-03	mg/kg	American eel	5 / 6	0.00005 - 0.00005	2.60E-02	1.19E-02	**Y**	**ASL**
	319-86-8	delta-BHC	2.16E-04	2.16E-04	2.16E-04	mg/kg	Blue catfish	1 / 6	0.0000472 - 0.0001	2.16E-04	6.60E-04	N	BSL
	60-57-1	Dieldrin	7.53E-04	1.78E-02	6.21E-03	mg/kg	American eel	6 / 6	--	1.78E-02	2.60E-04	**Y**	**ASL**
	33213-65-9	Endosulfan II	9.20E-05	1.90E-03	9.96E-04	mg/kg	Blue catfish	2 / 6	0.0000472 - 0.0001	1.90E-03	9.27E-01	N	BSL
	72-20-8	Endrin	1.14E-04	3.27E-03	1.15E-03	mg/kg	Blue catfish	4 / 6	0.0000472 - 0.0000494	3.27E-03	4.63E-02	N	BSL
	5566-34-7	gamma-Chlordane	1.46E-04	2.61E-02	1.09E-02	mg/kg	Carp	5 / 6	0.00005 - 0.00005	2.61E-02	1.19E-02	**Y**	**ASL**
	58-89-9	gamma-BHC (Lindane)	1.32E-04	1.62E-04	1.42E-04	mg/kg	Carp	4 / 6	0.0000472 - 0.0000478	1.62E-04	3.78E-03	N	BSL
	76-44-8	Hepatchlor	5.20E-05 J+	4.55E-04	1.89E-04	mg/kg	Blue catfish	5 / 6	0.0000472 - 0.0000472	4.55E-04	9.24E-04	N	BSL
	1024-57-3	Heptachlor epoxide	1.92E-04 J+	5.36E-03	2.35E-03	mg/kg	American eel	6 / 6	--	5.36E-03	4.57E-04	**Y**	**ASL**
	118-74-1	Hexachlorobenzene	1.95E-04	2.02E-03	8.79E-04	mg/kg	American eel	6 / 6	--	2.02E-03	2.60E-03	N	BSL
	2385-85-5	Mirex	7.70E-05	4.96E-04	2.94E-04	mg/kg	Blue catfish	4 / 6	0.0000472 - 0.0000478	4.96E-04	2.31E-04	**Y**	**ASL**
	27304-13-8	Oxychlordane	3.74E-04	1.43E-02	4.20E-03	mg/kg	American eel	5 / 6	0.00005 - 0.00005	1.43E-02	1.19E-02	**Y**	**ASL**
	1825-21-4	Pentachloroanisole	8.80E-05	1.12E-03	5.22E-04	mg/kg	Carp	6 / 6	--	1.12E-03	NSL	N	NSL
	39765-80-5	trans-Nonachlor	1.65E-04	8.02E-02	1.97E-02	mg/kg	American eel	6 / 6	--	8.02E-02	1.19E-02	**Y**	**ASL**

Table 3-18
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Lower Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [6]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Semivolatile Organic Compounds												
Lower Anacostia	2245-38-7	2,3,5-Trimethylnaphthalene	9.80E-04	7.31E-03	2.82E-03	mg/kg	Carp	4 / 6	0.000956 - 0.002	7.31E-03	NSL	N	NSL
	90-12-0	1-Methylnaphthalene	7.00E-04	2.66E-02	7.17E-03	mg/kg	Carp	5 / 6	0.002 - 0.002	2.66E-02	1.43E-01	N	BSL
	832-69-9	1-Methylphenanthrene	1.54E-03	2.18E-03	3.73E-03	mg/kg	Carp	2 / 6	0.000943 - 0.002	2.18E-03	4.63E+01	N	BSL
	581-42-0	2,6-Dimethylnaphthalene	1.14E-03	1.11E-02	3.73E-03	mg/kg	Carp	4 / 6	0.000956 - 0.002	1.11E-02	6.18E-01	N	BSL
	91-57-6	2-Methylnaphthalene	7.00E-04 J	2.12E-02	5.17E-03	mg/kg	Carp	6 / 6	--	2.12E-02	6.18E-01	N	BSL
	83-32-9	Acenaphthene	2.58E-03 J+	3.88E-02	1.34E-02	mg/kg	Carp	5 / 6	0.000956 - 0.000956	3.88E-02	9.27E+00	N	BSL
	208-96-8	Acenaphthylene	7.00E-04 J	8.05E-03	3.21E-03	mg/kg	Carp	4 / 6	0.000956 - 0.002	8.05E-03	9.27E+00	N	BSL
	120-12-7	Anthracene	1.07E-03	1.91E-02	6.75E-03	mg/kg	Carp	4 / 6	0.000956 - 0.002	1.91E-02	4.63E+01	N	BSL
	92-52-4	Biphenyl	2.94E-03	2.94E-03	2.94E-03	mg/kg	Carp	1 / 6	0.000943 - 0.002	2.94E-03	5.20E-01	N	BSL
	DBZTPC1	C1-dibenzothiophenes	1.57E-03	5.13E-03	3.39E-03	mg/kg	American eel	3 / 6	0.000943 - 0.000987	5.13E-03	NSL	N	NSL
	FLPYC1	C1-fluoranthenes/pyrenes	6.73E-03	6.73E-03	6.73E-03	mg/kg	American eel	1 / 6	0.000943 - 0.001	6.73E-03	NSL	N	NSL
	FLUORC1	C1-fluorenes	1.39E-03	1.67E-02	6.45E-03	mg/kg	Carp	5 / 6	0.000987 - 0.000987	1.67E-02	NSL	N	NSL
	NPHC1	C1-naphthalenes	1.43E-03	4.78E-02	1.15E-02	mg/kg	Carp	6 / 6	--	4.78E-02	NSL	N	NSL
	PHANC1	C1-phenanthrenes/anthracenes	1.08E-03	8.49E-03	3.68E-03	mg/kg	Carp	4 / 6	0.000943 - 0.000956	8.49E-03	NSL	N	NSL
	DBZTPC2	C2-dibenzothiophenes	1.80E-03	4.17E-03	2.99E-03	mg/kg	American eel	2 / 6	0.000943 - 0.001	4.17E-03	NSL	N	NSL
	FLUORC2	C2-fluorenes	8.00E-04	1.45E-02	4.98E-03	mg/kg	Carp	5 / 6	0.000987 - 0.000987	1.45E-02	NSL	N	NSL
	NPHC2	C2-naphthalenes	1.03E-03	4.71E-02	1.18E-02	mg/kg	Carp	6 / 6	--	4.71E-02	NSL	N	NSL
	PHANC2	C2-phenanthrenes/anthracenes	0.0005 J	7.99E-03	3.78E-03	mg/kg	Carp	4 / 6	0.000956 - 0.001	7.99E-03	NSL	N	NSL
	DBZTPC3	C3-dibenzothiophenes	2.32E-03	3.68E-03	3.00E-03	mg/kg	American eel	2 / 6	0.000943 - 0.001	3.68E-03	NSL	N	NSL
	FLUORC3	C3-fluorenes	1.29E-03	2.33E-03	1.81E-03	mg/kg	Blue catfish	2 / 6	0.000956 - 0.002	2.33E-03	NSL	N	NSL
	NPHC3	C3-naphthalenes	1.80E-03	2.78E-02	9.06E-03	mg/kg	Carp	6 / 6	--	2.78E-02	NSL	N	NSL
	PHANC3	C3-phenanthrenes/anthracenes	9.00E-04 J	1.48E-02	6.67E-03	mg/kg	American eel	5 / 6	0.001 - 0.001	1.48E-02	NSL	N	NSL
	NPHC4	C4-naphthalenes	1.28E-03	3.04E-02	8.70E-03	mg/kg	Carp	6 / 6	--	3.04E-02	NSL	N	NSL
	PHANC4	C4-phenanthrenes/anthracenes	5.00E-04	3.85E-03	1.41E-03	mg/kg	American eel	4 / 6	0.001 - 0.001	3.85E-03	NSL	N	NSL
	218-01-9	Chrysene	1.44E-03	1.44E-03	1.44E-03	mg/kg	Carp	1 / 6	0.000943 - 0.002	1.44E-03	4.16E+00	N	BSL
	132-65-0	Dibenzothiophene	3.64E-03	3.64E-03	3.64E-03	mg/kg	Carp	1 / 6	0.000943 - 0.002	3.64E-03	1.54E+00	N	BSL
	206-44-0	Fluoranthene	9.00E-04 J+	7.14E-03	2.73E-03	mg/kg	Carp	5 / 6	0.000956 - 0.000956	7.14E-03	6.18E+00	N	BSL
	86-73-7	Fluorene	1.01E-03 J+	1.80E-02	4.98E-03	mg/kg	Carp	5 / 6	0.002 - 0.002	1.80E-02	6.18E+00	N	BSL
	91-20-3	Naphthalene	4.33E-03	6.83E-02	2.03E-02	mg/kg	Carp	6 / 6	--	6.83E-02	3.09E+00	N	BSL
	198-55-0	Perylene	3.00E-04 J+	3.00E-04	3.00E-04	mg/kg	Largemouth bass	1 / 6	0.000956 - 0.002	3.00E-04	4.63E+00	N	BSL
	85-01-8	Phenanthrene	1.30E-03 J+	1.57E-02	4.31E-03	mg/kg	Carp	6 / 6	--	1.57E-02	4.63E+01	N	BSL
	129-00-0	Pyrene	3.58E-03	3.58E-03	3.58E-03	mg/kg	Carp	1 / 6	0.000943 - 0.002	3.58E-03	4.63E+00	N	BSL
	Polybrominated Diphenyl Ethers												
	RA_TOT_PBDE	Total PBDEs	5.14E-03	5.82E-02	2.66E-02	mg/kg	Carp	6 / 6	--	5.82E-02	NSL	N	NSL
	Polychlorinated Biphenyls												
	1336-36-3	Total PCBs (Congeners)	4.11E-02	6.45E-01	3.17E-01	mg/kg	American eel	6 / 6	--	6.45E-01	2.08E-03	**Y**	**ASL**
	PCB-TEQ	PCB-TEQ	1.18E-07	1.80E-05	8.15E-06	mg/kg	Blue catfish	6 / 6	--	1.80E-05	3.20E-08	**Y**	**ASL**

Notes:
(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.
(2) Average of detected results.
(3) Maximum detected concentration used for screening.
(4) Fish tissue screening levels are equal to the USEPA Regional Screening Levels (RSLs) for fish tissue, calculated using USEPA's RSL calculator based on a target risk level of $1x10^{-6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Accessed July 2018. See Table 3-12 for screening levels and surrogates used.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN); No Screening Level (NSL)
(6) Range of detection limits for constituents with nondetects. Presented with minimum followed by maximum nondetect concentration.

Definitions:
CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
EN - Essential Nutrient
mg/kg - milligrams per kilogram
NSL - No Screening Level
PBDE - Polybrominated diphenyl ethers
PCB - Polychlorinated Biphenyl
TEQ - Toxicity Equivalence

Table 3-19
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upper Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Metals												
	7429-90-5	Aluminum	4.00E-01	1.00E+00	6.00E-01	mg/kg	American eel	3 / 9	0.3 - 0.5	1.00E+00	1.54E+02	N	BSL
Upper Potomac	7440-38-2	Arsenic	1.12E-01	8.46E-01	3.54E-01	mg/kg	Striped bass	5 / 9	0.095 - 0.108	8.46E-01	2.77E-03	**Y**	**ASL**
	7440-39-3	Barium	1.54E-02	1.58E-01	5.48E-02	mg/kg	American eel	9 / 9	-	1.58E-01	3.09E+01	N	BSL
	7440-70-2	Calcium	6.45E+01	2.98E+03	5.48E+02	mg/kg	American eel	9 / 9	-	2.98E+03	EN	N	EN
	7440-47-3	Chromium	7.00E-02	1.60E-01	1.20E-01	mg/kg	Largemouth bass	2 / 9	0.03 - 0.05	1.60E-01	2.32E+02	N	BSL
	7440-48-4	Cobalt	5.00E-03	1.70E-02	9.10E-03	mg/kg	Brown bullhead	7 / 9	0.004 - 0.005	1.70E-02	4.63E-02	N	BSL
	7440-50-8	Copper	1.51E-01	7.44E-01	3.34E-01	mg/kg	Carp	9 / 9	-	7.44E-01	6.18E+00	N	BSL
	7439-89-6	Iron	2.40E+00	2.25E+01	5.93E+00	mg/kg	Carp	9 / 9	-	2.25E+01	1.08E+02	N	BSL
	7439-92-1	Lead	8.00E-03	3.60E-02	1.80E-02	mg/kg	American eel	3 / 9	0.003 - 0.005	3.60E-02	NSL	N	NSL
	7439-95-4	Magnesium	2.21E+02	2.87E+02	2.53E+02	mg/kg	Largemouth bass	9 / 9	-	2.87E+02	EN	N	EN
	7439-96-5	Manganese	9.77E-02	1.80E+00	3.48E-01	mg/kg	American eel	9 / 9	-	1.80E+00	2.16E+01	N	BSL
	7439-97-6	Mercury	5.00E-02	2.41E-01	1.23E-01	mg/kg	Largemouth bass	9 / 9	-	2.41E-01	1.54E-02	**Y**	**ASL**
	7440-02-0	Nickel	5.00E-02	5.30E-01	2.10E-01	mg/kg	Sunfish	4 / 9	0.04 - 0.06	5.30E-01	3.09E+00	N	BSL
	7782-49-2	Selenium	2.70E-01	6.00E-01	4.10E-01	mg/kg	White perch	6 / 9	0.19 - 0.32	6.00E-01	7.72E-01	N	BSL
	7440-23-5	Sodium	4.62E+02	6.80E+02	5.46E+02	mg/kg	White perch	9 / 9	-	6.80E+02	EN	N	EN
	7440-66-6	Zinc	5.17E+00	3.18E+01	1.28E+01	mg/kg	Carp	9 / 9	-	3.18E+01	4.63E+01	N	BSL
	Pesticides												
	634-66-2	1,2,3,4-Tetrachlorobenzene	1.42E-04	7.23E-04	4.33E-04	mg/kg	Largemouth bass	X (d)	0.0000492 - 0.0000502	7.23E-04	4.63E-02	N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	3.31E-04	4.41E-03	2.54E-03	mg/kg	Largemouth bass	8 / 9	0.0000497 - 0.0000497	4.41E-03	4.63E-02	N	BSL
	53-19-0	2,4'-DDD	7.00E-05	4.18E-03	1.49E-03	mg/kg	Carp	8 / 9	0.0000497 - 0.0000497	4.18E-03	NSL	N	NSL
	3424-82-6	2,4'-DDE	5.50E-05	1.17E-01	2.26E-02	mg/kg	Striped bass	6 / 9	0.0000492 - 0.00005	1.17E-01	NSL	N	NSL
	789-02-6	2,4'-DDT	1.54E-04	9.96E-03	2.43E-03	mg/kg	American eel	7 / 9	0.0000494 - 0.0000497	9.96E-03	NSL	N	NSL
	72-54-8	4,4'-DDD	2.91E-04	5.16E-02	1.03E-02	mg/kg	Striped bass	9 / 9	-	5.16E-02	4.63E-03	**Y**	**ASL**
	72-55-9	4,4'-DDE	4.16E-03	2.43E-01	6.24E-02	mg/kg	American eel	9 / 9	-	2.43E-01	1.22E-02	**Y**	**ASL**
	50-29-3	4,4'-DDT	7.20E-05	7.06E-03	1.75E-03	mg/kg	American eel	9 / 9	-	7.06E-03	1.22E-02	N	BSL
	309-00-2	Aldrin	6.70E-05	1.20E-03	3.59E-04	mg/kg	American eel	5 / 9	0.0000492 - 0.0000502	1.20E-03	2.45E-04	**Y**	**ASL**
	319-84-6	Alpha-BHC	5.10E-05	2.00E-04	1.30E-04	mg/kg	American eel	2 / 9	0.0000492 - 0.0000502	2.00E-04	6.60E-04	N	BSL
	5103-71-9	alpha-Chlordane	2.05E-04	5.37E-02	1.23E-02	mg/kg	Striped bass	9 / 9	-	5.37E-02	1.19E-02	**Y**	**ASL**
	319-85-7	beta-BHC	6.00E-05	2.74E-03	6.91E-04	mg/kg	Striped bass	9 / 9	-	2.74E-03	2.31E-03	**Y**	**ASL**
	2921-88-2	Chlorpyrifos	7.20E-05	1.40E-03	4.28E-04	mg/kg	American eel	8 / 9	0.0000497 - 0.0000497	1.40E-03	1.54E-01	N	BSL
	5103-73-1	cis-Nonachlor	1.02E-04	2.22E-02	4.35E-03	mg/kg	American eel	8 / 9	0.0000497 - 0.0000497	2.22E-02	1.19E-02	**Y**	**ASL**
	319-86-8	delta-BHC	6.90E-05	4.05E-04	1.84E-04	mg/kg	Largemouth bass	6 / 9	0.0000499 - 0.00005	4.05E-04	6.60E-04	N	BSL
	60-57-1	Dieldrin	3.45E-04	3.78E-02	7.28E-03	mg/kg	Striped bass	9 / 9	-	3.78E-02	2.60E-04	**Y**	**ASL**
	33213-65-9	Endosulfan II	5.10E-05	1.76E-02	4.18E-03	mg/kg	American eel	6 / 9	0.0000492 - 0.0000502	1.76E-02	9.27E-01	N	BSL
	72-20-8	Endrin	7.20E-05	2.24E-02	3.85E-03	mg/kg	Striped bass	6 / 9	0.0000492 - 0.00005	2.24E-02	4.63E-02	N	BSL
	5566-34-7	gamma-Chlordane	5.70E-05	8.76E-03	2.85E-03	mg/kg	American eel	8 / 9	0.0000497 - 0.0000497	8.76E-03	1.19E-02	**Y**	Chlordane (6)
	58-89-9	gamma-BHC (Lindane)	5.60E-05	1.63E-04	1.07E-04	mg/kg	Striped bass, White perch	6 / 9	0.00005 - 0.0000502	1.63E-04	3.78E-03	N	BSL
	76-44-8	Hepatchlor	9.20E-05	5.29E-04	2.41E-04	mg/kg	American eel	3 / 9	0.0000492 - 0.0000502	5.29E-04	9.24E-04	N	BSL
	1024-57-3	Heptachlor epoxide	2.13E-04	6.90E-03	1.97E-03	mg/kg	Striped bass	9 / 9	-	6.90E-03	4.57E-04	**Y**	**ASL**
	118-74-1	Hexachlorobenzene	4.71E-04	3.50E-03	1.62E-03	mg/kg	Striped bass	4 / 9	0.0000492 - 0.00005	3.50E-03	2.60E-03	**Y**	**ASL**
	2385-85-5	Mirex	6.40E-05	7.85E-04	3.32E-04	mg/kg	American eel	4 / 9	0.0000492 - 0.00005	7.85E-04	2.31E-04	**Y**	**ASL**
	27304-13-8	Oxychlordane	1.18E-04	9.85E-03	1.87E-03	mg/kg	American eel	9 / 9	-	9.85E-03	1.19E-02	**Y**	Chlordane (6)
	1825-21-4	Pentachloroanisole	5.20E-05	1.28E-03	4.82E-04	mg/kg	Striped bass	7 / 9	0.0000494 - 0.0000496	1.28E-03	NSL	N	NSL
	39765-80-5	trans-Nonachlor	1.37E-03	6.26E-02	1.18E-02	mg/kg	American eel	8 / 9	0.0000497 - 0.0000497	6.26E-02	1.19E-02	**Y**	Chlordane (6)

Table 3-19
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upper Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Semivolatile Organic Compounds												
	2245-38-7	2,3,5-Trimethylnaphthalene	1.09E-03	1.09E-03	1.09E-03	mg/kg	Channel catfish	1 / 9	0.000985 - 0.001	1.09E-03	NSL	N	NSL
Upper Potomac	90-12-0	1-Methylnaphthalene	2.25E-03 J+	3.14E-03 J+	2.69E-03	mg/kg	Channel catfish	4 / 9	0.000985 - 0.000999	3.14E-03	1.43E-01	N	BSL
	832-69-9	1-Methylphenanthrene	1.33E-03 J+	1.33E-03 J+	1.33E-03	mg/kg	Striped bass	1 / 9	0.000985 - 0.001	1.33E-03	4.63E+01	N	BSL
	581-42-0	2,6-Dimethylnaphthalene	1.52E-03	1.52E-03	1.52E-03	mg/kg	Channel catfish	1 / 9	0.000985 - 0.001	1.52E-03	6.18E-01	N	BSL
	91-57-6	2-Methylnaphthalene	2.13E-03 J+	3.78E-03 J+	3.01E-03	mg/kg	Striped bass	4 / 9	0.000985 - 0.000999	3.78E-03	6.18E-01	N	BSL
	83-32-9	Acenaphthene	1.48E-03 J+	1.56E-02	8.20E-03	mg/kg	American eel	5 / 9	0.000985 - 0.000996	1.56E-02	9.27E+00	N	BSL
	208-96-8	Acenaphthylene	1.42E-03	5.07E-03	2.75E-03	mg/kg	Striped bass	4 / 9	0.000985 - 0.000999	5.07E-03	9.27E+00	N	BSL
	120-12-7	Anthracene	1.75E-03	8.44E-03	4.00E-03	mg/kg	Striped bass	4 / 9	0.000985 - 0.000999	8.44E-03	4.63E+01	N	BSL
	205-99-2	Benzo(b)fluoranthene	1.79E-03 J+	1.79E-03 J+	1.79E-03	mg/kg	Striped bass	1 / 9	0.000985 - 0.001	1.79E-03	4.16E-02	N	BSL
	92-52-4	Biphenyl	1.73E-03	1.73E-03	1.73E-03	mg/kg	Brown bullhead	1 / 9	0.000985 - 0.001	1.73E-03	5.20E-01	N	BSL
	DBZTPC1	C1-dibenzothiophenes	1.05E-03	3.09E-03	2.07E-03	mg/kg	American eel	2 / 9	0.000985 - 0.000999	3.09E-03	NSL	N	NSL
	FLPYC1	C1-fluoranthenes/pyrenes	2.80E-03	1.25E-02	6.94E-03	mg/kg	American eel	4 / 9	0.000985 - 0.000999	1.25E-02	NSL	N	NSL
	FLUORC1	C1-fluorenes	1.11E-03	3.07E-03	1.97E-03	mg/kg	American eel	8 / 9	0.000992 - 0.000992	3.07E-03	NSL	N	NSL
	NPHC1	C1-naphthalenes	1.02E-03 J+	6.41E-03 J+	3.49E-03	mg/kg	Channel catfish	8 / 9	0.000992 - 0.000992	6.41E-03	NSL	N	NSL
	PHANC1	C1-phenanthrenes/anthracenes	1.65E-03	3.21E-03	2.41E-03	mg/kg	Striped bass	3 / 9	0.000985 - 0.000999	3.21E-03	NSL	N	NSL
	DBZTPC2	C2-dibenzothiophenes	5.11E-03	5.11E-03	5.11E-03	mg/kg	American eel	1 / 9	0.000985 - 0.001	5.11E-03	NSL	N	NSL
	FLUORC2	C2-fluorenes	1.15E-03	4.51E-03	2.56E-03	mg/kg	American eel	4 / 9	0.000985 - 0.000999	4.51E-03	NSL	N	NSL
	NPHC2	C2-naphthalenes	1.52E-03	5.88E-03	3.68E-03	mg/kg	Channel catfish	5 / 9	0.000985 - 0.000996	5.88E-03	NSL	N	NSL
	PHANC2	C2-phenanthrenes/anthracenes	1.06E-03	3.59E-03	2.31E-03	mg/kg	Striped bass	4 / 9	0.000985 - 0.000999	3.59E-03	NSL	N	NSL
	DBZTPC3	C3-dibenzothiophenes	2.15E-03	2.15E-03	2.15E-03	mg/kg	American eel	1 / 9	0.000985 - 0.001	2.15E-03	NSL	N	NSL
	FLUORC3	C3-fluorenes	1.06E-03	3.77E-03	2.37E-03	mg/kg	American eel	3 / 9	0.000985 - 0.000999	3.77E-03	NSL	N	NSL
	NPHC3	C3-naphthalenes	1.91E-03	6.09E-03	3.64E-03	mg/kg	American eel	5 / 9	0.000985 - 0.000996	6.09E-03	NSL	N	NSL
	PHANC3	C3-phenanthrenes/anthracenes	2.04E-03	4.34E-02	1.96E-02	mg/kg	American eel	5 / 9	0.000985 - 0.000999	4.34E-02	NSL	N	NSL
	NPHC4	C4-naphthalenes	2.66E-03	2.87E-03	2.77E-03	mg/kg	Carp	2 / 9	0.000985 - 0.001	2.87E-03	NSL	N	NSL
	PHANC4	C4-phenanthrenes/anthracenes	1.12E-03	4.43E-03	2.57E-03	mg/kg	American eel	4 / 9	0.000985 - 0.000999	4.43E-03	NSL	N	NSL
	132-65-0	Dibenzothiophene	1.02E-03 J+	1.02E-03 J+	1.02E-03	mg/kg	Channel catfish	1 / 9	0.000985 - 0.001	1.02E-03	1.54E+00	N	BSL
	206-44-0	Fluoranthene	1.38E-03 J+	3.84E-03 J+	2.79E-03	mg/kg	American eel	5 / 9	0.000985 - 0.000996	3.84E-03	6.18E+00	N	BSL
	86-73-7	Fluorene	2.74E-03 J+	2.93E-03 J+	2.85E-03	mg/kg	Carp	3 / 9	0.000985 - 0.001	2.93E-03	6.18E+00	N	BSL
	91-20-3	Naphthalene	2.48E-03 J+	8.25E-03 J+	4.11E-03	mg/kg	Brown bullhead	9 / 9	-	8.25E-03	3.09E+00	N	BSL
	85-01-8	Phenanthrene	1.11E-03 J+	5.68E-03 J+	3.42E-03	mg/kg	Channel catfish	7 / 9	0.000992 - 0.000996	5.68E-03	4.63E+01	N	BSL
	129-00-0	Pyrene	1.08E-03 J+	1.58E-03 J+	1.40E-03	mg/kg	Carp	3 / 9	0.000985 - 0.001	1.58E-03	4.63E+00	N	BSL
	Polybrominated Diphenyl Ethers												
	RA_TOT_PBDE	Total PBDEs	1.09E-03	7.77E-02	2.27E-02	mg/kg	Striped bass	9 / 9	-	7.77E-02	NSL	N	NSL
	Polychlorinated Biphenyls												
	1336-36-3	Total PCBs (Congeners)	3.15E-02	1.61E+00	4.59E-01	mg/kg	Striped bass	9 / 9	-	1.61E+00	2.08E-03	**Y**	**ASL**
	PCB-TEQ	PCB-TEQ	1.97E-06	5.65E-05	1.48E-05	mg/kg	Striped bass	9 / 9	-	5.65E-05	3.20E-08	**Y**	**ASL**

Table 3-19
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upper Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.

(2) Average of detected results.

(3) Maximum detected concentration used for screening.

(4) Fish tissue screening levels are equal to the USEPA Regional Screening Levels (RSLs) for fish tissue, calculated using USEPA's RSL calculator based on a target risk level of $1x10^{-6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Accessed July 2018. See Table 3-12 for screening levels and surrogates used.

(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN); No Screening Level (NSL)

(6) All chlordane isomer compounds were retained as COPCs if one or more was identified as a COPC.

(7) Range of detection limits for constituents with nondetects. Presented with minimum followed by maximum nondetect concentration.

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
EN - Essential Nutrient
mg/kg - milligrams per kilogram
NSL - No Screening Level
PBDE - Polybrominated diphenyl ethers
PCB - Polychlorinated Biphenyl
TEQ - Toxicity Equivalence

Table 3-20
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Lower Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Inorganics												
	7429-90-5	Aluminum	7.00E-01	5.20E+01	1.30E+01	mg/kg	American eel	5 / 9	0.4 - 0.5	5.20E+01	1.54E+02	N	BSL
Lower	7440-38-2	Arsenic	1.92E-01	3.71E+00	1.95E+00	mg/kg	American Shad	2 / 9	0.089 - 0.167	3.71E+00	2.77E-03	**Y**	**ASL**
Potomac	7440-39-3	Barium	1.84E-02	7.12E-01	1.48E-01	mg/kg	American eel	9 / 9	-	7.12E-01	3.09E+01	N	BSL
	7440-43-9	Cadmium	1.10E-02	1.10E-02	1.10E-02	mg/kg	American eel	1 / 9	0.004 - 0.005	1.10E-02	1.54E-01	N	BSL
	7440-70-2	Calcium	9.22E+01	5.44E+03	1.32E+03	mg/kg	American eel	9 / 9	-	5.44E+03	EN	N	EN
	7440-47-3	Chromium	5.00E-02	6.00E-02	6.00E-02	mg/kg	American eel	2 / 9	0.04 - 0.07	6.00E-02	2.32E+02	N	BSL
	7440-48-4	Cobalt	4.00E-03	2.20E-02	1.10E-02	mg/kg	American eel	8 / 9	0.004 - 0.004	2.20E-02	4.63E-02	N	BSL
	7440-50-8	Copper	1.85E-01	1.10E+00	3.66E-01	mg/kg	American Shad	9 / 9	-	1.10E+00	6.18E+00	N	BSL
	7439-89-6	Iron	2.10E+00	1.77E+01	6.06E+00	mg/kg	American Shad	9 / 9	-	1.77E+01	1.08E+02	N	BSL
	7439-92-1	Lead	4.00E-03	6.00E-02	2.20E-02	mg/kg	American eel	5 / 9	0.004 - 0.005	6.00E-02	NSL	N	NSL
	7439-95-4	Magnesium	2.37E+02	2.85E+02	2.65E+02	mg/kg	American eel	9 / 9	-	2.85E+02	EN	N	EN
	7439-96-5	Manganese	1.63E-01	3.68E+00	8.95E-01	mg/kg	American eel	9 / 9	-	3.68E+00	2.16E+01	N	BSL
	7439-97-6	Mercury	3.70E-02	1.43E-01	8.31E-02	mg/kg	Largemouth bass	9 / 9	-	1.43E-01	1.54E-02	**Y**	**ASL**
	7440-02-0	Nickel	8.00E-02	1.10E-01	8.80E-02	mg/kg	Sunfish	5 / 9	0.04 - 0.05	1.10E-01	3.09E+00	N	BSL
	7782-49-2	Selenium	2.50E-01	3.50E-01	3.10E-01	mg/kg	Carp	4 / 9	0.18 - 0.33	3.50E-01	7.72E-01	N	BSL
	7440-23-5	Sodium	3.24E+02	9.26E+02	6.39E+02	mg/kg	American Shad	9 / 9	-	9.26E+02	EN	N	EN
	7440-66-6	Zinc	4.49E+00	2.77E+01	1.28E+01	mg/kg	American eel	9 / 9	-	2.77E+01	4.63E+01	N	BSL
	Pesticides							X (d)					
	634-66-2	1,2,3,4-Tetrachlorobenzene	6.90E-05	1.25E-04	9.70E-05	mg/kg	American eel	2 / 9	0.0000491 - 0.0000791	1.25E-04	4.63E-02	N	BSL
	95-94-3	1,2,4,5-Tetrachlorobenzene	2.93E-04	4.63E-03	2.83E-03	mg/kg	American eel	8 / 9	0.0000501 - 0.0000501	4.63E-03	4.63E-02	N	BSL
	53-19-0	2,4'-DDD	2.07E-04	4.15E-03	1.34E-03	mg/kg	American eel	9 / 9	-	4.15E-03	NSL	N	NSL
	3424-82-6	2,4'-DDE	1.24E-04	1.97E-04	1.61E-04	mg/kg	Blue catfish	2 / 9	0.0000494 - 0.0000791	1.97E-04	NSL	N	NSL
	789-02-6	2,4'-DDT	4.49E-04	6.12E-03	1.94E-03	mg/kg	American eel	9 / 9	-	6.12E-03	NSL	N	NSL
	72-54-8	4,4'-DDD	4.52E-04	1.40E-02	3.46E-03	mg/kg	American eel	9 / 9	-	1.40E-02	4.63E-03	**Y**	**ASL**
	72-55-9	4,4'-DDE	2.43E-03	6.01E-02	1.71E-02	mg/kg	American eel	9 / 9	-	6.01E-02	1.22E-02	**Y**	**ASL**
	50-29-3	4,4'-DDT	1.04E-04	6.16E-03	1.05E-03	mg/kg	American eel	9 / 9	-	6.16E-03	1.22E-02	N	BSL
	309-00-2	Aldrin	5.50E-05	2.12E-04	1.33E-04	mg/kg	American Shad	7 / 9	0.0000497 - 0.0000501	2.12E-04	2.45E-04	N	BSL
	319-84-6	Alpha-BHC	6.40E-05	4.13E-04	1.50E-04	mg/kg	American eel	6 / 9	0.0000491 - 0.00005	4.13E-04	6.60E-04	N	BSL
	5103-71-9	alpha-Chlordane	4.17E-04	2.41E-02	5.71E-03	mg/kg	American eel	9 / 9	-	2.41E-02	1.19E-02	**Y**	**ASL**
	319-85-7	beta-BHC	2.71E-04	8.86E-04	4.74E-04	mg/kg	American eel	9 / 9	-	8.86E-04	2.31E-03	N	BSL
	2921-88-2	Chlorpyrifos	6.30E-05	6.42E-04	3.14E-04	mg/kg	American eel	6 / 9	0.0000496 - 0.0000501	6.42E-04	1.54E-01	N	BSL
	5103-73-1	cis-Nonachlor	4.97E-04	1.07E-02	2.75E-03	mg/kg	American eel	9 / 9	-	1.07E-02	1.19E-02	N	BSL
	319-86-8	delta-BHC	5.60E-05	7.60E-05	6.40E-05	mg/kg	Brown bullhead	5 / 9	0.0000491 - 0.0000791	7.60E-05	6.60E-04	N	BSL
	60-57-1	Dieldrin	6.80E-04	1.48E-02	3.82E-03	mg/kg	American eel	9 / 9	-	1.48E-02	2.60E-04	**Y**	**ASL**
	33213-65-9	Endosulfan II	9.50E-05	1.11E-03	5.36E-04	mg/kg	American Shad	3 / 9	0.0000494 - 0.0000791	1.11E-03	9.27E-01	N	BSL
	72-20-8	Endrin	7.80E-05	8.18E-04	2.31E-04	mg/kg	American eel	8 / 9	0.0000501 - 0.0000501	8.18E-04	4.63E-02	N	BSL
	5566-34-7	gamma-Chlordane	3.84E-04	9.43E-03	3.13E-03	mg/kg	American eel	8 / 9	0.0000496 - 0.0000496	9.43E-03	1.19E-02	**Y**	Chlordane (6)
	58-89-9	gamma-BHC (Lindane)	5.10E-05	3.09E-04	1.12E-04	mg/kg	American eel	7 / 9	0.0000494 - 0.00005	3.09E-04	3.78E-03	N	BSL
	76-44-8	Hepatchlor	8.30E-05	1.64E-04	1.21E-04	mg/kg	American eel	3 / 9	0.0000496 - 0.0000791	1.64E-04	9.24E-04	N	BSL
	1024-57-3	Heptachlor epoxide	4.14E-04	5.60E-03	1.37E-03	mg/kg	American eel	9 / 9	-	5.60E-03	4.57E-04	**Y**	**ASL**
	118-74-1	Hexachlorobenzene	6.40E-05	1.96E-03	6.59E-04	mg/kg	American eel	8 / 9	0.0000501 - 0.0000501	1.96E-03	2.60E-03	N	BSL
	2385-85-5	Mirex	5.80E-05	2.10E-04	1.33E-04	mg/kg	American eel	4 / 9	0.0000491 - 0.0000501	2.10E-04	2.31E-04	N	BSL
	27304-13-8	Oxychlordane	5.23E-04	7.25E-03	1.68E-03	mg/kg	American eel	9 / 9	-	7.25E-03	1.19E-02	**Y**	Chlordane (6)

Table 3-20
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Lower Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	1825-21-4	Pentachloroanisole	6.50E-05	8.36E-04	3.37E-04	mg/kg	American eel	9 / 9	-	8.36E-04	NSL	N	NSL
	39765-80-5	trans-Nonachlor	1.23E-03	3.58E-02	7.81E-03	mg/kg	American eel	9 / 9	-	3.58E-02	1.19E-02	**Y**	**ASL**
Lower	**Semivolatile Organic Compounds**												
Potomac	90-12-0	1-Methylnaphthalene	1.01E-03 J+	4.41E-03	2.20E-03	mg/kg	Carp	5 / 9	0.000987 - 0.001	4.41E-03	1.43E-01	N	BSL
	2245-38-7	2,3,5-Trimethylnaphthalene	3.00E-03	3.00E-03	3.00E-03	mg/kg	Carp	1 / 9	0.000982 - 0.00158	3.00E-03	NSL	N	NSL
	581-42-0	2,6-Dimethylnaphthalene	1.12E-03 J+	4.32E-03	2.72E-03	mg/kg	Carp	2 / 9	0.000987 - 0.00158	4.32E-03	6.18E-01	N	BSL
	91-57-6	2-Methylnaphthalene	1.03E-03 J+	4.72E-03 J+	2.96E-03	mg/kg	American Shad	4 / 9	0.000987 - 0.00158	4.72E-03	6.18E-01	N	BSL
	83-32-9	Acenaphthene	3.13E-03	3.08E-02	1.28E-02	mg/kg	American Shad	3 / 9	0.000987 - 0.00101	3.08E-02	9.27E+00	N	BSL
	208-96-8	Acenaphthylene	1.03E-03	1.46E-03	1.28E-03	mg/kg	Blue catfish	3 / 9	0.000987 - 0.00158	1.46E-03	9.27E+00	N	BSL
	120-12-7	Anthracene	1.05E-03 J+	2.42E-03 J+	1.80E-03	mg/kg	Blue catfish	4 / 9	0.000987 - 0.00158	2.42E-03	4.63E+01	N	BSL
	92-52-4	Biphenyl	1.13E-03	1.31E-03	1.22E-03	mg/kg	Carp	2 / 9	0.000987 - 0.00158	1.31E-03	5.20E-01	N	BSL
	DBZTPC1	C1-dibenzothiophenes	1.71E-03	1.71E-03	1.71E-03	mg/kg	Carp	1 / 9	0.000982 - 0.00158	1.71E-03	NSL	N	NSL
	FLPYC1	C1-fluoranthenes/pyrenes	3.26E-03	3.26E-03	3.26E-03	mg/kg	American eel	1 / 9	0.000982 - 0.00101	3.26E-03	NSL	N	NSL
	FLUORC1	C1-fluorenes	1.45E-03	5.39E-03	2.77E-03	mg/kg	Carp	6 / 9	0.000987 - 0.00101	5.39E-03	NSL	N	NSL
	NPHC1	C1-naphthalenes	1.06E-03 J+	8.90E-03 J+	3.30E-03	mg/kg	Carp	9 / 9	-	8.90E-03	NSL	N	NSL
	FLUORC2	C2-fluorenes	1.30E-03	4.18E-03	2.39E-03	mg/kg	American eel	5 / 9	0.000987 - 0.00101	4.18E-03	NSL	N	NSL
	NPHC2	C2-naphthalenes	1.18E-03	1.50E-02	3.69E-03	mg/kg	Carp	7 / 9	0.000987 - 0.00101	1.50E-02	NSL	N	NSL
	PHANC2	C2-phenanthrenes/anthracenes	1.78E-03	1.78E-03	1.78E-03	mg/kg	American eel	1 / 9	0.000982 - 0.00101	1.78E-03	NSL	N	NSL
	FLUORC3	C3-fluorenes	1.34E-03	3.07E-03	2.21E-03	mg/kg	American eel	2 / 9	0.000982 - 0.00101	3.07E-03	NSL	N	NSL
	NPHC3	C3-naphthalenes	1.01E-03	1.24E-02	3.92E-03	mg/kg	Carp	7 / 9	0.001 - 0.00101	1.24E-02	NSL	N	NSL
	PHANC3	C3-phenanthrenes/anthracenes	7.45E-03	7.45E-03	7.45E-03	mg/kg	American eel	1 / 9	0.000982 - 0.00101	7.45E-03	NSL	N	NSL
	NPHC4	C4-naphthalenes	1.77E-03	7.30E-03	3.62E-03	mg/kg	Carp	4 / 9	0.000982 - 0.00101	7.30E-03	NSL	N	NSL
	132-65-0	Dibenzothiophene	1.01E-03 J+	1.01E-03 J+	1.01E-03	mg/kg	Blue catfish	1 / 9	0.000982 - 0.00158	1.01E-03	1.54E+00	N	BSL
	206-44-0	Fluoranthene	1.96E-03 J+	3.78E-03 J+	2.83E-03	mg/kg	Brown bullhead	5 / 9	0.000987 - 0.001	3.78E-03	6.18E+00	N	BSL
	86-73-7	Fluorene	1.07E-03 J+	3.78E-03	2.74E-03	mg/kg	Carp	3 / 9	0.000987 - 0.00158	3.78E-03	6.18E+00	N	BSL
	91-20-3	Naphthalene	1.64E-03 J+	5.42E-03 J+	3.22E-03	mg/kg	Brown bullhead	9 / 9	-	5.42E-03	3.09E+00	N	BSL
	198-55-0	Perylene	1.80E-03 J+	1.80E-03 J+	1.80E-03	mg/kg	American eel	1 / 9	0.000987 - 0.001	1.80E-03	4.63E+00	N	BSL
	85-01-8	Phenanthrene	1.10E-03 J+	8.49E-03	3.58E-03	mg/kg	American Shad	6 / 9	0.000987 - 0.001	8.49E-03	4.63E+01	N	BSL
	129-00-0	Pyrene	1.24E-03 J+	1.66E-03 J+	1.45E-03	mg/kg	Brown bullhead	2 / 9	0.000982 - 0.00158	1.66E-03	4.63E+00	N	BSL
	Polybrominated Diphenyl Ethers												
	RA_TOT_PBDE	Total PBDEs	2.22E-03	3.46E-02	8.98E-03	mg/kg	American eel	9 / 9	-	3.46E-02	NSL	N	NSL
	Polychlorinated Biphenyls												
	1336-36-3	Total PCBs (Congeners)	3.33E-02	4.69E-01	1.64E-01	mg/kg	American eel	9 / 9	-	4.69E-01	2.08E-03	**Y**	**ASL**
	PCB-TEQ	PCB-TEQ	1.50E-07	7.47E-06	3.41E-06	mg/kg	Brown bullhead	9 / 9	-	7.47E-06	3.20E-08	**Y**	**ASL**

Table 3-20
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Lower Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.
(2) Average of detected results.
(3) Maximum detected concentration used for screening.
(4) Fish tissue screening levels are equal to the USEPA Regional Screening Levels (RSLs) for fish tissue, calculated using USEPA's RSL calculator based on a target risk level of $1x10^{-6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Accessed July 2018. See Table 3-12 for screening levels and surrogates used.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN); No Screening Level (NSL)
(6) All chlordane isomer compounds were retained as COPCs if one or more was identified as a COPC.
(7) Range of detection limits for constituents with nondetects. Presented with minimum followed by maximum nondetect concentration.

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
EN - Essential Nutrient
mg/kg - milligrams per kilogram
NSL - No Screening Level
PBDE - Polybrominated diphenyl ethers
PCB - Polychlorinated Biphenyl
TEQ - Toxicity Equivalence

Table 3-21
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
	Dioxins and Furans												
	DFTEQ-HH	2,3,7,8-TCDD-TEQ	1.10E-08	2.89E-07	9.74E-08	mg/kg	Smallmouth bass	28 / 28	-	2.89E-07	3.20E-08	**Y**	**ASL**
Non-tidal Anacostia	**Inorganics**												
	7429-90-5	Aluminum	5.50E-01 J	2.50E+00 J	9.90E-01	mg/kg	Largemouth bass	15 / 24	0.49 - 0.58	2.50E+00	1.54E+02	N	BSL
	7440-38-2	Arsenic	2.70E-02 J	1.40E-01	6.40E-02	mg/kg	Smallmouth bass	24 / 24	-	1.40E-01	2.77E-03	**Y**	**ASL**
	7440-39-3	Barium	4.30E-02 J	1.40E-01 J	8.50E-02	mg/kg	Northern snakehead	17 / 24	0.026 - 0.13	1.40E-01	3.09E+01	N	BSL
	7440-70-2	Calcium	3.60E+02	2.80E+03	1.08E+03	mg/kg	Largemouth bass	24 / 24	-	2.80E+03	EN	N	EN
	7440-47-3	Chromium	6.20E-01	1.20E+01	2.18E+00	mg/kg	Largemouth bass	24 / 24	-	1.20E+01	2.32E+02	N	BSL
	7440-48-4	Cobalt	6.20E-03 J	4.70E-02	1.50E-02	mg/kg	Largemouth bass	12 / 24	0.008 - 0.046	4.70E-02	4.63E-02	**Y**	**ASL**
	7440-50-8	Copper	2.00E-01	3.30E-01	2.78E-01	mg/kg	Largemouth bass	24 / 24	-	3.30E-01	6.18E+00	N	BSL
	7439-89-6	Iron	6.00E+00	8.20E+01	1.70E+01	mg/kg	Largemouth bass	24 / 24	-	8.20E+01	1.08E+02	N	BSL
	7439-92-1	Lead	7.60E-03 J	4.90E-02 J	2.20E-02	mg/kg	Largemouth bass	10 / 24	0.0075 - 0.0091	4.90E-02	NSL	N	NSL
	7439-95-4	Magnesium	2.60E+02	3.80E+02	3.10E+02	mg/kg	Largemouth bass	24 / 24	-	3.80E+02	EN	N	EN
	7439-96-5	Manganese	2.30E-01 J	9.80E-01	4.30E-01	mg/kg	Largemouth bass	18 / 24	0.27 - 0.39	9.80E-01	2.16E+01	N	BSL
	7439-97-6	Mercury	1.60E-01 J,J-	5.00E-01 J-	2.60E-01	mg/kg	Smallmouth bass	23 / 24	0.076 - 0.076	5.00E-01	1.54E-02	**Y**	**ASL**
	7440-02-0	Nickel	8.60E-02 J	1.50E+00	3.54E-01	mg/kg	Largemouth bass	24 / 24	-	1.50E+00	3.09E+00	N	BSL
	7440-09-7	Potassium	3.10E+03	4.30E+03	3.80E+03	mg/kg	Largemouth bass, Smallmouth bass	24 / 24	-	4.30E+03	EN	N	EN
	7782-49-2	Selenium	1.40E-01 J	4.20E-01	2.80E-01	mg/kg	Largemouth bass	18 / 24	0.22 - 0.37	4.20E-01	7.72E-01	N	BSL
	7440-23-5	Sodium	5.20E+02	8.50E+02	6.60E+02	mg/kg	Largemouth bass	X (d)	-	8.50E+02	EN	N	EN
	7440-28-0	Thallium	2.40E-03 J	6.20E-03 J	3.77E-03	mg/kg	Largemouth bass	19 / 24	0.0021 - 0.0026	6.20E-03	1.54E-03	**Y**	**ASL**
	7440-62-2	Vanadium	6.40E-02 J	6.80E-02 J	6.60E-02	mg/kg	Largemouth bass	3 / 24	0.057 - 0.07	6.80E-02	7.79E-01	N	BSL
	7440-66-6	Zinc	5.50E+00	1.20E+01	7.90E+00	mg/kg	Largemouth bass	24 / 24	-	1.20E+01	4.63E+01	N	BSL
	Pesticides												
	72-54-8	4,4'-DDD	1.10E-04 J	6.00E-04 J	3.70E-04	mg/kg	Northern snakehead	7 / 26	0.000042 - 0.00018	6.00E-04	4.63E-03	N	BSL
	72-55-9	4,4'-DDE	2.80E-04 J	2.80E-03	1.20E-03	mg/kg	Striped bass	26 / 26	-	2.80E-03	1.22E-02	N	BSL
	50-29-3	4,4'-DDT	1.90E-04 J	1.90E-04 J	1.90E-04	mg/kg	Smallmouth bass	1 / 26	0.000042 - 0.00018	1.90E-04	1.22E-02	N	BSL
	CHLORDANE_ALL	Chlordane	6.30E-03 J	6.20E-02	2.20E-02	mg/kg	Largemouth bass	25 / 26	0.00047 - 0.00047	6.20E-02	1.19E-02	**Y**	**ASL**
	60-57-1	Dieldrin	2.00E-04 J	4.70E-03	1.70E-03	mg/kg	Largemouth bass	23 / 26	0.000078 - 0.00014	4.70E-03	2.60E-04	**Y**	**ASL**
	1024-57-3	Heptachlor epoxide	1.20E-04 J	4.80E-03	1.80E-03	mg/kg	Largemouth bass	18 / 26	0.00005 - 0.0002	4.80E-03	4.57E-04	**Y**	**ASL**
	Semivolatile Organic Compounds												
	65-85-0	Benzoic Acid	6.10E-01 J	1.10E+00 J	7.10E-01	mg/kg	Largemouth bass	9 / 9	-	1.10E+00	6.18E+02	N	BSL
	84-66-2	Diethylphthalate	4.60E-02 J	4.60E-02 J	4.60E-02	mg/kg	Smallmouth bass	1 / 9	0.029 - 0.054	4.60E-02	1.24E+02	N	BSL
	117-84-0	Di-n-octylphthalate	2.30E-01 J	2.70E-01 J	2.40E-01	mg/kg	Smallmouth bass	4 / 9	0.028 - 0.052	2.70E-01	1.54E+00	N	BSL
	85-01-8	Phenanthrene	1.40E-02 J	1.40E-02 J	1.40E-02	mg/kg	Largemouth bass	1 / 9	0.0084 - 0.016	1.40E-02	4.63E+01	N	BSL
	108-95-2	Phenol	1.30E-02 J	5.20E-02 J	3.30E-02	mg/kg	Largemouth bass	2 / 9	0.0062 - 0.015	5.20E-02	4.63E+01	N	BSL
	Polychlorinated Biphenyls												
	1336-36-3	Total PCBs (Congeners)	9.49E-03	5.97E-02	2.84E-02	mg/kg	Striped bass	29 / 29	-	5.97E-02	2.08E-03	**Y**	**ASL**
	PCB-TEQ	PCB-TEQ	2.37E-08	2.54E-06	6.65E-07	mg/kg	Largemouth bass	29 / 29	-	2.54E-06	3.20E-08	**Y**	**ASL**

Table 3-21
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Fish Tissue - Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (fillet)

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration [1]	Maximum Detected Concentration [1]	Average Detected Concentration [2]	Units	Species with Maximum Concentration	Detection Frequency	Range of Reporting Limits [7]	Concentration Used for Screening [3]	Screening Toxicity Value [4]	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- = Indicates the result may be biased high/low.
(2) Average of detected results.
(3) Maximum detected concentration used for screening.
(4) Fish tissue screening levels are equal to the USEPA Regional Screening Levels (RSLs) for fish tissue, calculated using USEPA's RSL calculator based on a target risk level of $1x10^{-6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Accessed July 2018. See Table 3-12 for screening levels and surrogates used.
(5) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL); Essential Nutrient (EN); No Screening Level (NSL)
(6) All chlordane isomer compounds were retained as COPCs if one or more was identified as a COPC.
(7) Range of detection limits for constituents with nondetects. Presented with minimum followed by maximum nondetect concentration.

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
EN - Essential Nutrient
mg/kg - milligrams per kilogram
NSL - No Screening Level
PBDE - Polybrominated diphenyl ethers
PCB - Polychlorinated Biphenyl
TEQ - Toxicity Equivalence
TCDD-TEQ - Dioxin Toxic Equivalence

Table 3-22
Hexavalent Chromium Evaluation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Area	Location	Sample	Units	Total Chromium		Hexavalent Chromium		% Hexavalent Chromium	
				Result	Detect Flag	Result	Detect Flag	Including Non-Detects	Excluding Non-Detects
Anacostia Park Property	KMY04	SUSKMY0400N	mg/kg	51	Y	0.34	Y	0.67%	0.67%
	KMY05	SUSKMY0500N	mg/kg	41	Y	1.20	N	2.93%	--
	KMY07	SUSKMY0700N	mg/kg	36	Y	0.40	N	1.11%	--
	KMY08	SUSKMY0800N	mg/kg	44	Y	0.98	Y	2.23%	2.23%
	KMY12	SUSKMY1200N	mg/kg	40	Y	0.62	Y	1.55%	1.55%
	KMY14	SUSKMY1400N	mg/kg	35	Y	0.35	N	1.00%	--
Warehouse and Laydown Area	SUS08-1D	SUS081D00N2	mg/kg	69	Y	0.6	Y	0.87%	0.87%
	SUS08-1H	SUS081H00N2	mg/kg	42	Y	0.25	Y	0.60%	0.60%
	SUS08-1H	SUS081H00R2	mg/kg	53	Y	0.18	Y	0.34%	0.34%
	SUSDP08	SUS0800N2	mg/kg	27	Y	0.36	N	1.33%	--
	SUSDP08-1E	SUS081E00N2	mg/kg	160	Y	0.38	N	0.24%	--
	TA1C4	SUSTA1C400N2	mg/kg	120	Y	2.60	N	2.17%	--
	TA1C5	SUSTA1C500N2	mg/kg	160	Y	3.50	N	2.19%	--
	TA1E1	SUSTA1E100N2	mg/kg	18	Y	0.43	N	2.39%	--
	TA1E9	SUSTA1E900N2	mg/kg	11	Y	0.32	N	2.91%	--
	TA1F4	SUSTA1F400N2	mg/kg	22	Y	0.42	N	1.91%	--
	TA1G9	SUSTA1G900N2	mg/kg	18	Y	0.36	N	2.00%	--

Notes

Detect Flag: Y = Yes, Detected. N = No, Not Detected

Summary of % Hexavalent Chromium - Anacostia Park Property and Warehouse		
Statistic	Including Non-Detects	Excluding Non-Detects
Minimum	0.24%	0.34%
Maximum	2.93%	2.23%
Mean	**1.55%**	1.0%

Summary of % Hexavalent Chromium - Anacostia Park Property Only		
Statistic	Including Non-Detects	Excluding Non-Detects
Minimum	0.67%	0.67%
Maximum	2.93%	2.23%
Mean	**1.58%**	1.5%

Summary of % Hexavalent Chromium - Warehouse Only		
Statistic	Including Non-Detects	Excluding Non-Detects
Minimum	0.24%	0.34%
Maximum	2.91%	0.87%
Mean	**1.54%**	0.60%

Table 3-23
Summary of Chemicals of Potential Concern
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical	CAS Number	On-Site Landside Media			Waterside Media			Background Fish Fillet	Regional Fish Fillet		
		Groundwater (Excavation Trench)	Groundwater (Future Vapor Intrustion to Indoor Air)	Soil	Fringe Surface Sediment	Surface Water	Upper Anacostia River Fish Fillet (e)	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac
Dioxins and Furans											
2,3,7,8-TCDD-TEQ	DFTEQ-HH			X	X	X		X			
Inorganics											
Aluminum	7429-90-5				X						
Antimony	7440-36-0				X						
Arsenic	7440-38-2			X	X	X		X	X	X	X
Cobalt	7440-48-4			X	X	X		X			
Cyanide	57-12-5				X						
Manganese	7439-96-5			X	X	X					
Mercury	7439-97-6						X	X	X	X	X
Nickel	7440-02-0			X	X						
Thallium	7440-28-0			X	X			X			
Vanadium	7440-62-2			X	X						
Pesticides											
4,4'-DDE	72-55-9						X		X	X	X
4,4'-DDD	72-54-8						X		X	X	X
4,4'-DDT	50-29-3					X					
Aldrin	309-00-2						X		X	X	
alpha-Chlordane	5103-71-9						X	X (d)	X	X	X
beta-BHC	319-85-7									X	
cis-Nonachlor	5103-73-1						X		X	X	
Dieldrin	60-57-1						X	X	X	X	X
gamma-Chlordane	5566-34-7						X		X	X	X
Heptachlor Epoxide	1024-57-3						X	X	X	X	X
Hexachlorobenzene	118-74-1									X	
Mirex	2385-85-5						X		X	X	
Oxychlordane	27304-13-8						X		X	X	X
trans-Nonachlor	39765-80-5						X		X	X	X
PCBs											
Total PCBs (a)	1336-36-3			X	X	X (b)	X	X	X	X	X
PCB-TEQ	PCB-TEQ						X	X	X	X	X
SVOCs (c)											
Benzo(a)anthracene	56-55-3			X	X						
Benzo(a)pyrene	50-32-8			X	X						
Benzo(b)fluoranthene	205-99-2			X	X						
Benzo(k)fluoranthene	207-08-9			X	X						
Chrysene	218-01-9			X	X						
Dibenzo(a,h)anthracene	53-70-3			X	X						
Indeno(1,2,3-cd)pyrene	193-39-5			X	X						
Naphthalene	91-20-3			X							
TPH											
Diesel Range Organics (C10-C20)	C10C20			X	X						
VOCs											
Bromodichloromethane	75-27-4	X									
Butyl alcohol, tert-	75-65-0	X									
Chloroform	67-66-3	X	X								
Methyl tert-Butyl Ether (MTBE)	1634-04-4	X									
Tetrachloroethylene	127-18-4	X	X								
Trichloroethene	79-01-6	X	X								
Vinyl Chloride	75-01-4	X	X								
Total		**7**	**4**	**17**	**19**	**6**	**14**	**10**	**15**	**17**	**12**

Notes:

CAS - Chemical Abstracts Service
PCB - Polychlorinated biphenyl
SVOC - Semivolatile organic compound
TCDD-TEQ - Dioxin Toxic Equivalence.
X - Indicates chemical was identified as a chemical of potential concern in the associated media.

(a) Total PCBs for abiotic media (soil, sediment, surface water) are evaluated as Total PCB Aroclors. PCBs for biotic media (fish tissue) are evaluated as Total PCB (sum of congeners) and PCB-TEQ. (See text Section 3 for further discussion).
(b) PCBs was not detected in the RI surface water samples, however, the detection limit for the analytical method used (approximately 0.01 ug/L for Method 8082) exceeds the applicable surface water screening level of 0.000064 ug/L for PCBs. Therefore, PCBs was conservatively identified as a surface water COPC using the lowest reporting limit that was achieved (0.0094 ug/L).
(c) All seven potentially carcinogenic polycyclic aromatic hydrocarbons were conservatively retained as COPCs if one or more was identified as a COPC.
(d) Represents total chlordane.
(e) The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.

Table 4-1
Non-Cancer Toxicity Data For COPCs - Oral/Dermal
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern (d)	CAS Number	Chronic/ Subchronic	Chronic Oral Reference Dose (mg/kg-day)	Oral Absorption Efficiency for Dermal (a)	Absorbed Chronic RfD for Dermal (b) (mg/kg-day)	Study Animal	Study Method	Primary Target Organ/System	Critical Endpoint	Combined Uncertainty/ Modifying Factors	Confidence Level	RfD: Target Organ(s) Source	RfD: Target Organ(s) Date	RfD Tier (h)
Dioxin and Dioxin-Like PCBs														
2,3,7,8-TCDD-TEQ	DFTEQ-HH	Chronic	7.00E-10 (j)	--	7.00E-10	Human	Epidemiological	Reproductive, Developmental	Decreased sperm count and motility in men / Increased TSH in neonates	30	High	IRIS	8/2018	Tier 1
PCB-TEQ	PCB-TEQ	Chronic	7.00E-10 (j)	--	7.00E-10			Reproductive, Developmental						
Inorganics														
Aluminum	7429-90-5	Chronic	1.00E+00	--	1.00E+00	Mouse	Oral: Diet	Neurological	Neurological Toxicity	100	Low	PPRTV aluminum and its compounds	10/2006	Tier 2
Antimony	7440-36-0	Chronic	4.00E-04	0.15	6.00E-05	Rat	Oral: Bioassay	Mortality, Blood	Longevity, blood glucose, and cholesterol	1,000	Low	IRIS metallic form	8/2018	Tier 1
Arsenic	7440-38-2	Chronic	3.00E-04	--	3.00E-04	Human	Oral: Drinking water	Skin, Vascular	Hyperpigmentation, keratosis and possible vascular complications	3	Medium	IRIS inorganic form	8/2018	Tier 1
Arsenic, organic	75-60-5	Chronic	2.00E-02 (n)	NA	NA	Mouse	Oral: diet	Bladder	Vacuolization of the urothelium	100	NA	ATSDR dimethylarsinic acid	8/2007	Tier 3
Cobalt	7440-48-4	Chronic	3.00E-04	--	3.00E-04	Human	Oral	Thyroid	Decreased iodine uptake	3,000	Low/Medium	PPRTV	8/2008	Tier 2
Cyanide	57-12-5	Chronic	6.30E-04	--	--	Rat	Oral: Drinking water	Reproductive	Decreased cauda epididymis weight	3,000	Low/Medium	IRIS free cyanide	8/2018	Tier 1
Manganese	7439-96-5	Chronic	2.40E-02 (f)	0.04	9.60E-04	Human	Oral: dietary supplements	Neurological	CNS effects (other effect: Impairment of neurobehavioral function)	3	High	IRIS	8/2018	Tier 1
Mercury	7439-97-6	Chronic	3.00E-04	0.07	2.10E-05	Rat	Oral: Diet	Immune	Autoimmune	1,000	High	IRIS mercuric chloride	8/2018	Tier 1
Methyl Mercury	22967-92-6	Chronic	1.00E-04	NA	NA (g)	Human	Epidemiological	Neurological	Developmental neuropsychological impairment	10	High	IRIS methyl mercury	8/2018	Tier 1
Nickel	7440-02-0	Chronic	2.00E-02	0.04	8.00E-04	Rat	Oral: Diet	Decreased body and organ weights	Decreased body and organ weights	300	Medium	IRIS nickel soluble salts	8/2018	Tier 1
Thallium	7440-28-0	Chronic	1.00E-05 (g)	--	1.00E-05	Rat	Oral: Subchronic	Hair	Hair follicle atrophy	3,000	--	PPRTV screening value (e) thallium soluble salts	10/2012	Tier 3
Vanadium	7440-62-2	Chronic	5.04E-03 (i)	0.026	1.31E-04	Rat	Oral	Hair	Decreased hair cysteine	100	Low	IRIS vanadium and compounds (i)	8/2018	Tier 1
Pesticides														
4,4'-DDD	72-54-8	Chronic	3.00E-05	--	3.00E-05	Rat	Oral: diet	Liver	Liver lesions	300	--	PPRTV screening value (e)	9/2017	Tier 3
4,4'-DDE	72-55-9	Chronic	3.00E-04	--	3.00E-04	Rat	Oral: gavage	Liver, Developmental	Increased liver weight in male offspring	3,000	--	PPRTV screening value (e)	9/2017	Tier 3
4,4'-DDT	50-29-3	Chronic	5.00E-04	--	5.00E-04	Rat	Oral: diet	Liver	Liver lesions	100	Medium	IRIS	8/2018	Tier 1
Aldrin	309-00-2	Chronic	3.00E-05	--	3.00E-05	Rat	Oral: diet	Liver	Liver toxicity	1,000	Medium	IRIS	8/2018	Tier 1
alpha-Chlordane	5103-71-9	Chronic	5.00E-04 (k)	--	5.00E-04	Mouse	Oral	Liver	Liver necrosis	300	Medium	IRIS (k)	8/2018	Surrogate
beta-BHC	319-85-7	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-Nonachlor	5103-73-1	Chronic	5.00E-04 (k)	--	5.00E-04	Mouse	Oral	Liver	Liver necrosis	300	Medium	IRIS (k)	8/2018	Surrogate
Dieldrin	60-57-1	Chronic	5.00E-05	--	5.00E-05	Rat	Oral: diet	Liver	Liver lesions	100	Medium	IRIS	8/2018	Tier 1
gamma-Chlordane	5566-34-7	Chronic	5.00E-04 (k)	--	5.00E-04	Mouse	Oral	Liver	Liver necrosis	300	Medium	IRIS	8/2018	Tier 1
Heptachlor epoxide	1024-57-3	Chronic	1.30E-05	--	1.30E-05	Dog	Oral	Liver	Increased liver-to-body weight ratio in both males and females	1,000	Low	IRIS	8/2018	Tier 1
Hexachlorobenzene	118-74-1	Chronic	8.00E-04	--	8.00E-04	Rat	Oral: capsule	Liver	Liver effects	100	Medium	IRIS	8/2018	Tier 1
Mirex	2385-85-5	Chronic	2.00E-04	--	2.00E-04	Rat	Oral	Endocrine, Liver	Liver cytomegaly, fatty metamorphosis, angiectasis; thyroid cystic follicles	300	High	IRIS	8/2018	Tier 1
Oxychlordane	27304-13-8	Chronic	5.00E-04 (k)	--	5.00E-04	Mouse	Oral	Liver	Liver necrosis	300	Medium	IRIS (k)	8/2018	Surrogate
trans-Nonachlor	39765-80-5	Chronic	5.00E-04 (k)	--	5.00E-04	Mouse	Oral	Liver	Liver necrosis	300	Medium	IRIS (k)	8/2018	Surrogate

Table 4-1
Non-Cancer Toxicity Data For COPCs - Oral/Dermal
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern (d)	CAS Number	Chronic/ Subchronic	Chronic Oral Reference Dose (mg/kg-day)	Oral Absorption Efficiency for Dermal (a)	Absorbed Chronic RfD for Dermal (b) (mg/kg-day)	Study Animal	Study Method	Primary Target Organ/System	Critical Endpoint	Combined Uncertainty/ Modifying Factors	Confidence Level	RfD: Target Organ(s) Source	RfD: Target Organ(s) Date	RfD Tier (h)
PCBs														
Total PCBs	1336-36-3	Chronic	2.00E-05 (c)	--	2.00E-05	Monkey	Oral: Capsule	Ocular/eye, Nails, Immune	Ocular exudate, inflamed and prominent Meibomian glands, distorted growth of finger and toe nails; decreased antibody response to sheep erythrocytes	300	Medium	IRIS	8/2018	Tier 1
		Subchronic	5.00E-05 (m)	--	5.00E-05					100 (m)				
SVOCs														
Benzo(a)anthracene	56-55-3	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	Chronic	3.00E-04	--	3.00E-04	Rat	Oral: diet	Developmental	Neurobehavioral changes	300	Medium	IRIS	8/2018	Tier 1
Benzo(b)fluoranthene	205-99-2	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	218-01-9	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	53-70-3	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	193-39-5	Chronic	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	91-20-3	Chronic	2.00E-02	--	2.00E-02	Rat	Oral: gavage	Developmental	Decreased terminal body weight	3,000	Low	IRIS	8/2018	Tier 1
TPH														
Diesel Range Organics (C10-C20)	C10C20	Chronic	1.00E-02 (l)	--	1.00E-02	Rat	Oral: gavage	Liver, Kidney, Blood	Liver/kidney weight increases and other changes, serum chemistry changes	10,000	Low	PPRTV screening value (e)	9/2009	Tier 3

Notes:

"--" - No adjustment necessary.
$ABS_{(GI)}$ - Fraction of contaminant absorbed in gastrointestinal tract (dimensionless).
CAS - Chemical Abstracts Service.
CNS - Central Nervous System.
IRIS - Integrated Risk Information System, an online computer database of toxicological information (USEPA, 2018).
mg/kg-day - Milligrams per Kilogram per day.
NA - Not available/Not Applicable.
PCB - Polychlorinated Biphenyls.
PPRTV - Provisional Peer Reviewed Toxicity Value.
RfD - Reference Dose.
SVOCs - Semi-volatile organic compounds.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
TSH - Thyroid Stimulating Hormone.
USEPA - United States Environmental Protection Agency.

(a) USEPA, 2004. Risk Assessment Guidance for Superfund. Volume 1, Part E, Supplemental Guidance for Dermal Risk Assessment. Exhibit 4-1. Where USEPA, 2004 does not recommend adjustments, no value is listed.
(b) Oral RfD multiplied by ABS_{GI}. Where the gastrointestinal absorption is greater than or equal to 50%, Dermal RfD = Oral RfD.
(c) Value for Aroclor 1254 (2E-05 mg/kg-day) or Aroclor 1016 (7E-05 mg/kg-day) may be used to evaluate the noncarcinogenic hazards of total PCBs, and the Aroclor selected depends on the chlorine content of the PCB congeners in the medium of interest. For this HHRA, the RfD for Aroclor 1254 is used.
(d) - Volatile organic compounds are not chemicals of potential concern for oral or dermal pathways, and are therefore not presented here.
(e) No PPRTVs were developed in the PPRTV document. PPRTV document indicates that it is inappropriate to derive provisional chronic or subchronic RfDs but that information is available which, although insufficient to support derivation of a provisional toxicity value, under current guidelines, may be of limited use to risk assessors as a screening value. The use of screening provisional values is highly uncertain but they used in the USEPA Regional Screening Tables (May 2018).
(f) When assessing exposure to manganese for non-dietary pathways, IRIS recommends applying a modifying factor of 3 to the oral RfD of 0.14 mg/kg-day. The USEPA Regional Screening Level User's Guide also indicates that the average dietary manganese content of the US diet (5 mg/day) be subtracted from the critical dose of 10 mg/day when assessing exposure to non-dietary manganese. Therefore, the RfD is (10 mg/day - 5 mg/day)/Modifying Factor (3) = 1.67 mg/day / 70 kg = 0.024 mg/kg-day.
(g) Dermal pathway not applicable; methyl mercury is used to assess the fish ingestion pathway only.
(h) USEPA, 2003. Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53. December 5, 2003. IRIS values are considered Tier 1, PPRTVs are considered Tier 2, and other values, including ATSDR, CalEPA, HEAST, and other non-USEPA values are considered Tier 3 values. Selection of Tier 3 values followed the hierarchy put forth in USEPA's Tier 3 Toxicity Value White Paper, OSWER 9285.7-86, May 16, 2013.
(i) The oral RfD for Vanadium is derived from the IRIS oral RfD for Vanadium Pentoxide by factoring out the molecular weight (MW) of the oxide ion. Vanadium Pentoxide (V205) has a molecular weight of 181.88. The two atoms of Vanadium contribute 56% of the MW. Vanadium Pentoxide's oral RfD of 9E-03 mg/kg-day multiplied by 56% gives a Vanadium oral RfD of 5.04E-03 mg/kg-day.
(j) The IRIS reference dose for 2,3,7,8-TCDD is used to evaluate TCDD-TEQ and PCB-TEQ.
(k) Value for technical chlordane is used as a surrogate.
(l) Value for TPH (Aliphatic Medium), based on the PPRTV for Midrange Aliphatic Hydrocarbon Streams. RfD is considered a screening provisional value (USEPA 2009).
(m) As allowed by guidance (USEPA 1989), the UF of 3 used for extrapolation from subchronic to lifetime exposure was removed to derive a subchronic RfD of 5E-5 mg/kg-day for the construction worker scenario (LOAEL of 5E-3 mg/kg-day divided by uncertainty factor of 100).
(m) Minimal Risk Level for Dimethylarsinic acid (DMA) derived in Appendix A of Toxicological Profile for Arsenic (ATSDR, 2007). The value for organic arsenic is used to assess dietary exposure to fish tissue.

Table 4-2
Non-Cancer Toxicity Data For COPCs - Inhalation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	CAS Number	Chronic/ Subchronic	Chronic Inhalation Reference Concentration mg/m3	Study Animal	Study Method	Primary Target Organ/System	Critical Endpoint	Combined Uncertainty/ Modifying Factors	Confidence Level	RfD: Target Organ(s)		RfC Tier (a)
										Source	Date	
Dioxin and Dioxin-Like PCBs												
2,3,7,8-TCDD-TEQ	DFTEQ-HH	Chronic	4.00E-08	Rat	Oral: Diet	Liver, reproductive, developmental, endocrine, respiratory, blood	Increased mortality, decreased weight gain, various tissue changes	100	NA	CalEPA	8/2018	Tier 3
PCB-TEQ	PCB-TEQ	Chronic	4.00E-08									
Metals												
Aluminum	7429-90-5	Chronic	5.00E-03	Human	Inhalation	Neurological	Neurological effects	300	Low to Medium	PPRTV aluminum and its compounds	10/2006	Tier 2
Antimony	7440-36-0	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	Chronic	1.50E-05	Human	Inhalation	Neurological, developmental	Decreased intellectual function in children	30	NA	CalEPA inorganic form	9/2016	Tier 3
Cobalt	7440-48-4	Chronic	6.00E-06	Human	Inhalation	Respiratory	Respiratory tract and lung effects	300	Medium to Low	PPRTV	8/2008	Tier 2
Cyanide	57-12-5	Chronic	8.00E-04	Human	Inhalation	Endocrine	Thyroid enlargement	3000	Low to Medium	IRIS hydrogen cyanide	8/2018	Tier 1
Manganese	7439-96-5	Chronic	5.00E-05	Human	Inhalation	Neurological	Neurobehavioral effects	1000	Medium	IRIS	8/2018	Tier 1
Mercury	7439-97-6	Chronic	3.00E-04	Human	Inhalation	Neurological	Neurological effects	30	Medium	IRIS elemental mercury	8/2018	Tier 1
Methyl Mercury	22967-92-6	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	7440-02-0	Chronic	9.00E-05	Rat	Inhalation	Respiratory	Respiratory tract effects	30	NA	ATSDR nickel sulfate hexahydrate	5/2005	Tier 3
Thallium	7440-28-0	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	Chronic	1.00E-04	Rat	Inhalation	Respiratory	Respiratory tract effects	30	NA	ATSDR vanadium pentoxide	7/2012	Tier 3
Pesticides												
4,4'-DDD	72-54-8	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	72-55-9	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	50-29-3	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	309-00-2	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	5103-71-9	Chronic	7.00E-04 (b)	Rat	Inhalation	Liver	Hepatic effects	1000	Low	IRIS (b)	8/2018	Surrogate
beta-BHC	319-85-7	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-Nonachlor	5103-73-1	Chronic	7.00E-04 (b)	Rat	Inhalation	Liver	Hepatic effects	1000	Low	IRIS (b)	8/2018	Surrogate
Dieldrin	60-57-1	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	5566-34-7	Chronic	7.00E-04 (b)	Rat	Inhalation	Liver	Hepatic effects	1000	Low	IRIS (b)	8/2018	Surrogate
Heptachlor epoxide	1024-57-3	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	118-74-1	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mirex	2385-85-5	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxychlordane	27304-13-8	Chronic	7.00E-04 (b)	Rat	Inhalation	Liver	Hepatic effects	1000	Low	IRIS (b)	8/2018	Surrogate
trans-Nonachlor	39765-80-5	Chronic	7.00E-04 (b)	Rat	Inhalation	Liver	Hepatic effects	1000	Low	IRIS (b)	8/2018	Surrogate
PCBs												
Total PCBs	1336-36-3	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs												
Benzo(a)anthracene	56-55-3	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	Chronic	2.00E-06	Rat	Inhalation	Developmental	Decreased embryo/fetal survival	3000	Low to Medium	IRIS	8/2018	Tier 1
Benzo(b)fluoranthene	205-99-2	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	218-01-9	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	53-70-3	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	193-39-5	Chronic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	91-20-3	Chronic	3.00E-03	Mouse	Inhalation	Neurological and Respiratory	Nasal effects	3000	Medium	IRIS	8/2018	Tier 1

Table 4-2
Non-Cancer Toxicity Data For COPCs - Inhalation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	CAS Number	Chronic/ Subchronic	Chronic Inhalation Reference Concentration mg/m3		Study Animal	Study Method	Primary Target Organ/System	Critical Endpoint	Combined Uncertainty/ Modifying Factors	Confidence Level	RfD: Target Organ(s) Source	Date	RfC Tier (a)
TPH													
Diesel Range Organics (C10-C20)	C10C20	Chronic	1.00E-01	(d)	Rat	Inhalation	Respiratory	Nasal effects	100	Medium	PPRTV	9/2009	Tier 3
VOCs													
Bromodichloromethane	75-27-4	Chronic	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl alcohol, tert-	75-65-0	Chronic	2.00E-01	(c)	Mouse	Inhalation	Reproductive	Decreased testes weights	1000	Medium	PPRTV	9/2014	Surrogate
Chloroform	67-66-3	Chronic	9.80E-02		Human	Inhalation: Epidemiological	Liver	Hepatic effects	100	NA	ATSDR	9/1997	Tier 3
Methyl tert-Butyl Ether (MTBE)	1634-04-4	Chronic	3.00E+00		Rat	Inhalation	Liver, Kidney, Ocular	Increased liver/kidney weight, swollen periocular tissue	100	Medium	IRIS	8/2018	Tier 1
Tetrachloroethylene	127-18-4	Chronic	4.00E-02		Human	Inhalation	Neurological, Ocular	Vision and memory effects	1000	Medium	IRIS	8/2018	Tier 1
Trichloroethene	79-01-6	Chronic	2.00E-03		Mouse Rat	Oral: drinking water	Thyroid Vascular	Decreased thymus weight Increased fetal heart malformations	100 10	High	IRIS	8/2018	Tier 1
Vinyl Chloride	75-01-4	Chronic	1.00E-01		Rat	Inhalation	Liver	Liver cell polymorphism	30	Medium	IRIS	8/2018	Tier 1

Notes:

ATSDR - Agency for Toxic Substances and Disease Registry.
CalEPA - California Environmental Protection Agency. Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database. http://oehha.ca.gov/chemicals.
CAS - Chemical Abstracts Service.
IRIS - Integrated Risk Information System, an online computer database of toxicological information (USEPA, 2018).
NA - Not available/Not Applicable.
PCB - Polychlorinated Biphenyls.
PPRTV - Provisional Peer Reviewed Toxicity Value.
RfC - Reference concentration.
RfD - Reference Dose.
SVOCs - Semi-volatile organic compounds.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TPH - Total Petroleum Hydrocarbons.
TEQ - Toxicity Equivalence.
USEPA - United States Environmental Protection Agency.
VOCs - Volatile organic compounds.

(a) USEPA, 2003. Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53. December 5, 2003. IRIS values are considered Tier 1, PPRTVs are considered Tier 2, and other values, including ATSDR, CalEPA, HEAST, and other non-USEPA values are considered Tier 3 values. Selection of Tier 3 values followed the hierarchy put forth in USEPA's Tier 3 Toxicity Value White Paper, OSWER 9285.7-86, May 16, 2013.
(b) Value for technical chlordane is used as a surrogate.
(c) - Value for isopropanol.
(d) No PPRTVs were developed in the PPRTV document. PPRTV document indicates that it is inappropriate to derive provisional chronic or subchronic RfDs but that information is available which, although insufficient to support derivation of a provisional toxicity value, under current guidelines, may be of limited use to risk assessors as a screening value. The use of screening provisional values is highly uncertain but they used in the USEPA Regional Screening Tables (November 2017).

Table 4-3
Cancer Toxicity Data For COPCs - Oral/Dermal
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern (e)	CAS Number	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Oral Absorption Efficiency for Dermal (a)	Absorbed Dermal Cancer Slope Factor (b) $(mg/kg\text{-}day)^{-1}$	Study Animal	Study Method	Weight of Evidence/ Cancer Guideline Description (c)	Classification System	Oral CSF/WOE		CSF Tier (g)
									Source(s)	Date	
Dioxin and Dioxin-Like PCBs											
2,3,7,8-TCDD-TEQ	DFTEQ-HH	1.30E+05 (d)	--	1.30E+05 (d)	Mouse	Oral: Gavage	(j)	(j)	CalEPA	8/2018	Tier 3
PCB-TEQ	PCB-TEQ	1.30E+05 (d)	--	1.30E+05 (d)							
Metals											
Aluminum	7429-90-5	NA	--	NA	NA	NA	Inadequate Information	2005	PPRTV	2/2007	NA
Antimony	7440-36-0	NA	0.15	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	1.50E+00	--	1.50E+00	Human	Oral: Drinking Water	A	1986	IRIS inorganic form	8/2018	Tier 1
Arsenic, organic	75-60-5	NA	0.15	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	7440-48-4	NA	--	NA	NA	NA	Likely Carcinogenic (inhalation)	2005	PPRTV	8/2008	NA
Cyanide	57-12-5	NA	--	NA	NA	NA	D	1986	IRIS	8/2018	Tier 1
Manganese	7439-96-5	NA	0.04	NA	NA	NA	D	1986	IRIS	8/2018	NA
Mercury	7439-97-6	NA	0.07	NA	NA	NA	D	1986	IRIS	8/2018	NA
Methyl Mercury	22967-92-6	NA	NA	NA	NA	NA	C	1986	IRIS	8/2018	NA
Nickel	7440-02-0	NA	0.04	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	7440-28-0	NA	--	NA	NA	NA	Inadequate Information	2005	IRIS	8/2018	NA
Vanadium	7440-62-2	NA	0.026	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides											
4,4'-DDD	72-54-8	2.40E-01	--	2.40E-01	Mouse	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
4,4'-DDE	72-55-9	3.40E-01	--	3.40E-01	Mouse	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
4,4'-DDT	50-29-3	3.40E-01	--	3.40E-01	Mouse	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
Aldrin	309-00-2	1.70E+01	--	1.70E+01	Mouse	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
alpha-Chlordane	5103-71-9	3.50E-01 (f)	--	3.50E-01	Mouse	Oral: diet	B2	1986	IRIS (f)	8/2018	Surrogate
beta-BHC	319-85-7	1.80E+00	--	1.80E+00	Mouse	Oral: diet	C	1986	IRIS	8/2018	Tier 1
cis-Nonachlor	5103-73-1	3.50E-01 (f)	--	3.50E-01 (f)	Mouse	Oral: diet	B2	1986	IRIS (f)	8/2018	Surrogate
Dieldrin	60-57-1	1.60E+01	--	1.60E+01	Mouse	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
gamma-Chlordane	5566-34-7	3.50E-01	--	3.50E-01	Mouse	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
Heptachlor epoxide	1024-57-3	9.10E+00	--	9.10E+00	Mouse	Oral: diet	Likely Carcinogenic	2005	IRIS	8/2018	Tier 1
Hexachlorobenzene	118-74-1	1.60E+00	--	1.60E+00	Rat	Oral: diet	B2	1986	IRIS	8/2018	Tier 1
Mirex	2385-85-5	1.80E+01	--	1.80E+01	Rat	Oral: Diet	Carcinogen	SQE	CalEPA	4/1992	Tier 3
Oxychlordane	27304-13-8	3.50E-01 (f)	--	3.50E-01 (f)	Mouse	Oral: diet	B2	1986	IRIS (f)	8/2018	Surrogate
trans-Nonachlor	39765-80-5	3.50E-01 (f)	--	3.50E-01 (f)	Mouse	Oral: diet	B2	1986	IRIS (f)	8/2018	Surrogate
PCBs											
PCBs, total (high risk & persistence/upper bound)	1336-36-3	2.00E+00	--	2.00E+00	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (high risk & persistence/central estimate)	1336-36-3	1.00E+00	--	1.00E+00	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (low risk & persistence/upper bound)	1336-36-3	4.00E-01	--	4.00E-01	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (low risk & persistence/central estimate)	1336-36-3	3.00E-01	--	3.00E-01	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (lowest risk & persistence/upper bound)	1336-36-3	7.00E-02	--	7.00E-02	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (lowest risk & persistence/central estimate)	1336-36-3	4.00E-02	--	4.00E-02	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
SVOCs											
Benzo(a)anthracene	56-55-3	1.00E-01 (i,h)	--	1.00E-01 (i,h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Benzo(a)pyrene	50-32-8	1.00E+00 (h)	--	1.00E+00 (h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Benzo(b)fluoranthene	205-99-2	1.00E-01 (i,h)	--	1.00E-01 (i,h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Benzo(k)fluoranthene	207-08-9	1.00E-02 (i,h)	--	1.00E-02 (i,h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Chrysene	218-01-9	1.00E-03 (i,h)	--	1.00E-03 (i,h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Dibenzo(a,h)anthracene	53-70-3	1.00E+00 (i,h)	--	1.00E+00 (i,h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Indeno(1,2,3-cd)pyrene	193-39-5	1.00E-01 (i,h)	--	1.00E-01 (i,h)	Mouse	Oral: diet	Carcinogenic	2005	IRIS	8/2018	Tier 1
Naphthalene	91-20-3	NA	--	NA	NA	NA	NA	NA	NA	NA	NA
TPH											
Diesel Range Organics (C10-C20)	C10C20	NA	--	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-3
Cancer Toxicity Data For COPCs - Oral/Dermal
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern (e)	CAS Number	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Oral Absorption Efficiency for Dermal (a)	Absorbed Dermal Cancer Slope Factor (b) $(mg/kg\text{-}day)^{-1}$	Study Animal	Study Method	Weight of Evidence/ Cancer Guideline Description (c)	Classification System	Oral CSF/WOE Source(s)	Oral CSF/WOE Date	CSF Tier (g)

Notes:

"--" - No adjustment necessary.
$ABS_{(GI)}$ - Fraction of contaminant absorbed in gastrointestinal tract (dimensionless).
ATSDR - Agency for Toxic Substances and Disease Registry.
CalEPA - California Environmental Protection Agency. Toxicity Criteria Database. https://oehha.ca.gov/chemicals
CAS - Chemical Abstracts Service.
COPC - Chemical of Potential Concern.
CSF - Cancer Slope Factor.
IRIS - Integrated Risk Information System, an online computer database of toxicological information (USEPA, 2017).
mg/kg-day - Milligrams per Kilogram per day.
NA - Not available.
NJDEP - New Jersey Department of Environmental Protection.
NTP - National Toxicology Program.
PCB - Polychlorinated Biphenyls.
PPRTV - Provisional Peer Reviewed Toxicity Value.
SQE - State's Qualified Experts.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbons.
USEPA - United States Environmental Protection Agency.
WOE - Weight-of-Evidence.

(a) USEPA, 2004. Risk Assessment Guidance for Superfund. Volume 1, Part E, Supplemental Guidance for Dermal Risk Assessment. Exhibit 4-1. Where USEPA, 2004 does not recommend adjustments, no value is listed.
(b) Oral CSF divided by ABSGI. Where the gastrointestinal absorption is greater than or equal to 50%, Dermal CSF = Oral CSF.
(c) Some chemicals are classified under the 1986 system, while others have been classified under the 2005 system:

1986 Classifications
- Group A: Carcinogenic to Humans.
- Group B: Probably Carcinogenic to Humans:
  - B1: Based on limited human evidence.
  - B2: Based on animal evidence.
- Group C: Possibly Carcinogenic to Humans
- Group D: Not Classifiable as to Human Carcinogenicity.
- Group E: Evidence of Non-carcinogenicity for Humans

2005 Classifications
- Carcinogenic: Carcinogenic to Humans
- Likely Carcinogenic: Likely to be Carcinogenic to Humans
- Suggestive Evidence: Suggestive Evidence of Carcinogenic Potential
- Inadequate: Information Inadequate Information to Assess Carcinogenic Potential
- Not Likely Carcinogenic: Not Likely to be Carcinogenic to Humans

(d) Consistent with the hierarchy used in USEPA's development of Regional Screening Levels (November 2015), the CalEPA cancer slope factor for 2,3,7,8-TCDD is used to evaluate TCDD-TEQ and PCB-TEQ.
(e) - Volatile organic compounds are not chemicals of potential concern for oral or dermal pathways, and are therefore not presented here.
(f) Letter from Superfund Technical Support Center to Marian Olsen, USEPA Region 2, dated April 9, 2015. Approval of Surrogates for Multiple Chemicals. Cis- and trans-nonachlor and oxychlordane.
Value for chlordane is used as a surrogate based on structural similarity, and without the use of relative potency factors, per letters from Superfund Technical Support Center to Marian Olsen, USEPA Region 2, dated August 5, 2015 and November 24, 2015.
(g) USEPA, 2003. Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53. December 5, 2003. IRIS values are considered Tier 1, PPRTVs are considered Tier 2, and other values, including ATSDR, CalEPA, PPRTV Appendix Screening Toxicity Values, HEAST and other non-USEPA values are considered Tier 3 values. Selection of Tier 3 values followed the hierarchy put forth in USEPA's Tier 3 Toxicity Value White Paper, OSWER 9285.7-86, May 16, 2013.
(h) Assumed to act via a mutagenic mode of carcinogenic action; therefore, age-dependent adjustment factors are applied to the risk estimates.
(i) Calculated using Relative Potency Factors (RPFs) as per USEPA Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993).
(j) The cancer assessment for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is currently underway (USEPA IRIS, 2018).

Table 4-4
Cancer Toxicity Data For COPCs - Inhalation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	CAS Number	Inhalation Unit Risk Factor $(ug/m^3)^{-1}$		Study Animal	Study Method	Weight of Evidence/ Cancer Guideline Description (a)	Classification System	URF /WOE Source(s)	URF /WOE Date	URF Tier (b)
Dioxin and Dioxin-Like PCBs										
2,3,7,8-TCDD-TEQ	DFTEQ-HH	3.80E+01	(c)	Mouse	Oral: Diet	(h)	(h)	CalEPA	8/2018	Tier 3
PCB-TEQ	PCB-TEQ	3.80E+01	(c)							
Metals										
Aluminum	7429-90-5	NA		NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA		NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	4.30E-03		Human	Inhalation	A	1986	IRIS inorganic form	8/2018	Tier 1
Cobalt	7440-48-4	9.00E-03		Rat/Mouse	Inhalation	B2	1986	PPRTV	8/2008	Tier 2
Cyanide	57-12-5	NA		NA	NA	D	1986	IRIS	8/2018	NA
Manganese	7439-96-5	NA		NA	NA	D	1986	IRIS	8/2018	NA
Mercury	7439-97-6	NA		NA	NA	C	1986	IRIS	8/2018	NA
Methyl Mercury	22967-92-6	NA		NA	NA	C	1986	IRIS	8/2018	NA
Nickel	7440-02-0	2.60E-04		Human	Epidemiological (Refinery workers)	NA	NA	CalEPA nickel and compounds	NA	Tier 3
Thallium	7440-28-0	NA		NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA		NA	NA	NA	NA	NA	NA	NA
Pesticides										
4,4'-DDD	72-54-8	6.90E-05		Mouse	Oral: Diet	B2	1986	CalEPA	8/1998	Tier 3
4,4'-DDE	72-55-9	9.70E-05		Mouse	Oral: Diet	B2	1986	CalEPA	8/1998	Tier 3
4,4'-DDT	50-29-3	9.70E-05		Mouse	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
Aldrin	309-00-2	4.90E-03		Mouse	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
alpha-Chlordane	5103-71-9	1.00E-04		Mouse	Oral: Diet	B2	1986	IRIS (d)	8/2018	Surrogate
beta-BHC	319-85-7	5.30E-04		Mouse	Oral: Diet	C	1986	IRIS	8/2018	Tier 1
cis-Nonachlor	5103-73-1	1.00E-04		Mouse	Oral: Diet	B2	1986	IRIS (d)	8/2018	Surrogate
Dieldrin	60-57-1	4.60E-03		Mouse	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
gamma-Chlordane	5566-34-7	1.00E-04		Mouse	Oral: Diet	B2	1986	IRIS (d)	8/2018	Surrogate
Heptachlor epoxide	1024-57-3	2.60E-03		Mouse	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
Hexachlorobenzene	118-74-1	4.60E-04		Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
Mirex	2385-85-5	5.10E-03		Rat	Oral: Diet	Carcinogen	SQE	CalEPA	4/1992	Tier 3
Oxychlordane	27304-13-8	1.00E-04		Mouse	Oral: Diet	B2	1986	IRIS (d)	8/2018	Surrogate
trans-Nonachlor	39765-80-5	1.00E-04		Mouse	Oral: Diet	B2	1986	IRIS (d)	8/2018	Surrogate
PCBs										
PCBs, total (high risk & persistence/upper bound)	1336-36-3	5.71E-04	(e)	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (high risk & persistence/central estimate)	1336-36-3	2.86E-04	(e)	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (low risk & persistence/upper bound)	1336-36-3	1.14E-04	(e)	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (low risk & persistence/central estimate)	1336-36-3	8.57E-05	(e)	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (lowest risk & persistence/upper bound)	1336-36-3	2.00E-05	(e)	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
PCBs, total (lowest risk & persistence/central estimate)	1336-36-3	1.14E-05	(e)	Rat	Oral: Diet	B2	1986	IRIS	8/2018	Tier 1
SVOCs										
Benzo(a)anthracene	56-55-3	6.00E-05	(g,f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Benzo(a)pyrene	50-32-8	6.00E-04	(f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Benzo(b)fluoranthene	205-99-2	6.00E-05	(g,f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Benzo(k)fluoranthene	207-08-9	6.00E-06	(g,f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Chrysene	218-01-9	6.00E-07	(g,f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Dibenzo(a,h)anthracene	53-70-3	6.00E-04	(g,f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Indeno(1,2,3-cd)pyrene	193-39-5	6.00E-05	(g,f)	Hamster	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Naphthalene	91-20-3	3.40E-05		Rat	Inhalation	Carcinogenic	NTP, 2000	CalEPA	2004	Tier 3
TPH										
Diesel Range Organics (C10-C20)	C10C20	NA		NA	NA	NA	NA	NA	NA	NA

Table 4-4
Cancer Toxicity Data For COPCs - Inhalation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	CAS Number	Inhalation Unit Risk Factor $(ug/m^3)^{-1}$		Study Animal	Study Method	Weight of Evidence/ Cancer Guideline Description (a)	Classification System	URF /WOE Source(s)	URF /WOE Date	URF Tier (b)
VOCs										
Bromodichloromethane	75-27-4	3.70E-05		Rat	Oral: Gavage	B2	1986	CalEPA	8/2018	Tier 3
Butyl alcohol, tert-	75-65-0	NA		NA	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	2.30E-05		Mouse	Oral: Gavage	B2	1986	IRIS	8/2018	Tier1
Methyl tert-Butyl Ether (MTBE)	1634-04-4	2.60E-07		Rat	Oral: Gavage	Carcinogenic	OEHHA, 1999	CalEPA	8/2018	Tier 3
Tetrachloroethylene	127-18-4	2.60E-07		Mouse	Inhalation	Likely to be Carcinogenic	2005	IRIS	8/2018	Tier 1
Trichloroethene	79-01-6	4.10E-06	(f)	Human	Inhalation	Carcinogenic	2005	IRIS	8/2018	Tier 1
Vinyl Chloride	75-01-4	4.40E-06	(i)	Rat	Inhalation	A	1986	IRIS	8/2018	Tier 1

ug/m^3 - micrograms per cubic meter.
CalEPA - California Environmental Protection Agency Office of Environmental Health Hazard Assessment (OEHHA).
NTP - National Toxicology Program.
PPRTV - Provisional Peer Reviewed Toxicity Values.
SQE - State's Qualified Experts.
SVOCs - Semi-volatile organic compounds.
USEPA - United States Environmental Protection Agency.

(a) Some chemicals are classified under the 1986 system, while others have been classified under the 2005 system:

1986 Classifications
- Group A: Carcinogenic to Humans.
- Group B: Probably Carcinogenic to Humans:
  - B1: Based on limited human evidence.
  - B2: Based on animal evidence.
- Group C: Possibly Carcinogenic to Humans
- Group D: Not Classifiable as to Human Carcinogenicity.
- Group E: Evidence of Non-carcinogenicity for Humans

2005 Classifications
- Carcinogenic: Carcinogenic to Humans
- Likely Carcinogenic: Likely to be Carcinogenic to Humans
- Suggestive Evidence: Suggestive Evidence of Carcinogenic Potential
- Inadequate: Information Inadequate Information to Assess Carcinogenic Potential
- Not Likely Carcinogenic: Not Likely to be Carcinogenic to Humans

(b) USEPA, 2003. Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53. December 5, 2003. IRIS values are considered Tier 1, PPRTVs are considered Tier 2, and other values, including ATSDR, CalEPA, PPRTV Appendix Screening Toxicity Values, HEAST and other non-USEPA values are considered Tier 3 values. Selection of Tier 3 values followed the hierarchy put forth in USEPA's Tier 3 Toxicity Value White Paper, OSWER 9285.7-86, May 16, 2013.
(c) Consistent with the hierarchy used in USEPA's development of Regional Screening Levels (November 2015), the CalEPA cancer slope factor for 2,3,7,8-TCDD is used to evaluate TCDD-TEQ and PCB-TEQ.
(d) Value for chlordane is used as a surrogate based on structural similarity, and without the use of relative potency factors, per letters from Superfund Technical Support Center to Marian Olsen, USEPA Region 2, dated August 5, 2015 and November 24, 2015.
(e) Consistent with the IRIS file for PCBs, for inhalation of dust containing PCBs, the high risk and persistence slope factors are used. The Reasonable Maximum Exposure (RME) unit risk factor presented represents the upper-bound slope factor. The Central Tendency Exposure (CTE) unit risk factor is based on the central-estimate slope factor. The unit risk factors were converted from the slope factors as follows: URF = [CSF (mg/kg-day)-1 x (20 m3/day/70 kg) x 1 mg/1000 ug]
(f) Assumed to act via a mutagenic mode of carcinogenic action. However, no childhood exposue pathways were identified.
(g) Calculated using Relative Potency Factors (RPFs) as per USEPA Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons (USEPA, 1993).
(h) The cancer assessment for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is currently underway (USEPA IRIS, 2018).
(i) Value for continuous exposure during adulthood used; COPC only for the construction worker trench air inhalation pathway.

Table 5-1
Selection of Exposure Pathways
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Biota Tissue	Fish Tissue	Fish from Waterside Investigation Area	Recreational Angler	Young Child (1 to <7 year)	Ingestion	Quantitative	Despite the presence of an advisory warning against the consumption of certain species of fish from the Anacostia and Potomac Rivers, it is assumed that a recreational angler visits the Anacostia River to fish and consumes his/her catch. Assumes receptor will consume fish caught from Anacostia River and share it with family members.
					Older Child/Teen (7 to <19 years)	Ingestion	Quantitative	
					Adult	Ingestion	Quantitative	
		Fish Tissue	Fish from Waterside Investigation Area	High-end Consuming Angler	Young Child (1 to <7 year)	Ingestion	Quantitative	Some anglers may fish on a frequent basis to supplement their diet. While the available survey data indicate there is no evidence of year-round subsistence fishing, a high-end consuming angler who supplements a significant fraction of his/her diet and that of a family with Anacostia River fish is evaluated in the uncertainty analysis.
					Older Child/Teen (7 to <19 years)	Ingestion	Quantitative	
					Adult	Ingestion	Quantitative	
		Shellfish Tissue	Shellfish from Waterside Investigation Area	Angler	Young Child (1 to <7 year)	Ingestion	Qualitative	Anglers and their families may consume shellfish from the Anacostia River; due to limited data on shellfish consumption practices and shellfish tissue chemistry, this pathway is evaluated qualitatively.
					Older Child/Teen (7 to <19 years)	Ingestion	Qualitative	
					Adult	Ingestion	Qualitative	
	Sediment	Fringe Surface Sediment	Waterside Investigation Area	Recreational Angler	Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	Anglers may contact fringe surface sediment while fishing from the river bank. Assumes that young children under 6 years of age would not typically accompany adult anglers due to safety concerns.
						Dermal Contact	Quantitative	
					Adult	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
				Swimmer	Young Child (1 to <7 year)	Incidental Ingestion	Quantitative	Swimmers may contact fringe surface sediment while entering and leaving the river and while swimming.
						Dermal Contact	Quantitative	
					Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
					Adult	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
				Wader	Young Child (1 to <7 year)	Incidental Ingestion	Quantitative	Families visiting the river may contact fringe surface sediment while wading or playing along the shoreline.
						Dermal Contact	Quantitative	
					Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
					Adult	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
				Worker	Adult	Incidental Ingestion	Quantitative	Workers may be tasked with collecting trash or performing other shoreline maintenance activities with the potential for contact with fringe surface sediment.
						Dermal Contact	Quantitative	

Table 5-1
Selection of Exposure Pathways
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future (continued)	Surface Water	Surface Water	Waterside Investigation Area	Recreational Angler	Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	Angler may contact surface water while fishing from the river bank. Assumes that young children under 6 years of age would not typically accompany adult anglers due to safety concerns.
						Dermal Contact	Quantitative	
					Adult	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
				Swimmer	Young Child (1 to <7 year)	Incidental Ingestion	Quantitative	Swimmers may contact surface water while swimming.
						Dermal Contact	Quantitative	
					Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
					Adult	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
				Wader	Young Child (1 to <7 year)	Incidental Ingestion	Quantitative	Families visiting the river may contact surface water while wading or playing along the shoreline.
						Dermal Contact	Quantitative	
					Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
					Adult	Incidental Ingestion	Quantitative	
						Dermal Contact	Quantitative	
				Worker	Adult	Incidental Ingestion	Quantitative	Workers may be tasked with collecting trash or performing other shoreline maintenance activities with the potential for contact with surface water.
						Dermal Contact	Quantitative	
	Soil	Surface and Subsurface soil combined	Landside Investigation Area	Current/Future Construction Worker	Adult	Incidental Ingestion	Quantitative	Workers may contact surface and subsurface soil during utility or other construction work requiring excavation into the subsurface.
						Dermal Contact	Quantitative	
						Inhalation	Quantitative	
	Groundwater	Trench Air				Inhalation	Quantitative	Vapors may migrate from the subsurface into the air of an excavation trench.
Future	Soil	Surface Soil	Landside Investigation Area	Future Recreational Visitor	Older Child/Teen (7 to <19 years)	Incidental Ingestion	Quantitative	Site is fenced and access is closely controlled. No current potential exposure to recreational users. In the future, if Site use or security changes, it is possible that recreational receptors could contact on-site surface soil. Limited to the western portion of the Site next to Anacostia Avenue and the off-Site parcel of land owned by the National Park Service that is located between the Site and the river
						Dermal Contact	Quantitative	
						Inhalation	Quantitative	
				Future Industrial Worker	Adult	Incidental Ingestion	Quantitative	Pavement/clean soil cover limits current contact. If current Site configuration with respect to soil cover changes, an industrial worker may contact surface soil.
						Dermal Contact	Quantitative	
						Inhalation	Quantitative	

Table 5-2
Values Used for Daily Intake Calculations - Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium/Point:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) Equation
							Value	Rationale/ Reference	Value	Rationale/ Reference	
Incidental Ingestion	Future Recreational Visitor	Older Child/Teen (7 to <19 years)	Surface Soil	CS	Concentration in soil	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
				SIR	Ingestion Rate of soil	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
				FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
				ABS	Absorption Factor	dimensionless	--	--	--	--	
				EF	Exposure Frequency	days/year	39	one day/week for May, September, and October and 2 days/week for June through August	19	one day/ every other week for May, September, and October and 1 days/week for June through August	
				ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
				CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
				BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
				AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
				AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
				IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.73E-08	IF-C x CS x ABS = CDI-C	2.10E-09	IF-C x CS x ABS = CDI-C	
				IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.01E-07	IF-NC x CS x ABS = CDI-NC	2.46E-08	IF-NC x CS x ABS = CDI-NC	
	Future Outdoor Industrial Worker	Adult	Surface Soil	CS	Concentration in soil	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
				SIR	Ingestion Rate of soil	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
				FI	Fraction Ingested	dimensionless	1	Assumes 100%	1	Assumes 100%	
				ABS	Absorption Factor	dimensionless	--	--	--	--	
				EF	Exposure Frequency	days/year	225	USEPA, 2014	219	USEPA, 2004, Exhibit 3-5	
				ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	
				CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
				BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
				AT-N	Averaging Time (Noncancer)	days	9125	ED (years) x 365 days/year (USEPA, 2014)	2409	ED (years) x 365 days/year (USEPA, 2014)	
				IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	2.75E-07	IF-C x CS x ABS = CDI-C	3.54E-08	IF-C x CS x ABS = CDI-C	
				IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	7.71E-07	IF-NC x CS x ABS = CDI-NC	3.75E-07	IF-NC x CS x ABS = CDI-NC	
	Current/Future Construction Worker	Adult	Soil	CS	Concentration in soil	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
				SIR	Ingestion Rate of soil	mg/day	330	USEPA, 2002	330	USEPA, 2002	
				FI	Fraction Ingested	dimensionless	1	Assumes 100%	1	Assumes 100%	
				ABS	Absorption Factor	dimensionless	--	--	--	--	
				EF	Exposure Frequency	days/year	40	5 days/week for 2 months	20	5 days/week for 1 month	
				ED	Exposure Duration	years	1	Assumed to occur over 1 year	1	Assumed to occur over 1 year	
				CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
				BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
				AT-N	Averaging Time (Noncancer)	days	365	ED (years) x 365 days/year (USEPA, 2014)	365	ED (years) x 365 days/year (USEPA, 2014)	
				IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	6.46E-09	IF-C x CS x ABS = CDI-C	3.23E-09	IF-C x CS x ABS = CDI-C	
				IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	4.52E-07	IF-NC x CS x ABS = CDI-NC	2.26E-07	IF-NC x CS x ABS = CDI-NC	

Table 5-2
Values Used for Daily Intake Calculations - Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium/Point:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Dermal Contact	Future Recreational Visitor	Older Child/Teen (7 to <19 years)	Surface Soil	CS	Concentration in soil	mg/kg	--	--	--	--	CDI (mg/kg-day) = $\frac{CS \times FC \times SA \times AF \times DAF \times EF \times ED \times CF}{BW \times AT}$
				SA	Skin Surface Area Available for Contact	cm^2/day	3949.525	Head, hands, forearms, and lower legs. See Table 5-8 for calculation	3949.525	Head, hands, forearms, and lower legs. See Table 5-8 for calculation	
				FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
				AF	Adherence Factor	mg/cm^2	0.01	See Table 5-8 for calculation.	0.01	See Table 5-8 for calculation.	
				DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
				EF	Exposure Frequency	days/year	39	one day/week for May, September, and October and 2 days/week for June through August	19	one day/ every other week for May, September, and October and 1 days/week for June through August	
				ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
				CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
				BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
				AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
				AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
				IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.36E-08	IF-C x CS x ABS = CDI-C	3.32E-09	IF-C x CS x ABS = CDI-C	
				IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	7.96E-08	IF-NC x CS x ABS = CDI-NC	3.88E-08	IF-NC x CS x ABS = CDI-NC	
	Future Outdoor Industrial Worker	Adult	Surface Soil	CS	Concentration in soil	mg/kg	--	--	--	--	CDI (mg/kg-day) = $\frac{CS \times FC \times SA \times AF \times DAF \times EF \times ED \times CF}{BW \times AT}$
				SA	Skin Surface Area Available for Contact	cm^2/day	3527	USEPA, 2014 Head, hands, forearms.	3527	USEPA, 2014 Head, hands, forearms.	
				FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
				AF	Adherence Factor	mg/cm^2	0.12	USEPA, 2014	0.12	USEPA, 2014	
				DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
				EF	Exposure Frequency	days/year	225	USEPA, 2014	219	USEPA, 2004, Exhibit 3-5	
				ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	
				CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
				BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
				AT-N	Averaging Time (Noncancer)	days	9125	ED (years) x 365 days/year (USEPA, 2014)	2409	ED (years) x 365 days/year (USEPA, 2014)	
				IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.16E-06	IF-C x CS x ABS = CDI-C	2.99E-07	IF-C x CS x ABS = CDI-C	
				IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	3.26E-06	IF-NC x CS x ABS = CDI-NC	3.17E-06	IF-NC x CS x ABS = CDI-NC	
	Current/Future Construction Worker	Adult	Soil	CS	Concentration in soil	mg/kg	--	--	--	--	CDI (mg/kg-day) = $\frac{CS \times FC \times SA \times AF \times DAF \times EF \times ED \times CF}{BW \times AT}$
				SA	Skin Surface Area Available for Contact	cm^2/day	3527	USEPA, 2014 Head, hands, forearms.	3527	USEPA, 2014 Head, hands, forearms.	
				FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
				AF	Adherence Factor	mg/cm^2	0.3	USEPA, 2002	0.3	USEPA, 2002	
				DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
				EF	Exposure Frequency	days/year	40	5 days/week for 2 months	20	5 days/week for 1 month	
				ED	Exposure Duration	years	1	Assumed to occur over 1 year	1	Assumed to occur over 1 year	
				CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
				BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
				AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
				AT-N	Averaging Time (Noncancer)	days	365	ED (years) x 365 days/year (USEPA, 2014)	365	ED (years) x 365 days/year (USEPA, 2014)	
				IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	2.07E-08	IF-C x CS x ABS = CDI-C	1.04E-08	IF-C x CS x ABS = CDI-C	
				IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.45E-06	IF-NC x CS x ABS = CDI-NC	7.25E-07	IF-NC x CS x ABS = CDI-NC	

Table 5-2
Values Used for Daily Intake Calculations - Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium/Point:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Inhalation	Future Recreational Visitor	Older Child/Teen (7 to <19 years)	Outdoor Air	CS	Chemical Concentration in Soil	mg/kg	--	--			
				CA	Chemical Concentration in Air	mg/m^3	--	--			Exposure Concentration (EC) (mg/m^3) =
				ET	Exposure Time	hrs/day	2	Assumes visit is short in duration	1	1/2 RME	CA x (ET) x EF x ED x 1/AT
				EF	Exposure Frequency	days/year	39	one day/week for May, September, and October and 2 days/week for June through August	19	one day/ every other week for May, September, and October and 1 days/week for June through August	where:
				ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	CA = CS / (VF or PEF)
				VF	Volatilization Factor	m^3/kg	--	--	--	--	
				PEF	Particulate Emission Factor	m^3/kg	--	--	--	--	
				AT-C	Averaging Time (Cancer)	hrs	613200	70-year lifetime x 365 days/year x 24 hrs/day	613200	70-year lifetime x 365 days/year x 24 hrs/day	
				AT-N	Averaging Time (Noncancer)	hrs	105120	ED (year) x 365 days/year x 24 hrs/day	52560	ED (year) x 365 days/year x 24 hrs/day	
				IF-C	Intake factor, cancer	--	1.53E-03	IF-C x CA = CDI-C	1.86E-04	IF-C x CA = CDI-C	
				IF-NC	Intake factor, noncancer	--	8.90E-03	IF-NC x CA = CDI-NC	2.17E-03	IF-NC x CA = CDI-NC	
	Future Outdoor Industrial Worker	Adult	Outdoor Air	CS	Chemical Concentration in Soil	mg/kg	--	--	--	--	
				CA	Chemical Concentration in Air	mg/m^3	--	--	--	--	Exposure Concentration (EC) (mg/m^3) =
				ET	Exposure Time	hrs/day	8	USEPA, 2014	8	USEPA, 2014	CA x (ET) x EF x ED x 1/AT
				EF	Exposure Frequency	days/year	225	USEPA, 2014	219	USEPA, 2004, Exhibit 3-5	where:
				ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	CA = CS / (VF or PEF)
				VF	Volatilization Factor	m^3/kg	--	--	--	--	
				PEF	Particulate Emission Factor	m^3/kg	--	--	--	--	
				AT-C	Averaging Time (Cancer)	hrs	613200	70-year lifetime x 365 days/year x 24 hrs/day	613200	70-year lifetime x 365 days/year x 24 hrs/day	
				AT-N	Averaging Time (Noncancer)	hrs	219000	ED (year) x 365 days/year x 24 hrs/day	57816	ED (year) x 365 days/year x 24 hrs/day	
				IF-C	Intake factor, cancer	--	7.34E-02	IF-C x CA = CDI-C	1.89E-02	IF-C x CA = CDI-C	
				IF-NC	Intake factor, noncancer	--	2.05E-01	IF-NC x CA = CDI-NC	2.00E-01	IF-NC x CA = CDI-NC	
	Current/Future Construction Worker	Adult	Outdoor Air	CS	Chemical Concentration in Soil	mg/kg	--	--	--	--	
				CA	Chemical Concentration in Air	mg/m^3	--	--	--	--	Exposure Concentration (EC) (mg/m^3) =
				ET	Exposure Time	hrs/day	8	USEPA, 2014	8	USEPA, 2014	CA x (ET) x EF x ED x 1/AT
				EF	Exposure Frequency	days/year	40	5 days/week for 2 months	20	5 days/week for 1 month	where:
				ED	Exposure Duration	years	1	Assumed to occur over 1 year	1	Assumed to occur over 1 year	CA = CS / (VF or PEF)
				VF	Volatilization Factor	m^3/kg	--	--	--	--	
				PEF	Particulate Emission Factor	m^3/kg	--	--	--	--	
				AT-C	Averaging Time (Cancer)	hrs	613200	70-year lifetime x 365 days/year x 24 hrs/day	613200	70-year lifetime x 365 days/year x 24 hrs/day	
				AT-N	Averaging Time (Noncancer)	hrs	8760	ED (year) x 365 days/year x 24 hrs/day	8760	ED (year) x 365 days/year x 24 hrs/day	
				IF-C	Intake factor, cancer	--	5.22E-04	IF-C x CA = CDI-C	2.61E-04	IF-C x CA = CDI-C	
				IF-NC	Intake factor, noncancer	--	3.65E-02	IF-NC x CA = CDI-NC	1.83E-02	IF-NC x CA = CDI-NC	

Notes:

RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure
-- Chemical-specific value.
(a) On days when the receptor is assumed to have direct contact with Site soil, one-half of the receptor's total daily ingestion exposure to outdoor soil is assumed to come from the Site and the other half while away from the Site (i.e., at home, work, school).

Sources:

Fryar, C.D., Q. Gu, and C.L. Ogden. 2012. Anthropometric reference data for children and adults: United States, 2007-2010. National Center for Health Statistics. Vital Health Stat 11(252).
USEPA, 2002d. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December.
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USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F. Office of Research and Development, Washington, DC. September.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Assessment and Remediation Division, Office of Superfund Remediation and Technology Innovation, US Environmental Protection Agency, Washington, DC. February 6, 2014, with corrections through September 2015.

Table 5-3
Values Used for Daily Intake Calculations - Groundwater Volatilization to Air Pathway
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium/Point:	Excavation Trench Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) Equation
							Value	Rationale/ Reference	Value	Rationale/ Reference	
Inhalation	Current/Future Construction Worker	Adult	Excavation Trench Air	CS	Volatile Chemical Concentration in Groundwater	mg/kg	--	--	--	--	
				CA	Chemical Concentration in Air	mg/m^3	--	--	--	--	Exposure Concentration (EC) (mg/m^3) =
				ET	Exposure Time	hrs/day	2	Time in trench expected to be limited	2	Time in trench expected to be limited	CA x ET x EF x ED x 1/AT
				EF	Exposure Frequency	days/year	40	5 days/week for 2 months	20	5 days/week for 1 month	where:
				ED	Exposure Duration	years	1	Assumed to occur over 1 year	1	Assumed to occur over 1 year	CA = CS / (VF)
				VF	Volatilization Factor	m^3/kg	--	--	--	--	
				AT-C	Averaging Time (Cancer)	hrs	613,200	70-year lifetime x 365 days/year x 24 hrs/day	613,200	70-year lifetime x 365 days/year x 24 hrs/day	
				AT-N	Averaging Time (Noncancer)	hrs	8,760	ED (year) x 365 days/year x 24 hrs/day	8,760	ED (year) x 365 days/year x 24 hrs/day	
				IF-C	Intake factor, cancer	--	1.30E-04	IF-C x CA = CDI-C	6.52E-05	IF-C x CA = CDI-C	
				IF-NC	Intake factor, noncancer	--	9.13E-03	IF-NC x CA = CDI-NC	4.57E-03	IF-NC x CA = CDI-NC	
Inhalation	Future Indoor Industrial Worker	Adult	Excavation Trench Air	CS	Volatile Chemical Concentration in Groundwater	mg/kg	--	--	Not included in sceening level evaluation.		
				CA	Chemical Concentration in Air	mg/m^3	--	--			Exposure Concentration (EC) (mg/m^3) =
				ET	Exposure Time	hrs/day	8	USEPA, 2014			CA x ET x EF x ED x 1/AT
				EF	Exposure Frequency	days/year	250	USEPA, 2015			
				ED	Exposure Duration	years	25	USEPA, 2016			
				AT-C	Averaging Time (Cancer)	hrs	613,200	70-year lifetime x 365 days/year x 24 hrs/day			
				AT-N	Averaging Time (Noncancer)	hrs	8,760	ED (year) x 365 days/year x 24 hrs/day			
				IF-C	Intake factor, cancer	--	8.15E-02	IF-C x CA = CDI-C			
				IF-NC	Intake factor, noncancer	--	5.71E+00	IF-NC x CA = CDI-NC			

Sources:

USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. Assessment and Remediation Division, Office of Superfund Remediation and Technology Innovation, US Environmental Protection Agency, Washington, DC. February 6, 2014, with corrections through September 2015.

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Incidental Ingestion	Recreational Angler	young child	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Sediment	mg/day	200	USEPA, 2014	100	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year (USEPA, 2014)	730	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	3.59E-08	IF-C x CS x ABS = CDI-C	2.99E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	4.19E-07	IF-NC x CS x ABS = CDI-NC	1.05E-07	IF-NC x CS x ABS = CDI-NC	
		Older Child/Teen (7 to <19 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Fringe Surface Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.15E-08	IF-C x CS x ABS = CDI-C	1.44E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	6.72E-08	IF-NC x CS x ABS = CDI-NC	1.68E-08	IF-NC x CS x ABS = CDI-NC	
		Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year (USEPA, 2014)	3650	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.27E-08	IF-C x CS x ABS = CDI-C	1.59E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	4.45E-08	IF-NC x CS x ABS = CDI-NC	1.11E-08	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Incidental Ingestion continued	Swimmer	Young Child (1 to <7 year)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF BW x AT
			SIR	Ingestion Rate of Fringe Surface Sediment	mg/day	200	USEPA, 2014	100	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year (USEPA, 2014)	730	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.80E-08	IF-C x CS x ABS = CDI-C	1.50E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	2.10E-07	IF-NC x CS x ABS = CDI-NC	5.23E-08	IF-NC x CS x ABS = CDI-NC	
		Older Child/Teen (7 to <19 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF BW x AT
			SIR	Ingestion Rate of Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	3 months (13 weeks)/year, 2 days/week	13	3 months (13 weeks)/year, 1 day/week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.15E-08	IF-C x CS x ABS = CDI-C	1.44E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	6.72E-08	IF-NC x CS x ABS = CDI-NC	1.68E-08	IF-NC x CS x ABS = CDI-NC	
		Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF BW x AT
			SIR	Ingestion Rate of Fringe Surface Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year (USEPA, 2014)	3650	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	6.36E-09	IF-C x CS x ABS = CDI-C	7.94E-10	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	2.23E-08	IF-NC x CS x ABS = CDI-NC	5.56E-09	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Incidental Ingestion continued	Wader	Young Child (1 to <7 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Fringe Surface Sediment	mg/day	200	USEPA, 2014	100	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year (USEPA, 2014)	730	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	4.83E-08	IF-C x CS x ABS = CDI-C	3.98E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	5.64E-07	IF-NC x CS x ABS = CDI-NC	1.39E-07	IF-NC x CS x ABS = CDI-NC	
		Older Child/Teen (7 to <19 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	43	5 months (22 weeks)/year, 2 days/week	22	5 months (22 weeks)/year, 1 day/week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.91E-08	IF-C x CS x ABS = CDI-C	2.44E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.11E-07	IF-NC x CS x ABS = CDI-NC	2.84E-08	IF-NC x CS x ABS = CDI-NC	
		Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Fringe Surface Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	0.5	(a)	0.5	(a)	
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year (USEPA, 2014)	3650	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.71E-08	IF-C x CS x ABS = CDI-C	2.11E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	5.99E-08	IF-NC x CS x ABS = CDI-NC	1.48E-08	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Incidental Ingestion continued	Shoreline Worker	Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x SIR x FI x ABS x EF x ED x CF / BW x AT
			SIR	Ingestion Rate of Fringe Surface Sediment	mg/day	100	USEPA, 2014	50	USEPA, 2011 (Table 5-1, central)	
			FI	Fraction Ingested	dimensionless	1		1		
			ABS	Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	50	50 weeks/year, 1 day/week	25	50 weeks/year, 1 day every other week	
			ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	9125	ED (years) x 365 days/year (USEPA, 2014)	2409	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	6.12E-08	IF-C x CS x ABS = CDI-C	4.04E-09	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.71E-07	IF-NC x CS x ABS = CDI-NC	4.28E-08	IF-NC x CS x ABS = CDI-NC	
Dermal Contact	Shoreline Worker	Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	3527	See Table 5-10. Head, hands, forearms.	3527	See Table 5-10. Head, hands, forearms.	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.3	See Table 5-10.	0.3	See Table 5-10.	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	50	50 weeks/year, 1 day/week	25	50 weeks/year, 1 day every other week	
			ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	9125	ED (years) x 365 days/year (USEPA, 2014)	2409	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	6.47E-07	IF-C x CS x ABS = CDI-C	8.54E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.81E-06	IF-NC x CS x ABS = CDI-NC	9.06E-07	IF-NC x CS x ABS = CDI-NC	
		Young child	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	2057	See Table 5-12. Hands, forearms, lower legs, feet	2057	See Table 5-12. Hands, forearms, lower legs, feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.28	See Table 5-12. Hands, forearms, lower legs, feet	0.28	See Table 5-12. Hands, forearms, lower legs, feet	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year (USEPA, 2014)	730	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	2.07E-07	IF-C x CS x ABS = CDI-C	3.45E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	2.41E-06	IF-NC x CS x ABS = CDI-NC	1.21E-06	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Dermal Contact continued	Angler	Older Child/Teen (7 to <19 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	2710	See Table 5-11. Lower legs and feet	2710	See Table 5-11. Lower legs and feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.25	See Table 5-11. Lower legs and feet	0.25	See Table 5-11. Lower legs and feet	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.56E-07	IF-C x CS x ABS = CDI-C	3.90E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	9.11E-07	IF-NC x CS x ABS = CDI-NC	4.55E-07	IF-NC x CS x ABS = CDI-NC	
		Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	3800	See Table 5-10. Lower legs and feet	3800	See Table 5-10. Lower legs and feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.3	See Table 5-10.	0.3	See Table 5-10.	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year (USEPA, 2014)	3650	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	2.90E-07	IF-C x CS x ABS = CDI-C	7.24E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.02E-06	IF-NC x CS x ABS = CDI-NC	5.07E-07	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Dermal Contact continued	Swimmer	Young Child (1 to <7 year)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	2057	See Table 5-12. Hands, forearms, lower legs, feet	2057	See Table 5-12. Hands, forearms, lower legs, feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.28	See Table 5-12. Hands, forearms, lower legs, feet	0.28	See Table 5-12. Hands, forearms, lower legs, feet	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year (USEPA, 2014)	730	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.03E-07	IF-C x CS x ABS = CDI-C	1.72E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.21E-06	IF-NC x CS x ABS = CDI-NC	6.03E-07	IF-NC x CS x ABS = CDI-NC	
		Older Child/Teen (7 to <19 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	2710	See Table 5-11. Lower legs and feet	2710	See Table 5-11. Lower legs and feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.25	See Table 5-11. Lower legs and feet	0.25	See Table 5-11. Lower legs and feet	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	26	3 months (13 weeks)/year, 2 days/week	13	3 months (13 weeks)/year, 1 day/week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.56E-07	IF-C x CS x ABS = CDI-C	3.90E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	9.11E-07	IF-NC x CS x ABS = CDI-NC	4.55E-07	IF-NC x CS x ABS = CDI-NC	
		Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	3800	See Table 5-10. Lower legs and feet	3800	See Table 5-10. Lower legs and feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.3	See Table 5-10.	0.3	See Table 5-10.	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year (USEPA, 2014)	3650	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	1.45E-07	IF-C x CS x ABS = CDI-C	3.62E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	5.08E-07	IF-NC x CS x ABS = CDI-NC	2.54E-07	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Dermal Contact continued	Wader	Young Child (1 to <7 year)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	2057	See Table 5-12. Hands, forearms, lower legs, feet	2057	See Table 5-12. Hands, forearms, lower legs, feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.28	See Table 5-12. Hands, forearms, lower legs, feet	0.28	See Table 5-12. Hands, forearms, lower legs, feet	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year (USEPA, 2014)	730	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	2.78E-07	IF-C x CS x ABS = CDI-C	4.59E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	3.25E-06	IF-NC x CS x ABS = CDI-NC	1.60E-06	IF-NC x CS x ABS = CDI-NC	
		Older Child/Teen (7 to <19 years)	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	2710	See Table 5-11. Lower legs and feet	2710	See Table 5-11. Lower legs and feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.25	See Table 5-11. Lower legs and feet	0.25	See Table 5-11. Lower legs and feet	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	43	5 months (22 weeks)/year, 2 days/week	22	5 months (22 weeks)/year, 1 day/week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year (USEPA, 2014)	2190	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	2.58E-07	IF-C x CS x ABS = CDI-C	6.60E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.51E-06	IF-NC x CS x ABS = CDI-NC	7.70E-07	IF-NC x CS x ABS = CDI-NC	
		Adult	CS	Concentration in Fringe Surface Sediment	mg/kg	--	--	--	--	CDI (mg/kg-day) = CS x FC x SA x AF x DAF x EF x ED x CF / BW x AT
			SA	Skin Surface Area Available for Contact	cm^2/day	3800	See Table 5-10. Lower legs and feet	3800	See Table 5-10. Lower legs and feet	
			FC	Fraction of Skin Contacted	dimensionless	1	full SA assumed/day	1	full SA assumed/day	
			AF	Adherence Factor	mg/cm^2	0.3	See Table 5-10.	0.3	See Table 5-10.	
			DAF	Dermal Absorption Factor	dimensionless	--	--	--	--	
			EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/mg	0.000001	1 kg = 1E6 mg	0.000001	1 kg = 1E6 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70 years times 365 days per year (USEPA, 2014)	25550	70 years times 365 days per year (USEPA, 2014)	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year (USEPA, 2014)	3650	ED (years) x 365 days/year (USEPA, 2014)	
			IF-C	Intake factor, cancer	(kg-sed)/(kg-bw/d)	3.90E-07	IF-C x CS x ABS = CDI-C	9.64E-08	IF-C x CS x ABS = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-sed)/(kg-bw/d)	1.37E-06	IF-NC x CS x ABS = CDI-NC	6.75E-07	IF-NC x CS x ABS = CDI-NC	

Table 5-4
Values Used for Daily Intake Calculations - Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Sediment
Exposure Medium/Point:	Surface Sediment

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) Equation
						Value	Rationale/ Reference	Value	Rationale/ Reference	

Notes:

RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure
-- Constituent-specific value.
(a) On days when the receptor is assumed to have direct contact with Anacostia River fringe surface sediment, one-half of the receptor's total daily ingestion exposure to outdoor soil/fringe surface sediment is assumed to come from the River, and the other half while away from the River (i.e., at home, work, school).

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Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
			CW	Concentration in Water	ug/L	--	--	--	--	
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	CDI (mg/kg-day) =
		Young Child (1 to <7 year)	EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	CW x WIR-E x EV x EF x ED x CF
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	BW x AT
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (year) x 365 days/year	730	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	4.67E-09	IF-C x CW = CDI-C	2.39E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	5.45E-08	IF-NC x CW = CDI-NC	8.37E-09	Rationale/ Reference	
			CW	Concentration in Water	ug/L	--	--	--	--	
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	CDI (mg/kg-day) =
Incidental Ingestion	Recreational Angler	Older Child/Teen (7 to <19 years)	EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	CW x WIR-E x EV x EF x ED x CF
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	BW x AT
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (year) x 365 days/year	2190	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	3.00E-09	IF-C x CW = CDI-C	2.30E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.75E-08	IF-NC x CW = CDI-NC	2.69E-09	IF-NC x CW = CDI-NC	
			CW	Concentration in Water	ug/L	--	--	--	--	
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	CDI (mg/kg-day) =
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	CW x WIR-E x EV x EF x ED x CF
		Adult	ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	BW x AT
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (year) x 365 days/year	3650	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	3.30724E-09	IF-C x CW = CDI-C	2.54207E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.15753E-08	IF-NC x CW = CDI-NC	1.77945E-09	IF-NC x CW = CDI-NC	

Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
Incidental Ingestion	Swimmer	Young Child (1 to <7 year)	CW	Concentration in Water	ug/L	--	--	--	--	CDI (mg/kg-day) = CW x WIR-E x EV x EF x ED x CF / BW x AT
			WIR-H	Ingestion Rate of Water, hourly	L/hour	0.12	USEPA (2011, Table 3-5, upper percentile rate for child (ages 0-18 yr) in swimming pool)	0.049	USEPA (2011, Table 3-5, mean rate for child (ages 0-18 yr) in swimming pool)	
			t_{event}	Event Duration	hours/event	0.5	(a)	0.25	(a)	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.06	WIR-H x ET	0.01225	WIR-H x ET	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (year) x 365 days/year	730	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	1.08E-08	IF-C x CW = CDI-C	3.66E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.26E-07	IF-NC x CW = CDI-NC	1.28E-08	IF-NC x CW = CDI-NC	
		Older Child/Teen (7 to <19 years)	CW	Concentration in Water	ug/L	--	--	--	--	CDI (mg/kg-day) = CW x WIR-E x EV x EF x ED x CF / BW x AT
			WIR-H	Ingestion Rate of Water, hourly	L/hour	0.071	USEPA (2011, Table 3-5, upper percentile rate for adult in swimming pool)	0.049	USEPA (2011, Table 3-5, mean rate for adult in swimming pool)	
			t_{event}	Event Duration	hours/event	0.5	(a)	0.25	(a)	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.0355	WIR-H x ET	0.01225	WIR-H x ET	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	26	3 months (13 weeks)/year, 2 days/week	13	3 months (13 weeks)/year, 1 day/week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (year) x 365 days/year	2190	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	8.18E-09	IF-C x CW = CDI-C	7.05E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	4.77E-08	IF-NC x CW = CDI-NC	8.23E-09	IF-NC x CW = CDI-NC	
		Adult	CW	Concentration in Water	ug/L	--	--	--	--	CDI (mg/kg-day) = CW x WIR-E x EV x EF x ED x CF / BW x AT
			WIR-H	Ingestion Rate of Water, hourly	L/hour	0.071	USEPA (2011, Table 3-5, upper percentile rate for adult in swimming pool)	0.021	USEPA (2011, Table 3-5, mean rate for adult in swimming pool)	
			t_{event}	Event Duration	hours/event	0.5	(a)	0.25	(a)	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.0355	WIR-H x ET	0.00525	WIR-H x ET	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (year) x 365 days/year	3650	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	4.52E-09	IF-C x CW = CDI-C	1.67E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.58E-08	IF-NC x CW = CDI-NC	1.17E-09	IF-NC x CW = CDI-NC	

Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
						Value	Rationale/ Reference	Value	Rationale/ Reference	
Incidental Ingestion	Wader	Young Child (1 to <7 year)	CW	Concentration in Water	ug/L	--	--	--	--	
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	CDI (mg/kg-day) =
			EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	CW x WIR-E x EV x EF x ED x CF / BW x AT
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (year) x 365 days/year	730	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	6.28525E-09	IF-C x CW = CDI-C	3.18453E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	7.3328E-08	IF-NC x CW = CDI-NC	1.11459E-08	IF-NC x CW = CDI-NC	
		Older Child/Teen (7 to <19 years)	CW	Concentration in Water	ug/L	--	--	--	--	
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	CDI (mg/kg-day) =
			EF	Exposure Frequency	days/year	43	5 months (22 weeks)/year, 2 days/week	22	5 months (22 weeks)/year, 1 day/week	CW x WIR-E x EV x EF x ED x CF / BW x AT
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (year) x 365 days/year	2190	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	4.95E-09	IF-C x CW = CDI-C	3.90E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	2.89E-08	IF-NC x CW = CDI-NC	4.55E-09	IF-NC x CW = CDI-NC	
		Adult	CW	Concentration in Water	ug/L	--	--	--	--	
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	CDI (mg/kg-day) =
			EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	CW x WIR-E x EV x EF x ED x CF / BW x AT
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (year) x 365 days/year	3650	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	4.45E-09	IF-C x CW = CDI-C	3.38E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.56E-08	IF-NC x CW = CDI-NC	2.37E-09	IF-NC x CW = CDI-NC	

Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
Incidental Ingestion	Shoreline Worker	Adult	CW	Concentration in Water	ug/L	--	--	--	--	CDI (mg/kg-day) = CW x WIR-E x EV x EF x ED x CF / BW x AT
			WIR-H	Ingestion Rate of Water, hourly	L/hour	see daily rate	see daily rate	see daily rate	see daily rate	
			t_{event}	Event Duration	hours/event	see daily rate	see daily rate	see daily rate	see daily rate	
			WIR-E	Ingestion Rate of Water, per event	L/event	0.013	Dorevitch, S. et al. 2011	0.004	Dorevitch, S. et al. 2011	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	50	50 weeks/year, 1 day/week	25	50 weeks/year, 1 day every other week	
			ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	
			CF	Conversion Factor	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	9.13E+03	ED (year) x 365 days/year	2.41E+03	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	7.95E-09	IF-C x CW = CDI-C	3.23E-10	IF-C x CW = CDI-C	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	2.23E-08	IF-NC x CW = CDI-NC	3.42E-09	IF-NC x CW = CDI-NC	
Dermal	Shoreline Worker	Adult	CW	Concentration in Water	ug/L	--	--	--	--	DAD (mg/kg-day)= DAevent x SA x EV x EF x ED x CF1 x CF2 / BW x AT Daevent = Z x CW tevent is incorporated into Daevent. See text for equations.
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	3527	See Table 5-10. Head, hands, forearms.	3527	See Table 5-10. Head, hands, forearms.	
			t_{event}	Event Duration	hours/event	2	1/4 of work day	1	1/8 of work day	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	50	50 weeks/year, 1 day/week	25	50 weeks/year, 1 day every other week	
			ED	Exposure Duration	years	25	USEPA, 2014	6.6	USEPA, 2011 (Table 16-82, median tenure at same job, all workers)	
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	9125	ED (year) x 365 days/year	2409	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	2.16E-06	IF-C x Z x CW = DAD	2.85E-07	IF-C x Z x CW = DAD	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	6.04E-06	IF-NC x Z x CW = DAD	3.02E-06	IF-NC x Z x CW = DAD	
		Young Child (1 to <7 year)	CW	Concentration in Water	ug/L	--	--	--	--	DAD (mg/kg-day)= DAevent x SA x EV x EF x ED x CF1 x CF2 / BW x AT Daevent = Z x CW tevent is incorporated into Daevent. See text for equations.
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	2057	See Table 5-12. Hands, forearms, lower legs, feet	2057	See Table 5-12. Hands, forearms, lower legs, feet	
			t_{event}	Event Duration	hours/event	1	(b)	0.5	(b)	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (year) x 365 days/year	730	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	7.39E-07	IF-C x Z x CW = CDI	1.23E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	8.62E-06	IF-C x Z x CW = CDI	4.31E-06	IF-C x Z x CW = CDI	

Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
						Value	Rationale/ Reference	Value	Rationale/ Reference	
			CW	Concentration in Water	ug/L	--	--	--	--	
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	2710	See Table 5-11. Lower legs and feet	2710	See Table 5-11. Lower legs and feet	DAD (mg/kg-day)=
			t_{event}	Event Duration	hours/event	1	(b)	0.5	(b)	DAevent x SA x EV x EF x ED x CF1 x CF2
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	BW x AT
Dermal	Recreational Angler	Older Child/Teen (7 to <19 years)	EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	Daevent = Z x CW
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	tevent is incorporated into Daevent.
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	See text for equations.
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (year) x 365 days/year	2190	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	6.24E-07	IF-C x Z x CW = CDI	1.56E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	3.64E-06	IF-C x Z x CW = CDI	1.82E-06	IF-C x Z x CW = CDI	
			CW	Concentration in Water	ug/L	--	--	--	--	
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	3800	See Table 5-10. Lower legs and feet	3800	See Table 5-10. Lower legs and feet	DAD (mg/kg-day)=
			t_{event}	Event Duration	hours/event	1	(b)	0.5	(b)	DAevent x SA x EV x EF x ED x CF1 x CF2
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	BW x AT
		Adult	EF	Exposure Frequency	days/year	26	6 months (26 weeks)/year, 1 day/week	13	6 months (26 weeks)/year, 1 day every other week	Daevent = Z x CW
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	tevent is incorporated into Daevent.
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	See text for equations.
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (year) x 365 days/year	3650	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	9.67E-07	IF-C x Z x CW = CDI	2.41E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	3.38E-06	IF-C x Z x CW = CDI	1.69E-06	IF-C x Z x CW = CDI	

Table 5-5
Values Used for Daily Intake Calculations - Surface Water
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
Dermal	Swimmer	Young Child (1 to <7 year)	CW	Concentration in Water	ug/L	--	--	--	--	DAD (mg/kg-day)= DAevent x SA x EV x EF x ED x CF1 x CF2 / BW x AT Daevent = Z x CW tevent is incorporated into Daevent. See text for equations.
			DA$_{event}$	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	7500	See Table 5-6. Full body SA	7500	See Table 5-6. Full body SA	
			t$_{event}$	Event Duration	hours/event	0.5	(a)	0.25	(a)	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (year) x 365 days/year	730	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	1.35E-06	IF-C x Z x CW = CDI	2.24E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.57E-05	IF-C x Z x CW = CDI	7.85E-06	IF-C x Z x CW = CDI	
		Older Child/Teen (7 to <19 years)	CW	Concentration in Water	ug/L	--	--	--	--	DAD (mg/kg-day)= DAevent x SA x EV x EF x ED x CF1 x CF2 / BW x AT Daevent = Z x CW tevent is incorporated into Daevent. See text for equations.
			DA$_{event}$	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	14825	See Table 5-6. Full body SA	14825	See Table 5-6. Full body SA	
			t$_{event}$	Event Duration	hours/event	0.5	(a)	0.25	(a)	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	26	3 months (13 weeks)/year, 2 days/week	13	3 months (13 weeks)/year, 1 day/week	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (year) x 365 days/year	2190	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	3.42E-06	IF-C x Z x CW = CDI	8.53E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.99E-05	IF-C x Z x CW = CDI	9.95E-06	IF-C x Z x CW = CDI	
		Adult	CW	Concentration in Water	ug/L	--	--	--	--	DAD (mg/kg-day)= DAevent x SA x EV x EF x ED x CF1 x CF2 / BW x AT Daevent = Z x CW tevent is incorporated into Daevent. See text for equations.
			DA$_{event}$	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	20900	USEPA, 2014	20900	USEPA, 2014	
			t$_{event}$	Event Duration	hours/event	0.5	(a)	0.25	(a)	
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	
			EF	Exposure Frequency	days/year	13	3 months (13 weeks)/year, 1 day/week	6.495	3 months (13 weeks)/year, 1 day every other week	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (year) x 365 days/year	3650	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	2.66E-06	IF-C x Z x CW = CDI	6.64E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	9.30E-06	IF-C x Z x CW = CDI	4.65E-06	IF-C x Z x CW = CDI	

Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
						Value	Rationale/ Reference	Value	Rationale/ Reference	
			CW	Concentration in Water	ug/L	--	--	--	--	
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	2057	See Table 5-12. Hands, forearms, lower legs, feet	2057	See Table 5-12. Hands, forearms, lower legs, feet	DAD (mg/kg-day)=
			t_{event}	Event Duration	hours/event	1	(c)	0.5	(c)	DAevent x SA x EV x EF x ED x CF1 x CF2
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	BW x AT
		Young Child (1 to <7 year)	EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	Daevent = Z x CW
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	tevent is incorporated into Daevent.
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	See text for equations.
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (year) x 365 days/year	730	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	9.94521E-07	IF-C x Z x CW = CDI	1.63764E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	1.16027E-05	IF-C x Z x CW = CDI	5.73175E-06	IF-C x Z x CW = CDI	
			CW	Concentration in Water	ug/L	--	--	--	--	
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	2710	See Table 5-11. Lower legs and feet	2710	See Table 5-11. Lower legs and feet	DAD (mg/kg-day)=
			t_{event}	Event Duration	hours/event	1	(c)	0.5	(c)	DAevent x SA x EV x EF x ED x CF1 x CF2
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	BW x AT
Dermal	Wader	Older Child/Teen (7 to <19 years)	EF	Exposure Frequency	days/year	43	5 months (22 weeks)/year, 2 days/week	22	5 months (22 weeks)/year, 1 day/week	Daevent = Z x CW
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	tevent is incorporated into Daevent.
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	See text for equations.
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (year) x 365 days/year	2190	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	1.03E-06	IF-C x Z x CW = CDI	2.64E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	6.02E-06	IF-C x Z x CW = CDI	3.08E-06	IF-C x Z x CW = CDI	
			CW	Concentration in Water	ug/L	--	--	--	--	
			DA_{event}	Absorbed dose per event	mg/cm^2-event	--	--	--	--	
			Z	Dermal Factor	cm/event	--	--	--	--	
			SA	Skin Surface Area Available for Contact	cm^2	3800	See Table 5-10. Lower legs and feet	3800	See Table 5-10. Lower legs and feet	DAD (mg/kg-day)=
			t_{event}	Event Duration	hours/event	1	(c)	0.5	(c)	DAevent x SA x EV x EF x ED x CF1 x CF2
			EV	Event Frequency	events/day	1	1 event/day	1	1 event/day	BW x AT
		Adult	EF	Exposure Frequency	days/year	35	5 months (22 weeks)/year, 2 day/week during 3 summer months, 1 day/week in May & Sept	17	5 months (22 weeks)/year, 1 day/week during 3 summer months, 1 day every other week in May & Sept	Daevent = Z x CW
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	tevent is incorporated into Daevent.
			CF1	Conversion Factor 1	mg/ug	0.001	1 mg = 1000 ug	0.001	1 mg = 1000 ug	See text for equations.
			CF2	Conversion Factor 2	L/cm^3	0.001	1 L = 1000 cm^3	0.001	1 L = 1000 cm3	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (year) x 365 days/year	3650	ED (year) x 365 days/year	
			IF-C	Intake factor, cancer	mg/(ug/L*kg/day)	1.30E-06	IF-C x Z x CW = CDI	3.21E-07	IF-C x Z x CW = CDI	
			IF-NC	Intake factor, noncancer	mg/(ug/L*kg/day)	4.55E-06	IF-C x Z x CW = CDI	2.25E-06	IF-C x Z x CW = CDI	

Table 5-5

Values Used for Daily Intake Calculations - Surface Water

Benning Road Facility RI/FS Project

3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Surface Water
Exposure Medium/Point:	Surface Water

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) (Ingestion) Dermal Absorbed Dose (DAD) Equations
						Value	Rationale/ Reference	Value	Rationale/ Reference	

Notes:

RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure

-- Constituent-specific value.

(a) Extended periods of swimming in the Anacostia River are unlikely (see text). An upper-bound estimate of swimming event duration is estimated to be 30 minutes; the central tendency estimate is one-half of RME or 15 minutes.

(b) Anglers may occasionally wade in the river while fishing. An upper-bound estimate of wading duration while fishing is estimated to be 1 hour; the central tendency estimate is one-half of RME or 30 minutes.

(c) Visitors to the river may occasionally wade along the shoreline. An upper-bound estimate of wading while visiting/recreating is estimated to be 1 hour; the central tendency estimate is one-half of RME or 30 minutes.

Sources:

Dorevitch, S. et al. 2011. Water ingestion during water recreation. Water Research 45(5):2020-8.

Authors cite mean of 3-4 mL and upper confidence level estimate of 10-15 mL for limited contact recreational exposures to surface water (e.g., canoeing, kayaking, fishing, motor boating and rowing).

The midpoint of the upper confidence level rate (13 mL) is selected as the RME rate and the mean is selected as the CTE rate. As this is a per event rate, an hourly rate is not provided.

Fryar, C.D., Q. Gu, and C.L. Ogden. 2012. Anthropometric reference data for children and adults: United States, 2007-2010. National Center for Health Statistics. Vital Health Stat 11(252).

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Table 5-6
Values Used for Daily Intake Calculations - Fish Tissue
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Fish tissue
Exposure Medium/Point:	Fish tissue (fillet)

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME Value	RME Rationale/ Reference	CTE Value	CTE Rationale/ Reference	Chronic Daily Intake (CDI) Equation
Ingestion	Recreational Angler	Young Child (1 to <7 year)	CFF	Concentration in Fish Tissue	mg/kg wet weight	--	--	--	--	CDI (mg/kg-day) = CFF X FIR x FI x (1-Loss) x EF x ED x CF / BW x AT
			FIR	Ingestion Rate of Fish	g/day	7	1/3 of adult rate (USEPA, 2011)	3	1/3 of adult rate (USEPA, 2011)	
			FI	Fraction from source	unitless	0.5	Assumes half of consumed catch is from Anacostia River in vicinity of site	0.25	1/2 of RME (assumes anglers eat catch from various locations throughout the Wash DC area)	
			Loss	Cooking Loss	g/g	--	--	--	--	
			EF	Exposure Frequency	days/year	365	FIR rate prorated over one year	365	FIR rate prorated over one year	
			ED	Exposure Duration	years	6	USEPA, 2014. 26 years total (20 adult/6 child)	2	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/g	0.001	1 kg = 0.001 mg	0.001	1 kg = 0.001 mg	
			BW	Body Weight	kg	17	Fryar et al. 2012	17	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	2190	ED (years) x 365 days/year	730	ED (years) x 365 days/year	
			IF-C	Intake factor, cancer	(kg-fish)/(kg-bw/d)	1.76E-05	IF-C x CFF x (1-Loss) = CDI-C	1.26E-06	IF-C x CFF x (1-Loss) = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-fish)/(kg-bw/d)	2.06E-04	IF-NC x CFF x (1-Loss) = CDI-NC	4.41E-05	IF-NC x CFF x (1-Loss) = CDI-NC	
		Older Child/Teen (7 to <19 years)	CFF	Concentration in Fish Tissue	mg/kg wet weight	--	--	--	--	CDI (mg/kg-day) = CFF X FIR x FI x (1-Loss) x EF x ED x CF / BW x AT
			FIR	Ingestion Rate of Fish	g/day	13	2/3 of adult rate (USEPA, 2011)	7	2/3 of adult rate (USEPA, 2011)	
			FI	Fraction from source	unitless	0.5	Assumes half of consumed catch is from Anacostia River in vicinity of site	0.25	1/2 of RME (assumes anglers eat catch from various locations throughout the Wash DC area)	
			Loss	Cooking Loss	g/g	--	--	--	--	
			EF	Exposure Frequency	days/year	365	FIR rate prorated over one year	365	FIR rate prorated over one year	
			ED	Exposure Duration	years	12	receptor age range	6	1/2 RME	
			CF	Conversion Factor	kg/g	0.001	1 kg = 0.001 mg	0.001	1 kg = 0.001 mg	
			BW	Body Weight	kg	53	Fryar et al. 2012	53	Fryar et al. 2012	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	4380	ED (years) x 365 days/year	2190	ED (years) x 365 days/year	
			IF-C	Intake factor, cancer	(kg-fish)/(kg-bw/d)	2.10E-05	IF-C x CFF x (1-Loss) = CDI-C	2.83E-06	IF-C x CFF x (1-Loss) = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-fish)/(kg-bw/d)	1.23E-04	IF-NC x CFF x (1-Loss) = CDI-NC	3.30E-05	IF-NC x CFF x (1-Loss) = CDI-NC	
		Adult	CFF	Concentration in Fish Tissue	mg/kg wet weight	--	--	--	--	CDI (mg/kg-day) = CFF X FIR x FI x (1-Loss) x EF x ED x CF / BW x AT
			FIR	Ingestion Rate of Fish	g/day	20	Gibson & McClafferty, 2005. (Washington DC area anglers) See Table 5-5 for details on ingestion rate derivation.	10	Gibson & McClafferty, 2005. (Washington DC area anglers) See Table 5-5 for details on ingestion rate derivation.	
			FI	Fraction from source	unitless	0.5	Assumes half of consumed catch is from Anacostia River in vicinity of site	0.25	1/2 of RME (assumes anglers eat catch from various locations throughout the Wash DC area)	
			Loss	Cooking Loss	g/g	--	--	--	--	
			EF	Exposure Frequency	days/year	365	FIR rate prorated over one year	365	FIR rate prorated over one year	
			ED	Exposure Duration	years	20	USEPA, 2014. 26 years total (20 adult/6 child)	10	USEPA, 2011 (Table ES-1). Average 12 yrs (10 adult/2 child)	
			CF	Conversion Factor	kg/g	0.001	1 kg = 0.001 mg	0.001	1 kg = 0.001 mg	
			BW	Body Weight	kg	80	USEPA, 2014	80	USEPA, 2014	
			AT-C	Averaging Time (Cancer)	days	25550	70-year lifetime x 365 days/year	25550	70-year lifetime x 365 days/year	
			AT-N	Averaging Time (Noncancer)	days	7300	ED (years) x 365 days/year	3650	ED (years) x 365 days/year	
			IF-C	Intake factor, cancer	(kg-fish)/(kg-bw/d)	3.57E-05	IF-C x CFF x (1-Loss) = CDI-C	4.46E-06	IF-C x CFF x (1-Loss) = CDI-C	
			IF-NC	Intake factor, noncancer	(kg-fish)/(kg-bw/d)	1.25E-04	IF-NC x CFF x (1-Loss) = CDI-NC	3.13E-05	IF-NC x CFF x (1-Loss) = CDI-NC	

Table 5-6
Values Used for Daily Intake Calculations - Fish Tissue
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe:	Current/Future
Medium:	Fish tissue
Exposure Medium/Point:	Fish tissue (fillet)

Exposure Route	Receptor Population	Receptor Age	Parameter Code	Parameter Definition	Unit	RME		CTE		Chronic Daily Intake (CDI) Equation
						Value	Rationale/ Reference	Value	Rationale/ Reference	

Notes:

RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure

-- Constituent-specific value; CFF (concentration in fish tissue) is also species-specific.

Sources:

Fryar, C.D., Q. Gu, and C.L. Ogden. 2012. Anthropometric reference data for children and adults: United States, 2007-2010. National Center for Health Statistics. Vital Health Stat 11(252).

Gibson & McClafferty, 2005. Chesapeake Bay Angler Survey, Identifying Populations at Risk from Consuming Contaminated Fish in Three Regions of Concern. Virginia Polytechnic Institute and State University. CMI-HDD-05-01. March.

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Table 5-7
Default Absorption Factors for COPCs in Soil and Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

ls of Potential Concern in Soil and Fringe Surface S	CAS Number	Oral - Sediment Absorption Adjustment Factor		Dermal - Sediment Absorption Fraction	
		Default		Default	
Dioxin					
2,3,7,8-TCDD-TEQ	DFTEQ-HH	1	(a)	0.03	(c)
Metals					
Aluminum	7429-90-5	1	(a)	NA	(c)
Antimony	7440-36-0	1	(a)	NA	(c)
Arsenic	7440-38-2	0.6	(b)	0.03	(c)
Cobalt	7440-48-4	1	(a)	NA	(c)
Cyanide	57-12-5	1	(a)	NA	(c)
Manganese	7439-96-5	1	(a)	NA	(c)
Nickel	7440-02-0	1	(a)	NA	(c)
Thallium	7440-28-0	1	(a)	NA	(c)
Vanadium	7440-62-2	1	(a)	NA	(c)
PCBs					
Total PCBs	1336-36-3	1	(a)	0.14	(c)
SVOCs					
Benzo(a)anthracene	56-55-3	1	(a)	0.13	(c)
Benzo(a)pyrene	50-32-8	1	(a)	0.13	(c)
Benzo(b)fluoranthene	205-99-2	1	(a)	0.13	(c)
Benzo(k)fluoranthene	207-08-9	1	(a)	0.13	(c)
Chrysene	218-01-9	1	(a)	0.13	(c)
Dibenzo(a,h)anthracene	53-70-3	1	(a)	0.13	(c)
Indeno(1,2,3-cd)pyrene	193-39-5	1	(a)	0.13	(c)
Naphthalene	91-20-3	1	(a)	0.13	(c)
TPH					
Diesel Range Organics (C10-C20)	C10C20	1	(a)	NA	(c)

Notes:
CAS - Chemical Abstracts Service.
NA - Not Applicable. Chemical is not assessed via this pathway.
PCB - Polychlorinated Biphenyls.
SVOC - Semi-Volatile Organic Compounds.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.
USEPA - United States Environmental Protection Agency.
(a) Absorption is assumed to be 100% (absorption factor = 1) (USEPA Risk Assessment Guidance for Superfund (RAGS), Part A, 1989; USEPA Regional Screening Level (RSL) Table, May 2018).
(b) Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil. OSWER Directive 9200.1-113. USEPA, December 2012. Consistent with the approach used by the USEPA Regional Screening Level (RSL) table (May 2018).
(c) USEPA, 2004. Risk Assessment Guidance for Superfund. Vol. 1, Part E. July, 2004. Exhibit 3-4. Consistent with the approach used by the USEPA Regional Screening Level (RSL) table (May 2018).

Table 5-8
Dermal Water Parameters
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern in Surface Water	CAS Number	Chemical Properties		Dermal Water Parameters											
		MW (f) g/mol	log Kow (f) unitless	Kp (cm/hr)	B unitless	Lag Time τ hr/event	t* hr	FA unitless	lsc (e) cm	log (Dsc/lsc) unitless	Dsc/lsc unitless	Dsc unitless	b (a) unitless	c (a) unitless	In Effective Predictive Domain? (f)
Dioxin															
2,3,7,8-TCDD-TEQ	DFTEQ-HH	3.22E+02	6.80E+00	8.07E-01 (a)	5.57E+00 (a)	6.82E+00 (a)	3.01E+01 (a)	5.00E-01 (a)	1.00E-03	-4.61E+00	2.44E-05	2.44E-08	2.19E+01	5.62E+00	No
Metals															
Arsenic	7440-38-2	--	--	1.00E-03 (b,c)	--	--	--	--	--	--	--	--	--	--	Yes
Cobalt	7440-48-4	--	--	4.00E-04 (b)	--	--	--	--	--	--	--	--	--	--	Yes
Manganese	7439-96-5	--	--	1.00E-03 (b,c)	--	--	--	--	--	--	--	--	--	--	Yes
Pesticides															
4,4'-DDT	50-29-3	3.55E+02	6.36E+00	2.69E-01 (a)	1.95E+00 (a)	1.04E+01 (a)	4.25E+01 (a)	7.00E-01 (a)	1.00E-03	-4.80E+00	1.59E-05	1.59E-08	3.47E+00	2.06E+00	No
PCBs															
Total PCBs	1336-36-3	3.61E+02	6.72E+00	4.32E-01 (a,e)	3.15E+00 (a,f)	1.13E+01 (a,f)	4.79E+01 (a,f)	5.00E-01 (a,f)	1.00E-03	-4.83E+00	1.48E-05	1.48E-08	7.75E+00	3.23E+00	No

Notes:
CAS - Chemical Abstracts Service.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.
(a) USEPA, 2004. Exhibit B-3 (Organics). Values calculated based the equations below may have rounding different from that presented in Exhibit B-3.
(b) USEPA, 2004. Exhibit 3-1. (Inorganics)
(c) Default for all other inorganics.
(e) USEPA, 2004. Equation A-4. Default value.
(f) USEPA, 2004. Exhibit B-2. Value for hexachlorobiphenyl used for PCBs.

Equations:
USEPA, 2004. Risk Assessment Guidance for Superfund. Volume 1, Part E, Supplemental Guidance for Dermal Risk Assessment

Equation 3.8:	$\text{Log Kp} = -2.80 + 0.66 \log \text{Kow} - 0.0056\ \text{MW}$
Equation A.1:	$B = Kp \times MW^{0.5}/2.6$
Equation A.2:	Log Dsc/lsc = -2.8-0.0056 MW, where lsc = 1E-3 cm. Solving for Dsc: $Dsc = 10^{-2.8-0.0056\ MW} * lsc$.
Equation A.4:	$\tau = lsc^2/(6*Dsc)$
Equation A.5:	If $B \leq 0.6$, Equation A.5: $t^* = 2.4*\tau$
Equation A.6:	If B> 0.6: $t^* = (b - (b^2-c^2)^{0.5}) * l^2sc/(Dsc)$
Equation A-7:	$b = (2*(1+B)^2/\pi) - c$
Equation A-8:	$c = (1+3B+3B^2)/(3*(1+B))$

Definitions:
B - Relative Contribution of Permeability Coefficient.
Dsc - Effective diffusion coefficient through stratum corneum.
FA - Fraction Absorbed.
Kow - Octanol-Water Partition Coefficient.
Kp - Dermal Permeability Coefficient.
lsc - Apparent thickness of stratum corneum.
MW - Molecular Weight.
τ - lag time (hr/event).
t* - Time to reach steady state.

Table 5-9
Cooking Loss Factors for Fish Tissue
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical	CAS Number	Cooking Loss Factor (a) RME (b)	Cooking Loss Factor (a) CTE (c)
Dioxin and Dioxin-Like PCBs			
2,3,7,8-TCDD-TEQ	DFTEQ-HH	0.29	0.48
PCB-TEQ	PCB-TEQ	0.29	0.48
Inorganics			
Arsenic	7440-38-2	0	0
Arsenic, organic	75-60-5	0	0
Cobalt	7440-48-4	0	0
Mercury	7439-97-6	0	0
Thallium	7440-28-0	0	0
Pesticides			
4,4'-DDD	72-54-8	0.1	0.32
4,4'-DDE	72-55-9	0.1	0.32
4,4'-DDT	50-29-3	0.1	0.32
Aldrin	309-00-2	0.1	0.32
alpha-Chlordane	5103-71-9	0.1	0.32
beta-BHC	319-85-7	0.1	0.32
cis-Nonachlor	5103-73-1	0.1	0.32
Dieldrin	60-57-1	0.1	0.32
gamma-Chlordane	5566-34-7	0.1	0.32
Heptachlor epoxide	1024-57-3	0.1	0.32
Hexachlorobenzene	118-74-1	0.1	0.32
Mirex	2385-85-5	0.1	0.32
Oxychlordane	27304-13-8	0.1	0.32
trans-Nonachlor	39765-80-5	0.1	0.32
PCBs			
Total PCBs	1336-36-3	0.13	0.3

Notes:
CTE - Central Tendency Exposure.
PCBs - Polychlorinated biphenyls.
RME - Reasonable Maximum Exposure.
TCDD - 2,3,7,8-Tetrachlorodibenzo-p-dioxin.
TEQ - Toxicity Equivalence.

(a) Fraction of mass loss values reported in 17 studies for various species and cooking methods (see Section 5.4.4 and Attachment D).
(b) For the RME scenario, the 10th percentile value is used.
(c) For the CTE scenario, the median value is used.

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Hypothetical Future Park Land/Green Space	**Dioxin**									
	2,3,7,8-TCDD-TEQ	2 / 2	1.89E-06	NC	NC	2.51E-06	2.51E-06	mg/kg	Max	Footnote (4)
	Inorganics									
	Arsenic	2 / 2	2.20E+00	NC	NC	2.60E+00	2.60E+00	mg/kg	Max	Footnote (4)
	Cobalt	2 / 2	1.11E+02	NC	NC	1.30E+02	1.30E+02	mg/kg	Max	Footnote (4)
	Manganese	2 / 2	1.18E+02	NC	NC	2.00E+02	2.00E+02	mg/kg	Max	Footnote (4)
	Nickel	2 / 2	1.04E+01	NC	NC	1.20E+01	1.20E+01	mg/kg	Max	Footnote (4)
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	2 / 2	3.70E+01	NC	NC	5.80E+01	5.80E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	3 / 4	4.42E-02	NC	NC	9.20E-02	9.20E-02	mg/kg	Max	Footnote (4)
	SVOCs									
	Benzo(a)anthracene	4 / 4	1.37E-01	NC	NC	1.90E-01	1.90E-01	mg/kg	Max	Footnote (4)
	Benzo(a)pyrene	4 / 4	1.55E-01	NC	NC	1.80E-01	1.80E-01	mg/kg	Max	Footnote (4)
	Benzo(b)fluoranthene	4 / 4	1.65E-01	NC	NC	2.60E-01	2.60E-01	mg/kg	Max	Footnote (4)
	Benzo(k)fluoranthene	4 / 4	6.80E-02	NC	NC	9.10E-02	9.10E-02	mg/kg	Max	Footnote (4)
	Chrysene	4 / 4	1.53E-01	NC	NC	2.00E-01	2.00E-01	mg/kg	Max	Footnote (4)
	Dibenzo(a,h)anthracene	4 / 4	3.23E-02	NC	NC	4.60E-02	4.60E-02	mg/kg	Max	Footnote (4)
	Indeno(1,2,3-cd)pyrene	4 / 4	1.04E-01	NC	NC	1.50E-01	1.50E-01	mg/kg	Max	Footnote (4)
	Naphthalene	2 / 4	1.22E-02	NC	NC	1.80E-02	1.80E-02	mg/kg	Max	Footnote (4)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 2	1.30E+01	NC	NC	1.30E+01	1.30E+01	mg/kg	Max	Footnote (4)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Warehouse and Laydown Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	22 / 22	1.51E-05	3.17E-05	95% Chebyshev (Mean, Sd) UCL	5.87E-05	3.17E-05	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Arsenic	44 / 44	1.83E+01	3.85E+01	95% Chebyshev(Mean, Sd) UCL	1.90E+02	3.85E+01	mg/kg	95% UCL	Footnote (2,5)
	Cobalt	44 / 44	1.95E+01	4.55E+01	95% Chebyshev (Mean, Sd) UCL	2.40E+02	4.55E+01	mg/kg	95% UCL	Footnote (2)
	Manganese	44 / 44	3.99E+02	1.05E+03	95% Chebyshev(Mean, Sd) UCL	6.60E+03	1.05E+03	mg/kg	95% UCL	Footnote (2,5)
	Nickel	44 / 44	5.13E+02	1.53E+03	95% Chebyshev (Mean, Sd) UCL	8.00E+03	1.53E+03	mg/kg	95% UCL	Footnote (2)
	Thallium	29 / 44	1.31E-01	1.56E-01	95% KM Adjusted Gamma UCL	4.60E-01	1.56E-01	mg/kg	95% UCL	Footnote (2)
	Vanadium	50 / 50	2.24E+03	7.06E+03	95% Chebyshev (Mean, Sd) UCL	4.20E+04	7.06E+03	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	55 / 57	1.28E+00	5.19E+00	KM H-UCL	8.60E+00	5.19E+00	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	18 / 18	4.36E-01	5.83E-01	95% Student's-t UCL	1.20E+00	5.83E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	18 / 18	4.31E-01	5.77E-01	95% Student's-t UCL	1.20E+00	5.77E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	18 / 18	5.16E-01	6.81E-01	95% Student's-t UCL	1.40E+00	6.81E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	18 / 18	1.95E-01	2.58E-01	95% Student's-t UCL	5.40E-01	2.58E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	18 / 18	4.90E-01	6.39E-01	95% Student's-t UCL	1.30E+00	6.39E-01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	15 / 18	9.93E-02	1.50E-01	95% KM Adjusted Gamma UCL	3.10E-01	1.50E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	18 / 18	3.19E-01	4.42E-01	95% Student's-t UCL	1.10E+00	4.42E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	16 / 18	6.76E-02	1.14E-01	KM H-UCL	4.40E-01	1.14E-01	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	7 / 12	9.62E+01	1.49E+02	95% KM (t) UCL	2.80E+02	1.49E+02	mg/kg	95% UCL	Footnote (2)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Salvage Yard and Waste Storage Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	23 / 23	6.10E-05	1.08E-04	95% Adjusted Gamma UCL	4.84E-04	1.08E-04	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Arsenic	3 / 3	1.14E+01	NC	NC	1.40E+01	1.40E+01	mg/kg	Max	Footnote (4)
	Cobalt	3 / 3	1.03E+01	NC	NC	1.70E+01	1.70E+01	mg/kg	Max	Footnote (4)
	Manganese	3 / 3	2.77E+02	NC	NC	5.00E+02	5.00E+02	mg/kg	Max	Footnote (4)
	Nickel	3 / 3	1.69E+01	NC	NC	2.70E+01	2.70E+01	mg/kg	Max	Footnote (4)
	Thallium	3 / 3	1.80E-01	NC	NC	2.00E-01	2.00E-01	mg/kg	Max	Footnote (4)
	Vanadium	3 / 3	2.47E+01	NC	NC	3.60E+01	3.60E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	40 / 41	1.14E+00	2.15E+00	Gamma Adjusted KM-UCL	1.40E+01	2.15E+00	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	18 / 19	8.21E-01	1.34E+00	Gamma Adjusted KM-UCL	2.50E+00	1.34E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	18 / 19	7.80E-01	1.29E+00	Gamma Adjusted KM-UCL	2.50E+00	1.29E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	18 / 19	1.17E+00	2.03E+00	Gamma Adjusted KM-UCL	5.00E+00	2.03E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	18 / 19	3.57E-01	4.92E-01	95% KM (t) UCL	1.30E+00	4.92E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	18 / 19	8.58E-01	1.41E+00	95% GROS Adjusted Gamma UCL	2.50E+00	1.41E+00	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	15 / 19	1.42E-01	2.40E-01	Gamma Adjusted KM-UCL	5.10E-01	2.40E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	18 / 19	5.90E-01	9.69E-01	Gamma Adjusted KM-UCL	2.00E+00	9.69E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	17 / 19	1.12E-01	1.66E-01	95% KM Adjusted Gamma UCL	3.20E-01	1.66E-01	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	5 / 5	1.30E+03	NC	NC	3.40E+03	3.40E+03	mg/kg	Max	Footnote (4)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [(3)]	Rationale
Stores and Fleet Maintenance Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	14 / 14	6.19E-06	1.45E-05	95% Adjusted Gamma UCL	2.23E-05	1.45E-05	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Arsenic	8 / 8	5.25E+00	NC	NC	7.50E+00	7.50E+00	mg/kg	Max	Footnote (4)
	Cobalt	8 / 8	4.48E+00	NC	NC	7.90E+00	7.90E+00	mg/kg	Max	Footnote (4)
	Manganese	8 / 8	1.18E+02	NC	NC	2.20E+02	2.20E+02	mg/kg	Max	Footnote (4)
	Nickel	8 / 8	1.13E+01	NC	NC	3.10E+01	3.10E+01	mg/kg	Max	Footnote (4)
	Thallium	5 / 8	1.03E-01	NC	NC	1.70E-01	1.70E-01	mg/kg	Max	Footnote (4)
	Vanadium	8 / 8	2.08E+01	NC	NC	3.00E+01	3.00E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	24 / 27	6.80E-01	1.35E+00	Gamma Adjusted KM-UCL	4.80E+00	1.35E+00	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	12 / 13	2.42E-01	3.70E-01	95% KM (t) UCL	9.00E-01	3.70E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	12 / 13	2.49E-01	5.41E-01	Gamma Adjusted KM-UCL	1.10E+00	5.41E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	12 / 13	3.24E-01	6.87E-01	Gamma Adjusted KM-UCL	1.40E+00	6.87E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	12 / 13	1.32E-01	2.73E-01	Gamma Adjusted KM-UCL	5.20E-01	2.73E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	12 / 13	3.02E-01	6.82E-01	Gamma Adjusted KM-UCL	1.40E+00	6.82E-01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	12 / 13	5.68E-02	1.39E-01	Gamma Adjusted KM-UCL	2.90E-01	1.39E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	12 / 13	1.92E-01	4.37E-01	Gamma Adjusted KM-UCL	9.00E-01	4.37E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	12 / 13	2.78E-02	4.00E-02	95% KM (t) UCL	6.70E-02	4.00E-02	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	3 / 8	3.98E+01	NC	NC	1.70E+02	1.70E+02	mg/kg	Max	Footnote (4)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Offices and Parking Lot	**Dioxin**									
	2,3,7,8-TCDD-TEQ	2 / 2	9.63E-06	NC	NC	1.37E-05	1.37E-05	mg/kg	Max	Footnote (4)
	Inorganics									
	Arsenic	3 / 3	2.97E+00	NC	NC	3.70E+00	3.70E+00	mg/kg	Max	Footnote (4)
	Cobalt	3 / 3	6.87E+00	NC	NC	1.10E+01	1.10E+01	mg/kg	Max	Footnote (4)
	Manganese	3 / 3	1.87E+02	NC	NC	2.60E+02	2.60E+02	mg/kg	Max	Footnote (4)
	Nickel	3 / 3	2.27E+01	NC	NC	3.00E+01	3.00E+01	mg/kg	Max	Footnote (4)
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	3 / 3	1.93E+01	NC	NC	2.30E+01	2.30E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	5 / 5	2.34E-01	NC	NC	3.30E-01	3.30E-01	mg/kg	Max	Footnote (4)
	SVOCs									
	Benzo(a)anthracene	28 / 30	1.24E+00	2.79E+00	Gamma Adjusted KM-UCL	1.40E+01	2.79E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	28 / 30	1.11E+00	2.27E+00	Gamma Adjusted KM-UCL	1.10E+01	2.27E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	28 / 30	1.33E+00	2.58E+00	Gamma Adjusted KM-UCL	1.20E+01	2.58E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	26 / 30	5.25E-01	1.12E+00	Gamma Adjusted KM-UCL	5.50E+00	1.12E+00	mg/kg	95% UCL	Footnote (2)
	Chrysene	28 / 30	1.17E+00	2.45E+00	Gamma Adjusted KM-UCL	1.20E+01	2.45E+00	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	25 / 30	2.47E-01	4.70E-01	Gamma Adjusted KM-UCL	2.20E+00	4.70E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	28 / 30	7.78E-01	1.51E+00	Gamma Adjusted KM-UCL	7.10E+00	1.51E+00	mg/kg	95% UCL	Footnote (2)
	Naphthalene	20 / 30	3.93E-02	7.92E-02	Gamma Adjusted KM-UCL	4.10E-01	7.92E-02	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	ND	--	--	--	--	ND	--	--	--

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Substation #7	**Dioxin**									
	2,3,7,8-TCDD-TEQ	1 / 1	4.37E-06	NC	NC	4.37E-06	4.37E-06	mg/kg	Max	Footnote (4)
	Inorganics									
	Arsenic	4 / 4	1.00E+01	NC	NC	3.30E+01	3.30E+01	mg/kg	Max	Footnote (4)
	Cobalt	4 / 4	4.03E+00	NC	NC	4.70E+00	4.70E+00	mg/kg	Max	Footnote (4)
	Manganese	4 / 4	1.98E+02	NC	NC	3.70E+02	3.70E+02	mg/kg	Max	Footnote (4)
	Nickel	4 / 4	1.04E+01	NC	NC	1.40E+01	1.40E+01	mg/kg	Max	Footnote (4)
	Thallium	1 / 4	1.38E-01	NC	NC	2.50E-01	2.50E-01	mg/kg	Max	Footnote (4)
	Vanadium	4 / 4	1.46E+01	NC	NC	2.30E+01	2.30E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	11 / 13	4.62E-01	8.85E+00	95% KM Bootstrap t UCL	5.10E+00	5.10E+00	mg/kg	Max	Footnote (4)
	SVOCs									
	Benzo(a)anthracene	4 / 5	4.01E-01	NC	NC	1.80E+00	1.80E+00	mg/kg	Max	Footnote (4)
	Benzo(a)pyrene	4 / 5	3.17E-01	NC	NC	1.40E+00	1.40E+00	mg/kg	Max	Footnote (4)
	Benzo(b)fluoranthene	4 / 5	7.13E-01	NC	NC	3.20E+00	3.20E+00	mg/kg	Max	Footnote (4)
	Benzo(k)fluoranthene	4 / 5	3.65E-01	NC	NC	1.70E+00	1.70E+00	mg/kg	Max	Footnote (4)
	Chrysene	4 / 5	7.10E-01	NC	NC	3.20E+00	3.20E+00	mg/kg	Max	Footnote (4)
	Dibenzo(a,h)anthracene	4 / 5	9.44E-02	NC	NC	4.00E-01	4.00E-01	mg/kg	Max	Footnote (4)
	Indeno(1,2,3-cd)pyrene	4 / 5	2.95E-01	NC	NC	1.30E+00	1.30E+00	mg/kg	Max	Footnote (4)
	Naphthalene	4 / 5	2.70E-02	NC	NC	6.70E-02	6.70E-02	mg/kg	Max	Footnote (4)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 4	1.90E+01	NC	NC	2.00E+01	2.00E+01	mg/kg	Max	Footnote (4)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Transformer Shop	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	1 / 1	1.70E+00	NC	NC	1.70E+00	1.70E+00	mg/kg	Max	Footnote (4)
	Cobalt	1 / 1	2.70E+00	NC	NC	2.70E+00	2.70E+00	mg/kg	Max	Footnote (4)
	Manganese	1 / 1	2.60E+02	NC	NC	2.60E+02	2.60E+02	mg/kg	Max	Footnote (4)
	Nickel	1 / 1	1.60E+01	NC	NC	1.60E+01	1.60E+01	mg/kg	Max	Footnote (4)
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	1 / 1	9.70E+00	NC	NC	9.70E+00	9.70E+00	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	47 / 48	1.89E+02	2.01E+03	99% KM (Chebyshev) UCL	8.80E+03	2.01E+03	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	13 / 25	3.24E-01	7.49E-01	Gamma Adjusted KM-UCL	2.00E+00	7.49E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	11 / 25	2.86E-01	6.52E-01	Gamma Adjusted KM-UCL	1.70E+00	6.52E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	13 / 25	3.80E-01	8.16E-01	Gamma Adjusted KM-UCL	2.10E+00	8.16E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	11 / 25	1.42E-01	2.33E-01	95% KM (t) UCL	7.90E-01	2.33E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	13 / 25	3.23E-01	7.36E-01	Gamma Adjusted KM-UCL	1.90E+00	7.36E-01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	9 / 25	7.51E-02	1.22E-01	95% KM (t) UCL	4.50E-01	1.22E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	12 / 25	2.41E-01	3.91E-01	95% KM (t) UCL	1.40E+00	3.91E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	8 / 25	1.70E-02	2.67E-02	95% KM (t) UCL	9.60E-02	2.67E-02	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 2	4.90E+01	NC	NC	8.00E+01	8.00E+01	mg/kg	Max	Footnote (4)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [(3)]	Rationale
Vehicle Refueling Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	ND	--	--	--	--	ND	--	--	--
	Cobalt	ND	--	--	--	--	ND	--	--	--
	Manganese	ND	--	--	--	--	ND	--	--	--
	Nickel	ND	--	--	--	--	ND	--	--	--
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	ND	--	--	--	--	ND	--	--	--
	PCBs									
	Total PCBs	2 / 2	7.40E-02	NC	NC	1.40E-01	1.40E-01	mg/kg	Max	Footnote (4)
	SVOCs									
	Benzo(a)anthracene	2 / 2	1.75E+00	NC	NC	2.60E+00	2.60E+00	mg/kg	Max	Footnote (4)
	Benzo(a)pyrene	2 / 2	8.85E-01	NC	NC	1.30E+00	1.30E+00	mg/kg	Max	Footnote (4)
	Benzo(b)fluoranthene	2 / 2	1.48E+00	NC	NC	2.20E+00	2.20E+00	mg/kg	Max	Footnote (4)
	Benzo(k)fluoranthene	2 / 2	4.60E-01	NC	NC	6.10E-01	6.10E-01	mg/kg	Max	Footnote (4)
	Chrysene	2 / 2	1.71E+00	NC	NC	2.50E+00	2.50E+00	mg/kg	Max	Footnote (4)
	Dibenzo(a,h)anthracene	2 / 2	2.15E-01	NC	NC	3.10E-01	3.10E-01	mg/kg	Max	Footnote (4)
	Indeno(1,2,3-cd)pyrene	2 / 2	5.55E-01	NC	NC	7.80E-01	7.80E-01	mg/kg	Max	Footnote (4)
	Naphthalene	2 / 2	3.43E-01	NC	NC	6.30E-01	6.30E-01	mg/kg	Max	Footnote (4)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 1	3.80E+02	NC	NC	3.80E+02	3.80E+02	mg/kg	Max	Footnote (4)

Table 5-10
Exposure Point Concentration Summary — Surface Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale

Notes:

EPC - Exposure Point Concentration.
NC - Not Calculated.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
RME - Reasonable Maximum Exposure.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meier method to handle detection limits.
(2) 95% Upper Confidence Limit (UCL) on the arithmetic mean concentration calculated using USEPA ProUCL Version 5.1. The UCL suggested by ProUCL is used, unless otherwise noted. In cases where more than one UCL is suggested, the higher UCL is used, unless otherwise noted. Where too few samples or detects are available, the 95% UCL is not calculated. See text for details.
(3) The EPC is equal to the 95% UCL where a sufficient number of samples and/or detects are available. The EPC is equal to the maximum detected concentration where a sufficient number of samples and/or detects are not available to calculate a UCL. See text for details.
(4) The 95% UCL exceeded the maximum detected concentration or was not calculated due to small sample size, and the maximum detected concentration was selected as the EPC.
(5) ProUCL recommended the H-Stat UCL. Alternate UCL selected based on ProUCL technical guidance and review of data.

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Hypothetical Future Park Land/Green Space	**Dioxin**									
	2,3,7,8-TCDD-TEQ	2 / 2	1.89E-06	NC	NC	2.51E-06	1.89E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	2 / 2	2.20E+00	NC	NC	2.60E+00	2.20E+00	mg/kg	Mean	Footnote (2)
	Cobalt	2 / 2	1.11E+02	NC	NC	1.30E+02	1.11E+02	mg/kg	Mean	Footnote (2)
	Manganese	2 / 2	1.18E+02	NC	NC	2.00E+02	1.18E+02	mg/kg	Mean	Footnote (2)
	Nickel	2 / 2	1.04E+01	NC	NC	1.20E+01	1.04E+01	mg/kg	Mean	Footnote (2)
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	2 / 2	3.70E+01	NC	NC	5.80E+01	3.70E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	3 / 4	4.42E-02	NC	NC	9.20E-02	4.42E-02	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	4 / 4	1.37E-01	NC	NC	1.90E-01	1.37E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	4 / 4	1.55E-01	NC	NC	1.80E-01	1.55E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	4 / 4	1.65E-01	NC	NC	2.60E-01	1.65E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	4 / 4	6.80E-02	NC	NC	9.10E-02	6.80E-02	mg/kg	Mean	Footnote (2)
	Chrysene	4 / 4	1.53E-01	NC	NC	2.00E-01	1.53E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	4 / 4	3.23E-02	NC	NC	4.60E-02	3.23E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	4 / 4	1.04E-01	NC	NC	1.50E-01	1.04E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	2 / 4	1.22E-02	NC	NC	1.80E-02	1.22E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 2	1.30E+01	NC	NC	1.30E+01	1.30E+01	mg/kg	Maximum	Footnote (2)

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Warehouse and Laydown Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	22 / 22	1.51E-05	3.17E-05	95% Chebyshev (Mean, Sd) UCL	5.87E-05	1.51E-05	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	44 / 44	1.83E+01	3.85E+01	95% Chebyshev(Mean, Sd) UCL	1.90E+02	1.83E+01	mg/kg	Mean	Footnote (2)
	Cobalt	44 / 44	1.95E+01	4.55E+01	95% Chebyshev (Mean, Sd) UCL	2.40E+02	1.95E+01	mg/kg	Mean	Footnote (2)
	Manganese	44 / 44	3.99E+02	1.05E+03	95% Chebyshev(Mean, Sd) UCL	6.60E+03	3.99E+02	mg/kg	Mean	Footnote (2)
	Nickel	44 / 44	5.13E+02	1.53E+03	95% Chebyshev (Mean, Sd) UCL	8.00E+03	5.13E+02	mg/kg	Mean	Footnote (2)
	Thallium	29 / 44	1.31E-01	1.56E-01	95% KM Adjusted Gamma UCL	4.60E-01	1.31E-01	mg/kg	Mean	Footnote (2)
	Vanadium	50 / 50	2.24E+03	7.06E+03	95% Chebyshev (Mean, Sd) UCL	4.20E+04	2.24E+03	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	55 / 57	1.28E+00	5.19E+00	KM H-UCL	8.60E+00	1.28E+00	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	18 / 18	4.36E-01	5.83E-01	95% Student's-t UCL	1.20E+00	4.36E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	18 / 18	4.31E-01	5.77E-01	95% Student's-t UCL	1.20E+00	4.31E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	18 / 18	5.16E-01	6.81E-01	95% Student's-t UCL	1.40E+00	5.16E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	18 / 18	1.95E-01	2.58E-01	95% Student's-t UCL	5.40E-01	1.95E-01	mg/kg	Mean	Footnote (2)
	Chrysene	18 / 18	4.90E-01	6.39E-01	95% Student's-t UCL	1.30E+00	4.90E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	15 / 18	9.93E-02	1.50E-01	95% KM Adjusted Gamma UCL	3.10E-01	9.93E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	18 / 18	3.19E-01	4.42E-01	95% Student's-t UCL	1.10E+00	3.19E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	16 / 18	6.76E-02	1.14E-01	KM H-UCL	4.40E-01	6.76E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	7 / 12	9.62E+01	1.49E+02	95% KM (t) UCL	2.80E+02	9.62E+01	mg/kg	Mean	Footnote (2)

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Salvage Yard and Waste Storage Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	23 / 23	6.10E-05	1.08E-04	95% Adjusted Gamma UCL	4.84E-04	6.10E-05	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	3 / 3	1.14E+01	NC	NC	1.40E+01	1.14E+01	mg/kg	Mean	Footnote (2)
	Cobalt	3 / 3	1.03E+01	NC	NC	1.70E+01	1.03E+01	mg/kg	Mean	Footnote (2)
	Manganese	3 / 3	2.77E+02	NC	NC	5.00E+02	2.77E+02	mg/kg	Mean	Footnote (2)
	Nickel	3 / 3	1.69E+01	NC	NC	2.70E+01	1.69E+01	mg/kg	Mean	Footnote (2)
	Thallium	3 / 3	1.80E-01	NC	NC	2.00E-01	1.80E-01	mg/kg	Mean	Footnote (2)
	Vanadium	3 / 3	2.47E+01	NC	NC	3.60E+01	2.47E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	40 / 41	1.14E+00	2.15E+00	Gamma Adjusted KM-UCL	1.40E+01	1.14E+00	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	18 / 19	8.21E-01	1.34E+00	Gamma Adjusted KM-UCL	2.50E+00	8.21E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	18 / 19	7.80E-01	1.29E+00	Gamma Adjusted KM-UCL	2.50E+00	7.80E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	18 / 19	1.17E+00	2.03E+00	Gamma Adjusted KM-UCL	5.00E+00	1.17E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	18 / 19	3.57E-01	4.92E-01	95% KM (t) UCL	1.30E+00	3.57E-01	mg/kg	Mean	Footnote (2)
	Chrysene	18 / 19	8.58E-01	1.41E+00	95% GROS Adjusted Gamma UCL	2.50E+00	8.58E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	15 / 19	1.42E-01	2.40E-01	Gamma Adjusted KM-UCL	5.10E-01	1.42E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	18 / 19	5.90E-01	9.69E-01	Gamma Adjusted KM-UCL	2.00E+00	5.90E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	17 / 19	1.12E-01	1.66E-01	95% KM Adjusted Gamma UCL	3.20E-01	1.12E-01	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	5 / 5	1.30E+03	NC	NC	3.40E+03	1.30E+03	mg/kg	Mean	Footnote (2)

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic Mean (mg/kg) [(1)]	95% UCL (mg/kg) [(2)]	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Stores and Fleet Maintenance Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	14 / 14	6.19E-06	1.45E-05	95% Adjusted Gamma UCL	2.23E-05	6.19E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	8 / 8	5.25E+00	NC	NC	7.50E+00	5.25E+00	mg/kg	Mean	Footnote (2)
	Cobalt	8 / 8	4.48E+00	NC	NC	7.90E+00	4.48E+00	mg/kg	Mean	Footnote (2)
	Manganese	8 / 8	1.18E+02	NC	NC	2.20E+02	1.18E+02	mg/kg	Mean	Footnote (2)
	Nickel	8 / 8	1.13E+01	NC	NC	3.10E+01	1.13E+01	mg/kg	Mean	Footnote (2)
	Thallium	5 / 8	1.03E-01	NC	NC	1.70E-01	1.03E-01	mg/kg	Mean	Footnote (2)
	Vanadium	8 / 8	2.08E+01	NC	NC	3.00E+01	2.08E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	24 / 27	6.80E-01	1.35E+00	Gamma Adjusted KM-UCL	4.80E+00	6.80E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	12 / 13	2.42E-01	3.70E-01	95% KM (t) UCL	9.00E-01	2.42E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	12 / 13	2.49E-01	5.41E-01	Gamma Adjusted KM-UCL	1.10E+00	2.49E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	12 / 13	3.24E-01	6.87E-01	Gamma Adjusted KM-UCL	1.40E+00	3.24E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	12 / 13	1.32E-01	2.73E-01	Gamma Adjusted KM-UCL	5.20E-01	1.32E-01	mg/kg	Mean	Footnote (2)
	Chrysene	12 / 13	3.02E-01	6.82E-01	Gamma Adjusted KM-UCL	1.40E+00	3.02E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	12 / 13	5.68E-02	1.39E-01	Gamma Adjusted KM-UCL	2.90E-01	5.68E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	12 / 13	1.92E-01	4.37E-01	Gamma Adjusted KM-UCL	9.00E-01	1.92E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	12 / 13	2.78E-02	4.00E-02	95% KM (t) UCL	6.70E-02	2.78E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	3 / 8	3.98E+01	NC	NC	1.70E+02	3.98E+01	mg/kg	Mean	Footnote (2)

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Offices and Parking Lot	**Dioxin**									
	2,3,7,8-TCDD-TEQ	2 / 2	9.63E-06	NC	NC	1.37E-05	9.63E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	3 / 3	2.97E+00	NC	NC	3.70E+00	2.97E+00	mg/kg	Mean	Footnote (2)
	Cobalt	3 / 3	6.87E+00	NC	NC	1.10E+01	6.87E+00	mg/kg	Mean	Footnote (2)
	Manganese	3 / 3	1.87E+02	NC	NC	2.60E+02	1.87E+02	mg/kg	Mean	Footnote (2)
	Nickel	3 / 3	2.27E+01	NC	NC	3.00E+01	2.27E+01	mg/kg	Mean	Footnote (2)
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	3 / 3	1.93E+01	NC	NC	2.30E+01	1.93E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	5 / 5	2.34E-01	NC	NC	3.30E-01	2.34E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	28 / 30	1.24E+00	2.79E+00	Gamma Adjusted KM-UCL	1.40E+01	1.24E+00	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	28 / 30	1.11E+00	2.27E+00	Gamma Adjusted KM-UCL	1.10E+01	1.11E+00	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	28 / 30	1.33E+00	2.58E+00	Gamma Adjusted KM-UCL	1.20E+01	1.33E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	26 / 30	5.25E-01	1.12E+00	Gamma Adjusted KM-UCL	5.50E+00	5.25E-01	mg/kg	Mean	Footnote (2)
	Chrysene	28 / 30	1.17E+00	2.45E+00	Gamma Adjusted KM-UCL	1.20E+01	1.17E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	25 / 30	2.47E-01	4.70E-01	Gamma Adjusted KM-UCL	2.20E+00	2.47E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	28 / 30	7.78E-01	1.51E+00	Gamma Adjusted KM-UCL	7.10E+00	7.78E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	20 / 30	3.93E-02	7.92E-02	Gamma Adjusted KM-UCL	4.10E-01	3.93E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	ND	--	--	--	--	ND	--	--	--

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Substation #7	**Dioxin**									
	2,3,7,8-TCDD-TEQ	1 / 1	4.37E-06	NC	NC	4.37E-06	4.37E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	4 / 4	1.00E+01	NC	NC	3.30E+01	1.00E+01	mg/kg	Mean	Footnote (2)
	Cobalt	4 / 4	4.03E+00	NC	NC	4.70E+00	4.03E+00	mg/kg	Mean	Footnote (2)
	Manganese	4 / 4	1.98E+02	NC	NC	3.70E+02	1.98E+02	mg/kg	Mean	Footnote (2)
	Nickel	4 / 4	1.04E+01	NC	NC	1.40E+01	1.04E+01	mg/kg	Mean	Footnote (2)
	Thallium	1 / 4	1.38E-01	NC	NC	2.50E-01	1.38E-01	mg/kg	Mean	Footnote (2)
	Vanadium	4 / 4	1.46E+01	NC	NC	2.30E+01	1.46E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	11 / 13	4.62E-01	8.85E+00	95% KM Bootstrap t UCL	5.10E+00	4.62E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	4 / 5	4.01E-01	NC	NC	1.80E+00	4.01E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	4 / 5	3.17E-01	NC	NC	1.40E+00	3.17E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	4 / 5	7.13E-01	NC	NC	3.20E+00	7.13E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	4 / 5	3.65E-01	NC	NC	1.70E+00	3.65E-01	mg/kg	Mean	Footnote (2)
	Chrysene	4 / 5	7.10E-01	NC	NC	3.20E+00	7.10E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	4 / 5	9.44E-02	NC	NC	4.00E-01	9.44E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	4 / 5	2.95E-01	NC	NC	1.30E+00	2.95E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	4 / 5	2.70E-02	NC	NC	6.70E-02	2.70E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 4	1.90E+01	NC	NC	2.00E+01	1.90E+01	mg/kg	Mean	Footnote (2)

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Transformer Shop	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	1 / 1	1.70E+00	NC	NC	1.70E+00	1.70E+00	mg/kg	Maximum	Footnote (2)
	Cobalt	1 / 1	2.70E+00	NC	NC	2.70E+00	2.70E+00	mg/kg	Maximum	Footnote (2)
	Manganese	1 / 1	2.60E+02	NC	NC	2.60E+02	2.60E+02	mg/kg	Maximum	Footnote (2)
	Nickel	1 / 1	1.60E+01	NC	NC	1.60E+01	1.60E+01	mg/kg	Maximum	Footnote (2)
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	1 / 1	9.70E+00	NC	NC	9.70E+00	9.70E+00	mg/kg	Maximum	Footnote (2)
	PCBs									
	Total PCBs	47 / 48	1.89E+02	2.01E+03	99% KM (Chebyshev) UCL	8.80E+03	1.89E+02	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	13 / 25	3.24E-01	7.49E-01	Gamma Adjusted KM-UCL	2.00E+00	3.24E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	11 / 25	2.86E-01	6.52E-01	Gamma Adjusted KM-UCL	1.70E+00	2.86E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	13 / 25	3.80E-01	8.16E-01	Gamma Adjusted KM-UCL	2.10E+00	3.80E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	11 / 25	1.42E-01	2.33E-01	95% KM (t) UCL	7.90E-01	1.42E-01	mg/kg	Mean	Footnote (2)
	Chrysene	13 / 25	3.23E-01	7.36E-01	Gamma Adjusted KM-UCL	1.90E+00	3.23E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	9 / 25	7.51E-02	1.22E-01	95% KM (t) UCL	4.50E-01	7.51E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	12 / 25	2.41E-01	3.91E-01	95% KM (t) UCL	1.40E+00	2.41E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	8 / 25	1.70E-02	2.67E-02	95% KM (t) UCL	9.60E-02	1.70E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 2	4.90E+01	NC	NC	8.00E+01	8.00E+01	mg/kg	Maximum	Footnote (2)

Table 5-11
Exposure Point Concentration Summary — Surface Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Vehicle Refueling Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	ND	--	--	--	--	ND	--	--	--
	Cobalt	ND	--	--	--	--	ND	--	--	--
	Manganese	ND	--	--	--	--	ND	--	--	--
	Nickel	ND	--	--	--	--	ND	--	--	--
	Thallium	ND	--	--	--	--	ND	--	--	--
	Vanadium	ND	--	--	--	--	ND	--	--	--
	PCBs									
	Total PCBs	2 / 2	7.40E-02	NC	NC	1.40E-01	7.40E-02	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	2 / 2	1.75E+00	NC	NC	2.60E+00	1.75E+00	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	2 / 2	8.85E-01	NC	NC	1.30E+00	8.85E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	2 / 2	1.48E+00	NC	NC	2.20E+00	1.48E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	2 / 2	4.60E-01	NC	NC	6.10E-01	4.60E-01	mg/kg	Mean	Footnote (2)
	Chrysene	2 / 2	1.71E+00	NC	NC	2.50E+00	1.71E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	2 / 2	2.15E-01	NC	NC	3.10E-01	2.15E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	2 / 2	5.55E-01	NC	NC	7.80E-01	5.55E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	2 / 2	3.43E-01	NC	NC	6.30E-01	3.43E-01	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 1	3.80E+02	NC	NC	3.80E+02	3.80E+02	mg/kg	Mean	Footnote (2)

Notes:

CTE - Central Tendency Exposure.
EPC - Exposure Point Concentration.
NC - Not Calculated.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
UCL - Upper confidence limit.
(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meier method to handle detection limits.
(2) The EPC is the detected concentration for datasets with only one detected result. The EPC is the arithmetic mean for datasets with multiple detects, calculated as described above, in footnote (1).

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Hypothetical Future Park Land/Green Space	**Dioxin**									
	2,3,7,8-TCDD-TEQ	4 / 4	1.14E-06	NC	NC	2.51E-06	2.51E-06	mg/kg	Max	Footnote (4)
	Inorganics									
	Arsenic	4 / 4	1.81E+00	NC	NC	2.60E+00	2.60E+00	mg/kg	Max	Footnote (4)
	Cobalt	4 / 4	5.85E+01	NC	NC	1.30E+02	1.30E+02	mg/kg	Max	Footnote (4)
	Manganese	4 / 4	2.09E+02	NC	NC	3.70E+02	3.70E+02	mg/kg	Max	Footnote (4)
	Nickel	4 / 4	7.08E+00	NC	NC	1.20E+01	1.20E+01	mg/kg	Max	Footnote (4)
	Thallium	2 / 4	4.50E-02	NC	NC	5.30E-02	5.30E-02	mg/kg	Max	Footnote (4)
	Vanadium	4 / 4	2.37E+01	NC	NC	5.80E+01	5.80E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	6 / 19	1.42E-02	2.66E-02	95% KM (t) UCL	9.20E-02	2.66E-02	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	10 / 13	1.05E-01	1.56E-01	95% KM (t) UCL	2.90E-01	1.56E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	10 / 13	1.04E-01	1.50E-01	95% KM (t) UCL	2.90E-01	1.50E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	10 / 13	1.24E-01	1.85E-01	95% KM (t) UCL	3.90E-01	1.85E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	10 / 13	5.03E-01	7.24E-02	95% KM (t) UCL	1.30E-01	7.24E-02	mg/kg	95% UCL	Footnote (2)
	Chrysene	10 / 13	1.13E-01	1.63E-01	95% KM (t) UCL	3.10E-01	1.63E-01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	10 / 13	2.30E-02	3.33E-02	95% KM (t) UCL	7.60E-02	3.33E-02	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	10 / 13	7.09E-02	1.06E-01	95% KM (t) UCL	2.50E-01	1.06E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	8 / 13	7.97E-03	1.15E-02	95% KM (t) UCL	1.80E-02	1.15E-02	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 11	1.30E+01	NC	NC	1.30E+01	1.30E+01	mg/kg	Max	Footnote (4)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Warehouse and Laydown Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	25 / 25	1.35E-05	2.85E-05	95% Chebyshev(Mean, Sd) UCL	5.87E-05	2.85E-05	mg/kg	95% UCL	Footnote (2,5)
	Inorganics									
	Arsenic	74 / 74	1.40E+01	2.70E+01	95% Chebyshev(Mean, Sd) UCL	1.90E+02	2.70E+01	mg/kg	95% UCL	Footnote (2,5)
	Cobalt	74 / 74	1.41E+01	2.99E+01	95% Chebyshev (Mean, Sd) UCL	2.40E+02	2.99E+01	mg/kg	95% UCL	Footnote (2)
	Manganese	74 / 74	3.12E+02	7.05E+02	95% Chebyshev(Mean, Sd) UCL	6.60E+03	7.05E+02	mg/kg	95% UCL	Footnote (2,5)
	Nickel	74 / 74	3.20E+02	9.36E+02	95% Chebyshev (Mean, Sd) UCL	8.00E+03	9.36E+02	mg/kg	95% UCL	Footnote (2)
	Thallium	58 / 74	1.46E-01	2.45E-01	95% KM (Chebyshev) UCL	1.60E+00	2.45E-01	mg/kg	95% UCL	Footnote (2)
	Vanadium	80 / 80	1.47E+03	4.51E+03	95% Chebyshev (Mean, Sd) UCL	4.20E+04	4.51E+03	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	152 / 172	1.16E+00	8.34E+00	KM H-UCL	1.40E+01	8.34E+00	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	62 / 70	1.02E+00	2.85E+00	KM H-UCL	3.90E+01	2.85E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	58 / 70	9.08E-01	1.78E+00	KM H-UCL	3.40E+01	1.78E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	60 / 70	1.11E+00	3.90E+00	95% KM (Chebyshev) UCL	4.50E+01	3.90E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	59 / 70	3.99E-01	6.01E-01	KM H-UCL	1.60E+01	6.01E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	62 / 70	1.15E+00	3.94E+00	95% KM (Chebyshev) UCL	4.50E+01	3.94E+00	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	53 / 70	1.99E-01	2.54E-01	KM H-UCL	7.40E+00	2.54E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	58 / 70	5.70E-01	1.21E+00	KM H-UCL	2.10E+01	1.21E+00	mg/kg	95% UCL	Footnote (2)
	Naphthalene	57 / 70	7.16E-02	9.07E-02	95% KM Approximate Gamma UCL	4.40E-01	9.07E-02	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	40 / 71	6.53E+02	8.23E+02	KM H-UCL	1.10E+04	8.23E+02	mg/kg	95% UCL	Footnote (2)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Salvage Yard and Waste Storage Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	30 / 30	4.87E-05	8.23E-05	95% Adjusted Gamma UCL	4.84E-04	8.23E-05	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Arsenic	9 / 9	5.42E+00	NC	NC	1.40E+01	1.40E+01	mg/kg	Max	Footnote (4)
	Cobalt	9 / 9	6.11E+00	NC	NC	1.70E+01	1.70E+01	mg/kg	Max	Footnote (4)
	Manganese	9 / 9	1.42E+02	NC	NC	5.00E+02	5.00E+02	mg/kg	Max	Footnote (4)
	Nickel	9 / 9	1.08E+01	NC	NC	2.70E+01	2.70E+01	mg/kg	Max	Footnote (4)
	Thallium	9 / 9	1.30E-01	NC	NC	2.00E-01	2.00E-01	mg/kg	Max	Footnote (4)
	Vanadium	9 / 9	2.37E+01	NC	NC	3.60E+01	3.60E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	90 / 110	6.59E-01	1.32E+00	95% KM (Chebyshev) UCL	1.40E+01	1.32E+00	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	81 / 97	1.02E+01	2.35E+01	KM H-UCL	5.30E+02	2.35E+01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	80 / 97	8.48E+00	2.14E+01	KM H-UCL	4.20E+02	2.14E+01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	79 / 97	1.03E+01	2.21E+01	KM H-UCL	5.10E+02	2.21E+01	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	78 / 97	4.03E+00	5.87E+00	KM H-UCL	2.00E+02	5.87E+00	mg/kg	95% UCL	Footnote (2)
	Chrysene	82 / 97	9.11E+00	2.51E+01	KM H-UCL	4.50E+02	2.51E+01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	67 / 97	1.10E+00	9.18E-01	KM H-UCL	6.20E+01	9.18E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	79 / 97	5.45E+00	1.29E+01	KM H-UCL	2.60E+02	1.29E+01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	71 / 97	1.80E+00	7.24E-01	KM H-UCL	1.30E+02	7.24E-01	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	13 / 25	6.63E+02	2.09E+03	Gamma Adjusted KM-UCL	7.90E+03	2.09E+03	mg/kg	95% UCL	Footnote (2)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [(3)]	Rationale
Stores and Fleet Maintenance Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	16 / 16	5.51E-06	1.25E-05	95% Adjusted Gamma UCL	2.23E-05	1.25E-05	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Arsenic	11 / 11	4.49E+00	5.56E+00	95% Student's-t UCL	7.50E+00	5.56E+00	mg/kg	95% UCL	Footnote (2)
	Cobalt	11 / 11	3.99E+00	5.09E+00	95% Student's-t UCL	7.90E+00	5.09E+00	mg/kg	95% UCL	Footnote (2)
	Manganese	11 / 11	1.18E+02	1.55E+02	95% Student's-t UCL	2.30E+02	1.55E+02	mg/kg	95% UCL	Footnote (2)
	Nickel	11 / 11	9.05E+00	2.19E+01	95% Chebyshev(Mean, Sd) UCL	3.10E+01	2.19E+01	mg/kg	95% UCL	Footnote (2,5)
	Thallium	7 / 11	9.16E-02	1.17E-01	95% KM (t) UCL	1.70E-01	1.17E-01	mg/kg	95% UCL	Footnote (2)
	Vanadium	11 / 11	1.99E+01	2.37E+01	95% Student's-t UCL	3.00E+01	2.37E+01	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	56 / 76	4.94E-01	7.14E-01	95% KM Approximate Gamma UCL	4.80E+00	7.14E-01	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	40 / 44	1.13E+00	4.63E+00	95% KM (Chebyshev) UCL	3.50E+01	4.63E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	40 / 44	6.65E-01	2.31E+00	95% KM (Chebyshev) UCL	1.60E+01	2.31E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	40 / 44	1.18E+00	4.66E+00	95% KM (Chebyshev) UCL	3.50E+01	4.66E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	39 / 44	3.02E-01	4.46E-01	KM H-UCL	7.10E+00	4.46E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	40 / 44	1.07E+00	4.25E+00	95% KM (Chebyshev) UCL	3.20E+01	4.25E+00	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	35 / 44	1.28E-01	1.69E-01	KM H-UCL	2.90E+00	1.69E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	39 / 44	3.87E-01	6.11E-01	KM H-UCL	7.80E+00	6.11E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	37 / 44	5.77E-02	8.86E-02	KM H-UCL	6.80E-01	8.86E-02	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	7 / 24	5.15E+01	7.82E+01	95% KM (t) UCL	2.80E+02	7.82E+01	mg/kg	95% UCL	Footnote (2)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Offices and Parking Lot	**Dioxin**									
	2,3,7,8-TCDD-TEQ	4 / 4	6.57E-06	NC	NC	1.37E-05	1.37E-05	mg/kg	Max	Footnote (4)
	Inorganics									
	Arsenic	6 / 6	3.08E+00	NC	NC	4.20E+00	4.20E+00	mg/kg	Max	Footnote (4)
	Cobalt	6 / 6	8.25E+00	NC	NC	1.30E+01	1.30E+01	mg/kg	Max	Footnote (4)
	Manganese	6 / 6	2.05E+02	NC	NC	4.00E+02	4.00E+02	mg/kg	Max	Footnote (4)
	Nickel	6 / 6	1.83E+01	NC	NC	3.00E+01	3.00E+01	mg/kg	Max	Footnote (4)
	Thallium	3 / 6	8.89E-02	NC	NC	1.30E-01	1.30E-01	mg/kg	Max	Footnote (4)
	Vanadium	6 / 6	2.42E+01	NC	NC	3.60E+01	3.60E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	11 / 22	1.08E-01	1.73E-01	95% KM (t) UCL	7.10E-01	1.73E-01	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	152 / 165	1.07E+01	3.07E+01	95% KM (Chebyshev) UCL	7.20E+02	3.07E+01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	147 / 165	9.48E+00	2.72E+01	95% KM (Chebyshev) UCL	6.40E+02	2.72E+01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	148 / 165	9.11E+00	2.15E+01	95% KM (Chebyshev) UCL	4.20E+02	2.15E+01	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	142 / 165	6.15E+00	2.15E+01	95% KM (Chebyshev) UCL	5.70E+02	2.15E+01	mg/kg	95% UCL	Footnote (2)
	Chrysene	151 / 165	9.54E+00	2.68E+01	95% KM (Chebyshev) UCL	6.20E+02	2.68E+01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	129 / 165	1.80E+00	7.68E+00	KM H-UCL	1.00E+02	7.68E+00	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	147 / 165	6.29E+00	1.68E+01	95% KM (Chebyshev) UCL	3.80E+02	1.68E+01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	105 / 165	1.06E+00	1.12E+00	KM H-UCL	1.00E+02	1.12E+00	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 12	1.86E+01	NC	NC	2.30E+01	2.30E+01	mg/kg	Max	Footnote (4)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Substation #7	**Dioxin**									
	2,3,7,8-TCDD-TEQ	2 / 2	2.37E-06	NC	NC	4.37E-06	4.37E-06	mg/kg	Max	Footnote (4)
	Inorganics									
	Arsenic	7 / 7	6.64E+00	NC	NC	3.30E+01	3.30E+01	mg/kg	Max	Footnote (4)
	Cobalt	7 / 7	3.79E+00	NC	NC	4.70E+00	4.70E+00	mg/kg	Max	Footnote (4)
	Manganese	7 / 7	1.34E+02	NC	NC	3.70E+02	3.70E+02	mg/kg	Max	Footnote (4)
	Nickel	7 / 7	7.56E+00	NC	NC	1.40E+01	1.40E+01	mg/kg	Max	Footnote (4)
	Thallium	3 / 7	6.44E-02	NC	NC	2.50E-01	2.50E-01	mg/kg	Max	Footnote (4)
	Vanadium	7 / 7	1.60E+01	NC	NC	3.20E+01	3.20E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	13 / 25	2.41E-01	1.56E+00	Gamma Adjusted KM-UCL	5.10E+00	1.56E+00	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	6 / 12	1.71E-01	4.47E+00	95% KM Bootstrap t UCL	1.80E+00	1.80E+00	mg/kg	Max	Footnote (4)
	Benzo(a)pyrene	6 / 12	1.36E-01	1.34E+00	99% KM (Chebyshev) UCL	1.40E+00	1.34E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	7 / 12	2.99E-01	1.07E+01	95% KM Bootstrap t UCL	3.20E+00	3.20E+00	mg/kg	Max	Footnote (4)
	Benzo(k)fluoranthene	6 / 12	1.54E-01	1.62E+00	99% KM (Chebyshev) UCL	1.70E+00	1.62E+00	mg/kg	95% UCL	Footnote (2)
	Chrysene	6 / 12	2.99E-01	1.44E+01	95% KM Bootstrap t UCL	3.20E+00	3.20E+00	mg/kg	Max	Footnote (4)
	Dibenzo(a,h)anthracene	6 / 12	4.04E-02	9.72E-01	95% KM Bootstrap t UCL	4.00E-01	4.00E-01	mg/kg	Max	Footnote (4)
	Indeno(1,2,3-cd)pyrene	6 / 12	1.26E-01	3.32E+00	95% KM Bootstrap t UCL	1.30E+00	1.30E+00	mg/kg	Max	Footnote (4)
	Naphthalene	4 / 12	1.41E-02	NC	NC	6.70E-02	6.70E-02	mg/kg	Max	Footnote (4)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 14	1.82E+01	NC	NC	2.00E+01	2.00E+01	mg/kg	Max	Footnote (4)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Transformer Shop	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	3 / 3	3.40E+00	NC	NC	7.70E+00	7.70E+00	mg/kg	Max	Footnote (4)
	Cobalt	3 / 3	3.47E+00	NC	NC	6.50E+00	6.50E+00	mg/kg	Max	Footnote (4)
	Manganese	3 / 3	1.57E+02	NC	NC	2.60E+02	2.60E+02	mg/kg	Max	Footnote (4)
	Nickel	3 / 3	1.39E+01	NC	NC	2.30E+01	2.30E+01	mg/kg	Max	Footnote (4)
	Thallium	2 / 3	1.13E-01	NC	NC	1.70E-01	1.70E-01	mg/kg	Max	Footnote (4)
	Vanadium	3 / 3	1.66E+01	NC	NC	2.30E+01	2.30E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	125 / 136	7.46E+01	1.26E+02	KM H-UCL	8.80E+03	1.26E+02	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	79 / 99	2.23E+00	3.04E+00	95% KM Approximate Gamma UCL	2.30E+01	3.04E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	77 / 99	1.87E+00	2.52E+00	95% KM Approximate Gamma UCL	1.80E+01	2.52E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	79 / 99	2.44E+00	3.25E+00	95% KM Approximate Gamma UCL	2.30E+01	3.25E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	74 / 99	9.18E-01	1.22E+00	95% KM Approximate Gamma UCL	8.20E+00	1.22E+00	mg/kg	95% UCL	Footnote (2)
	Chrysene	79 / 99	2.05E+00	2.77E+00	95% KM Approximate Gamma UCL	2.00E+01	2.77E+00	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	68 / 99	4.25E-01	5.67E-01	95% KM Approximate Gamma UCL	4.20E+00	5.67E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	79 / 99	1.38E+00	1.82E+00	95% KM Approximate Gamma UCL	1.30E+01	1.82E+00	mg/kg	95% UCL	Footnote (2)
	Naphthalene	47 / 99	9.91E-02	1.94E-01	KM H-UCL	1.10E+00	1.94E-01	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	3 / 12	1.86E+01	NC	NC	8.00E+01	8.00E+01	mg/kg	Max	Footnote (4)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [(3)]	Rationale
Vehicle Refueling Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	5 / 5	2.48E+00	NC	NC	3.70E+00	3.70E+00	mg/kg	Max	Footnote (4)
	Cobalt	5 / 5	5.52E+00	NC	NC	7.30E+00	7.30E+00	mg/kg	Max	Footnote (4)
	Manganese	5 / 5	1.41E+02	NC	NC	2.00E+02	2.00E+02	mg/kg	Max	Footnote (4)
	Nickel	5 / 5	6.34E+00	NC	NC	1.20E+01	1.20E+01	mg/kg	Max	Footnote (4)
	Thallium	4 / 5	1.03E-01	NC	NC	1.50E-01	1.50E-01	mg/kg	Max	Footnote (4)
	Vanadium	5 / 5	2.18E+01	NC	NC	2.90E+01	2.90E+01	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	10 / 19	2.32E-02	6.03E-02	Gamma Adjusted KM-UCL	1.40E-01	6.03E-02	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	16 / 19	3.73E-01	8.96E-01	Gamma Adjusted KM-UCL	2.60E+00	8.96E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(a)pyrene	14 / 19	3.28E-01	6.81E-01	Gamma Adjusted KM-UCL	1.40E+00	6.81E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	15 / 19	4.40E-01	1.01E+00	Gamma Adjusted KM-UCL	2.30E+00	1.01E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	14 / 19	1.26E-01	2.63E-01	Gamma Adjusted KM-UCL	6.10E-01	2.63E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	16 / 19	3.91E-01	8.78E-01	Gamma Adjusted KM-UCL	2.50E+00	8.78E-01	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	11 / 19	7.31E-02	1.17E-01	95% KM (t) UCL	3.10E-01	1.17E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	14 / 19	2.11E-01	4.50E-01	Gamma Adjusted KM-UCL	1.00E+00	4.50E-01	mg/kg	95% UCL	Footnote (2)
	Naphthalene	12 / 19	7.18E-02	2.37E-01	Gamma Adjusted KM-UCL	6.30E-01	2.37E-01	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	5 / 12	7.07E+01	NC	NC	3.80E+02	3.80E+02	mg/kg	Max	Footnote (4)

Table 5-12
Exposure Point Concentration Summary — Soil (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale

Notes:

EPC - Exposure Point Concentration.

PCB - Polychlorinated Biphenyl.

NC - Not Calculated.

ND - Not Detected in this area.

RME - Reasonable Maximum Exposure.

SVOC - Semivolatile Organic Compound

TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.

TPH - Total Petroleum Hydrocarbon

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meier method to handle detection limits.

(2) 95% Upper Confidence Limit (UCL) on the arithmetic mean concentration calculated using USEPA ProUCL Version 5.1. The UCL suggested by ProUCL is used, unless otherwise noted. In cases where more than one UCL is suggested, the higher UCL is used, unless otherwise noted. Where too few samples or detects are available, the 95% UCL is not calculated. See text for details.

(3) The EPC is equal to the 95% UCL where a sufficient number of samples and/or detects are available. The EPC is equal to the maximum detected concentration where a sufficient number of samples and/or detects are not available to calculate a UCL. See text for details.

(4) The 95% UCL exceeded the maximum detected concentration or was not calculated due to small sample size, and the maximum detected concentration was selected as the EPC.

(5) ProUCL recommended the H-Stat UCL. Alternate UCL selected based on ProUCL technical guidance and review of data.

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Hypothetical Future Park Land/Green Space	**Dioxin**									
	2,3,7,8-TCDD-TEQ	4 / 4	1.14E-06	NC	NC	2.51E-06	1.14E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	4 / 4	1.81E+00	NC	NC	2.60E+00	1.81E+00	mg/kg	Mean	Footnote (2)
	Cobalt	4 / 4	5.85E+01	NC	NC	1.30E+02	5.85E+01	mg/kg	Mean	Footnote (2)
	Manganese	4 / 4	2.09E+02	NC	NC	3.70E+02	2.09E+02	mg/kg	Mean	Footnote (2)
	Nickel	4 / 4	7.08E+00	NC	NC	1.20E+01	7.08E+00	mg/kg	Mean	Footnote (2)
	Thallium	2 / 4	4.50E-02	NC	NC	5.30E-02	4.50E-02	mg/kg	Mean	Footnote (2)
	Vanadium	4 / 4	2.37E+01	NC	NC	5.80E+01	2.37E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	6 / 19	1.42E-02	2.66E-02	95% KM (t) UCL	9.20E-02	1.42E-02	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	10 / 13	1.05E-01	1.56E-01	95% KM (t) UCL	2.90E-01	1.05E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	10 / 13	1.04E-01	1.50E-01	95% KM (t) UCL	2.90E-01	1.04E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	10 / 13	1.24E-01	1.85E-01	95% KM (t) UCL	3.90E-01	1.24E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	10 / 13	5.03E-01	7.24E-02	95% KM (t) UCL	1.30E-01	5.03E-01	mg/kg	Mean	Footnote (2)
	Chrysene	10 / 13	1.13E-01	1.63E-01	95% KM (t) UCL	3.10E-01	1.13E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	10 / 13	2.30E-02	3.33E-02	95% KM (t) UCL	7.60E-02	2.30E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	10 / 13	7.09E-02	1.06E-01	95% KM (t) UCL	2.50E-01	7.09E-02	mg/kg	Mean	Footnote (2)
	Naphthalene	8 / 13	7.97E-03	1.15E-02	95% KM (t) UCL	1.80E-02	7.97E-03	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 11	1.30E+01	NC	NC	1.30E+01	1.30E+01	mg/kg	Maximum	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Warehouse and Laydown Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	25 / 25	1.35E-05	2.85E-05	95% Chebyshev(Mean, Sd) UCL	5.87E-05	1.35E-05	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	74 / 74	1.40E+01	2.70E+01	95% Chebyshev(Mean, Sd) UCL	1.90E+02	1.40E+01	mg/kg	Mean	Footnote (2)
	Cobalt	74 / 74	1.41E+01	2.99E+01	95% Chebyshev (Mean, Sd) UCL	2.40E+02	1.41E+01	mg/kg	Mean	Footnote (2)
	Manganese	74 / 74	3.12E+02	7.05E+02	95% Chebyshev(Mean, Sd) UCL	6.60E+03	3.12E+02	mg/kg	Mean	Footnote (2)
	Nickel	74 / 74	3.20E+02	9.36E+02	95% Chebyshev (Mean, Sd) UCL	8.00E+03	3.20E+02	mg/kg	Mean	Footnote (2)
	Thallium	58 / 74	1.46E-01	2.45E-01	95% KM (Chebyshev) UCL	1.60E+00	1.46E-01	mg/kg	Mean	Footnote (2)
	Vanadium	80 / 80	1.47E+03	4.51E+03	95% Chebyshev (Mean, Sd) UCL	4.20E+04	1.47E+03	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	152 / 172	1.16E+00	8.34E+00	KM H-UCL	1.40E+01	1.16E+00	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	62 / 70	1.02E+00	2.85E+00	KM H-UCL	3.90E+01	1.02E+00	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	58 / 70	9.08E-01	1.78E+00	KM H-UCL	3.40E+01	9.08E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	60 / 70	1.11E+00	3.90E+00	95% KM (Chebyshev) UCL	4.50E+01	1.11E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	59 / 70	3.99E-01	6.01E-01	KM H-UCL	1.60E+01	3.99E-01	mg/kg	Mean	Footnote (2)
	Chrysene	62 / 70	1.15E+00	3.94E+00	95% KM (Chebyshev) UCL	4.50E+01	1.15E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	53 / 70	1.99E-01	2.54E-01	KM H-UCL	7.40E+00	1.99E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	58 / 70	5.70E-01	1.21E+00	KM H-UCL	2.10E+01	5.70E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	57 / 70	7.16E-02	9.07E-02	95% KM Approximate Gamma UCL	4.40E-01	7.16E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	40 / 71	6.53E+02	8.23E+02	KM H-UCL	1.10E+04	6.53E+02	mg/kg	Mean	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Salvage Yard and Waste Storage Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	30 / 30	4.87E-05	8.23E-05	95% Adjusted Gamma UCL	4.84E-04	4.87E-05	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	9 / 9	5.42E+00	NC	NC	1.40E+01	5.42E+00	mg/kg	Mean	Footnote (2)
	Cobalt	9 / 9	6.11E+00	NC	NC	1.70E+01	6.11E+00	mg/kg	Mean	Footnote (2)
	Manganese	9 / 9	1.42E+02	NC	NC	5.00E+02	1.42E+02	mg/kg	Mean	Footnote (2)
	Nickel	9 / 9	1.08E+01	NC	NC	2.70E+01	1.08E+01	mg/kg	Mean	Footnote (2)
	Thallium	9 / 9	1.30E-01	NC	NC	2.00E-01	1.30E-01	mg/kg	Mean	Footnote (2)
	Vanadium	9 / 9	2.37E+01	NC	NC	3.60E+01	2.37E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	90 / 110	6.59E-01	1.32E+00	95% KM (Chebyshev) UCL	1.40E+01	6.59E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	81 / 97	1.02E+01	2.35E+01	KM H-UCL	5.30E+02	1.02E+01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	80 / 97	8.48E+00	2.14E+01	KM H-UCL	4.20E+02	8.48E+00	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	79 / 97	1.03E+01	2.21E+01	KM H-UCL	5.10E+02	1.03E+01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	78 / 97	4.03E+00	5.87E+00	KM H-UCL	2.00E+02	4.03E+00	mg/kg	Mean	Footnote (2)
	Chrysene	82 / 97	9.11E+00	2.51E+01	KM H-UCL	4.50E+02	9.11E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	67 / 97	1.10E+00	9.18E-01	KM H-UCL	6.20E+01	1.10E+00	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	79 / 97	5.45E+00	1.29E+01	KM H-UCL	2.60E+02	5.45E+00	mg/kg	Mean	Footnote (2)
	Naphthalene	71 / 97	1.80E+00	7.24E-01	KM H-UCL	1.30E+02	1.80E+00	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	13 / 25	6.63E+02	2.09E+03	Gamma Adjusted KM-UCL	7.90E+03	6.63E+02	mg/kg	Mean	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Stores and Fleet Maintenance Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	16 / 16	5.51E-06	1.25E-05	95% Adjusted Gamma UCL	2.23E-05	5.51E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	11 / 11	4.49E+00	5.56E+00	95% Student's-t UCL	7.50E+00	4.49E+00	mg/kg	Mean	Footnote (2)
	Cobalt	11 / 11	3.99E+00	5.09E+00	95% Student's-t UCL	7.90E+00	3.99E+00	mg/kg	Mean	Footnote (2)
	Manganese	11 / 11	1.18E+02	1.55E+02	95% Student's-t UCL	2.30E+02	1.18E+02	mg/kg	Mean	Footnote (2)
	Nickel	11 / 11	9.05E+00	2.19E+01	95% Chebyshev(Mean, Sd) UCL	3.10E+01	9.05E+00	mg/kg	Mean	Footnote (2)
	Thallium	7 / 11	9.16E-02	1.17E-01	95% KM (t) UCL	1.70E-01	9.16E-02	mg/kg	Mean	Footnote (2)
	Vanadium	11 / 11	1.99E+01	2.37E+01	95% Student's-t UCL	3.00E+01	1.99E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	56 / 76	4.94E-01	7.14E-01	95% KM Approximate Gamma UCL	4.80E+00	4.94E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	40 / 44	1.13E+00	4.63E+00	95% KM (Chebyshev) UCL	3.50E+01	1.13E+00	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	40 / 44	6.65E-01	2.31E+00	95% KM (Chebyshev) UCL	1.60E+01	6.65E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	40 / 44	1.18E+00	4.66E+00	95% KM (Chebyshev) UCL	3.50E+01	1.18E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	39 / 44	3.02E-01	4.46E-01	KM H-UCL	7.10E+00	3.02E-01	mg/kg	Mean	Footnote (2)
	Chrysene	40 / 44	1.07E+00	4.25E+00	95% KM (Chebyshev) UCL	3.20E+01	1.07E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	35 / 44	1.28E-01	1.69E-01	KM H-UCL	2.90E+00	1.28E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	39 / 44	3.87E-01	6.11E-01	KM H-UCL	7.80E+00	3.87E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	37 / 44	5.77E-02	8.86E-02	KM H-UCL	6.80E-01	5.77E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	7 / 24	5.15E+01	7.82E+01	95% KM (t) UCL	2.80E+02	5.15E+01	mg/kg	Mean	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Offices and Parking Lot	**Dioxin**									
	2,3,7,8-TCDD-TEQ	4 / 4	6.57E-06	NC	NC	1.37E-05	6.57E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	6 / 6	3.08E+00	NC	NC	4.20E+00	3.08E+00	mg/kg	Mean	Footnote (2)
	Cobalt	6 / 6	8.25E+00	NC	NC	1.30E+01	8.25E+00	mg/kg	Mean	Footnote (2)
	Manganese	6 / 6	2.05E+02	NC	NC	4.00E+02	2.05E+02	mg/kg	Mean	Footnote (2)
	Nickel	6 / 6	1.83E+01	NC	NC	3.00E+01	1.83E+01	mg/kg	Mean	Footnote (2)
	Thallium	3 / 6	8.89E-02	NC	NC	1.30E-01	8.89E-02	mg/kg	Mean	Footnote (2)
	Vanadium	6 / 6	2.42E+01	NC	NC	3.60E+01	2.42E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	11 / 22	1.08E-01	1.73E-01	95% KM (t) UCL	7.10E-01	1.08E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	152 / 165	1.07E+01	3.07E+01	95% KM (Chebyshev) UCL	7.20E+02	1.07E+01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	147 / 165	9.48E+00	2.72E+01	95% KM (Chebyshev) UCL	6.40E+02	9.48E+00	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	148 / 165	9.11E+00	2.15E+01	95% KM (Chebyshev) UCL	4.20E+02	9.11E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	142 / 165	6.15E+00	2.15E+01	95% KM (Chebyshev) UCL	5.70E+02	6.15E+00	mg/kg	Mean	Footnote (2)
	Chrysene	151 / 165	9.54E+00	2.68E+01	95% KM (Chebyshev) UCL	6.20E+02	9.54E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	129 / 165	1.80E+00	7.68E+00	KM H-UCL	1.00E+02	1.80E+00	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	147 / 165	6.29E+00	1.68E+01	95% KM (Chebyshev) UCL	3.80E+02	6.29E+00	mg/kg	Mean	Footnote (2)
	Naphthalene	105 / 165	1.06E+00	1.12E+00	KM H-UCL	1.00E+02	1.06E+00	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 12	1.86E+01	NC	NC	2.30E+01	2.30E+01	mg/kg	Maximum	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Substation #7	**Dioxin**									
	2,3,7,8-TCDD-TEQ	2 / 2	2.37E-06	NC	NC	4.37E-06	2.37E-06	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	7 / 7	6.64E+00	NC	NC	3.30E+01	6.64E+00	mg/kg	Mean	Footnote (2)
	Cobalt	7 / 7	3.79E+00	NC	NC	4.70E+00	3.79E+00	mg/kg	Mean	Footnote (2)
	Manganese	7 / 7	1.34E+02	NC	NC	3.70E+02	1.34E+02	mg/kg	Mean	Footnote (2)
	Nickel	7 / 7	7.56E+00	NC	NC	1.40E+01	7.56E+00	mg/kg	Mean	Footnote (2)
	Thallium	3 / 7	6.44E-02	NC	NC	2.50E-01	6.44E-02	mg/kg	Mean	Footnote (2)
	Vanadium	7 / 7	1.60E+01	NC	NC	3.20E+01	1.60E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	13 / 25	2.41E-01	1.56E+00	Gamma Adjusted KM-UCL	5.10E+00	2.41E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	6 / 12	1.71E-01	4.47E+00	95% KM Bootstrap t UCL	1.80E+00	1.71E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	6 / 12	1.36E-01	1.34E+00	99% KM (Chebyshev) UCL	1.40E+00	1.36E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	7 / 12	2.99E-01	1.07E+01	95% KM Bootstrap t UCL	3.20E+00	2.99E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	6 / 12	1.54E-01	1.62E+00	99% KM (Chebyshev) UCL	1.70E+00	1.54E-01	mg/kg	Mean	Footnote (2)
	Chrysene	6 / 12	2.99E-01	1.44E+01	95% KM Bootstrap t UCL	3.20E+00	2.99E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	6 / 12	4.04E-02	9.72E-01	95% KM Bootstrap t UCL	4.00E-01	4.04E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	6 / 12	1.26E-01	3.32E+00	95% KM Bootstrap t UCL	1.30E+00	1.26E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	4 / 12	1.41E-02	NC	NC	6.70E-02	1.41E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	1 / 14	1.82E+01	NC	NC	2.00E+01	2.00E+01	mg/kg	Maximum	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Transformer Shop	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	--	--	--
	Inorganics									
	Arsenic	3 / 3	3.40E+00	NC	NC	7.70E+00	3.40E+00	mg/kg	Mean	Footnote (2)
	Cobalt	3 / 3	3.47E+00	NC	NC	6.50E+00	3.47E+00	mg/kg	Mean	Footnote (2)
	Manganese	3 / 3	1.57E+02	NC	NC	2.60E+02	1.57E+02	mg/kg	Mean	Footnote (2)
	Nickel	3 / 3	1.39E+01	NC	NC	2.30E+01	1.39E+01	mg/kg	Mean	Footnote (2)
	Thallium	2 / 3	1.13E-01	NC	NC	1.70E-01	1.13E-01	mg/kg	Mean	Footnote (2)
	Vanadium	3 / 3	1.66E+01	NC	NC	2.30E+01	1.66E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	125 / 136	7.46E+01	1.26E+02	KM H-UCL	8.80E+03	7.46E+01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	79 / 99	2.23E+00	3.04E+00	95% KM Approximate Gamma UCL	2.30E+01	2.23E+00	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	77 / 99	1.87E+00	2.52E+00	95% KM Approximate Gamma UCL	1.80E+01	1.87E+00	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	79 / 99	2.44E+00	3.25E+00	95% KM Approximate Gamma UCL	2.30E+01	2.44E+00	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	74 / 99	9.18E-01	1.22E+00	95% KM Approximate Gamma UCL	8.20E+00	9.18E-01	mg/kg	Mean	Footnote (2)
	Chrysene	79 / 99	2.05E+00	2.77E+00	95% KM Approximate Gamma UCL	2.00E+01	2.05E+00	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	68 / 99	4.25E-01	5.67E-01	95% KM Approximate Gamma UCL	4.20E+00	4.25E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	79 / 99	1.38E+00	1.82E+00	95% KM Approximate Gamma UCL	1.30E+01	1.38E+00	mg/kg	Mean	Footnote (2)
	Naphthalene	47 / 99	9.91E-02	1.94E-01	KM H-UCL	1.10E+00	9.91E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	3 / 12	1.86E+01	NC	NC	8.00E+01	1.86E+01	mg/kg	Mean	Footnote (2)

Table 5-13
Exposure Point Concentration Summary — Soil (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Soil (0-16 feet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Vehicle Refueling Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	ND	--	--	--	--	ND	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	5 / 5	2.48E+00	NC	NC	3.70E+00	2.48E+00	mg/kg	Mean	Footnote (2)
	Cobalt	5 / 5	5.52E+00	NC	NC	7.30E+00	5.52E+00	mg/kg	Mean	Footnote (2)
	Manganese	5 / 5	1.41E+02	NC	NC	2.00E+02	1.41E+02	mg/kg	Mean	Footnote (2)
	Nickel	5 / 5	6.34E+00	NC	NC	1.20E+01	6.34E+00	mg/kg	Mean	Footnote (2)
	Thallium	4 / 5	1.03E-01	NC	NC	1.50E-01	1.03E-01	mg/kg	Mean	Footnote (2)
	Vanadium	5 / 5	2.18E+01	NC	NC	2.90E+01	2.18E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	10 / 19	2.32E-02	6.03E-02	Gamma Adjusted KM-UCL	1.40E-01	2.32E-02	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	16 / 19	3.73E-01	8.96E-01	Gamma Adjusted KM-UCL	2.60E+00	3.73E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	14 / 19	3.28E-01	6.81E-01	Gamma Adjusted KM-UCL	1.40E+00	3.28E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	15 / 19	4.40E-01	1.01E+00	Gamma Adjusted KM-UCL	2.30E+00	4.40E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	14 / 19	1.26E-01	2.63E-01	Gamma Adjusted KM-UCL	6.10E-01	1.26E-01	mg/kg	Mean	Footnote (2)
	Chrysene	16 / 19	3.91E-01	8.78E-01	Gamma Adjusted KM-UCL	2.50E+00	3.91E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	11 / 19	7.31E-02	1.17E-01	95% KM (t) UCL	3.10E-01	7.31E-02	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	14 / 19	2.11E-01	4.50E-01	Gamma Adjusted KM-UCL	1.00E+00	2.11E-01	mg/kg	Mean	Footnote (2)
	Naphthalene	12 / 19	7.18E-02	2.37E-01	Gamma Adjusted KM-UCL	6.30E-01	7.18E-02	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	5 / 12	7.07E+01	NC	NC	3.80E+02	7.07E+01	mg/kg	Mean	Footnote (2)

Notes:

CTE - Central Tendency Exposure.

EPC - Exposure Point Concentration.

NC - Not Calculated.

ND - Not Detected in this area.

PCB - Polychlorinated Biphenyl.

SVOC - Semivolatile Organic Compound

TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.

TPH - Total Petroleum Hydrocarbon

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meier method to handle detection limits.

(2) The EPC is the detected concentration for datasets with only one detected result. The EPC is the arithmetic mean for datasets with multiple detects, calculated as described above, in footnote (1).

Table 5-14
Exposure Point Concentration Summary — Groundwater for the Excavation Trench (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic Mean [(1)] (ug/L)	95% UCL [(2)] (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [(3)]	Rationale
Hypothetical Future Park Land/Green Space	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	3 / 20	3.07E-01	NC	NC	1.20E+00	1.20E+00	ug/L	Max	Footnote (4)
	Methyl tert-Butyl Ether (MTBE)	11 / 20	7.56E-01	1.28E+00	95% GROS Adjusted Gamma UCL	3.90E+00	1.28E+00	ug/L	95% UCL	Footnote (2)
	Tetrachloroethylene	13 / 20	3.77E+00	1.00E+01	Gamma Adjusted KM-UCL	3.00E+01	1.00E+01	ug/L	95% UCL	Footnote (2)
	Trichloroethene	6 / 20	7.64E-01	1.34E+00	95% KM (t) UCL	5.90E+00	1.34E+00	ug/L	95% UCL	Footnote (2)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--
Warehouse and Laydown Area	**VOCs**									
	Bromodichloromethane	1 / 20	3.60E-01	NC	NC	3.60E-01	3.60E-01	ug/L	Max	Footnote (4)
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	7 / 20	7.59E-01	1.06E+00	95% KM (t) UCL	2.10E+00	1.06E+00	ug/L	95% UCL	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	8 / 20	9.56E-01	1.22E+00	95% KM (t) UCL	3.10E+00	1.22E+00	ug/L	95% UCL	Footnote (2)
	Tetrachloroethylene	5 / 21	1.18E+00	NC	NC	1.50E+01	1.50E+01	ug/L	Max	Footnote (4)
	Trichloroethene	3 / 21	6.62E-01	NC	NC	2.30E+00	2.30E+00	ug/L	Max	Footnote (4)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--
Salvage Yard and Waste Storage Area	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	ND	--	--	--	--	ND	--	--	--
	Methyl tert-Butyl Ether (MTBE)	8 / 8	1.56E+00	NC	NC	4.90E+00	4.90E+00	ug/L	Max	Footnote (4)
	Tetrachloroethylene	2 / 8	2.40E-01	NC	NC	2.70E-01	2.70E-01	ug/L	Max	Footnote (4)
	Trichloroethene	ND	--	--	--	--	ND	--	--	--
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--

Table 5-14
Exposure Point Concentration Summary — Groundwater for the Excavation Trench (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (ug/L)	95% UCL [2] (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Stores and Fleet Maintenance Area	**VOCs**									
	Bromodichloromethane	1 / 13	1.12E+00	NC	NC	2.60E+00	2.60E+00	ug/L	Max	Footnote (4)
	Butyl alcohol, tert-	1 / 7	5.00E+01	NC	NC	1.10E+02	1.10E+02	ug/L	Max	Footnote (4)
	Chloroform	4 / 13	1.57E+00	NC	NC	1.50E+01	1.50E+01	ug/L	Max	Footnote (4)
	Methyl tert-Butyl Ether (MTBE)	10 / 13	8.72E+00	3.44E+01	95% KM Bootstrap t UCL	4.80E+01	3.44E+01	ug/L	95% UCL	Footnote (2)
	Tetrachloroethylene	8 / 15	2.31E+00	1.25E+01	97.5% KM (Chebyshev) UCL	2.40E+01	1.25E+01	ug/L	95% UCL	Footnote (2)
	Trichloroethene	2 / 15	3.85E-01	NC	NC	5.80E-01	5.80E-01	ug/L	Max	Footnote (4)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--
Offices and Parking Lot	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	2 / 7	4.60E-01	NC	NC	1.30E+00	1.30E+00	ug/L	Max	Footnote (4)
	Methyl tert-Butyl Ether (MTBE)	5 / 7	1.18E+00	NC	NC	5.00E+00	5.00E+00	ug/L	Max	Footnote (4)
	Tetrachloroethylene	19 / 27	1.12E+02	1.56E+02	95% KM (t) UCL	4.70E+02	1.56E+02	ug/L	95% UCL	Footnote (2)
	Trichloroethene	15 / 27	9.24E+00	1.29E+01	95% KM (t) UCL	4.10E+01	1.29E+01	ug/L	95% UCL	Footnote (2)
	Vinyl Chloride	1 / 27	1.16E+00	NC	NC	5.30E+00	5.30E+00	ug/L	Max	Footnote (4)
Substation #7	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	ND	--	--	--	--	ND	--	--	--
	Methyl tert-Butyl Ether (MTBE)	5 / 8	6.12E+00	NC	NC	2.10E+01	2.10E+01	ug/L	Max	Footnote (4)
	Tetrachloroethylene	4 / 8	6.85E-01	NC	NC	9.60E-01	9.60E-01	ug/L	Max	Footnote (4)
	Trichloroethene	1 / 8	1.70E-01	NC	NC	1.70E-01	1.70E-01	ug/L	Max	Footnote (4)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--

Table 5-14
Exposure Point Concentration Summary — Groundwater for the Excavation Trench (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (ug/L)	95% UCL (2) (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Transformer Shop	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	1 / 5	4.40E-01	NC	NC	4.40E-01	4.40E-01	ug/L	Max	Footnote (4)
	Methyl tert-Butyl Ether (MTBE)	ND	--	--	--	--	ND	--	--	--
	Tetrachloroethylene	1 / 5	2.00E-01	NC	NC	2.00E-01	2.00E-01	ug/L	Max	Footnote (4)
	Trichloroethene	ND	--	--	--	--	ND	--	--	--
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--
Vehicle Refueling Area	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	--
	Chloroform	1 / 6	1.38E+00	NC	NC	3.30E+00	3.30E+00	ug/L	Max	Footnote (4)
	Methyl tert-Butyl Ether (MTBE)	2 / 6	1.13E+00	NC	NC	1.60E+00	1.60E+00	ug/L	Max	Footnote (4)
	Tetrachloroethylene	1 / 6	2.60E-01	NC	NC	2.60E-01	2.60E-01	ug/L	Max	Footnote (4)
	Trichloroethene	ND	--	--	--	--	ND	--	--	--
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	--

Notes:

EPC - Exposure point concentration.

NC - Not Calculated; A sufficient number of samples is not available to calculate a UCL.

ND - Not Detected in this area.

RME - Reasonable maximum exposure.

VOC - Volatile Organic Compound.

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meier method to handle detection limits.

(2) 95% Upper Confidence Limit (UCL) on the arithmetic mean concentration calculated using USEPA ProUCL Version 5.1. The UCL suggested by ProUCL is used, unless otherwise noted. In cases where more than one UCL is suggested, the higher UCL is used, unless otherwise noted. Where too few samples or detects are available, the 95% UCL is not calculated.

(3) The EPC is equal to the 95% UCL where a sufficient number of samples and/or detects are available. The EPC is equal to the maximum detected concentration where a sufficient number of samples and/or detects are not available to calculate a UCL. Statistic: Maximum Detected Value (Max); 95% UCL (95% UCL).

(4) The 95% UCL exceeded the maximum detected concentration or was not calculated, and the maximum detected concentration was selected as the EPC.

Table 5-15
Exposure Point Concentration Summary — Groundwater for the Excavation Trench (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic[1] Mean (ug/L)	95% UCL (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Hypothetical Future Park Land/Green Space	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	--
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	3 / 20	3.07E-01	NC	NC	1.20E+00	3.07E-01	ug/L	Mean	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	11 / 20	7.56E-01	1.28E+00	95% GROS Adjusted Gamma UCL	3.90E+00	7.56E-01	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	13 / 20	3.77E+00	1.00E+01	Gamma Adjusted KM-UCL	3.00E+01	3.77E+00	ug/L	Mean	Footnote (2)
	Trichloroethene	6 / 20	7.64E-01	1.34E+00	95% KM (t) UCL	5.90E+00	7.64E-01	ug/L	Mean	Footnote (2)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	
Warehouse and Laydown Area	**VOCs**									
	Bromodichloromethane	1 / 20	3.60E-01	NC	NC	3.60E-01	3.60E-01	ug/L	Max	Footnote (2)
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	7 / 20	7.59E-01	1.06E+00	95% KM (t) UCL	2.10E+00	7.59E-01	ug/L	Mean	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	8 / 20	9.56E-01	1.22E+00	95% KM (t) UCL	3.10E+00	9.56E-01	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	5 / 21	1.18E+00	NC	NC	1.50E+01	1.18E+00	ug/L	Mean	Footnote (2)
	Trichloroethene	3 / 21	6.62E-01	NC	NC	2.30E+00	6.62E-01	ug/L	Mean	Footnote (2)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	
Salvage Yard and Waste Storage Area	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	ND	--	--	--	--	ND	--	--	
	Methyl tert-Butyl Ether (MTBE)	8 / 8	1.56E+00	NC	NC	4.90E+00	1.56E+00	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	2 / 8	2.40E-01	NC	NC	2.70E-01	2.40E-01	ug/L	Mean	Footnote (2)
	Trichloroethene	ND	--	--	--	--	ND	--	--	
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	

Table 5-15
Exposure Point Concentration Summary — Groundwater for the Excavation Trench (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic[(1)] Mean (ug/L)	95% UCL (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Stores and Fleet Maintenance Area	**VOCs**									
	Bromodichloromethane	1 / 13	1.12E+00	NC	NC	2.60E+00	2.60E+00	ug/L	Max	Footnote (2)
	Butyl alcohol, tert-	1 / 7	5.00E+01	NC	NC	1.10E+02	1.10E+02	ug/L	Max	Footnote (2)
	Chloroform	4 / 13	1.57E+00	NC	NC	1.50E+01	1.57E+00	ug/L	Mean	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	10 / 13	8.72E+00	3.44E+01	95% KM Bootstrap t UCL	4.80E+01	8.72E+00	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	8 / 15	2.31E+00	1.25E+01	97.5% KM (Chebyshev) UCL	2.40E+01	2.31E+00	ug/L	Mean	Footnote (2)
	Trichloroethene	2 / 15	3.85E-01	NC	NC	5.80E-01	3.85E-01	ug/L	Mean	Footnote (2)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	
Offices and Parking Lot	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	2 / 7	4.60E-01	NC	NC	1.30E+00	4.60E-01	ug/L	Mean	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	5 / 7	1.18E+00	NC	NC	5.00E+00	1.18E+00	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	19 / 27	1.12E+02	1.56E+02	95% KM (t) UCL	4.70E+02	1.12E+02	ug/L	Mean	Footnote (2)
	Trichloroethene	15 / 27	9.24E+00	1.29E+01	95% KM (t) UCL	4.10E+01	9.24E+00	ug/L	Mean	Footnote (2)
	Vinyl Chloride	1 / 27	1.16E+00	NC	NC	5.30E+00	5.30E+00	ug/L	Max	Footnote (2)
Substation #7	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	ND	--	--	--	--	ND	--	--	
	Methyl tert-Butyl Ether (MTBE)	5 / 8	6.12E+00	NC	NC	2.10E+01	6.12E+00	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	4 / 8	6.85E-01	NC	NC	9.60E-01	6.85E-01	ug/L	Mean	Footnote (2)
	Trichloroethene	1 / 8	1.70E-01	NC	NC	1.70E-01	1.70E-01	ug/L	Max	Footnote (2)
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	

Table 5-15
Exposure Point Concentration Summary — Groundwater for the Excavation Trench (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (ug/L)	95% UCL (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Transformer Shop	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	1 / 5	4.40E-01	NC	NC	4.40E-01	4.40E-01	ug/L	Max	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	ND	--	--	--	--	ND	--	--	
	Tetrachloroethylene	1 / 5	2.00E-01	NC	NC	2.00E-01	2.00E-01	ug/L	Max	Footnote (2)
	Trichloroethene	ND	--	--	--	--	ND	--	--	
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	
Vehicle Refueling Area	**VOCs**									
	Bromodichloromethane	ND	--	--	--	--	ND	--	--	
	Butyl alcohol, tert-	ND	--	--	--	--	ND	--	--	
	Chloroform	1 / 6	1.38E+00	NC	NC	3.30E+00	3.30E+00	ug/L	Max	Footnote (2)
	Methyl tert-Butyl Ether (MTBE)	2 / 6	1.13E+00	NC	NC	1.60E+00	1.13E+00	ug/L	Mean	Footnote (2)
	Tetrachloroethylene	1 / 6	2.60E-01	NC	NC	2.60E-01	2.60E-01	ug/L	Max	Footnote (2)
	Trichloroethene	ND	--	--	--	--	ND	--	--	
	Vinyl Chloride	ND	--	--	--	--	ND	--	--	

Notes:

CTE - Central Tendency Exposure.

EPC - Exposure Point Concentration.

NC - Not Calculated.

ND - Not Detected in this area.

VOC - Volatile Organic Compound.

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meier method to handle detection limits.

(2) The EPC is the detected concentration for datasets with only one detected result. The EPC is the arithmetic mean for datasets with multiple detects, calculated as described above, in footnote (1).

Table 5-16
Exposure Point Concentration Summary — Fringe Surface Sediment (RME) (4)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Fringe Surface Sediment

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME) Value	Units	Statistic (3)	Rationale
Waterside Investigation Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	24 / 24	7.25E-05	2.13E-04	95% Chebyshev (Mean, Sd) UCL	7.07E-04	2.13E-04	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Aluminum	41 / 41	8.07E+03	8.92E+03	95% Student's-t UCL	1.55E+04	8.92E+03	mg/kg	95% UCL	Footnote (2)
	Antimony	41 / 41	1.93E+00	6.43E+00	95% Chebyshev (Mean, Sd) UCL	4.30E+01	6.43E+00	mg/kg	95% UCL	Footnote (2,5)
	Arsenic	41 / 41	5.56E+00	6.55E+00	95% Adjusted Gamma UCL	1.70E+01	6.55E+00	mg/kg	95% UCL	Footnote (2)
	Cobalt	41 / 41	1.51E+01	1.65E+01	95% Student's-t UCL	3.20E+01	1.65E+01	mg/kg	95% UCL	Footnote (2)
	Cyanide	11 / 13	8.76E-01	3.40E+00	95% KM Bootstrap t UCL	4.90E+00	3.40E+00	mg/kg	95% UCL	Footnote (2)
	Manganese	41 / 41	2.10E+02	2.34E+02	95% Adjusted Gamma UCL	4.30E+02	2.34E+02	mg/kg	95% UCL	Footnote (2)
	Nickel	41 / 41	5.07E+01	6.02E+01	95% Adjusted Gamma UCL	1.60E+02	6.02E+01	mg/kg	95% UCL	Footnote (2)
	Thallium	41 / 41	2.10E-01	2.38E-01	95% Modified-t UCL	6.30E-01	2.38E-01	mg/kg	95% UCL	Footnote (2)
	Vanadium	41 / 41	8.70E+01	1.49E+02	95% Chebyshev (Mean, Sd) UCL	4.40E+02	1.49E+02	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	41 / 41	4.47E-01	5.93E-01	95% Adjusted Gamma UCL	1.90E+00	5.93E-01	mg/kg	95% UCL	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	32 / 32	5.90E-01	1.25E+00	99% Chebyshev (Mean, Sd) UCL	2.30E+00	1.25E+00	mg/kg	95% UCL	Footnote (2,5)
	Benzo(a)pyrene	32 / 32	6.50E-01	7.62E-01	95% Adjusted Gamma UCL	2.00E+00	7.62E-01	mg/kg	95% UCL	Footnote (2)
	Benzo(b)fluoranthene	32 / 32	9.70E-01	1.12E+00	95% Adjusted Gamma UCL	2.60E+00	1.12E+00	mg/kg	95% UCL	Footnote (2)
	Benzo(k)fluoranthene	32 / 32	3.55E-01	4.07E-01	95% Student's-t UCL	9.60E-01	4.07E-01	mg/kg	95% UCL	Footnote (2)
	Chrysene	32 / 32	8.76E-01	1.01E+00	95% Adjusted Gamma UCL	2.40E+00	1.01E+00	mg/kg	95% UCL	Footnote (2)
	Dibenzo(a,h)anthracene	30 / 32	1.48E-01	1.79E-01	95% KM Adjusted Gamma UCL, 95% GROS Adjusted Gamma UCL	4.70E-01	1.79E-01	mg/kg	95% UCL	Footnote (2)
	Indeno(1,2,3-cd)pyrene	32 / 32	5.70E-01	6.55E-01	95% Student's-t UCL	1.40E+00	6.55E-01	mg/kg	95% UCL	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	11 / 11	9.10E+01	1.25E+02	95% Adjusted Gamma UCL	2.20E+02	1.25E+02	mg/kg	95% UCL	Footnote (2)

Notes:

EPC - Exposure Point Concentration.
PCB - Polychlorinated Biphenyl.
RME - Reasonable Maximum Exposure.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meir method to handle detection limits.
(2) 95% Upper Confidence Limit (UCL) on the arithmetic mean concentration calculated using USEPA ProUCL Version 5.1. The UCL suggested by ProUCL is used, unless otherwise noted. In cases where more than one UCL is suggested, the higher UCL is used, unless otherwise noted. Where too few samples or detects are available, the 95% UCL is not calculated. See text for details.
(3) The EPC is equal to the 95% UCL where a sufficient number of samples and/or detects are available. The EPC is equal to the maximum detected concentration where a sufficient number of samples and/or detects are not available to calculate a UCL. See text for details.
(4) EPCs calculated based on fringe surface sediment samples available for exposure by human receptors. See text.
(5) ProUCL recommended the H-Stat UCL. Alternate UCL selected based on ProUCL technical guidance and review of data.

Table 5-17
Exposure Point Concentration Summary — Fringe Surface Sediment(CTE) (3)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Fringe Surface Sediment

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic	Rationale
Waterside Investigation Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	24 / 24	7.25E-05	2.13E-04	95% Chebyshev (Mean, Sd) UCL	7.07E-04	7.25E-05	mg/kg	Mean	Footnote (2)
	Inorganics									
	Aluminum	41 / 41	8.07E+03	8.92E+03	95% Student's-t UCL	1.55E+04	8.07E+03	mg/kg	Mean	Footnote (2)
	Antimony	41 / 41	1.93E+00	6.43E+00	95% Chebyshev (Mean, Sd) UCL	4.30E+01	1.93E+00	mg/kg	Mean	Footnote (2)
	Arsenic	41 / 41	5.56E+00	6.55E+00	95% Adjusted Gamma UCL	1.70E+01	5.56E+00	mg/kg	Mean	Footnote (2)
	Cobalt	41 / 41	1.51E+01	1.65E+01	95% Student's-t UCL	3.20E+01	1.51E+01	mg/kg	Mean	Footnote (2)
	Cyanide	11 / 13	8.76E-01	3.40E+00	95% KM Bootstrap t UCL	4.90E+00	8.76E-01	mg/kg	Mean	Footnote (2)
	Manganese	41 / 41	2.10E+02	2.34E+02	95% Adjusted Gamma UCL	4.30E+02	2.10E+02	mg/kg	Mean	Footnote (2)
	Nickel	41 / 41	5.07E+01	6.02E+01	95% Adjusted Gamma UCL	1.60E+02	5.07E+01	mg/kg	Mean	Footnote (2)
	Thallium	41 / 41	2.10E-01	2.38E-01	95% Modified-t UCL	6.30E-01	2.10E-01	mg/kg	Mean	Footnote (2)
	Vanadium	41 / 41	8.70E+01	1.49E+02	95% Chebyshev (Mean, Sd) UCL	4.40E+02	8.70E+01	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	41 / 41	4.47E-01	5.93E-01	95% Adjusted Gamma UCL	1.90E+00	4.47E-01	mg/kg	Mean	Footnote (2)
	SVOCs									
	Benzo(a)anthracene	32 / 32	5.90E-01	1.25E+00	99% Chebyshev (Mean, Sd) UCL	2.30E+00	5.90E-01	mg/kg	Mean	Footnote (2)
	Benzo(a)pyrene	32 / 32	6.50E-01	7.62E-01	95% Adjusted Gamma UCL	2.00E+00	6.50E-01	mg/kg	Mean	Footnote (2)
	Benzo(b)fluoranthene	32 / 32	9.70E-01	1.12E+00	95% Adjusted Gamma UCL	2.60E+00	9.70E-01	mg/kg	Mean	Footnote (2)
	Benzo(k)fluoranthene	32 / 32	3.55E-01	4.07E-01	95% Student's-t UCL	9.60E-01	3.55E-01	mg/kg	Mean	Footnote (2)
	Chrysene	32 / 32	8.76E-01	1.01E+00	95% Adjusted Gamma UCL	2.40E+00	8.76E-01	mg/kg	Mean	Footnote (2)
	Dibenzo(a,h)anthracene	30 / 32	1.48E-01	1.79E-01	95% KM Adjusted Gamma UCL, 95% GROS Adjusted Gamma UCL	4.70E-01	1.48E-01	mg/kg	Mean	Footnote (2)
	Indeno(1,2,3-cd)pyrene	32 / 32	5.70E-01	6.55E-01	95% Student's-t UCL	1.40E+00	5.70E-01	mg/kg	Mean	Footnote (2)
	TPH									
	Diesel Range Organics (C10-C20)	11 / 11	9.10E+01	1.25E+02	95% Adjusted Gamma UCL	2.20E+02	9.10E+01	mg/kg	Mean	Footnote (2)

Notes:
CTE - Central Tendency Exposure.
EPC - Exposure Point Concentration.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
UCL - Upper Confidence Limit.
(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meir method to handle detection limits.
(2) The EPC is the detected concentration for datasets with only one detected result. The EPC is the arithmetic mean for datasets with multiple detects.
(3) EPCs calculated based on fringe surface sediment samples available for exposure by human receptors. See text.

Table 5-18
Exposure Point Concentration Summary — Surface Water (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (ug/L)	95% UCL (2) (ug/L)	UCL Basis	Maximum Concentration (ug/L)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Waterside Investigation Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	5:5	4.08E-07	NC	NC	6.12E-07	6.12E-07	ug/L	Max	Footnote (4)
	Inorganics									
	Arsenic	10:10	7.80E-01	9.21E-01	95% Student's-t UCL	1.20E+00	9.21E-01	ug/L	95% UCL	Footnote (2)
	Cobalt	10:10	9.80E-01	1.04E+00	95% Student's-t UCL	1.10E+00	1.04E+00	ug/L	95% UCL	Footnote (2)
	Manganese	10:10	1.40E+02	1.48E+02	95% Student's-t UCL	1.70E+02	1.48E+02	ug/L	95% UCL	Footnote (2)
	Pesticides									
	4,4'-DDT	5:5	1.30E-03	NC	NC	1.60E-03	1.60E-03	ug/L	Max	Footnote (4)
	PCBs									
	Total PCBs	--	--	--	--	--	9.40E-03	ug/L	Lowest RL	Footnote (5)

Notes:

EPC - Exposure point concentration.

PCB - Polychlorinated Biphenyl.

RL - Reporting Limit.

RME - Reasonable maximum exposure.

TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meir method to handle detection limits.

(2) 95% Upper Confidence Limit (UCL) on the arithmetic mean concentration calculated using USEPA ProUCL Version 5.1. The UCL suggested by ProUCL is used, unless otherwise noted. In cases where more than one UCL is suggested, the higher UCL is used, unless otherwise noted. Where too few samples or detects are available, the 95% UCL is not calculated. See text for details.

(3) The EPC is equal to the 95% UCL where a sufficient number of samples and/or detects are available. The EPC is equal to the maximum detected concentration where a sufficient number of samples and/or detects are not available to calculate a UCL. See text for details.

(4) The 95% UCL exceeded the maximum detected concentration or was not calculated due to small sample size, and the maximum detected concentration was selected as the EPC.

(5) PCBs were not detected in Anacostia River surface water samples analyzed via Method 8082. Historical data analyzed via EPA 1668 suggest much lower concentrations in the 1 to 5 ng/L range. However, the lowest reporting limit (RL) for Method 8082 has been used, which is highly conservative.

Table 5-19
Exposure Point Concentration Summary — Surface Water (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (ug/L)	95% UCL (2) (ug/L)	UCL Basis	Maximum Concentration (Qualifier) (ug/L)	Exposure Point Concentration (CTE) Value	Units	Statistic	Rationale
Waterside Investigation Area	**Dioxin**									
	2,3,7,8-TCDD-TEQ	5:5	4.08E-07	NC	NC	6.12E-07	4.08E-07	ug/L	Mean	Footnote (2)
	Inorganics									
	Arsenic	10:10	7.80E-01	9.21E-01	95% Student's-t UCL	1.20E+00	7.80E-01	ug/L	Mean	Footnote (2)
	Cobalt	10:10	9.80E-01	1.04E+00	95% Student's-t UCL	1.10E+00	9.80E-01	ug/L	Mean	Footnote (2)
	Manganese	10:10	1.40E+02	1.48E+02	95% Student's-t UCL	1.70E+02	1.40E+02	ug/L	Mean	Footnote (2)
	Pesticides									
	4,4'-DDT	5:5	1.30E-03	NC	NC	1.60E-03	1.30E-03	ug/L	Mean	Footnote (2)
	PCBs									
	Total PCBs	--	--	--	--	--	9.40E-03	ug/L	Lowest RL	Footnote (3)

Notes:

CTE - Central tendency exposure.

EPC - Exposure point concentration.

PCB - Polychlorinated Biphenyl.

RL - Reporting Limit.

TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meir method to handle detection limits.

(2) The EPC is the detected concentration for datasets with only one detected result. The EPC is the arithmetic mean for datasets with multiple detects.

(3) PCBs were not detected in Anacostia River surface water samples analyzed via Method 8082. Historical data analyzed via EPA 1668 suggest much lower concentrations in the 1 to 5 ng/L range. However, the lowest reporting limit (RL) for Method 8082 has been used, which is highly conservative.

Table 5-20
Exposure Point Concentration Summary — Fish Tissue (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [3]	Rationale
Lower Anacostia	**Inorganics**									
	Arsenic	1 / 6	2.45E-02	NC	NC	2.45E-02	2.45E-02	mg/kg	Max	Footnote (4,5)
	Arsenic, Organic	1 / 6	2.21E-01	NC	NC	2.21E-01	2.21E-01	mg/kg	Max	Footnote (4,5)
	Mercury	6 / 6	7.20E-02	9.77E-02	95% Student's-t UCL	1.10E-01	9.77E-02	mg/kg	95% UCL	Footnote (2)
	Pesticides									
	4,4'-DDD	6 / 6	1.08E-02	6.66E-02	95% Adjusted Gamma UCL	3.32E-02	3.32E-02	mg/kg	Max	Footnote (4)
	4,4'-DDE	6 / 6	3.63E-02	6.62E-02	95% Student's-t UCL	1.01E-01	6.62E-02	mg/kg	95% UCL	Footnote (2)
	Aldrin	4 / 6	2.04E-04	4.02E-04	95% KM (t) UCL	6.17E-04	4.02E-04	mg/kg	95% UCL	Footnote (2)
	alpha-Chlordane	6 / 6	1.89E-02	3.60E-02	95% Student's-t UCL	5.27E-02	3.60E-02	mg/kg	95% UCL	Footnote (2)
	cis-Nonachlor	5 / 6	7.13E-03	1.55E-02	95% KM (t) UCL	2.60E-02	1.55E-02	mg/kg	95% UCL	Footnote (2)
	Dieldrin	6 / 6	6.21E-03	3.68E-02	95% Adjusted Gamma UCL	1.78E-02	1.78E-02	mg/kg	Max	Footnote (4)
	gamma-Chlordane	5 / 6	9.07E-03	1.98E-02	95% KM (t) UCL	2.61E-02	1.98E-02	mg/kg	95% UCL	Footnote (2)
	Heptachlor epoxide	6 / 6	2.35E-03	4.27E-03	95% Student's-t UCL	5.36E-03	4.27E-03	mg/kg	95% UCL	Footnote (2)
	Mirex	4 / 6	2.12E-04	3.92E-04	95% KM (t) UCL	4.96E-04	3.92E-04	mg/kg	95% UCL	Footnote (2)
	Oxychlordane	5 / 6	3.51E-03	8.13E-03	95% KM (t) UCL	1.43E-02	8.13E-03	mg/kg	95% UCL	Footnote (2)
	trans-Nonachlor	6 / 6	1.97E-02	4.48E-02	95% Student's-t UCL	8.02E-02	4.48E-02	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	6 / 6	3.17E-01	5.28E-01	95% Student's-t UCL	6.45E-01	5.28E-01	mg/kg	95% UCL	Footnote (2)
	PCB-TEQ	6 / 6	8.15E-06	1.40E-05	95% Student's-t UCL	1.80E-05	1.40E-05	mg/kg	95% UCL	Footnote (2)

Table 5-20
Exposure Point Concentration Summary — Fish Tissue (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [(1)] Mean (mg/kg)	95% UCL [(2)] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic [(3)]	Rationale
Upper Anacostia [(6)]	**Inorganics**									
	Mercury	7 / 7	1.08E-01	1.58E-01	95% Student's-t UCL	2.36E-01	1.58E-01	mg/kg	95% UCL	Footnote (2)
	Pesticides									
	4,4'-DDD	7 / 7	5.47E-03	2.04E-02	95% Adjusted Gamma UCL	2.19E-02	2.04E-02	mg/kg	95% UCL	Footnote (2)
	4,4'-DDE	7 / 7	1.56E-02	2.69E-02	95% Student's-t UCL	4.43E-02	2.69E-02	mg/kg	95% UCL	Footnote (2)
	Aldrin	5 / 7	1.46E-04	4.34E-04	KM H-UCL	3.82E-04	3.82E-04	mg/kg	Max	Footnote (4)
	alpha-Chlordane	7 / 7	9.58E-03	3.11E-02	95% Adjusted Gamma UCL	3.10E-02	3.10E-02	mg/kg	Max	Footnote (4)
	cis-Nonachlor	7 / 7	4.13E-03	1.13E-02	95% Adjusted Gamma UCL	1.29E-02	1.13E-02	mg/kg	95% UCL	Footnote (2)
	Dieldrin	7 / 7	2.89E-03	6.64E-03	95% Adjusted Gamma UCL	8.49E-03	6.64E-03	mg/kg	95% UCL	Footnote (2)
	gamma-Chlordane	7 / 7	3.47E-03	5.74E-03	95% Student's-t UCL	9.19E-03	5.74E-03	mg/kg	95% UCL	Footnote (2)
	Heptachlor epoxide	7 / 7	1.31E-03	2.14E-03	95% Student's-t UCL	3.69E-03	2.14E-03	mg/kg	95% UCL	Footnote (2)
	Mirex	5 / 7	1.76E-04	3.12E-04	95% KM (t) UCL	5.41E-04	3.12E-04	mg/kg	95% UCL	Footnote (2)
	Oxychlordane	7 / 7	1.82E-03	2.87E-03	95% Student's-t UCL	4.82E-03	2.87E-03	mg/kg	95% UCL	Footnote (2)
	trans-Nonachlor	7 / 7	1.07E-02	1.78E-02	95% Student's-t UCL	3.00E-02	1.78E-02	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	7 / 7	1.92E-01	3.59E-01	95% Student's-t UCL	6.81E-01	3.59E-01	mg/kg	95% UCL	Footnote (2)
	PCB-TEQ	7 / 7	1.30E-06	2.69E-06	95% Student's-t UCL	5.33E-06	2.69E-06	mg/kg	95% UCL	Footnote (2)

Table 5-20
Exposure Point Concentration Summary — Fish Tissue (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Lower Potomac	**Inorganics**									
	Arsenic	2 / 9	5.03E-02	NC	NC	3.71E-01	3.71E-01	mg/kg	Max	Footnote (4,5)
	Arsenic, Organic	2 / 9	4.53E-01	NC	NC	3.34E+00	3.34E+00	mg/kg	Max	Footnote (4,5)
	Mercury	9 / 9	8.31E-02	1.10E-01	95% Student's-t UCL	1.43E-01	1.10E-01	mg/kg	95% UCL	Footnote (2)
	Pesticides									
	4,4'-DDD	9 / 9	3.46E-03	8.29E-03	95% Adjusted Gamma UCL	1.40E-02	8.29E-03	mg/kg	95% UCL	Footnote (2)
	4,4'-DDE	9 / 9	1.71E-02	4.10E-02	95% Adjusted Gamma UCL	6.01E-02	4.10E-02	mg/kg	95% UCL	Footnote (2)
	alpha-Chlordane	9 / 9	5.71E-03	1.54E-02	95% Adjusted Gamma UCL	2.41E-02	1.54E-02	mg/kg	95% UCL	Footnote (2)
	Dieldrin	9 / 9	3.82E-03	6.62E-03	95% Student's-t UCL	1.48E-02	6.62E-03	mg/kg	95% UCL	Footnote (2)
	gamma-Chlordane	8 / 9	2.79E-03	7.97E-03	Gamma Adjusted KM-UCL	9.43E-03	7.97E-03	mg/kg	95% UCL	Footnote (2)
	Heptachlor epoxide	9 / 9	1.37E-03	3.11E-03	95% Adjusted Gamma UCL	5.60E-03	3.11E-03	mg/kg	95% UCL	Footnote (2)
	Oxychlordane	9 / 9	1.68E-03	3.86E-03	95% Adjusted Gamma UCL	7.25E-03	3.86E-03	mg/kg	95% UCL	Footnote (2)
	trans-Nonachlor	9 / 9	7.81E-03	1.94E-02	95% Adjusted Gamma UCL	3.58E-02	1.94E-02	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	9 / 9	1.64E-01	2.52E-01	95% Student's-t UCL	4.69E-01	2.52E-01	mg/kg	95% UCL	Footnote (2)
	PCB-TEQ	9 / 9	3.41E-06	5.46E-06	95% Student's-t UCL	7.47E-06	5.46E-06	mg/kg	95% UCL	Footnote (2)

Table 5-20
Exposure Point Concentration Summary — Fish Tissue (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Upper Potomac	**Inorganics**									
	Arsenic	5 / 9	2.39E-02	3.98E-02	95% KM (t) UCL	8.46E-02	3.98E-02	mg/kg	95% UCL	Footnote (2,5)
	Arsenic, Organic	5 / 9	2.15E-01	3.58E-01	95% KM (t) UCL	7.61E-01	3.58E-01	mg/kg	95% UCL	Footnote (2,5)
	Mercury	9 / 9	1.23E-01	1.61E-01	95% Student's-t UCL	2.41E-01	1.61E-01	mg/kg	95% UCL	Footnote (2)
	Pesticides									
	4,4'-DDD	9 / 9	1.03E-02	4.22E-02	95% Adjusted Gamma UCL	5.16E-02	4.22E-02	mg/kg	95% UCL	Footnote (2)
	4,4'-DDE	9 / 9	6.24E-02	3.97E-01	99% Chebyshev (Mean, Sd) UCL	2.43E-01	2.43E-01	mg/kg	Max	Footnote (4)
	Aldrin	5 / 9	2.21E-04	1.86E-03	95% KM Bootstrap t UCL	1.20E-03	1.20E-03	mg/kg	Max	Footnote (4)
	alpha-Chlordane	9 / 9	1.23E-02	5.10E-02	95% Adjusted Gamma UCL	5.37E-02	5.10E-02	mg/kg	95% UCL	Footnote (2)
	beta-BHC	9 / 9	6.91E-04	1.73E-03	95% Adjusted Gamma UCL	2.74E-03	1.73E-03	mg/kg	95% UCL	Footnote (2)
	cis-Nonachlor	8 / 9	3.87E-03	2.20E-02	95% KM Bootstrap t UCL	2.22E-02	2.20E-02	mg/kg	95% UCL	Footnote (2)
	Dieldrin	9 / 9	7.28E-03	2.87E-02	95% Adjusted Gamma UCL	3.78E-02	2.87E-02	mg/kg	95% UCL	Footnote (2)
	gamma-Chlordane	8 / 9	2.54E-03	4.64E-03	95% KM (t) UCL	8.76E-03	4.64E-03	mg/kg	95% UCL	Footnote (2)
	Heptachlor epoxide	9 / 9	1.97E-03	3.39E-03	95% Student's-t UCL	6.90E-03	3.39E-03	mg/kg	95% UCL	Footnote (2)
	Hexachlorobenzene	4 / 9	7.46E-04	1.55E-03	95% KM (t) UCL	3.50E-03	1.55E-03	mg/kg	95% UCL	Footnote (2)
	Mirex	4 / 9	1.75E-04	3.45E-04	95% KM (t) UCL	7.85E-04	3.45E-04	mg/kg	95% UCL	Footnote (2)
	Oxychlordane	9 / 9	1.87E-03	5.50E-03	95% Adjusted Gamma UCL	9.85E-03	5.50E-03	mg/kg	95% UCL	Footnote (2)
	trans-Nonachlor	8 / 9	1.05E-02	6.38E-02	Gamma Adjusted KM-UCL	6.26E-02	6.26E-02	mg/kg	Max	Footnote (4)
	PCBs									
	Total PCBs	9 / 9	4.59E-01	2.60E+00	99% Chebyshev (Mean, Sd) UCL	1.61E+00	1.61E+00	mg/kg	Max	Footnote (4)
	PCB-TEQ	9 / 9	1.48E-05	4.27E-05	95% Adjusted Gamma UCL	5.65E-05	4.27E-05	mg/kg	95% UCL	Footnote (2)

Table 5-20
Exposure Point Concentration Summary — Fish Tissue (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (RME)			
							Value	Units	Statistic (3)	Rationale
Upstream Non-Tidal Anacostia	**Dioxin**									
	2,3,7,8-TCDD-TEQ	28 / 28	9.74E-08	1.20E-07	95% Student's-t UCL	2.89E-07	1.20E-07	mg/kg	95% UCL	Footnote (2)
	Inorganics									
	Arsenic	24 / 24	6.43E-03	7.58E-03	95% Student's-t UCL	1.40E-02	7.58E-03	mg/kg	95% UCL	Footnote (2,5)
	Arsenic, Organic	24 / 24	5.79E-02	6.82E-02	95% Student's-t UCL	1.26E-01	6.82E-02	mg/kg	95% UCL	Footnote (2,5)
	Cobalt	12 / 24	1.21E-02	1.62E-02	95% KM Adjusted Gamma UCL	4.70E-02	1.62E-02	mg/kg	95% UCL	Footnote (2)
	Mercury	23 / 24	2.57E-01	2.98E-01	95% KM Adjusted Gamma UCL, 95% GROS Adjusted Gamma UCL	5.00E-01	2.98E-01	mg/kg	95% UCL	Footnote (2)
	Thallium	19 / 24	3.43E-03	3.85E-03	95% KM (t) UCL	6.20E-03	3.85E-03	mg/kg	95% UCL	Footnote (2)
	Pesticides									
	Chlordane	25 / 26	2.16E-02	2.61E-02	95% KM (t) UCL	6.20E-02	2.61E-02	mg/kg	95% UCL	Footnote (2)
	Dieldrin	23 / 26	1.54E-03	1.97E-03	95% KM (t) UCL	4.70E-03	1.97E-03	mg/kg	95% UCL	Footnote (2)
	Heptachlor epoxide	18 / 26	1.24E-03	1.72E-03	95% KM (t) UCL	4.80E-03	1.72E-03	mg/kg	95% UCL	Footnote (2)
	PCBs									
	Total PCBs	29 / 29	2.84E-02	3.31E-02	95% Adjusted Gamma UCL	5.97E-02	3.31E-02	mg/kg	95% UCL	Footnote (2)
	PCB-TEQ	29 / 29	6.65E-07	8.76E-07	95% Adjusted Gamma UCL	2.54E-06	8.76E-07	mg/kg	95% UCL	Footnote (2)

Notes:

EPC - Exposure point concentration.

NC - Not Calculated; a sufficient number of samples and/or detects is not available to calculate a UCL.

PCB - Polychlorinated Biphenyl.

PCB-TEQ - Polychlorinated Biphenyl Toxicity Equivalence.

RME - Reasonable maximum exposure.

TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meir method to handle detection limits.

(2) 95% Upper Confidence Limit (UCL) on the arithmetic mean concentration calculated using USEPA ProUCL Version 5.1. The UCL suggested by ProUCL is used, unless otherwise noted. In cases where more than one UCL is suggested, the higher UCL is used, unless otherwise noted. Where too few samples or detects are available, the 95% UCL is not calculated. See text for details.

(3) The EPC is equal to the 95% UCL where a sufficient number of samples and/or detects are available. The EPC is equal to the maximum detected concentration where a sufficient number of samples and/or detects are not available to calculate a UCL. See text for details.

(4) The 95% UCL exceeded the maximum detected concentration or was not calculated, and the maximum detected concentration was selected as the EPC.

(5) Organic and inorganic arsenic calculated assuming 90% of total arsenic is organic, and 10% is inorganic (FDA, 1993, Pinkney, 2017).

(6) The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.

Table 5-21
Exposure Point Concentration Summary — Fish Tissue (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic [2]	Rationale
Lower Anacostia	**Inorganics**									
	Arsenic	1 / 6	2.45E-02	NC	NC	2.45E-02	2.45E-02	mg/kg	Maximum	Footnote (2,3)
	Arsenic, Organic	1 / 6	2.21E-01	NC	NC	2.21E-01	2.21E-01	mg/kg	Maximum	Footnote (2,3)
	Mercury	6 / 6	7.20E-02	9.77E-02	95% Student's-t UCL	1.10E-01	7.20E-02	mg/kg	Mean	Footnote (2)
	Pesticides									
	4,4'-DDD	6 / 6	1.08E-02	6.66E-02	95% Adjusted Gamma UCL	3.32E-02	1.08E-02	mg/kg	Mean	Footnote (2)
	4,4'-DDE	6 / 6	3.63E-02	6.62E-02	95% Student's-t UCL	1.01E-01	3.63E-02	mg/kg	Mean	Footnote (2)
	Aldrin	4 / 6	2.04E-04	4.02E-04	95% KM (t) UCL	6.17E-04	2.04E-04	mg/kg	Mean	Footnote (2)
	alpha-Chlordane	6 / 6	1.89E-02	3.60E-02	95% Student's-t UCL	5.27E-02	1.89E-02	mg/kg	Mean	Footnote (2)
	cis-Nonachlor	5 / 6	7.13E-03	1.55E-02	95% KM (t) UCL	2.60E-02	7.13E-03	mg/kg	Mean	Footnote (2)
	Dieldrin	6 / 6	6.21E-03	3.68E-02	95% Adjusted Gamma UCL	1.78E-02	6.21E-03	mg/kg	Mean	Footnote (2)
	gamma-Chlordane	5 / 6	9.07E-03	1.98E-02	95% KM (t) UCL	2.61E-02	9.07E-03	mg/kg	Mean	Footnote (2)
	Heptachlor epoxide	6 / 6	2.35E-03	4.27E-03	95% Student's-t UCL	5.36E-03	2.35E-03	mg/kg	Mean	Footnote (2)
	Mirex	4 / 6	2.12E-04	3.92E-04	95% KM (t) UCL	4.96E-04	2.12E-04	mg/kg	Mean	Footnote (2)
	Oxychlordane	5 / 6	3.51E-03	8.13E-03	95% KM (t) UCL	1.43E-02	3.51E-03	mg/kg	Mean	Footnote (2)
	trans-Nonachlor	6 / 6	1.97E-02	4.48E-02	95% Student's-t UCL	8.02E-02	1.97E-02	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs (Congeners)	6 / 6	3.17E-01	5.28E-01	95% Student's-t UCL	6.45E-01	3.17E-01	mg/kg	Mean	Footnote (2)
	PCB-TEQ	6 / 6	8.15E-06	1.40E-05	95% Student's-t UCL	1.80E-05	8.15E-06	mg/kg	Mean	Footnote (2)

Table 5-21
Exposure Point Concentration Summary — Fish Tissue (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic [2]	Rationale
Upper Anacostia [4]	**Inorganics**									
	Mercury	7 / 7	1.08E-01	1.58E-01	95% Student's-t UCL	2.36E-01	1.08E-01	mg/kg	Mean	Footnote (2)
	Pesticides									
	4,4'-DDD	7 / 7	5.47E-03	2.04E-02	95% Adjusted Gamma UCL	2.19E-02	5.47E-03	mg/kg	Mean	Footnote (2)
	4,4'-DDE	7 / 7	1.56E-02	2.69E-02	95% Student's-t UCL	4.43E-02	1.56E-02	mg/kg	Mean	Footnote (2)
	Aldrin	5 / 7	1.46E-04	4.34E-04	KM H-UCL	3.82E-04	1.46E-04	mg/kg	Mean	Footnote (2)
	alpha-Chlordane	7 / 7	9.58E-03	3.11E-02	95% Adjusted Gamma UCL	3.10E-02	9.58E-03	mg/kg	Mean	Footnote (2)
	cis-Nonachlor	7 / 7	4.13E-03	1.13E-02	95% Adjusted Gamma UCL	1.29E-02	4.13E-03	mg/kg	Mean	Footnote (2)
	Dieldrin	7 / 7	2.89E-03	6.64E-03	95% Adjusted Gamma UCL	8.49E-03	2.89E-03	mg/kg	Mean	Footnote (2)
	gamma-Chlordane	7 / 7	3.47E-03	5.74E-03	95% Student's-t UCL	9.19E-03	3.47E-03	mg/kg	Mean	Footnote (2)
	Heptachlor epoxide	7 / 7	1.31E-03	2.14E-03	95% Student's-t UCL	3.69E-03	1.31E-03	mg/kg	Mean	Footnote (2)
	Mirex	5 / 7	1.76E-04	3.12E-04	95% KM (t) UCL	5.41E-04	1.76E-04	mg/kg	Mean	Footnote (2)
	Oxychlordane	7 / 7	1.82E-03	2.87E-03	95% Student's-t UCL	4.82E-03	1.82E-03	mg/kg	Mean	Footnote (2)
	trans-Nonachlor	7 / 7	1.07E-02	1.78E-02	95% Student's-t UCL	3.00E-02	1.07E-02	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	7 / 7	1.92E-01	3.59E-01	95% Student's-t UCL	6.81E-01	1.92E-01	mg/kg	Mean	Footnote (2)
	PCB-TEQ	7 / 7	1.30E-06	2.69E-06	95% Student's-t UCL	5.33E-06	1.30E-06	mg/kg	Mean	Footnote (2)

Table 5-21
Exposure Point Concentration Summary — Fish Tissue (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic [2]	Rationale
Lower Potomac	**Inorganics**									
	Arsenic	2 / 9	5.03E-02	NC	NC	3.71E-01	5.03E-02	mg/kg	Mean	Footnote (2,3)
	Arsenic, Organic	2 / 9	4.53E-01	NC	NC	3.34E+00	4.53E-01	mg/kg	Mean	Footnote (2,3)
	Mercury	9 / 9	8.31E-02	1.10E-01	95% Student's-t UCL	1.43E-01	8.31E-02	mg/kg	Mean	Footnote (2)
	Pesticides									
	4,4'-DDD	9 / 9	3.46E-03	8.29E-03	95% Adjusted Gamma UCL	1.40E-02	3.46E-03	mg/kg	Mean	Footnote (2)
	4,4'-DDE	9 / 9	1.71E-02	4.10E-02	95% Adjusted Gamma UCL	6.01E-02	1.71E-02	mg/kg	Mean	Footnote (2)
	alpha-Chlordane	9 / 9	5.71E-03	1.54E-02	95% Adjusted Gamma UCL	2.41E-02	5.71E-03	mg/kg	Mean	Footnote (2)
	Dieldrin	9 / 9	3.82E-03	6.62E-03	95% Student's-t UCL	1.48E-02	3.82E-03	mg/kg	Mean	Footnote (2)
	gamma-Chlordane	8 / 9	2.79E-03	7.97E-03	Gamma Adjusted KM-UCL	9.43E-03	2.79E-03	mg/kg	Mean	Footnote (2)
	Heptachlor epoxide	9 / 9	1.37E-03	3.11E-03	95% Adjusted Gamma UCL	5.60E-03	1.37E-03	mg/kg	Mean	Footnote (2)
	Oxychlordane	9 / 9	1.68E-03	3.86E-03	95% Adjusted Gamma UCL	7.25E-03	1.68E-03	mg/kg	Mean	Footnote (2)
	trans-Nonachlor	9 / 9	7.81E-03	1.94E-02	95% Adjusted Gamma UCL	3.58E-02	7.81E-03	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	9 / 9	1.64E-01	2.52E-01	95% Student's-t UCL	4.69E-01	1.64E-01	mg/kg	Mean	Footnote (2)
	PCB-TEQ	9 / 9	3.41E-06	5.46E-06	95% Student's-t UCL	7.47E-06	3.41E-06	mg/kg	Mean	Footnote (2)

Table 5-21
Exposure Point Concentration Summary — Fish Tissue (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic [1] Mean (mg/kg)	95% UCL [2] (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic [2]	Rationale
Upper Potomac	**Inorganics**									
	Arsenic	5 / 9	2.39E-02	3.98E-02	95% KM (t) UCL	8.46E-02	2.39E-02	mg/kg	Mean	Footnote (2,3)
	Arsenic, Organic	5 / 9	2.15E-01	3.58E-01	95% KM (t) UCL	7.61E-01	2.15E-01	mg/kg	Mean	Footnote (2,3)
	Mercury	9 / 9	1.23E-01	1.61E-01	95% Student's-t UCL	2.41E-01	1.23E-01	mg/kg	Mean	Footnote (2)
	Pesticides									
	4,4'-DDD	9 / 9	1.03E-02	4.22E-02	95% Adjusted Gamma UCL	5.16E-02	1.03E-02	mg/kg	Mean	Footnote (2)
	4,4'-DDE	9 / 9	6.24E-02	3.97E-01	99% Chebyshev (Mean, Sd) UCL	2.43E-01	6.24E-02	mg/kg	Mean	Footnote (2)
	Aldrin	5 / 9	2.21E-04	1.86E-03	95% KM Bootstrap t UCL	1.20E-03	2.21E-04	mg/kg	Mean	Footnote (2)
	alpha-Chlordane	9 / 9	1.23E-02	5.10E-02	95% Adjusted Gamma UCL	5.37E-02	1.23E-02	mg/kg	Mean	Footnote (2)
	beta-BHC	9 / 9	6.91E-04	1.73E-03	95% Adjusted Gamma UCL	2.74E-03	6.91E-04	mg/kg	Mean	Footnote (2)
	cis-Nonachlor	8 / 9	3.87E-03	2.20E-02	95% KM Bootstrap t UCL	2.22E-02	3.87E-03	mg/kg	Mean	Footnote (2)
	Dieldrin	9 / 9	7.28E-03	2.87E-02	95% Adjusted Gamma UCL	3.78E-02	7.28E-03	mg/kg	Mean	Footnote (2)
	gamma-Chlordane	8 / 9	2.54E-03	4.64E-03	95% KM (t) UCL	8.76E-03	2.54E-03	mg/kg	Mean	Footnote (2)
	Heptachlor epoxide	9 / 9	1.97E-03	3.39E-03	95% Student's-t UCL	6.90E-03	1.97E-03	mg/kg	Mean	Footnote (2)
	Hexachlorobenzene	4 / 9	7.46E-04	1.55E-03	95% KM (t) UCL	3.50E-03	7.46E-04	mg/kg	Mean	Footnote (2)
	Mirex	4 / 9	1.75E-04	3.45E-04	95% KM (t) UCL	7.85E-04	1.75E-04	mg/kg	Mean	Footnote (2)
	Oxychlordane	9 / 9	1.87E-03	5.50E-03	95% Adjusted Gamma UCL	9.85E-03	1.87E-03	mg/kg	Mean	Footnote (2)
	trans-Nonachlor	8 / 9	1.05E-02	6.38E-02	Gamma Adjusted KM-UCL	6.26E-02	1.05E-02	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	9 / 9	4.59E-01	2.60E+00	99% Chebyshev (Mean, Sd) UCL	1.61E+00	4.59E-01	mg/kg	Mean	Footnote (2)
	PCB-TEQ	9 / 9	1.48E-05	4.27E-05	95% Adjusted Gamma UCL	5.65E-05	1.48E-05	mg/kg	Mean	Footnote (2)

Table 5-21
Exposure Point Concentration Summary — Fish Tissue (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Fish Tissue
Exposure Medium: Fish Tissue (Fillet)

Exposure Point	Chemical of Potential Concern	Frequency of Detection	Arithmetic (1) Mean (mg/kg)	95% UCL (2) (mg/kg)	UCL Basis	Maximum Concentration (mg/kg)	Exposure Point Concentration (CTE)			
							Value	Units	Statistic (2)	Rationale
Upstream Non-Tidal Anacostia	**Dioxin**									
	2,3,7,8-TCDD-TEQ	28 / 28	9.74E-08	1.20E-07	95% Student's-t UCL	2.89E-07	9.74E-08	mg/kg	Mean	Footnote (2)
	Inorganics									
	Arsenic	24 / 24	6.43E-03	7.58E-03	95% Student's-t UCL	1.40E-02	6.43E-03	mg/kg	Mean	Footnote (2,3)
	Arsenic, Organic	24 / 24	5.79E-02	6.82E-02	95% Student's-t UCL	1.26E-01	5.79E-02	mg/kg	Mean	Footnote (2,3)
	Cobalt	12 / 24	1.21E-02	1.62E-02	95% KM Adjusted Gamma UCL	4.70E-02	1.21E-02	mg/kg	Mean	Footnote (2)
	Mercury	23 / 24	2.57E-01	2.98E-01	95% KM Adjusted Gamma UCL, 95% GROS Adjusted Gamma UCL	5.00E-01	2.57E-01	mg/kg	Mean	Footnote (2)
	Thallium	19 / 24	3.43E-03	3.85E-03	95% KM (t) UCL	6.20E-03	3.43E-03	mg/kg	Mean	Footnote (2)
	Pesticides									
	Chlordane	25 / 26	2.16E-02	2.61E-02	95% KM (t) UCL	6.20E-02	2.16E-02	mg/kg	Mean	Footnote (2)
	Dieldrin	23 / 26	1.54E-03	1.97E-03	95% KM (t) UCL	4.70E-03	1.54E-03	mg/kg	Mean	Footnote (2)
	Heptachlor epoxide	18 / 26	1.24E-03	1.72E-03	95% KM (t) UCL	4.80E-03	1.24E-03	mg/kg	Mean	Footnote (2)
	PCBs									
	Total PCBs	29 / 29	2.84E-02	3.31E-02	95% Adjusted Gamma UCL	5.97E-02	2.84E-02	mg/kg	Mean	Footnote (2)
	PCB-TEQ	29 / 29	6.65E-07	8.76E-07	95% Adjusted Gamma UCL	2.54E-06	6.65E-07	mg/kg	Mean	Footnote (2)

Notes:

CTE - Central tendency exposure.

EPC - Exposure point concentration.

J - The chemical was positively identified; however, the associated numerical value is an estimated concentration.

+/- - Indicates the result may be biased high/low.

NC - Not Calculated; a sufficient number of samples and/or detects is not available to calculate a UCL.

PCB - Polychlorinated Biphenyl.

PCB-TEQ - Polychlorinated Biphenyl Toxicity Equivalence.

TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.

UCL - Upper confidence limit.

(1) Arithmetic mean. For datasets with non-detects, ProUCL Version 5.1 used the Kaplan-Meir method to handle detection limits.

(2) The EPC is the detected concentration for datasets with only one detected result. The EPC is the arithmetic mean for datasets with multiple detects.

(3) Organic and inorganic arsenic calculated assuming 90% of total arsenic is organic, and 10% is inorganic (FDA, 1993, Pinkney, 2017).

(4) The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.

Table 5-22
Derivation of Particulate Emission Factor for the Surface Soil to Outdoor Air Pathway (non-excavation pathway)
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Parameter	Definition	Units	Value	Notes
A_c	Areal extent of site	acres	77	Site-specific
A	Dispersion modeling constants (Philadelphia, PA)	unitless	14.0111	USEPA 2002, Exhibit D-2
B			19.6154	
C			225.3397	
Q/C_{wind}	Dispersion Factor - Inverse of mean concentration at center of source	g/m^2-s per kg/m^3	39.44	USEPA 2002, Equation D-1
V	Fraction of vegetative cover	unitless	0.5	USEPA, 2002 Default Value Equation 4-5
U_m	Mean annual windspeed	m/s	4.69	
U_t	Equivalent threshold value of windspeed at 7 m	m/s	11.32	
F(x)	Function dependent on U_m/U_t	unitless	0.194	
PEF	**Particulate emission factor**	**m^3/kg**	**5.72E+08**	USEPA 2002, Equation 4-5

Equations:

Equation D-1

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

Equation 4-5

$$PEF(m^3/kg) = \frac{Q/C_{wind}(3600 s/h)}{0.036(1-V)(U_m/U_t)^3 F(x)}$$

Source:
United States Environmental Protection Agency (USEPA) 2002.
Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.

Table 5-23
Derivation of Particulate Emission Factor for Unpaved Road Traffic for the Construction Worker Scenario
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Parameter	Definition	Units	Values	Notes
A	constant	unitless	12.9351	USEPA 2002 default Equation E-19
B	constant	unitless	5.7383	USEPA 2002 default Equation E-19
C	constant	unitless	71.7711	USEPA 2002 default Equation E-19
A_s	areal extent of site surface soil contamination	acres	77.0	Site-specific
A_s	areal extent of site surface soil contamination	m^2	311,608	Acres x 4046.86 m^2
L_R	length of contaminated road segment	m	558	square root of A_s
T	total time over which construction occurs	weeks	52	Construction activities are assumed to occur over one year.
T	total time over which construction occurs	days	260	# weeks x 5 days/week
t_c	Overall duration of construction	unitless	8736	# weeks x 7 days/week x 24 hours per day
T	total time over which construction occurs	seconds	7,488,000	# days x 8 hr/day x 3600 sec/hr
W_R	width of contaminated road segment	m	6.096	USEPA 2002 default (20 feet) Equation E-18
A_R	surface area of contaminated road segment	m^2	3403	L_R x W_R
W	mean vehicle weight	tons	8	Value used by USEPA 2002 example, Page E 20
p	number of days with at least 0.01 inches of precipitation	days/yr	107	University of North Carolina, Southeast Regional Climate Center. Annual average for Washington National Airport[1]
s	Road surface silt content	%	8.5	USEPA 2002 default Equation E-18
M_{dry}	Road surface material moisture content under dry, uncontrolled conditions	%	0.2	USEPA 2002 default Equation E-18
v	number of vehicles	#/day	30	Value used by USEPA 2002 example, Page E 20
∑VKT	sum of fleet vehicle kilometers traveled during the exposure duration	km	4354	USEPA 2002 Equation E-18 v x Lr x T (weeks) x 5 days/week
Q/C_{sr}	inverse of the ratio of the 1-hr geometric mean air concentration to the emission flux along a straight road segment bisecting a square site	g/m^2-s per kg/m^3	13.29036	USEPA 2002 Equation E-19
F_D	dispersion correction factor	unitless	0.186	USEPA 2002 Equation E-16
PEF_{SC}	subchronic road particulate emission factor	m^3/kg	7.19E+05	USEPA 2002 Equation E-18

Equations:

Equation E-16

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9}{}$$

Equation E-18

$$PEF_{sc} \bullet Q/C_{sr} \times \frac{1}{F_D} \times \frac{T \times A_R}{\frac{2.6 \times (s/12)^{0.8} (W/3)^{0.4}}{(M_{dry}/0.2)^{0.3}} \times \left[\frac{(365 \bullet p)}{365}\right] \times 281.9 \times \Sigma VKT}$$

Equation E-19

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

Source:
United States Environmental Protection Agency (USEPA) 2002.
Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.

[1] http://www.sercc.com/climateinfo/historical/meanprecip.html#VA. Accessed August 8, 2018.

Table 5-24
Exposure Point Concentration Summary — Surface Soil to Outdoor Air - Non-Excavation Scenario (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Surface Soil (0-1 foot)
Exposure Medium: Soil

Chemical of Potential Concern	Hypothetical Future Park Land/Green Space		Warehouse and Laydown Area		Salvage Yard and Waste Storage Area		Stores and Fleet Maintenance Area		Offices and Parking Lot		Substation #7		Transformer Shop		Vehicle Refueling Area	
	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)
Dioxin																
2,3,7,8-TCDD-TEQ	2.51E-06	4.39E-15	3.17E-05	5.54E-14	1.08E-04	1.88E-13	1.45E-05	2.53E-14	1.37E-05	2.40E-14	4.37E-06	7.64E-15	ND	ND	ND	ND
Inorganics																
Arsenic	2.60E+00	4.55E-09	3.85E+01	6.74E-08	1.40E+01	2.45E-08	7.50E+00	1.31E-08	3.70E+00	6.47E-09	3.30E+01	5.77E-08	1.70E+00	2.97E-09	ND	ND
Cobalt	1.30E+02	2.27E-07	4.55E+01	7.96E-08	1.70E+01	2.97E-08	7.90E+00	1.38E-08	1.10E+01	1.92E-08	4.70E+00	8.22E-09	2.70E+00	4.72E-09	ND	ND
Manganese	2.00E+02	3.50E-07	1.05E+03	1.84E-06	5.00E+02	8.75E-07	2.20E+02	3.85E-07	2.60E+02	4.55E-07	3.70E+02	6.47E-07	2.60E+02	4.55E-07	ND	ND
Nickel	1.20E+01	2.10E-08	1.53E+03	2.68E-06	2.70E+01	4.72E-08	3.10E+01	5.42E-08	3.00E+01	5.25E-08	1.40E+01	2.45E-08	1.60E+01	2.80E-08	ND	ND
Thallium	ND	ND	1.56E-01	2.73E-10	2.00E-01	3.50E-10	1.70E-01	2.97E-10	ND	ND	2.50E-01	4.37E-10	ND	ND	ND	ND
Vanadium	5.80E+01	1.01E-07	7.06E+03	1.23E-05	3.60E+01	6.30E-08	3.00E+01	5.25E-08	2.30E+01	4.02E-08	2.30E+01	4.02E-08	9.70E+00	1.70E-08	ND	ND
PCBs																
Total PCBs	9.20E-02	1.61E-10	5.19E+00	9.08E-09	2.15E+00	3.76E-09	1.35E+00	2.36E-09	3.30E-01	5.77E-10	5.10E+00	8.92E-09	2.01E+03	3.52E-06	1.40E-01	2.45E-10
SVOCs																
Benzo(a)anthracene	1.90E-01	3.32E-10	5.83E-01	1.02E-09	1.34E+00	2.35E-09	3.70E-01	6.47E-10	2.79E+00	4.88E-09	1.80E+00	3.15E-09	7.49E-01	1.31E-09	2.60E+00	4.55E-09
Benzo(a)pyrene	1.80E-01	3.15E-10	5.77E-01	1.01E-09	1.29E+00	2.25E-09	5.41E-01	9.46E-10	2.27E+00	3.97E-09	1.40E+00	2.45E-09	6.52E-01	1.14E-09	1.30E+00	2.27E-09
Benzo(b)fluoranthene	2.60E-01	4.55E-10	6.81E-01	1.19E-09	2.03E+00	3.56E-09	6.87E-01	1.20E-09	2.58E+00	4.50E-09	3.20E+00	5.60E-09	8.16E-01	1.43E-09	2.20E+00	3.85E-09
Benzo(k)fluoranthene	9.10E-02	1.59E-10	2.58E-01	4.51E-10	4.92E-01	8.61E-10	2.73E-01	4.77E-10	1.12E+00	1.95E-09	1.70E+00	2.97E-09	2.33E-01	4.08E-10	6.10E-01	1.07E-09
Chrysene	2.00E-01	3.50E-10	6.39E-01	1.12E-09	1.41E+00	2.46E-09	6.82E-01	1.19E-09	2.45E+00	4.28E-09	3.20E+00	5.60E-09	7.36E-01	1.29E-09	2.50E+00	4.37E-09
Dibenzo(a,h)anthracene	4.60E-02	8.05E-11	1.50E-01	2.62E-10	2.40E-01	4.20E-10	1.39E-01	2.43E-10	4.70E-01	8.22E-10	4.00E-01	7.00E-10	1.22E-01	2.13E-10	3.10E-01	5.42E-10
Indeno(1,2,3-cd)pyrene	1.50E-01	2.62E-10	4.42E-01	7.73E-10	9.69E-01	1.69E-09	4.37E-01	7.64E-10	1.51E+00	2.65E-09	1.30E+00	2.27E-09	3.91E-01	6.84E-10	7.80E-01	1.36E-09
Naphthalene	1.80E-02	3.15E-11	1.14E-01	1.99E-10	1.66E-01	2.90E-10	4.00E-02	7.00E-11	7.92E-02	1.39E-10	6.70E-02	1.17E-10	2.67E-02	4.67E-11	6.30E-01	1.10E-09
TPH																
Diesel Range Organics (C10-C20)	1.30E+01	2.27E-08	1.49E+02	2.61E-07	3.40E+03	5.95E-06	1.70E+02	2.97E-07	ND	ND	2.00E+01	3.50E-08	8.00E+01	1.40E-07	3.80E+02	6.65E-07

Notes:
EPC - Exposure Point Concentration.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
PEF - Particulate Emission Factor.
RME - Reasonable Maximum Exposure.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
(1) Estimated outdoor air EPCs were calculated by dividing the surface soil RME EPC by the PEF for the non-excavation scenario. See report text for details.

Table 5-25
Exposure Point Concentration Summary — Surface Soil to Outdoor Air - Non-Excavation Scenario (RME)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Surface Soil (0-1 foot)
Exposure Medium: Soil

Chemical of Potential Concern	Hypothetical Future Park Land/Green Space		Warehouse and Laydown Area		Salvage Yard and Waste Storage Area		Stores and Fleet Maintenance Area		Offices and Parking Lot		Substation #7		Transformer Shop		Vehicle Refueling Area	
	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Surface Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)
Dioxin																
2,3,7,8-TCDD-TEQ	1.89E-06	3.31E-15	1.51E-05	2.64E-14	6.10E-05	1.07E-13	6.19E-06	1.08E-14	9.63E-06	1.68E-14	4.37E-06	7.64E-15	ND	ND	ND	ND
Inorganics																
Arsenic	2.20E+00	3.85E-09	1.83E+01	3.20E-08	1.14E+01	1.99E-08	5.25E+00	9.18E-09	2.97E+00	5.19E-09	1.00E+01	1.75E-08	1.70E+00	2.97E-09	ND	ND
Cobalt	1.11E+02	1.94E-07	1.95E+01	3.41E-08	1.03E+01	1.81E-08	4.48E+00	7.83E-09	6.87E+00	1.20E-08	4.03E+00	7.04E-09	2.70E+00	4.72E-09	ND	ND
Manganese	1.18E+02	2.06E-07	3.99E+02	6.98E-07	2.77E+02	4.84E-07	1.18E+02	2.06E-07	1.87E+02	3.27E-07	1.98E+02	3.45E-07	2.60E+02	4.55E-07	ND	ND
Nickel	1.04E+01	1.81E-08	5.13E+02	8.97E-07	1.69E+01	2.96E-08	1.13E+01	1.98E-08	2.27E+01	3.97E-08	1.04E+01	1.82E-08	1.60E+01	2.80E-08	ND	ND
Thallium	ND	ND	1.31E-01	2.29E-10	1.80E-01	3.15E-10	1.03E-01	1.80E-10	ND	ND	1.38E-01	2.41E-10	ND	ND	ND	ND
Vanadium	3.70E+01	6.47E-08	2.24E+03	3.92E-06	2.47E+01	4.31E-08	2.08E+01	3.63E-08	1.93E+01	3.38E-08	1.46E+01	2.55E-08	9.70E+00	1.70E-08	ND	ND
PCBs																
Total PCBs	4.42E-02	7.73E-11	1.28E+00	2.23E-09	1.14E+00	2.00E-09	6.80E-01	1.19E-09	2.34E-01	4.09E-10	4.62E-01	8.08E-10	1.89E+02	3.31E-07	7.40E-02	1.29E-10
SVOCs																
Benzo(a)anthracene	1.37E-01	2.40E-10	4.36E-01	7.63E-10	8.21E-01	1.44E-09	2.42E-01	4.23E-10	1.24E+00	2.16E-09	4.01E-01	7.01E-10	3.24E-01	5.67E-10	1.75E+00	3.07E-09
Benzo(a)pyrene	1.55E-01	2.71E-10	4.31E-01	7.54E-10	7.80E-01	1.36E-09	2.49E-01	4.36E-10	1.11E+00	1.93E-09	3.17E-01	5.54E-10	2.86E-01	5.00E-10	8.85E-01	1.55E-09
Benzo(b)fluoranthene	1.65E-01	2.89E-10	5.16E-01	9.02E-10	1.17E+00	2.04E-09	3.24E-01	5.67E-10	1.33E+00	2.33E-09	7.13E-01	1.25E-09	3.80E-01	6.65E-10	1.48E+00	2.58E-09
Benzo(k)fluoranthene	6.80E-02	1.19E-10	1.95E-01	3.41E-10	3.57E-01	6.24E-10	1.32E-01	2.31E-10	5.25E-01	9.18E-10	3.65E-01	6.38E-10	1.42E-01	2.48E-10	4.60E-01	8.05E-10
Chrysene	1.53E-01	2.68E-10	4.90E-01	8.57E-10	8.58E-01	1.50E-09	3.02E-01	5.28E-10	1.17E+00	2.04E-09	7.10E-01	1.24E-09	3.23E-01	5.65E-10	1.71E+00	2.99E-09
Dibenzo(a,h)anthracene	3.23E-02	5.65E-11	9.93E-02	1.74E-10	1.42E-01	2.48E-10	5.68E-02	9.93E-11	2.47E-01	4.32E-10	9.44E-02	1.65E-10	7.51E-02	1.31E-10	2.15E-01	3.76E-10
Indeno(1,2,3-cd)pyrene	1.04E-01	1.82E-10	3.19E-01	5.58E-10	5.90E-01	1.03E-09	1.92E-01	3.36E-10	7.78E-01	1.36E-09	2.95E-01	5.16E-10	2.41E-01	4.22E-10	5.55E-01	9.71E-10
Naphthalene	1.22E-02	2.13E-11	6.76E-02	1.18E-10	1.12E-01	1.96E-10	2.78E-02	4.86E-11	3.93E-02	6.87E-11	2.70E-02	4.72E-11	1.70E-02	2.97E-11	3.43E-01	6.00E-10
TPH																
Diesel Range Organics (C10-C20)	1.30E+01	2.27E-08	9.62E+01	1.68E-07	1.30E+03	2.27E-06	3.98E+01	6.96E-08	ND	ND	1.90E+01	3.32E-08	8.00E+01	1.40E-07	3.80E+02	6.65E-07

Notes:
CTE - Central Tendency Exposure.
EPC - Exposure Point Concentration.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
PEF - Particulate Emission Factor.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
(1) Estimated outdoor air EPCs were calculated by dividing the surface soil CTE EPC by the PEF for the non-excavation scenario. See report text for details.

Table 5-26
Exposure Point Concentration Summary — Soil to Outdoor Air - Excavation Scenario (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Air

Chemical of Potential Concern	Hypothetical Future Park Land/Green Space		Warehouse and Laydown Area		Salvage Yard and Waste Storage Area		Stores and Fleet Maintenance Area		Offices and Parking Lot		Substation #7		Transformer Shop		Vehicle Refueling Area	
	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)
Dioxin																
2,3,7,8-TCDD-TEQ	2.51E-06	3.49E-12	2.85E-05	3.97E-11	8.23E-05	1.14E-10	1.25E-05	1.73E-11	1.37E-05	1.91E-11	4.37E-06	6.08E-12	ND	ND	ND	ND
Inorganics																
Arsenic	2.60E+00	3.62E-06	2.70E+01	3.76E-05	1.40E+01	1.95E-05	5.56E+00	7.73E-06	4.20E+00	5.84E-06	3.30E+01	4.59E-05	7.70E+00	1.07E-05	3.70E+00	5.15E-06
Cobalt	1.30E+02	1.81E-04	2.99E+01	4.16E-05	1.70E+01	2.36E-05	5.09E+00	7.08E-06	1.30E+01	1.81E-05	4.70E+00	6.54E-06	6.50E+00	9.04E-06	7.30E+00	1.02E-05
Manganese	3.70E+02	5.15E-04	7.05E+02	9.80E-04	5.00E+02	6.95E-04	1.55E+02	2.16E-04	4.00E+02	5.56E-04	3.70E+02	5.15E-04	2.60E+02	3.62E-04	2.00E+02	2.78E-04
Nickel	1.20E+01	1.67E-05	9.36E+02	1.30E-03	2.70E+01	3.75E-05	2.19E+01	3.04E-05	3.00E+01	4.17E-05	1.40E+01	1.95E-05	2.30E+01	3.20E-05	1.20E+01	1.67E-05
Thallium	5.30E-02	7.37E-08	2.45E-01	3.41E-07	2.00E-01	2.78E-07	1.17E-01	1.63E-07	1.30E-01	1.81E-07	2.50E-01	3.48E-07	1.70E-01	2.36E-07	1.50E-01	2.09E-07
Vanadium	5.80E+01	8.07E-05	4.51E+03	6.27E-03	3.60E+01	5.01E-05	2.37E+01	3.30E-05	3.60E+01	5.01E-05	3.20E+01	4.45E-05	2.30E+01	3.20E-05	2.90E+01	4.03E-05
PCBs																
Total PCBs	2.66E-02	3.70E-08	8.34E+00	1.16E-05	1.32E+00	1.84E-06	7.14E-01	9.93E-07	1.73E-01	2.41E-07	1.56E+00	2.17E-06	1.26E+02	1.75E-04	6.03E-02	8.39E-08
SVOCs																
Benzo(a)anthracene	1.56E-01	2.17E-07	2.85E+00	3.96E-06	2.35E+01	3.27E-05	4.63E+00	6.43E-06	3.07E+01	4.27E-05	1.80E+00	2.50E-06	3.04E+00	4.22E-06	8.96E-01	1.25E-06
Benzo(a)pyrene	1.50E-01	2.09E-07	1.78E+00	2.47E-06	2.14E+01	2.98E-05	2.31E+00	3.21E-06	2.72E+01	3.78E-05	1.34E+00	1.86E-06	2.52E+00	3.50E-06	6.81E-01	9.47E-07
Benzo(b)fluoranthene	1.85E-01	2.57E-07	3.90E+00	5.42E-06	2.21E+01	3.07E-05	4.66E+00	6.49E-06	2.15E+01	2.99E-05	3.20E+00	4.45E-06	3.25E+00	4.52E-06	1.01E+00	1.40E-06
Benzo(k)fluoranthene	7.24E-02	1.01E-07	6.01E-01	8.36E-07	5.87E+00	8.16E-06	4.46E-01	6.20E-07	2.15E+01	2.99E-05	1.62E+00	2.25E-06	1.22E+00	1.70E-06	2.63E-01	3.66E-07
Chrysene	1.63E-01	2.27E-07	3.94E+00	5.48E-06	2.51E+01	3.49E-05	4.25E+00	5.91E-06	2.68E+01	3.73E-05	3.20E+00	4.45E-06	2.77E+00	3.86E-06	8.78E-01	1.22E-06
Dibenzo(a,h)anthracene	3.33E-02	4.63E-08	2.54E-01	3.53E-07	9.18E-01	1.28E-06	1.69E-01	2.35E-07	7.68E+00	1.07E-05	4.00E-01	5.56E-07	5.67E-01	7.88E-07	1.17E-01	1.63E-07
Indeno(1,2,3-cd)pyrene	1.06E-01	1.47E-07	1.21E+00	1.69E-06	1.29E+01	1.80E-05	6.11E-01	8.50E-07	1.68E+01	2.34E-05	1.30E+00	1.81E-06	1.82E+00	2.53E-06	4.50E-01	6.26E-07
Naphthalene	1.15E-02	1.60E-08	9.07E-02	1.26E-07	7.24E-01	1.01E-06	8.86E-02	1.23E-07	1.12E+00	1.56E-06	6.70E-02	9.32E-08	1.94E-01	2.70E-07	2.37E-01	3.30E-07
TPH																
Diesel Range Organics (C10-C20)	1.30E+01	1.81E-05	8.23E+02	1.14E-03	2.09E+03	2.91E-03	7.82E+01	1.09E-04	2.30E+01	3.20E-05	2.00E+01	2.78E-05	8.00E+01	1.11E-04	3.80E+02	5.28E-04

Notes:
EPC - Exposure Point Concentration.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
PEF - Particulate Emission Factor.
RME - Reasonable Maximum Exposure.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
(1) Estimated outdoor air EPCs were calculated by dividing the soil RME EPC by the PEF for the excavation scenario. See report text for details.

Table 5-27
Exposure Point Concentration Summary — Soil to Outdoor Air - Excavation Scenario (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Medium: Soil (0-16 feet)
Exposure Medium: Air

Chemical of Potential Concern	Hypothetical Future Park Land/Green Space		Warehouse and Laydown Area		Salvage Yard and Waste Storage Area		Stores and Fleet Maintenance Area		Offices and Parking Lot		Substation #7		Transformer Shop		Vehicle Refueling Area	
	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)	Soil EPC (mg/kg)	Outdoor Air EPC (1) (mg/m^3)
Dioxin																
2,3,7,8-TCDD-TEQ	1.14E-06	1.58E-12	1.35E-05	1.88E-11	4.87E-05	6.78E-11	5.51E-06	7.66E-12	6.57E-06	9.14E-12	2.37E-06	3.29E-12	ND	ND	ND	ND
Inorganics																
Arsenic	1.81E+00	2.51E-06	1.40E+01	1.95E-05	5.42E+00	7.54E-06	4.49E+00	6.25E-06	3.08E+00	4.29E-06	6.64E+00	9.23E-06	3.40E+00	4.73E-06	2.48E+00	3.45E-06
Cobalt	5.85E+01	8.13E-05	1.41E+01	1.96E-05	6.11E+00	8.50E-06	3.99E+00	5.55E-06	8.25E+00	1.15E-05	3.79E+00	5.26E-06	3.47E+00	4.82E-06	5.52E+00	7.68E-06
Manganese	2.09E+02	2.91E-04	3.12E+02	4.33E-04	1.42E+02	1.98E-04	1.18E+02	1.64E-04	2.05E+02	2.84E-04	1.34E+02	1.86E-04	1.57E+02	2.18E-04	1.41E+02	1.96E-04
Nickel	7.08E+00	9.84E-06	3.20E+02	4.45E-04	1.08E+01	1.50E-05	9.05E+00	1.26E-05	1.83E+01	2.55E-05	7.56E+00	1.05E-05	1.39E+01	1.94E-05	6.34E+00	8.82E-06
Thallium	4.50E-02	6.26E-08	1.46E-01	2.03E-07	1.30E-01	1.81E-07	9.16E-02	1.27E-07	8.89E-02	1.24E-07	6.44E-02	8.96E-08	1.13E-01	1.57E-07	1.03E-01	1.43E-07
Vanadium	2.37E+01	3.29E-05	1.47E+03	2.05E-03	2.37E+01	3.29E-05	1.99E+01	2.77E-05	2.42E+01	3.36E-05	1.60E+01	2.23E-05	1.66E+01	2.30E-05	2.18E+01	3.03E-05
PCBs																
Total PCBs	1.42E-02	1.97E-08	1.16E+00	1.62E-06	6.59E-01	9.16E-07	4.94E-01	6.87E-07	1.08E-01	1.50E-07	2.41E-01	3.35E-07	7.46E+01	1.04E-04	2.32E-02	3.23E-08
SVOCs																
Benzo(a)anthracene	1.05E-01	1.46E-07	1.02E+00	1.42E-06	1.02E+01	1.42E-05	1.13E+00	1.57E-06	1.07E+01	1.48E-05	1.71E-01	2.38E-07	2.23E+00	3.09E-06	3.73E-01	5.19E-07
Benzo(a)pyrene	1.04E-01	1.45E-07	9.08E-01	1.26E-06	8.48E+00	1.18E-05	6.65E-01	9.25E-07	9.48E+00	1.32E-05	1.36E-01	1.89E-07	1.87E+00	2.60E-06	3.28E-01	4.56E-07
Benzo(b)fluoranthene	1.24E-01	1.72E-07	1.11E+00	1.54E-06	1.03E+01	1.43E-05	1.18E+00	1.64E-06	9.11E+00	1.27E-05	2.99E-01	4.16E-07	2.44E+00	3.39E-06	4.40E-01	6.12E-07
Benzo(k)fluoranthene	5.03E-01	6.99E-07	3.99E-01	5.55E-07	4.03E+00	5.60E-06	3.02E-01	4.20E-07	6.15E+00	8.56E-06	1.54E-01	2.14E-07	9.18E-01	1.28E-06	1.26E-01	1.75E-07
Chrysene	1.13E-01	1.57E-07	1.15E+00	1.60E-06	9.11E+00	1.27E-05	1.07E+00	1.48E-06	9.54E+00	1.33E-05	2.99E-01	4.16E-07	2.05E+00	2.86E-06	3.91E-01	5.44E-07
Dibenzo(a,h)anthracene	2.30E-02	3.20E-08	1.99E-01	2.77E-07	1.10E+00	1.52E-06	1.28E-01	1.78E-07	1.80E+00	2.50E-06	4.04E-02	5.62E-08	4.25E-01	5.91E-07	7.31E-02	1.02E-07
Indeno(1,2,3-cd)pyrene	7.09E-02	9.86E-08	5.70E-01	7.93E-07	5.45E+00	7.58E-06	3.87E-01	5.38E-07	6.29E+00	8.74E-06	1.26E-01	1.75E-07	1.38E+00	1.92E-06	2.11E-01	2.93E-07
Naphthalene	7.97E-03	1.11E-08	7.16E-02	9.96E-08	1.80E+00	2.50E-06	5.77E-02	8.02E-08	1.06E+00	1.47E-06	1.41E-02	1.96E-08	9.91E-02	1.38E-07	7.18E-02	9.98E-08
TPH																
Diesel Range Organics (C10-C20)	1.30E+01	1.81E-05	6.53E+02	9.08E-04	6.63E+02	9.22E-04	5.15E+01	7.15E-05	2.30E+01	3.20E-05	2.00E+01	2.78E-05	1.86E+01	2.59E-05	7.07E+01	9.83E-05

Notes:
CTE - Central Tendency Exposure.
EPC - Exposure Point Concentration.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
PEF - Particulate Emission Factor.
SVOC - Semivolatile Organic Compound
TCDD-TEQ - 2,3,7,8-Dioxin-Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon
(1) Estimated outdoor air EPCs were calculated by dividing the soil CTE EPC by the PEF for the excavation scenario. See report text for details.

Table 5-28
Exposure Point Concentration Summary — Groundwater Volatilization to Excavation Trench Air Pathway (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Chemical of Potential Concern	Volatilization Factor[1]	Hypothetical Future Park Land/Green Space		Warehouse and Laydown Area		Salvage Yard and Waste Storage Area		Stores and Fleet Maintenance Area		Offices and Parking Lots		Substation #7		Transformer Shop		Vehicle Refueling Area	
		Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]
	(L/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)
VOCs																	
Bromodichloromethane	6.36E+00	ND	ND	3.60E-01	2.29E-03	ND	ND	2.60E+00	1.65E-02	ND	ND	ND	ND	ND	ND	ND	ND
Butyl alcohol, tert-	1.21E+00	ND	ND	ND	ND	ND	ND	1.10E+02	1.33E-01	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7.53E+00	1.20E+00	9.03E-03	1.06E+00	8.00E-03	ND	ND	1.50E+01	1.13E-01	1.30E+00	9.78E-03	ND	ND	4.40E-01	3.31E-03	3.30E+00	2.48E-02
Methyl tert-Butyl Ether (MTBE)	8.07E+00	1.28E+00	1.03E-02	1.22E+00	9.87E-03	4.90E+00	3.95E-02	3.44E+01	2.77E-01	5.00E+00	4.03E-02	2.10E+01	1.69E-01	ND	ND	1.60E+00	1.29E-02
Tetrachloroethylene	6.47E+00	1.00E+01	6.47E-02	1.50E+01	9.70E-02	2.70E-01	1.75E-03	1.25E+01	8.08E-02	1.56E+02	1.01E+00	9.60E-01	6.21E-03	2.00E-01	1.29E-03	2.60E-01	1.68E-03
Trichloroethene	7.24E+00	1.34E+00	9.72E-03	2.30E+00	1.67E-02	ND	ND	5.80E-01	4.20E-03	1.29E+01	9.31E-02	1.70E-01	1.23E-03	ND	ND	ND	ND
Vinyl Chloride	1.05E+01	ND	ND	ND	ND	ND	ND	ND	ND	5.30E+00	5.59E-02	ND	ND	ND	ND	ND	ND

Notes:
EPC - Exposure Point Concentration.
ND - Not Detected.
RME - Reasonable Maximum Exposure.
VOC - Volatile Organic Compound
(1) Volatilization factor for groundwater to an excavation trench. Calculated in Attachment F.
(2) Trench air EPC = [Groundwater EPC (ug/L) * Volatilization Factor (L/m3)]/[1000 ug/mg]

Table 5-29
Exposure Point Concentration Summary — Groundwater Volatilization to Excavation Trench Air Pathway (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Chemical of Potential Concern	Volatilization Factor	Hypothetical Future Park Land/Green Space		Warehouse and Laydown Area		Salvage Yard and Waste Storage Area		Stores and Fleet Maintenance Area		Offices and Parking Lots		Substation #7		Transformer Shop		Vehicle Refueling Area	
		Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]	Groundwater EPC	Trench Air EPC[2]
	(L/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)	(ug/L)	(mg/m^3)
VOCs																	
Bromodichloromethane	6.36E+00	ND	ND	3.60E-01	2.29E-03	ND	ND	2.60E+00	1.65E-02	ND	ND	ND	ND	ND	ND	ND	ND
Butyl alcohol, tert-	1.21E+00	ND	ND	ND	ND	ND	ND	1.10E+02	1.33E-01	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7.53E+00	3.07E-01	2.31E-03	7.59E-01	5.71E-03	ND	ND	1.57E+00	1.18E-02	4.60E-01	3.46E-03	ND	ND	4.40E-01	3.31E-03	3.30E+00	2.48E-02
Methyl tert-Butyl Ether (MTBE)	8.07E+00	7.56E-01	6.10E-03	9.56E-01	7.71E-03	1.56E+00	1.26E-02	8.72E+00	7.03E-02	1.18E+00	9.48E-03	6.12E+00	4.93E-02	ND	ND	1.13E+00	9.14E-03
Tetrachloroethylene	6.47E+00	3.77E+00	2.44E-02	1.18E+00	7.63E-03	2.40E-01	1.55E-03	2.31E+00	1.49E-02	1.12E+02	7.21E-01	6.85E-01	4.43E-03	2.00E-01	1.29E-03	2.60E-01	1.68E-03
Trichloroethene	7.24E+00	7.64E-01	5.53E-03	6.62E-01	4.80E-03	ND	ND	3.85E-01	2.79E-03	9.24E+00	6.69E-02	1.70E-01	1.23E-03	ND	ND	ND	ND
Vinyl Chloride	1.05E+01	ND	ND	ND	ND	ND	ND	ND	ND	5.30E+00	5.59E-02	ND	ND	ND	ND	ND	ND

Notes:
EPC - Exposure Point Concentration.
ND - Not Detected.
CTE - Central Tendency Exposure.
VOC - Volatile Organic Compound
(1) Volatilization factor for groundwater to an excavation trench. Calculated in Attachment x.
(2) Trench air EPC = [Groundwater EPC (ug/L) * Volatilization Factor (L/m3)]/[1000 ug/mg]

Table 5-30
Evaluation of the Groundwater to Surface Water Migration Pathway
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

				Upper Aquifer																	
		Surface Water Screening	Location ID	Groundwater Concentration		Estimated Surface Water Concentration (c)	Groundwater Concentration		Estimated Surface Water Concentration (c)	Groundwater Concentration		Estimated Surface Water Concentration (c)	Groundwater Concentration		Estimated Surface Water Concentration (c)	Groundwater Concentration		Estimated Surface Water Concentration (c)	Groundwater Concentration		Estimated Surface Water Concentration (c)
				MW01A			MW02A			MW03A			MW04A			MW08A			MW11A		
Chemical (a)	CAS	Level (b)	DAF	9.93E-05			5.66E-05			1.44E-05			6.02E-06			4.17E-05			1.92E-04		
Dioxins and Furans																					
2,3,7,8-TCDD-TEQ	DFTEQ-HH	5.10E-08		2.77E-09		2.75E-13	NA		NA	1.25E-08		1.80E-13	1.28E-09		7.70E-15	NA		NA	9.81E-07	U	1.89E-10
Inorganics (Total)																					
Aluminum	7429-90-5	2.00E+03		7.30E+02	J+	7.25E-02	1.60E+02	J+	9.06E-03	2.10E+02	J+	3.02E-03	5.00E+02	J+	3.01E-03	1.60E+03		6.67E-02	3.20E+02	J+	6.16E-02
Arsenic	7440-38-2	1.40E-01		2.50E+00	J+	2.48E-04	3.70E+00	J+	2.10E-04	6.10E+00	J+	8.78E-05	8.00E+00	J+	4.81E-05	1.40E+01	J+	5.84E-04	3.40E+00	J+	6.54E-04
Barium	7440-39-3	3.80E+02		2.70E+02		2.68E-02	1.80E+01		1.02E-03	9.80E+01		1.41E-03	1.10E+02		6.62E-04	1.00E+02	U	4.17E-03	4.20E+01		8.08E-03
Beryllium	7440-41-7	2.50E+00		7.20E-02	J+	7.15E-06	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	4.10E-02	J	2.47E-07	1.00E+01	U	4.17E-04	4.80E-02	J	9.23E-06
Calcium	7440-70-2	EN		8.00E+04		7.94E+00	5.30E+04		3.00E+00	3.90E+04		5.61E-01	6.80E+04		4.09E-01	4.60E+04		1.92E+00	2.10E+04		4.04E+00
Chromium	7440-47-3	2.20E+03		3.40E+00	U	3.38E-04	2.00E+00	U	1.13E-04	4.30E+00	U	6.19E-05	4.80E+00	U	2.89E-05	2.00E+01	U	8.34E-04	8.10E+00		1.56E-03
Cobalt	7440-48-4	6.00E-01		1.30E+01		1.29E-03	7.40E-01	J+	4.19E-05	6.70E+00		9.64E-05	3.30E+01		1.99E-04	7.90E+00		3.29E-04	2.60E+00		5.00E-04
Copper	7440-50-8	8.00E+01		2.00E+00	U	1.99E-04	2.00E+00	U	1.13E-04	3.10E+00	U	4.46E-05	2.40E+00	U	1.44E-05	2.00E+01	U	8.34E-04	3.20E+00	U	6.16E-04
Iron	7439-89-6	EN		4.40E+04		4.37E+00	8.20E+02		4.64E-02	1.90E+03		2.73E-02	1.20E+04		7.22E-02	7.90E+03		3.29E-01	1.80E+03		3.46E-01
Lead	7439-92-1	1.50E+01		1.40E+00	J	1.39E-04	1.00E+00	U	5.66E-05	4.80E-01	J	6.91E-06	7.30E-01	J	4.39E-06	1.00E+01	U	4.17E-04	1.00E+00	J	1.92E-04
Magnesium	7439-95-4	EN		1.20E+04		1.19E+00	5.10E+03		2.89E-01	3.80E+03		5.47E-02	1.70E+04		1.02E-01	8.60E+03		3.58E-01	3.80E+03		7.31E-01
Manganese	7439-96-5	1.00E+02		4.10E+03		4.07E-01	2.80E+02		1.59E-02	3.90E+03		5.61E-02	5.70E+03		3.43E-02	1.50E+03		6.25E-02	4.40E+02		8.46E-02
Nickel	7440-02-0	4.60E+03		2.30E+00		2.28E-04	8.50E-01	J-	4.81E-05	4.00E+00		5.76E-05	7.90E+00		4.75E-05	4.10E+00	J	1.71E-04	2.10E+00		4.04E-04
Potassium	7440-09-7	EN		7.10E+03		7.05E-01	7.90E+03		4.47E-01	6.60E+03		9.50E-02	8.20E+03		4.93E-02	7.20E+03		3.00E-01	4.60E+03		8.85E-01
Sodium	7440-23-5	EN		1.10E+05	J	1.09E+01	1.00E+05	J	5.66E+00	4.70E+04	J	6.76E-01	1.90E+05	J	1.14E+00	3.00E+04		1.25E+00	1.60E+04	J	3.08E+00
Vanadium	7440-62-2	8.60E+00		9.80E+00	J+	9.73E-04	3.10E+00	J	1.76E-04	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	5.20E+01	J+	2.17E-03	3.60E+00	J+	6.92E-04
Zinc	7440-66-6	2.60E+04		6.10E+00	U	6.06E-04	5.00E+00	U	2.83E-04	5.00E+00	U	7.19E-05	5.00E+00	U	3.01E-05	5.00E+01	U	2.08E-03	5.00E+00	U	9.62E-04
Pesticides																					
4,4'-DDT	50-29-3	2.20E-04		1.20E-03	U	1.19E-07	1.30E-03	U	7.36E-08	1.20E-03	U	1.73E-08	1.30E-03	U	7.82E-09	1.30E-03	U	5.42E-08	1.20E-03	U	2.31E-07
beta-BHC	319-85-7	1.70E-02		1.20E-03	U	1.19E-07	1.30E-03	U	7.36E-08	9.50E-04	J	1.37E-08	1.30E-03	U	7.82E-09	1.30E-03	U	5.42E-08	1.20E-03	U	2.31E-07
delta-BHC	319-86-8	7.20E-03		1.20E-03	U	1.19E-07	4.00E-04	J	2.27E-08	1.20E-03	U	1.73E-08	1.30E-03	U	7.82E-09	1.30E-03	U	5.42E-08	1.20E-03	U	2.31E-07
Dieldrin	60-57-1	5.40E-05		1.20E-03	U	1.19E-07	1.30E-03	U	7.36E-08	1.20E-03	U	1.73E-08	1.30E-03	U	7.82E-09	1.30E-03	U	5.42E-08	1.20E-03	U	2.31E-07
Heptachlor Epoxide	1024-57-3	3.90E-05		1.20E-03	U	1.19E-07	1.30E-03	U	7.36E-08	1.20E-03	U	1.73E-08	1.30E-03	U	7.82E-09	1.30E-03	U	5.42E-08	8.10E-04	J	1.56E-07
PCBs																					
Total PCBs	1336-36-3	6.40E-05		9.50E-03	U	9.43E-07	9.60E-03	U	5.44E-07	9.50E-03	U	1.37E-07	9.80E-03	U	5.90E-08	9.70E-03	U	4.04E-07	9.50E-03	U	1.83E-06
SVOCs																					
1,1'-Biphenyl	92-52-4	8.30E-02		1.00E+00	U	9.93E-05	2.70E-01	J	1.53E-05	1.00E+00	U	1.44E-05	1.10E+00	U	6.62E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
2-Methylnaphthalene	91-57-6	3.60E+00		2.90E-02	J	2.88E-06	1.20E+00		6.80E-05	2.10E-01	U	3.02E-06	2.20E-01	U	1.32E-06	2.00E-01	U	8.34E-06	2.00E-01	U	3.85E-05
4-Methylphenol	106-44-5	1.90E+02		3.30E-01	J	3.28E-05	9.60E-01	U	5.44E-05	1.00E+00	U	1.44E-05	1.10E+00	U	6.62E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Carbazole	86-74-8	2.90E+01		1.00E+00	U	9.93E-05	2.70E-01	J	1.53E-05	1.00E+00	U	1.44E-05	1.10E+00	U	6.62E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Dibenzofuran	132-64-9	7.90E-01		1.00E+00	U	9.93E-05	7.10E-01	J	4.02E-05	1.00E+00	U	1.44E-05	1.10E+00	U	6.62E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Naphthalene	91-20-3	1.70E-01		2.00E-01		1.99E-05	1.80E-01	U	1.02E-05	2.10E-01	U	3.02E-06	2.20E-01	U	1.32E-06	4.60E-02	J	1.92E-06	2.00E-01	U	3.85E-05
Pentachlorophenol	87-86-5	3.00E+00		1.00E+00	U	9.93E-05	9.60E-01	U	5.44E-05	1.00E+00	U	1.44E-05	1.10E+00	U	6.62E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Phenol	108-95-2	8.60E+05		5.70E-01	J	5.66E-05	9.60E-01	U	5.44E-05	1.00E+00	U	1.44E-05	1.10E+00	U	6.62E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
VOCs																					
2-Butanone	78-93-3	5.60E+02		5.00E+00	U	4.96E-04	5.00E+00	U	2.83E-04	7.50E+00		1.08E-04	5.00E+00	U	3.01E-05	5.00E+00	U	2.08E-04	5.00E+00	U	9.62E-04
Acetone	67-64-1	1.40E+03		5.00E+00	U	4.96E-04	5.00E+00	U	2.83E-04	4.10E+00	J	5.90E-05	5.00E+00	U	3.01E-05	5.00E+00	U	2.08E-04	5.00E+00	U	9.62E-04
Benzene	71-43-2	5.10E+01		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Bromodichloromethane	75-27-4	1.70E+01		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Butyl alcohol, tert-	75-65-0	1.40E+01		4.00E+01	U	3.97E-03	4.00E+01	U	2.27E-03	NA		NA	NA		NA	NA		NA	4.00E+01	U	7.69E-03
Carbon Disulfide	75-15-0	8.10E+01		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Chloroform	67-66-3	4.70E+02		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.20E+00		1.73E-05	2.20E-01	J	1.32E-06	1.20E+00		5.00E-05	1.00E+00	U	1.92E-04
cis-1,2-Dichloroethylene	156-59-2	1.00E+04		8.30E-01	J	8.24E-05	3.40E-01	J	1.93E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Dibromochloromethane	124-48-1	1.30E+01		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Diisopropyl ether	108-20-3	1.50E+02		2.90E-01	J	2.88E-05	1.00E+00	U	5.66E-05	NA		NA	NA		NA	NA		NA	1.00E+00	U	1.92E-04
Ethyl-Tert-Butyl-Ether	637-92-3	NA		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	NA		NA	NA		NA	NA		NA	1.00E+00	U	1.92E-04
Methyl tert-Butyl Ether (MTBE)	1634-04-4	1.40E+01		1.70E+00		1.69E-04	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	2.90E-01	J	1.75E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Methylene Chloride	75-09-2	5.90E+02		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Tertiary-Amyl Methyl Ether	994-05-8	4.10E+01		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	NA		NA	NA		NA	NA		NA	1.00E+00	U	1.92E-04
Tetrachloroethylene	127-18-4	3.30E+00		5.50E+00	J	5.46E-04	1.80E+00		1.02E-04	3.20E-01	J	4.60E-06	2.50E-01	J	1.50E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Toluene	108-88-3	1.50E+04		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	3.40E-01	J	4.89E-06	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
trans-1,2-Dichloroethene	156-60-5	1.00E+04		1.00E+00	U	9.93E-05	1.00E+00	U	5.66E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04
Trichloroethene	79-01-6	3.00E+01		1.20E+00		1.19E-04	2.20E-01	J	1.25E-05	1.00E+00	U	1.44E-05	1.00E+00	U	6.02E-06	1.00E+00	U	4.17E-05	1.00E+00	U	1.92E-04

See last page for footnotes.

Table 5-30
Evaluation of the Groundwater to Surface Water Migration Pathway
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical (a)	CAS	Surface Water Screening Level (b)		Lower Aquifer: Groundwater Concentration	Estimated Surface Water Concentration (c)	Groundwater Concentration	Estimated Surface Water Concentration (c)	Groundwater Concentration	Estimated Surface Water Concentration (c)	Groundwater Concentration	Estimated Surface Water Concentration (c)	Groundwater Concentration	Estimated Surface Water Concentration (c)	Groundwater Concentration	Estimated Surface Water Concentration (c)
			Location ID	MW01B		MW02B		MW03B		MW04B		MW08B		MW11B	
			DAF	3.06E-05		7.72E-05		7.22E-05		4.94E-05		7.68E-05		1.20E-04	
Dioxins and Furans															
2,3,7,8-TCDD-TEQ	DFTEQ-HH	5.10E-08		7.11E-09	2.18E-13	NA	NA	8.49E-09	6.13E-13	2.53E-06 U	1.25E-10	NA	NA	1.35E-06 U	1.63E-10
Inorganics (Total)															
Aluminum	7429-90-5	2.00E+03		2.60E+02 J+	7.95E-03	9.00E+02 J+	6.95E-02	6.90E+02 J+	4.98E-02	6.00E+02 J+	2.96E-02	9.90E+02 J	7.60E-02	1.30E+03 J+	1.57E-01
Arsenic	7440-38-2	1.40E-01		2.00E+00 J+	6.12E-05	1.00E+00 U	7.72E-05	3.60E+00 J+	2.60E-04	5.20E+00 J+	2.57E-04	3.30E+00 J	2.53E-04	5.40E+00 J+	6.51E-04
Barium	7440-39-3	3.80E+02		2.40E+02	7.34E-03	8.00E+01	6.18E-03	1.70E+02	1.23E-02	1.20E+02	5.92E-03	1.80E+02	1.38E-02	1.80E+02	2.17E-02
Beryllium	7440-41-7	2.50E+00		5.90E-02 J+	1.81E-06	9.10E-01 J	7.03E-05	9.60E-02 J	6.93E-06	6.40E-02 J	3.16E-06	5.30E-02 J	4.07E-06	1.40E-01 J	1.69E-05
Calcium	7440-70-2	EN		3.40E+04	1.04E+00	1.20E+04	9.27E-01	2.10E+04	1.52E+00	2.70E+04	1.33E+00	1.90E+04	1.46E+00	3.40E+04	4.10E+00
Chromium	7440-47-3	2.20E+03		2.00E+00 U	6.12E-05	3.00E+00 U	2.32E-04	6.50E+00 U	4.69E-04	6.10E+00 U	3.01E-04	2.20E+00 U	1.69E-04	7.80E+00	9.40E-04
Cobalt	7440-48-4	6.00E-01		8.00E+00	2.45E-04	2.60E+01	2.01E-03	2.80E+00	2.02E-04	2.80E+00	1.38E-04	2.10E+00	1.61E-04	2.50E+00	3.01E-04
Copper	7440-50-8	8.00E+01		2.00E+00 U	6.12E-05	2.00E+00 U	1.54E-04	4.80E+00	3.47E-04	2.70E+00 U	1.33E-04	4.50E+00 U	3.46E-04	5.00E+00	6.02E-04
Iron	7439-89-6	EN		3.70E+04	1.13E+00	4.10E+04	3.17E+00	2.40E+04	1.73E+00	7.60E+03	3.75E-01	5.70E+03	4.38E-01	1.70E+04	2.05E+00
Lead	7439-92-1	1.50E+01		4.80E-01 J	1.47E-05	1.20E+00 J	9.27E-05	1.50E+00 J	1.08E-04	7.50E-01 J	3.70E-05	3.20E+00 J	2.46E-04	2.20E+00 J	2.65E-04
Magnesium	7439-95-4	EN		1.50E+04	4.59E-01	4.70E+03	3.63E-01	5.70E+03	4.12E-01	7.70E+03	3.80E-01	6.90E+03	5.30E-01	7.00E+03	8.43E-01
Manganese	7439-96-5	1.00E+02		3.70E+03	1.13E-01	1.60E+03	1.24E-01	5.50E+02	3.97E-02	1.00E+03	4.94E-02	3.30E+02	2.53E-02	5.20E+02	6.27E-02
Nickel	7440-02-0	4.60E+03		4.70E+00	1.44E-04	1.20E+01	9.27E-04	3.90E+00	2.82E-04	3.50E+00	1.73E-04	2.90E+00	2.23E-04	3.90E+00	4.70E-04
Potassium	7440-09-7	EN		5.80E+03	1.77E-01	2.60E+03	2.01E-01	3.00E+03	2.17E-01	4.30E+03	2.12E-01	4.50E+03	3.46E-01	1.20E+04	1.45E+00
Sodium	7440-23-5	EN		1.30E+05 J	3.98E+00	3.50E+04 J	2.70E+00	1.50E+04 J	1.08E+00	2.10E+04 J	1.04E+00	2.10E+04 J	1.61E+00	5.60E+04 J	6.75E+00
Vanadium	7440-62-2	8.60E+00		2.00E+01 J+	6.12E-04	1.20E+01 J+	9.27E-04	3.00E+00 J+	2.17E-04	1.00E+00 U	4.94E-05	2.30E+01 J	1.77E-03	4.80E+00 J+	5.78E-04
Zinc	7440-66-6	2.60E+04		6.40E+00 U	1.96E-04	3.70E+01	2.86E-03	9.90E+00	7.15E-04	6.70E+00 U	3.31E-04	7.50E+00 U	5.76E-04	8.50E+00	1.02E-03
Pesticides															
4,4'-DDT	50-29-3	2.20E-04		1.30E-03 U	3.98E-08	1.20E-03 U	9.27E-08	1.30E-03 U	9.39E-08	1.30E-03 U	6.42E-08	1.20E-03 U	9.22E-08	2.80E-03	3.37E-07
beta-BHC	319-85-7	1.70E-02		1.30E-03 U	3.98E-08	1.10E-03 J	8.50E-08	1.30E-03 U	9.39E-08	1.30E-03 U	6.42E-08	1.20E-03 U	9.22E-08	1.30E-03 U	1.57E-07
delta-BHC	319-86-8	7.20E-03		1.30E-03 U	3.98E-08	1.20E-03 U	9.27E-08	1.30E-03 U	9.39E-08	1.30E-03 U	6.42E-08	1.20E-03 U	9.22E-08	1.30E-03 U	1.57E-07
Dieldrin	60-57-1	5.40E-05		1.30E-03 U	3.98E-08	1.20E-03 U	9.27E-08	1.30E-03 U	9.39E-08	1.30E-03 U	6.42E-08	2.20E-03	1.69E-07	1.30E-03 U	1.57E-07
Heptachlor Epoxide	1024-57-3	3.90E-05		1.30E-03 U	3.98E-08	1.20E-03 U	9.27E-08	1.30E-03 U	9.39E-08	1.30E-03 U	6.42E-08	7.70E-04 J	5.91E-08	1.30E-03 U	1.57E-07
PCBs															
Total PCBs	1336-36-3	6.40E-05		9.60E-03 U	2.94E-07	9.50E-03 U	7.34E-07	9.70E-03 U	7.01E-07	9.40E-03 U	4.64E-07	1.10E-01	8.45E-06	9.60E-03 U	1.16E-06
SVOCs															
1,1'-Biphenyl	92-52-4	8.30E-02		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	9.60E-01 U	1.16E-04
2-Methylnaphthalene	91-57-6	3.60E+00		2.00E-02 J	6.12E-07	2.00E-01 U	1.54E-05	2.00E-01 U	1.44E-05	2.10E-01 U	1.04E-05	2.10E-01 U	1.61E-05	1.90E-01 U	2.29E-05
4-Methylphenol	106-44-5	1.90E+02		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	4.90E-01 J	3.76E-05	9.60E-01 U	1.16E-04
Carbazole	86-74-8	2.90E+01		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	9.60E-01 U	1.16E-04
Dibenzofuran	132-64-9	7.90E-01		1.00E+00 U	3.06E-05	1.10E-01 J	8.50E-06	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	9.60E-01 U	1.16E-04
Naphthalene	91-20-3	1.70E-01		1.80E-01 U	5.51E-06	1.80E-01 U	1.39E-05	2.00E-01 U	1.44E-05	2.10E-01 U	1.04E-05	2.10E-01 U	1.61E-05	1.90E-01 U	2.29E-05
Pentachlorophenol	87-86-5	3.00E+00		5.30E-01 J	1.62E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	9.60E-01 U	1.16E-04
Phenol	108-95-2	8.60E+05		2.60E-01 J	7.95E-06	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	2.20E-01 J	1.69E-05	9.60E-01 U	1.16E-04
VOCs															
2-Butanone	78-93-3	5.60E+02		5.00E+00 U	1.53E-04	5.00E+00 U	3.86E-04	5.00E+00 U	3.61E-04	5.00E+00 U	2.47E-04	5.00E+00 U	3.84E-04	5.00E+00 U	6.02E-04
Acetone	67-64-1	1.40E+03		5.00E+00 U	1.53E-04	5.00E+00 U	3.86E-04	5.00E+00 U	3.61E-04	2.80E+00 J	1.38E-04	5.00E+00 U	3.84E-04	5.00E+00 U	6.02E-04
Benzene	71-43-2	5.10E+01		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	6.80E-01 J	5.22E-05	1.00E+00 U	1.20E-04
Bromodichloromethane	75-27-4	1.70E+01		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	6.50E-01 J	4.69E-05	1.00E+00 U	4.94E-05	2.30E-01 J	1.77E-05	1.00E+00 U	1.20E-04
Butyl alcohol, tert-	75-65-0	1.40E+01		2.00E+02 U	6.12E-03	NA	NA	NA	NA	NA	NA	NA	NA	4.00E+01 U	4.82E-03
Carbon Disulfide	75-15-0	8.10E+01		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	1.80E+00	1.30E-04	1.10E+00	5.43E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04
Chloroform	67-66-3	4.70E+02		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	3.20E+00	2.31E-04	1.40E+00	6.91E-05	3.20E+00	2.46E-04	1.00E+00 U	1.20E-04
cis-1,2-Dichloroethylene	156-59-2	1.00E+04		7.00E+00	2.14E-04	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04
Dibromochloromethane	124-48-1	1.30E+01		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	2.40E-01 J	1.73E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04
Diisopropyl ether	108-20-3	1.50E+02		2.60E+00 J	7.95E-05	NA	NA	NA	NA	NA	NA	NA	NA	1.00E+00 U	1.20E-04
Ethyl-Tert-Butyl-Ether	637-92-3	NA		5.00E+00 U	1.53E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.00E+00 U	1.20E-04
Methyl tert-Butyl Ether (MTBE)	1634-04-4	1.40E+01		3.40E+00	1.04E-04	3.90E-01 J	3.01E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04
Methylene Chloride	75-09-2	5.90E+02		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	2.00E-01 J	1.54E-05	1.00E+00 U	1.20E-04
Tertiary-Amyl Methyl Ether	994-05-8	4.10E+01		5.00E+00 U	1.53E-04	NA	NA	NA	NA	NA	NA	NA	NA	1.00E+00 U	1.20E-04
Tetrachloroethylene	127-18-4	3.30E+00		7.80E+01	2.39E-03	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04
Toluene	108-88-3	1.50E+04		1.00E+00 U	3.06E-05	1.00E+00 U	7.72E-05	2.80E-01 J	2.02E-05	1.00E+00 U	4.94E-05	1.90E-01 J	1.46E-05	1.00E+00 U	1.20E-04
trans-1,2-Dichloroethene	156-60-5	1.00E+04		5.10E-01 J	1.56E-05	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04
Trichloroethene	79-01-6	3.00E+01		4.80E+01	1.47E-03	1.00E+00 U	7.72E-05	1.00E+00 U	7.22E-05	1.00E+00 U	4.94E-05	1.00E+00 U	7.68E-05	1.00E+00 U	1.20E-04

See last page for footnotes.

Table 5-30
Evaluation of the Groundwater to Surface Water Migration Pathway
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Notes:
All units are in microgram per liter (ug/L).
CAS - Chemical Abstracts Service.
DAF - Dilution Attenuation Factor.
EN - Essential Nutrient.
HH - Human health.
J - The chemical was positively identified; however, the associated numerical value is an estimated concentration.
+/- Likely to have a high (+) or low (-) bias.
NA - Not analyzed.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile organic compound.
TCDD TEQ - Dioxin toxicity equivalence.
VOC - Volatile organic compound.
U - Not detected above the laboratory reporting limit.
UJ - Not detected above laboratory reporting limit; Estimated value.
USEPA - United States Environmental Protection Agency.

(a) Only chemicals detected at least once in nearshore groundwater monitoring wells are presented. For TCDD-TEQ, pesticides, SVOCs, and VOCs 2016 groundwater data were used, where available (See Section 5.6 of the text). Otherwise data collected in 2014 was used, such that for each chemical and well combination, the most recent data point is presented. The RI Report presents 2016 and 2016 data for all wells/chemicals.
(b) Surface water screening levels were selected based on the following hierarchy:
1. District Department of the Environment. Title 21 of the District of Columbia Municipal Regulations, Chapter 11, Water Quality Standards. Effective November 1, 2013.
2. USEPA National Recommended Water Quality Criteria for Priority Pollutants. Value for Human Health for the consumption of organisms. Accessed September 2017.
3. USEPA Regional Screening Level for Tapwater based on 1x10-6 target risk level and target hazard quotient of 0.1. May 2018.
See Table 3-11 for surface water screening levels and surrogates used.
(c) Surface water concentrations were estimated by multiplying groundwater results from the nearshore monitoring wells by a site-specific dilution attenuation factor (DAF). DAFs were derived separately for the upper and lower aquifers as further discussed in the Remedial Investigation Report and shown in Attachment F of the BHHRA report.

Table 6-1
Total Potential Carcinogenic Risks for Construction Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks															
	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area				Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
				Total				Total				Total				Total
	Soil	Outdoor Air	Trench Air	Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	2E-09	7E-14	NCOPC	2E-09	3E-08	8E-13	NCOPC	3E-08	8E-08	2E-12	NCOPC	8E-08	1E-08	3E-13	NCOPC	1E-08
Metals																
Arsenic	2E-08	8E-12	NCOPC	2E-08	2E-07	8E-11	NCOPC	2E-07	9E-08	4E-11	NCOPC	9E-08	4E-08	2E-11	NCOPC	4E-08
Cobalt	NA	8E-10	NCOPC	8E-10	NA	2E-10	NCOPC	2E-10	NA	1E-10	NCOPC	1E-10	NA	3E-11	NCOPC	3E-11
Manganese	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Nickel	NA	2E-12	NCOPC	2E-12	NA	2E-10	NCOPC	2E-10	NA	5E-12	NCOPC	5E-12	NA	4E-12	NCOPC	4E-12
Thallium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Vanadium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
PCBs																
Total PCBs	5E-10	1E-14	NCOPC	5E-10	2E-07	3E-12	NCOPC	2E-07	2E-08	5E-13	NCOPC	2E-08	1E-08	3E-13	NCOPC	1E-08
SVOCs																
Benzo(a)anthracene	1E-10	7E-15	NCOPC	1E-10	3E-09	1E-13	NCOPC	3E-09	2E-08	1E-12	NCOPC	2E-08	4E-09	2E-13	NCOPC	4E-09
Benzo(a)pyrene	1E-09	7E-14	NCOPC	1E-09	2E-08	8E-13	NCOPC	2E-08	2E-07	9E-12	NCOPC	2E-07	2E-08	1E-12	NCOPC	2E-08
Benzo(b)fluoranthene	2E-10	8E-15	NCOPC	2E-10	4E-09	2E-13	NCOPC	4E-09	2E-08	1E-12	NCOPC	2E-08	4E-09	2E-13	NCOPC	4E-09
Benzo(k)fluoranthene	7E-12	3E-16	NCOPC	7E-12	5E-11	3E-15	NCOPC	5E-11	5E-10	3E-14	NCOPC	5E-10	4E-11	2E-15	NCOPC	4E-11
Chrysene	1E-12	7E-17	NCOPC	1E-12	4E-11	2E-15	NCOPC	4E-11	2E-10	1E-14	NCOPC	2E-10	4E-11	2E-15	NCOPC	4E-11
Dibenzo(a,h)anthracene	3E-10	1E-14	NCOPC	3E-10	2E-09	1E-13	NCOPC	2E-09	8E-09	4E-13	NCOPC	8E-09	2E-09	7E-14	NCOPC	2E-09
Indeno(1,2,3-cd)pyrene	1E-10	5E-15	NCOPC	1E-10	1E-09	5E-14	NCOPC	1E-09	1E-08	6E-13	NCOPC	1E-08	6E-10	3E-14	NCOPC	6E-10
Naphthalene	NA	3E-16	NCOPC	3E-16	NA	2E-15	NCOPC	2E-15	NA	2E-14	NCOPC	2E-14	NA	2E-15	NCOPC	2E-15
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	1E-11	1E-11	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	8E-11	8E-11
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	NA	NC
Chloroform	NCOPC	NCOPC	3E-11	3E-11	NCOPC	NCOPC	2E-11	2E-11	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	3E-10	3E-10
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	3E-13	3E-13	NCOPC	NCOPC	3E-13	3E-13	NCOPC	NCOPC	1E-12	1E-12	NCOPC	NCOPC	9E-12	9E-12
Tetrachloroethylene	NCOPC	NCOPC	2E-12	2E-12	NCOPC	NCOPC	3E-12	3E-12	NCOPC	NCOPC	6E-14	6E-14	NCOPC	NCOPC	3E-12	3E-12
Trichloroethene	NCOPC	NCOPC	5E-12	5E-12	NCOPC	NCOPC	9E-12	9E-12	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	2E-12	2E-12
Vinyl Chloride	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Total	2E-08	9E-10	3E-11	2E-08	4E-07	5E-10	5E-11	4E-07	5E-07	2E-10	1E-12	5E-07	9E-08	6E-11	4E-10	9E-08

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

Table 6-1
Total Potential Carcinogenic Risks for Construction Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks															
	Offices and Parking Lot				Substation #7				Transformer Shop				Vehicle Refueling Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	1E-08	4E-13	NCOPC	1E-08	4E-09	1E-13	NCOPC	4E-09	ND	ND	NCOPC	NC	ND	ND	NCOPC	NC
Metals																
Arsenic	3E-08	1E-11	NCOPC	3E-08	2E-07	1E-10	NCOPC	2E-07	5E-08	2E-11	NCOPC	5E-08	2E-08	1E-11	NCOPC	2E-08
Cobalt	NA	8E-11	NCOPC	8E-11	NA	3E-11	NCOPC	3E-11	NA	4E-11	NCOPC	4E-11	NA	5E-11	NCOPC	5E-11
Manganese	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Nickel	NA	6E-12	NCOPC	6E-12	NA	3E-12	NCOPC	3E-12	NA	4E-12	NCOPC	4E-12	NA	2E-12	NCOPC	2E-12
Thallium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Vanadium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
PCBs																
Total PCBs	3E-09	7E-14	NCOPC	3E-09	3E-08	6E-13	NCOPC	3E-08	2E-06	5E-11	NCOPC	2E-06	1E-09	3E-14	NCOPC	1E-09
SVOCs																
Benzo(a)anthracene	3E-08	1E-12	NCOPC	3E-08	2E-09	8E-14	NCOPC	2E-09	3E-09	1E-13	NCOPC	3E-09	8E-10	4E-14	NCOPC	8E-10
Benzo(a)pyrene	2E-07	1E-11	NCOPC	2E-07	1E-08	6E-13	NCOPC	1E-08	2E-08	1E-12	NCOPC	2E-08	6E-09	3E-13	NCOPC	6E-09
Benzo(b)fluoranthene	2E-08	9E-13	NCOPC	2E-08	3E-09	1E-13	NCOPC	3E-09	3E-09	1E-13	NCOPC	3E-09	9E-10	4E-14	NCOPC	9E-10
Benzo(k)fluoranthene	2E-09	9E-14	NCOPC	2E-09	1E-10	7E-15	NCOPC	1E-10	1E-10	5E-15	NCOPC	1E-10	2E-11	1E-15	NCOPC	2E-11
Chrysene	2E-10	1E-14	NCOPC	2E-10	3E-11	1E-15	NCOPC	3E-11	3E-11	1E-15	NCOPC	3E-11	8E-12	4E-16	NCOPC	8E-12
Dibenzo(a,h)anthracene	7E-08	3E-12	NCOPC	7E-08	4E-09	2E-13	NCOPC	4E-09	5E-09	2E-13	NCOPC	5E-09	1E-09	5E-14	NCOPC	1E-09
Indeno(1,2,3-cd)pyrene	2E-08	7E-13	NCOPC	2E-08	1E-09	6E-14	NCOPC	1E-09	2E-09	8E-14	NCOPC	2E-09	4E-10	2E-14	NCOPC	4E-10
Naphthalene	NA	3E-14	NCOPC	3E-14	NA	2E-15	NCOPC	2E-15	NA	5E-15	NCOPC	5E-15	NA	6E-15	NCOPC	6E-15
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Chloroform	NCOPC	NCOPC	3E-11	3E-11	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	1E-11	1E-11	NCOPC	NCOPC	7E-11	7E-11
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	1E-12	1E-12	NCOPC	NCOPC	6E-12	6E-12	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	4E-13	4E-13
Tetrachloroethylene	NCOPC	NCOPC	3E-11	3E-11	NCOPC	NCOPC	2E-13	2E-13	NCOPC	NCOPC	4E-14	4E-14	NCOPC	NCOPC	6E-14	6E-14
Trichloroethene	NCOPC	NCOPC	5E-11	5E-11	NCOPC	NCOPC	7E-13	7E-13	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Vinyl Chloride	NCOPC	NCOPC	3E-11	3E-11	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Total	4E-07	1E-10	1E-10	4E-07	3E-07	1E-10	7E-12	3E-07	2E-06	1E-10	1E-11	2E-06	4E-08	6E-11	8E-11	4E-08

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this medi
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

Table 6-2
Total Potential Hazard Index for Construction Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index															
	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area				Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	2E-03	3E-06	NCOPC	2E-03	2E-02	4E-05	NCOPC	2E-02	6E-02	1E-04	NCOPC	6E-02	9E-03	2E-05	NCOPC	9E-03
Metals																
Arsenic	3E-03	9E-03	NCOPC	1E-02	3E-02	9E-02	NCOPC	1E-01	1E-02	5E-02	NCOPC	6E-02	6E-03	2E-02	NCOPC	2E-02
Cobalt	2E-01	1E+00	NCOPC	1E+00	5E-02	3E-01	NCOPC	3E-01	3E-02	1E-01	NCOPC	2E-01	8E-03	4E-02	NCOPC	5E-02
Manganese	7E-03	4E-01	NCOPC	4E-01	1E-02	7E-01	NCOPC	7E-01	9E-03	5E-01	NCOPC	5E-01	3E-03	2E-01	NCOPC	2E-01
Nickel	3E-04	7E-03	NCOPC	7E-03	2E-02	5E-01	NCOPC	5E-01	6E-04	2E-02	NCOPC	2E-02	5E-04	1E-02	NCOPC	1E-02
Thallium	2E-03	NA	NCOPC	2E-03	1E-02	NA	NCOPC	1E-02	9E-03	NA	NCOPC	9E-03	5E-03	NA	NCOPC	5E-03
Vanadium	5E-03	3E-02	NCOPC	3E-02	4E-01	2E+00	NCOPC	3E+00	3E-03	2E-02	NCOPC	2E-02	2E-03	1E-02	NCOPC	1E-02
PCBs																
Total PCBs	3E-04	NA	NCOPC	3E-04	1E-01	NA	NCOPC	1E-01	2E-02	NA	NCOPC	2E-02	9E-03	NA	NCOPC	9E-03
SVOCs																
Benzo(a)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(a)pyrene	3E-04	4E-03	NCOPC	4E-03	4E-03	5E-02	NCOPC	5E-02	5E-02	5E-01	NCOPC	6E-01	5E-03	6E-02	NCOPC	6E-02
Benzo(b)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Chrysene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Naphthalene	4E-07	2E-07	NCOPC	6E-07	3E-06	2E-06	NCOPC	4E-06	2E-05	1E-05	NCOPC	4E-05	3E-06	2E-06	NCOPC	4E-06
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	NA	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	NA	NC
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	6E-03	6E-03
Chloroform	NCOPC	NCOPC	8E-04	8E-04	NCOPC	NCOPC	7E-04	7E-04	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	1E-02	1E-02
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	3E-05	3E-05	NCOPC	NCOPC	3E-05	3E-05	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	8E-04	8E-04
Tetrachloroethylene	NCOPC	NCOPC	1E-02	1E-02	NCOPC	NCOPC	2E-02	2E-02	NCOPC	NCOPC	4E-04	4E-04	NCOPC	NCOPC	2E-02	2E-02
Trichloroethene	NCOPC	NCOPC	4E-02	4E-02	NCOPC	NCOPC	8E-02	8E-02	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	2E-02	2E-02
Vinyl Chloride	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	6E-04	7E-06	NCOPC	6E-04	4E-02	4E-04	NCOPC	4E-02	9E-02	1E-03	NCOPC	1E-01	4E-03	4E-05	NCOPC	4E-03
Total	2E-01	2E+00	6E-02	2E+00	7E-01	4E+00	1E-01	5E+00	3E-01	1E+00	5E-04	2E+00	5E-02	3E-01	6E-02	4E-01
Highest Target Endpoint Hazard Index (a)	--	--	--	1E+00	--	--	--	3E+00	--	--	--	7E-01	--	--	--	2E-01

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-2
Total Potential Hazard Index for Construction Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index															
	Offices and Parking Lot				Substation #7				Transformer Shop				Vehicle Refueling Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	1E-02	2E-05	NCOPC	1E-02	3E-03	6E-06	NCOPC	3E-03	ND	ND	NCOPC	NC	ND	ND	NCOPC	NC
Metals																
Arsenic	4E-03	1E-02	NCOPC	2E-02	3E-02	1E-01	NCOPC	1E-01	8E-03	3E-02	NCOPC	3E-02	4E-03	1E-02	NCOPC	2E-02
Cobalt	2E-02	1E-01	NCOPC	1E-01	7E-03	4E-02	NCOPC	5E-02	1E-02	6E-02	NCOPC	6E-02	1E-02	6E-02	NCOPC	7E-02
Manganese	8E-03	4E-01	NCOPC	4E-01	7E-03	4E-01	NCOPC	4E-01	5E-03	3E-01	NCOPC	3E-01	4E-03	2E-01	NCOPC	2E-01
Nickel	7E-04	2E-02	NCOPC	2E-02	3E-04	8E-03	NCOPC	8E-03	5E-04	1E-02	NCOPC	1E-02	3E-04	7E-03	NCOPC	7E-03
Thallium	6E-03	NA	NCOPC	6E-03	1E-02	NA	NCOPC	1E-02	8E-03	NA	NCOPC	8E-03	7E-03	NA	NCOPC	7E-03
Vanadium	3E-03	2E-02	NCOPC	2E-02	3E-03	2E-02	NCOPC	2E-02	2E-03	1E-02	NCOPC	1E-02	3E-03	1E-02	NCOPC	2E-02
PCBs																
Total PCBs	2E-03	NA	NCOPC	2E-03	2E-02	NA	NCOPC	2E-02	2E+00	NA	NCOPC	2E+00	8E-04	NA	NCOPC	8E-04
SVOCs																
Benzo(a)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(a)pyrene	6E-02	7E-01	NCOPC	7E-01	3E-03	3E-02	NCOPC	4E-02	5E-03	6E-02	NCOPC	7E-02	1E-03	2E-02	NCOPC	2E-02
Benzo(b)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Chrysene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Naphthalene	4E-05	2E-05	NCOPC	5E-05	2E-06	1E-06	NCOPC	3E-06	6E-06	3E-06	NCOPC	9E-06	8E-06	4E-06	NCOPC	1E-05
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Chloroform	NCOPC	NCOPC	9E-04	9E-04	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	3E-04	3E-04	NCOPC	NCOPC	2E-03	2E-03
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	5E-04	5E-04	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	4E-05	4E-05
Tetrachloroethylene	NCOPC	NCOPC	2E-01	2E-01	NCOPC	NCOPC	1E-03	1E-03	NCOPC	NCOPC	3E-04	3E-04	NCOPC	NCOPC	4E-04	4E-04
Trichloroethene	NCOPC	NCOPC	4E-01	4E-01	NCOPC	NCOPC	6E-03	6E-03	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Vinyl Chloride	NCOPC	NCOPC	5E-03	5E-03	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	1E-03	1E-05	NCOPC	1E-03	9E-04	1E-05	NCOPC	9E-04	4E-03	4E-05	NCOPC	4E-03	2E-02	2E-04	NCOPC	2E-02
Total	1E-01	1E+00	7E-01	2E+00	9E-02	6E-01	8E-03	7E-01	2E+00	4E-01	6E-04	2E+00	5E-02	3E-01	3E-03	4E-01
Highest Target Endpoint Hazard Index (a)	--	--	--	8E-01	--	--	--	5E-01	--	--	--	2E+00	--	--	--	2E-01

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this medi
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-3
Total Potential Carcinogenic Risks for Construction Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks															
	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area				Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	5E-10	2E-14	NCOPC	5E-10	6E-09	2E-13	NCOPC	6E-09	2E-08	7E-13	NCOPC	2E-08	3E-09	8E-14	NCOPC	3E-09
Metals																
Arsenic	6E-09	3E-12	NCOPC	6E-09	5E-08	2E-11	NCOPC	5E-08	2E-08	8E-12	NCOPC	2E-08	2E-08	7E-12	NCOPC	2E-08
Cobalt	NA	2E-10	NCOPC	2E-10	NA	5E-11	NCOPC	5E-11	NA	2E-11	NCOPC	2E-11	NA	1E-11	NCOPC	1E-11
Manganese	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Nickel	NA	7E-13	NCOPC	7E-13	NA	3E-11	NCOPC	3E-11	NA	1E-12	NCOPC	1E-12	NA	9E-13	NCOPC	9E-13
Thallium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Vanadium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
PCBs																
Total PCBs	1E-10	3E-15	NCOPC	1E-10	1E-08	2E-13	NCOPC	1E-08	6E-09	1E-13	NCOPC	6E-09	5E-09	1E-13	NCOPC	5E-09
SVOCs																
Benzo(a)anthracene	5E-11	2E-15	NCOPC	5E-11	5E-10	2E-14	NCOPC	5E-10	5E-09	2E-13	NCOPC	5E-09	5E-10	2E-14	NCOPC	5E-10
Benzo(a)pyrene	5E-10	2E-14	NCOPC	5E-10	4E-09	2E-13	NCOPC	4E-09	4E-08	2E-12	NCOPC	4E-08	3E-09	1E-13	NCOPC	3E-09
Benzo(b)fluoranthene	6E-11	3E-15	NCOPC	6E-11	5E-10	2E-14	NCOPC	5E-10	5E-09	2E-13	NCOPC	5E-09	5E-10	3E-14	NCOPC	5E-10
Benzo(k)fluoranthene	2E-11	1E-15	NCOPC	2E-11	2E-11	9E-16	NCOPC	2E-11	2E-10	9E-15	NCOPC	2E-10	1E-11	7E-16	NCOPC	1E-11
Chrysene	5E-13	2E-17	NCOPC	5E-13	5E-12	3E-16	NCOPC	5E-12	4E-11	2E-15	NCOPC	4E-11	5E-12	2E-16	NCOPC	5E-12
Dibenzo(a,h)anthracene	1E-10	5E-15	NCOPC	1E-10	9E-10	4E-14	NCOPC	9E-10	5E-09	2E-13	NCOPC	5E-09	6E-10	3E-14	NCOPC	6E-10
Indeno(1,2,3-cd)pyrene	3E-11	2E-15	NCOPC	3E-11	3E-10	1E-14	NCOPC	3E-10	2E-09	1E-13	NCOPC	2E-09	2E-10	8E-15	NCOPC	2E-10
Naphthalene	NA	1E-16	NCOPC	1E-16	NA	9E-16	NCOPC	9E-16	NA	2E-14	NCOPC	2E-14	NA	7E-16	NCOPC	7E-16
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	6E-12	6E-12	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	4E-11	4E-11
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	NA	NC
Chloroform	NCOPC	NCOPC	3E-12	3E-12	NCOPC	NCOPC	9E-12	9E-12	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	2E-11	2E-11
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	1E-13	1E-13	NCOPC	NCOPC	1E-13	1E-13	NCOPC	NCOPC	2E-13	2E-13	NCOPC	NCOPC	1E-12	1E-12
Tetrachloroethylene	NCOPC	NCOPC	4E-13	4E-13	NCOPC	NCOPC	1E-13	1E-13	NCOPC	NCOPC	3E-14	3E-14	NCOPC	NCOPC	3E-13	3E-13
Trichloroethene	NCOPC	NCOPC	1E-12	1E-12	NCOPC	NCOPC	1E-12	1E-12	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	7E-13	7E-13
Vinyl Chloride	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Total	7E-09	2E-10	5E-12	8E-09	7E-08	1E-10	2E-11	7E-08	1E-07	3E-11	2E-13	1E-07	3E-08	2E-11	6E-11	3E-08

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

Table 6-3
Total Potential Carcinogenic Risks for Construction Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks															
	Offices and Parking Lot				Substation #7				Transformer Shop				Vehicle Refueling Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	3E-09	9E-14	NCOPC	3E-09	1E-09	3E-14	NCOPC	1E-09	ND	ND	NCOPC	NC	ND	ND	NCOPC	NC
Metals																
Arsenic	1E-08	5E-12	NCOPC	1E-08	2E-08	1E-11	NCOPC	2E-08	1E-08	5E-12	NCOPC	1E-08	8E-09	4E-12	NCOPC	8E-09
Cobalt	NA	3E-11	NCOPC	3E-11	NA	1E-11	NCOPC	1E-11	NA	1E-11	NCOPC	1E-11	NA	2E-11	NCOPC	2E-11
Manganese	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Nickel	NA	2E-12	NCOPC	2E-12	NA	7E-13	NCOPC	7E-13	NA	1E-12	NCOPC	1E-12	NA	6E-13	NCOPC	6E-13
Thallium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Vanadium	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
PCBs																
Total PCBs	1E-09	2E-14	NCOPC	1E-09	2E-09	5E-14	NCOPC	2E-09	7E-07	2E-11	NCOPC	7E-07	2E-10	5E-15	NCOPC	2E-10
SVOCs																
Benzo(a)anthracene	5E-09	2E-13	NCOPC	5E-09	8E-11	4E-15	NCOPC	8E-11	1E-09	5E-14	NCOPC	1E-09	2E-10	8E-15	NCOPC	2E-10
Benzo(a)pyrene	4E-08	2E-12	NCOPC	4E-08	6E-10	3E-14	NCOPC	6E-10	9E-09	4E-13	NCOPC	9E-09	2E-09	7E-14	NCOPC	2E-09
Benzo(b)fluoranthene	4E-09	2E-13	NCOPC	4E-09	1E-10	7E-15	NCOPC	1E-10	1E-09	5E-14	NCOPC	1E-09	2E-10	1E-14	NCOPC	2E-10
Benzo(k)fluoranthene	3E-10	1E-14	NCOPC	3E-10	7E-12	3E-16	NCOPC	7E-12	4E-11	2E-15	NCOPC	4E-11	6E-12	3E-16	NCOPC	6E-12
Chrysene	4E-11	2E-15	NCOPC	4E-11	1E-12	7E-17	NCOPC	1E-12	9E-12	4E-16	NCOPC	9E-12	2E-12	9E-17	NCOPC	2E-12
Dibenzo(a,h)anthracene	8E-09	4E-13	NCOPC	8E-09	2E-10	9E-15	NCOPC	2E-10	2E-09	9E-14	NCOPC	2E-09	3E-10	2E-14	NCOPC	3E-10
Indeno(1,2,3-cd)pyrene	3E-09	1E-13	NCOPC	3E-09	6E-11	3E-15	NCOPC	6E-11	6E-10	3E-14	NCOPC	6E-10	1E-10	5E-15	NCOPC	1E-10
Naphthalene	NA	1E-14	NCOPC	1E-14	NA	2E-16	NCOPC	2E-16	NA	1E-15	NCOPC	1E-15	NA	9E-16	NCOPC	9E-16
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Chloroform	NCOPC	NCOPC	5E-12	5E-12	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	5E-12	5E-12	NCOPC	NCOPC	4E-11	4E-11
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	2E-13	2E-13	NCOPC	NCOPC	8E-13	8E-13	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	2E-13	2E-13
Tetrachloroethylene	NCOPC	NCOPC	1E-11	1E-11	NCOPC	NCOPC	8E-14	8E-14	NCOPC	NCOPC	2E-14	2E-14	NCOPC	NCOPC	3E-14	3E-14
Trichloroethene	NCOPC	NCOPC	2E-11	2E-11	NCOPC	NCOPC	3E-13	3E-13	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Vinyl Chloride	NCOPC	NCOPC	2E-11	2E-11	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Total	8E-08	4E-11	5E-11	8E-08	3E-08	2E-11	1E-12	3E-08	7E-07	3E-11	5E-12	7E-07	1E-08	2E-11	4E-11	1E-08

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this medi
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

Table 6-4
Total Potential Hazard Index for Construction Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index															
	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area				Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	4E-04	7E-07	NCOPC	4E-04	5E-03	9E-06	NCOPC	5E-03	2E-02	3E-05	NCOPC	2E-02	2E-03	3E-06	NCOPC	2E-03
Metals																
Arsenic	9E-04	3E-03	NCOPC	4E-03	7E-03	2E-02	NCOPC	3E-02	3E-03	9E-03	NCOPC	1E-02	2E-03	8E-03	NCOPC	1E-02
Cobalt	4E-02	2E-01	NCOPC	3E-01	1E-02	6E-02	NCOPC	7E-02	5E-03	3E-02	NCOPC	3E-02	3E-03	2E-02	NCOPC	2E-02
Manganese	2E-03	1E-01	NCOPC	1E-01	3E-03	2E-01	NCOPC	2E-01	1E-03	7E-02	NCOPC	7E-02	1E-03	6E-02	NCOPC	6E-02
Nickel	8E-05	2E-03	NCOPC	2E-03	4E-03	9E-02	NCOPC	9E-02	1E-04	3E-03	NCOPC	3E-03	1E-04	3E-03	NCOPC	3E-03
Thallium	1E-03	NA	NCOPC	1E-03	3E-03	NA	NCOPC	3E-03	3E-03	NA	NCOPC	3E-03	2E-03	NA	NCOPC	2E-03
Vanadium	1E-03	6E-03	NCOPC	7E-03	7E-02	4E-01	NCOPC	4E-01	1E-03	6E-03	NCOPC	7E-03	9E-04	5E-03	NCOPC	6E-03
PCBs																
Total PCBs	9E-05	NA	NCOPC	9E-05	8E-03	NA	NCOPC	8E-03	4E-03	NA	NCOPC	4E-03	3E-03	NA	NCOPC	3E-03
SVOCs																
Benzo(a)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(a)pyrene	1E-04	1E-03	NCOPC	1E-03	1E-03	1E-02	NCOPC	1E-02	9E-03	1E-01	NCOPC	1E-01	7E-04	8E-03	NCOPC	9E-03
Benzo(b)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Chrysene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Naphthalene	1E-07	7E-08	NCOPC	2E-07	1E-06	6E-07	NCOPC	2E-06	3E-05	2E-05	NCOPC	4E-05	9E-07	5E-07	NCOPC	1E-06
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	NA	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	NA	NC
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	3E-03	3E-03
Chloroform	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	3E-04	3E-04	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	6E-04	6E-04
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	9E-06	9E-06	NCOPC	NCOPC	1E-05	1E-05	NCOPC	NCOPC	2E-05	2E-05	NCOPC	NCOPC	1E-04	1E-04
Tetrachloroethylene	NCOPC	NCOPC	3E-03	3E-03	NCOPC	NCOPC	9E-04	9E-04	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	2E-03	2E-03
Trichloroethene	NCOPC	NCOPC	1E-02	1E-02	NCOPC	NCOPC	1E-02	1E-02	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	6E-03	6E-03
Vinyl Chloride	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	3E-04	3E-06	NCOPC	3E-04	1E-02	2E-04	NCOPC	1E-02	1E-02	2E-04	NCOPC	2E-02	1E-03	1E-05	NCOPC	1E-03
Total	5E-02	4E-01	2E-02	4E-01	1E-01	7E-01	1E-02	9E-01	6E-02	2E-01	2E-04	3E-01	2E-02	1E-01	1E-02	1E-01
Highest Target Endpoint Hazard Index (a)	--	--	--	3E-01	--	--	--	5E-01	--	--	--	1E-01	--	--	--	7E-02

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-4
Total Potential Hazard Index for Construction Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks															
	Offices and Parking Lot				Substation #7				Transformer Shop				Vehicle Refueling Area			
	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air	Soil	Outdoor Air	Trench Air	Total Soil, Outdoor Air, Trench Air
Dioxin																
2,3,7,8-TCDD-TEQ	2E-03	4E-06	NCOPC	2E-03	8E-04	2E-06	NCOPC	8E-04	ND	ND	NCOPC	NC	ND	ND	NCOPC	NC
Metals																
Arsenic	2E-03	5E-03	NCOPC	7E-03	3E-03	1E-02	NCOPC	1E-02	2E-03	6E-03	NCOPC	8E-03	1E-03	4E-03	NCOPC	6E-03
Cobalt	6E-03	3E-02	NCOPC	4E-02	3E-03	2E-02	NCOPC	2E-02	3E-03	1E-02	NCOPC	2E-02	4E-03	2E-02	NCOPC	3E-02
Manganese	2E-03	1E-01	NCOPC	1E-01	1E-03	7E-02	NCOPC	7E-02	1E-03	8E-02	NCOPC	8E-02	1E-03	7E-02	NCOPC	7E-02
Nickel	2E-04	5E-03	NCOPC	5E-03	9E-05	2E-03	NCOPC	2E-03	2E-04	4E-03	NCOPC	4E-03	7E-05	2E-03	NCOPC	2E-03
Thallium	2E-03	NA	NCOPC	2E-03	1E-03	NA	NCOPC	1E-03	3E-03	NA	NCOPC	3E-03	2E-03	NA	NCOPC	2E-03
Vanadium	1E-03	6E-03	NCOPC	7E-03	7E-04	4E-03	NCOPC	5E-03	7E-04	4E-03	NCOPC	5E-03	1E-03	6E-03	NCOPC	7E-03
PCBs																
Total PCBs	7E-04	NA	NCOPC	7E-04	2E-03	NA	NCOPC	2E-03	5E-01	NA	NCOPC	5E-01	2E-04	NA	NCOPC	2E-04
SVOCs																
Benzo(a)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(a)pyrene	1E-02	1E-01	NCOPC	1E-01	1E-04	2E-03	NCOPC	2E-03	2E-03	2E-02	NCOPC	3E-02	4E-04	4E-03	NCOPC	5E-03
Benzo(b)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Chrysene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC
Naphthalene	2E-05	9E-06	NCOPC	3E-05	2E-07	1E-07	NCOPC	3E-07	2E-06	8E-07	NCOPC	2E-06	1E-06	6E-07	NCOPC	2E-06
VOCs																
Bromodichloromethane	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Butyl alcohol, tert-	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Chloroform	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	1E-03	1E-03
Methyl tert-Butyl Ether (MTBE)	NCOPC	NCOPC	1E-05	1E-05	NCOPC	NCOPC	8E-05	8E-05	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	1E-05	1E-05
Tetrachloroethylene	NCOPC	NCOPC	8E-02	8E-02	NCOPC	NCOPC	5E-04	5E-04	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	2E-04	2E-04
Trichloroethene	NCOPC	NCOPC	2E-01	2E-01	NCOPC	NCOPC	3E-03	3E-03	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
Vinyl Chloride	NCOPC	NCOPC	3E-03	3E-03	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC	NCOPC	NCOPC	ND	NC
TPH																
Diesel Range Organics (C10-C20)	5E-04	6E-06	NCOPC	5E-04	5E-04	5E-06	NCOPC	5E-04	4E-04	5E-06	NCOPC	4E-04	2E-03	2E-05	NCOPC	2E-03
Total	3E-02	3E-01	2E-01	5E-01	1E-02	1E-01	3E-03	1E-01	5E-01	1E-01	3E-04	6E-01	1E-02	1E-01	1E-03	1E-01
Highest Target Endpoint Hazard Index (a)	--	--	--	2E-01	--	--	--	8E-02	--	--	--	5E-01	--	--	--	8E-02

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this medi
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
VOC - Volatile Organic Compound.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-5
Total Potential Carcinogenic Risks for Outdoor Industrial Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks											
	Hypothetical Future Park Land/Green Space			Warehouse and Laydown Area			Salvage Yard and Waste Storage Area			Stores and Fleet Maintenance Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	1E-07	1E-14	1E-07	1E-06	2E-13	1E-06	4E-06	5E-13	4E-06	6E-07	7E-14	6E-07
Metals												
Arsenic	8E-07	1E-12	8E-07	1E-05	2E-11	1E-05	4E-06	8E-12	4E-06	2E-06	4E-12	2E-06
Cobalt	NA	2E-10	2E-10	NA	5E-11	5E-11	NA	2E-11	2E-11	NA	9E-12	9E-12
Manganese	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Nickel	NA	4E-13	4E-13	NA	5E-11	5E-11	NA	9E-13	9E-13	NA	1E-12	1E-12
Thallium	ND	ND	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Vanadium	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
PCBs												
Total PCBs	8E-08	7E-15	8E-08	5E-06	4E-13	5E-06	2E-06	2E-13	2E-06	1E-06	1E-13	1E-06
SVOCs												
Benzo(a)anthracene	8E-09	1E-15	8E-09	2E-08	4E-15	2E-08	6E-08	1E-14	6E-08	2E-08	3E-15	2E-08
Benzo(a)pyrene	8E-08	1E-14	8E-08	2E-07	4E-14	2E-07	5E-07	1E-13	5E-07	2E-07	4E-14	2E-07
Benzo(b)fluoranthene	1E-08	2E-15	1E-08	3E-08	5E-15	3E-08	9E-08	2E-14	9E-08	3E-08	5E-15	3E-08
Benzo(k)fluoranthene	4E-10	7E-17	4E-10	1E-09	2E-16	1E-09	2E-09	4E-16	2E-09	1E-09	2E-16	1E-09
Chrysene	9E-11	2E-17	9E-11	3E-10	5E-17	3E-10	6E-10	1E-16	6E-10	3E-10	5E-17	3E-10
Dibenzo(a,h)anthracene	2E-08	4E-15	2E-08	6E-08	1E-14	6E-08	1E-07	2E-14	1E-07	6E-08	1E-14	6E-08
Indeno(1,2,3-cd)pyrene	6E-09	1E-15	6E-09	2E-08	3E-15	2E-08	4E-08	7E-15	4E-08	2E-08	3E-15	2E-08
Naphthalene	NA	8E-17	8E-17	NA	5E-16	5E-16	NA	7E-16	7E-16	NA	2E-16	2E-16
TPH												
Diesel Range Organics (C10-C20)	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Total	1E-06	2E-10	1E-06	2E-05	1E-10	2E-05	1E-05	3E-11	1E-05	4E-06	1E-11	4E-06

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

Table 6-5
Total Potential Carcinogenic Risks for Outdoor Industrial Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks											
	Offices and Parking Lot			Substation #7			Transformer Shop			Vehicle Refueling Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	6E-07	7E-14	6E-07	2E-07	2E-14	2E-07	ND	ND	NC	ND	ND	NC
Metals												
Arsenic	1E-06	2E-12	1E-06	1E-05	2E-11	1E-05	5E-07	9E-13	5E-07	ND	ND	NC
Cobalt	NA	1E-11	1E-11	NA	5E-12	5E-12	NA	3E-12	3E-12	ND	ND	NC
Manganese	NA	NA	NC	NA	NA	NC	NA	NA	NC	ND	ND	NC
Nickel	NA	1E-12	1E-12	NA	5E-13	5E-13	NA	5E-13	5E-13	ND	ND	NC
Thallium	ND	ND	NC	NA	NA	NC	ND	ND	NC	ND	ND	NC
Vanadium	NA	NA	NC	NA	NA	NC	NA	NA	NC	ND	ND	NC
PCBs												
Total PCBs	3E-07	2E-14	3E-07	4E-06	4E-13	4E-06	2E-03	1E-10	2E-03	1E-07	1E-14	1E-07
SVOCs												
Benzo(a)anthracene	1E-07	2E-14	1E-07	8E-08	1E-14	8E-08	3E-08	6E-15	3E-08	1E-07	2E-14	1E-07
Benzo(a)pyrene	1E-06	2E-13	1E-06	6E-07	1E-13	6E-07	3E-07	5E-14	3E-07	6E-07	1E-13	6E-07
Benzo(b)fluoranthene	1E-07	2E-14	1E-07	1E-07	2E-14	1E-07	3E-08	6E-15	3E-08	9E-08	2E-14	9E-08
Benzo(k)fluoranthene	5E-09	9E-16	5E-09	7E-09	1E-15	7E-09	1E-09	2E-16	1E-09	3E-09	5E-16	3E-09
Chrysene	1E-09	2E-16	1E-09	1E-09	2E-16	1E-09	3E-10	6E-17	3E-10	1E-09	2E-16	1E-09
Dibenzo(a,h)anthracene	2E-07	4E-14	2E-07	2E-07	3E-14	2E-07	5E-08	9E-15	5E-08	1E-07	2E-14	1E-07
Indeno(1,2,3-cd)pyrene	6E-08	1E-14	6E-08	6E-08	1E-14	6E-08	2E-08	3E-15	2E-08	3E-08	6E-15	3E-08
Naphthalene	NA	3E-16	3E-16	NA	3E-16	3E-16	NA	1E-16	1E-16	NA	3E-15	3E-15
TPH												
Diesel Range Organics (C10-C20)	ND	ND	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Total	3E-06	2E-11	3E-06	2E-05	2E-11	2E-05	2E-03	2E-10	2E-03	1E-06	2E-13	1E-06

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

Table 6-6
Total Potential Hazard Index for Outdoor Industrial Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index											
	Hypothetical Future Park Land/Green Space			Warehouse and Laydown Area			Salvage Yard and Waste Storage Area			Stores and Fleet Maintenance Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	3E-03	2E-08	3E-03	4E-02	3E-07	4E-02	1E-01	1E-06	1E-01	2E-02	1E-07	2E-02
Metals												
Arsenic	5E-03	6E-05	5E-03	7E-02	9E-04	7E-02	3E-02	3E-04	3E-02	1E-02	2E-04	1E-02
Cobalt	3E-01	8E-03	3E-01	1E-01	3E-03	1E-01	4E-02	1E-03	4E-02	2E-02	5E-04	2E-02
Manganese	6E-03	1E-03	8E-03	3E-02	8E-03	4E-02	2E-02	4E-03	2E-02	7E-03	2E-03	9E-03
Nickel	5E-04	5E-05	5E-04	6E-02	6E-03	7E-02	1E-03	1E-04	1E-03	1E-03	1E-04	1E-03
Thallium	ND	ND	NC	1E-02	NA	1E-02	2E-02	NA	2E-02	1E-02	NA	1E-02
Vanadium	9E-03	2E-04	9E-03	1E+00	3E-02	1E+00	6E-03	1E-04	6E-03	5E-03	1E-04	5E-03
PCBs												
Total PCBs	6E-03	NA	6E-03	3E-01	NA	3E-01	1E-01	NA	1E-01	8E-02	NA	8E-02
SVOCs												
Benzo(a)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(a)pyrene	7E-04	3E-05	7E-04	2E-03	1E-04	2E-03	5E-03	2E-04	5E-03	2E-03	1E-04	2E-03
Benzo(b)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(k)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Chrysene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Dibenzo(a,h)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Naphthalene	1E-06	2E-09	1E-06	7E-06	1E-08	7E-06	1E-05	2E-08	1E-05	2E-06	5E-09	2E-06
TPH												
Diesel Range Organics (C10-C20)	1E-03	5E-08	1E-03	1E-02	5E-07	1E-02	3E-01	1E-05	3E-01	1E-02	6E-07	1E-02
Total	4E-01	1E-02	4E-01	2E+00	4E-02	2E+00	6E-01	5E-03	6E-01	2E-01	3E-03	2E-01
Highest Target Endpoint Hazard Index (a)	NA	NA	3E-01	NA	NA	1E+00	NA	NA	3E-01	NA	NA	8E-02

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-6
Total Potential Hazard Index for Outdoor Industrial Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index											
	Offices and Parking Lot			Substation #7			Transformer Shop			Vehicle Refueling Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	2E-02	1E-07	2E-02	5E-03	4E-08	5E-03	ND	ND	NC	ND	ND	NC
Metals												
Arsenic	7E-03	9E-05	7E-03	6E-02	8E-04	6E-02	3E-03	4E-05	3E-03	ND	ND	NC
Cobalt	3E-02	7E-04	3E-02	1E-02	3E-04	1E-02	7E-03	2E-04	7E-03	ND	ND	NC
Manganese	8E-03	2E-03	1E-02	1E-02	3E-03	1E-02	8E-03	2E-03	1E-02	ND	ND	NC
Nickel	1E-03	1E-04	1E-03	5E-04	6E-05	6E-04	6E-04	6E-05	7E-04	ND	ND	NC
Thallium	ND	ND	NC	2E-02	NA	2E-02	ND	ND	NC	ND	ND	NC
Vanadium	4E-03	8E-05	4E-03	4E-03	8E-05	4E-03	1E-03	3E-05	2E-03	ND	ND	NC
PCBs												
Total PCBs	2E-02	NA	2E-02	3E-01	NA	3E-01	1E+02	NA	1E+02	9E-03	NA	9E-03
SVOCs												
Benzo(a)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(a)pyrene	9E-03	4E-04	9E-03	6E-03	3E-04	6E-03	3E-03	1E-04	3E-03	5E-03	2E-04	5E-03
Benzo(b)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(k)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Chrysene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Dibenzo(a,h)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Naphthalene	5E-06	9E-09	5E-06	4E-06	8E-09	4E-06	2E-06	3E-09	2E-06	4E-05	8E-08	4E-05
TPH												
Diesel Range Organics (C10-C20)	ND	ND	NC	2E-03	7E-08	2E-03	6E-03	3E-07	6E-03	3E-02	1E-06	3E-02
Total	9E-02	3E-03	1E-01	4E-01	4E-03	4E-01	1E+02	2E-03	1E+02	4E-02	2E-04	4E-02
Highest Target Endpoint Hazard Index (a)	NA	NA	3E-02	NA	NA	3E-01	NA	NA	1E+02	NA	NA	3E-02

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-7
Total Potential Carcinogenic Risks for Outdoor Industrial Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks											
	Hypothetical Future Park Land/Green Space			Warehouse and Laydown Area			Salvage Yard and Waste Storage Area			Stores and Fleet Maintenance Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	1E-08	2E-15	1E-08	9E-08	2E-14	9E-08	4E-07	8E-14	4E-07	4E-08	8E-15	4E-08
Metals												
Arsenic	1E-07	3E-13	1E-07	8E-07	3E-12	8E-07	5E-07	2E-12	5E-07	2E-07	7E-13	2E-07
Cobalt	NA	3E-11	3E-11	NA	6E-12	6E-12	NA	3E-12	3E-12	NA	1E-12	1E-12
Manganese	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Nickel	NA	9E-14	9E-14	NA	4E-12	4E-12	NA	1E-13	1E-13	NA	1E-13	1E-13
Thallium	ND	ND	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Vanadium	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
PCBs												
Total PCBs	7E-09	8E-16	7E-09	2E-07	2E-14	2E-07	2E-07	2E-14	2E-07	1E-07	1E-14	1E-07
SVOCs												
Benzo(a)anthracene	1E-09	3E-16	1E-09	3E-09	9E-16	3E-09	6E-09	2E-15	6E-09	2E-09	5E-16	2E-09
Benzo(a)pyrene	1E-08	3E-15	1E-08	3E-08	9E-15	3E-08	6E-08	2E-14	6E-08	2E-08	5E-15	2E-08
Benzo(b)fluoranthene	1E-09	3E-16	1E-09	4E-09	1E-15	4E-09	9E-09	2E-15	9E-09	2E-09	6E-16	2E-09
Benzo(k)fluoranthene	5E-11	1E-17	5E-11	1E-10	4E-17	1E-10	3E-10	7E-17	3E-10	1E-10	3E-17	1E-10
Chrysene	1E-11	3E-18	1E-11	4E-11	1E-17	4E-11	6E-11	2E-17	6E-11	2E-11	6E-18	2E-11
Dibenzo(a,h)anthracene	2E-09	6E-16	2E-09	7E-09	2E-15	7E-09	1E-08	3E-15	1E-08	4E-09	1E-15	4E-09
Indeno(1,2,3-cd)pyrene	8E-10	2E-16	8E-10	2E-09	6E-16	2E-09	4E-09	1E-15	4E-09	1E-09	4E-16	1E-09
Naphthalene	NA	1E-17	1E-17	NA	8E-17	8E-17	NA	1E-16	1E-16	NA	3E-17	3E-17
TPH												
Diesel Range Organics (C10-C20)	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Total	1E-07	3E-11	1E-07	1E-06	1E-11	1E-06	1E-06	5E-12	1E-06	4E-07	2E-12	4E-07

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

Table 6-7
Total Potential Carcinogenic Risks for Outdoor Industrial Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks											
	Offices and Parking Lot			Substation #7			Transformer Shop			Vehicle Refueling Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	6E-08	1E-14	6E-08	3E-08	5E-15	3E-08	ND	ND	NC	ND	ND	NC
Metals												
Arsenic	1E-07	4E-13	1E-07	5E-07	1E-12	5E-07	8E-08	2E-13	8E-08	ND	ND	NC
Cobalt	NA	2E-12	2E-12	NA	1E-12	1E-12	NA	8E-13	8E-13	ND	ND	NC
Manganese	NA	NA	NC	NA	NA	NC	NA	NA	NC	ND	ND	NC
Nickel	NA	2E-13	2E-13	NA	9E-14	9E-14	NA	1E-13	1E-13	ND	ND	NC
Thallium	ND	ND	NC	NA	NA	NC	ND	ND	NC	ND	ND	NC
Vanadium	NA	NA	NC	NA	NA	NC	NA	NA	NC	ND	ND	NC
PCBs												
Total PCBs	4E-08	4E-15	4E-08	7E-08	9E-15	7E-08	3E-05	4E-12	3E-05	1E-08	1E-15	1E-08
SVOCs												
Benzo(a)anthracene	9E-09	2E-15	9E-09	3E-09	8E-16	3E-09	2E-09	6E-16	2E-09	1E-08	3E-15	1E-08
Benzo(a)pyrene	8E-08	2E-14	8E-08	2E-08	6E-15	2E-08	2E-08	6E-15	2E-08	7E-08	2E-14	7E-08
Benzo(b)fluoranthene	1E-08	3E-15	1E-08	5E-09	1E-15	5E-09	3E-09	8E-16	3E-09	1E-08	3E-15	1E-08
Benzo(k)fluoranthene	4E-10	1E-16	4E-10	3E-10	7E-17	3E-10	1E-10	3E-17	1E-10	3E-10	9E-17	3E-10
Chrysene	9E-11	2E-17	9E-11	5E-11	1E-17	5E-11	2E-11	6E-18	2E-11	1E-10	3E-17	1E-10
Dibenzo(a,h)anthracene	2E-08	5E-15	2E-08	7E-09	2E-15	7E-09	6E-09	1E-15	6E-09	2E-08	4E-15	2E-08
Indeno(1,2,3-cd)pyrene	6E-09	2E-15	6E-09	2E-09	6E-16	2E-09	2E-09	5E-16	2E-09	4E-09	1E-15	4E-09
Naphthalene	NA	4E-17	4E-17	NA	3E-17	3E-17	NA	2E-17	2E-17	NA	4E-16	4E-16
TPH												
Diesel Range Organics (C10-C20)	ND	ND	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Total	4E-07	3E-12	4E-07	6E-07	3E-12	6E-07	3E-05	5E-12	3E-05	1E-07	3E-14	1E-07

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

Table 6-8
Total Potential Hazard Index for Outdoor Industrial Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index											
	Hypothetical Future Park Land/Green Space			Warehouse and Laydown Area			Salvage Yard and Waste Storage Area			Stores and Fleet Maintenance Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	1E-03	2E-08	1E-03	1E-02	1E-07	1E-02	4E-02	5E-07	4E-02	4E-03	5E-08	4E-03
Metals												
Arsenic	2E-03	5E-05	2E-03	2E-02	4E-04	2E-02	1E-02	3E-04	1E-02	6E-03	1E-04	6E-03
Cobalt	1E-01	6E-03	1E-01	2E-02	1E-03	3E-02	1E-02	6E-04	1E-02	6E-03	3E-04	6E-03
Manganese	2E-03	8E-04	3E-03	6E-03	3E-03	9E-03	4E-03	2E-03	6E-03	2E-03	8E-04	3E-03
Nickel	2E-04	4E-05	2E-04	1E-02	2E-03	1E-02	3E-04	7E-05	4E-04	2E-04	4E-05	3E-04
Thallium	ND	ND	NC	5E-03	NA	5E-03	7E-03	NA	7E-03	4E-03	NA	4E-03
Vanadium	3E-03	1E-04	3E-03	2E-01	8E-03	2E-01	2E-03	9E-05	2E-03	2E-03	7E-05	2E-03
PCBs												
Total PCBs	2E-03	NA	2E-03	5E-02	NA	5E-02	5E-02	NA	5E-02	3E-02	NA	3E-02
SVOCs												
Benzo(a)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(a)pyrene	4E-04	3E-05	4E-04	1E-03	8E-05	1E-03	2E-03	1E-04	2E-03	7E-04	4E-05	7E-04
Benzo(b)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(k)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Chrysene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Dibenzo(a,h)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Naphthalene	5E-07	1E-09	5E-07	3E-06	8E-09	3E-06	4E-06	1E-08	4E-06	1E-06	3E-09	1E-06
TPH												
Diesel Range Organics (C10-C20)	5E-04	5E-08	5E-04	4E-03	3E-07	4E-03	5E-02	5E-06	5E-02	1E-03	1E-07	1E-03
Total	1E-01	8E-03	2E-01	3E-01	1E-02	3E-01	2E-01	3E-03	2E-01	5E-02	1E-03	5E-02
Highest Target Endpoint Hazard Index (a)	NA	NA	1E-01	NA	NA	2E-01	NA	NA	5E-02	NA	NA	3E-02

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-8
Total Potential Hazard Index for Outdoor Industrial Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index											
	Offices and Parking Lot			Substation #7			Transformer Shop			Vehicle Refueling Area		
	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total	Surface Soil	Outdoor Air	Total
Dioxin												
2,3,7,8-TCDD-TEQ	6E-03	8E-08	6E-03	3E-03	4E-08	3E-03	ND	ND	NC	ND	ND	NC
Metals												
Arsenic	3E-03	7E-05	3E-03	1E-02	2E-04	1E-02	2E-03	4E-05	2E-03	ND	ND	NC
Cobalt	9E-03	4E-04	9E-03	5E-03	2E-04	5E-03	3E-03	2E-04	4E-03	ND	ND	NC
Manganese	3E-03	1E-03	4E-03	3E-03	1E-03	4E-03	4E-03	2E-03	6E-03	ND	ND	NC
Nickel	4E-04	9E-05	5E-04	2E-04	4E-05	2E-04	3E-04	6E-05	4E-04	ND	ND	NC
Thallium	ND	ND	NC	5E-03	NA	5E-03	ND	ND	NC	ND	ND	NC
Vanadium	1E-03	7E-05	2E-03	1E-03	5E-05	1E-03	7E-04	3E-05	8E-04	ND	ND	NC
PCBs												
Total PCBs	1E-02	NA	1E-02	2E-02	NA	2E-02	8E+00	NA	8E+00	3E-03	NA	3E-03
SVOCs												
Benzo(a)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(a)pyrene	3E-03	2E-04	3E-03	8E-04	6E-05	9E-04	8E-04	5E-05	8E-04	2E-03	2E-04	2E-03
Benzo(b)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Benzo(k)fluoranthene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Chrysene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Dibenzo(a,h)anthracene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NC	NA	NA	NC	NA	NA	NC	NA	NA	NC
Naphthalene	2E-06	5E-09	2E-06	1E-06	3E-09	1E-06	7E-07	2E-09	7E-07	1E-05	4E-08	1E-05
TPH												
Diesel Range Organics (C10-C20)	ND	ND	NC	7E-04	7E-08	7E-04	3E-03	3E-07	3E-03	1E-02	1E-06	1E-02
Total	4E-02	2E-03	4E-02	5E-02	2E-03	5E-02	8E+00	2E-03	8E+00	2E-02	2E-04	2E-02
Highest Target Endpoint Hazard Index (a)	NA	NA	1E-02	NA	NA	2E-02	NA	NA	8E+00	NA	NA	1E-02

Notes:
EPC - Exposure point concentration.
NA - Not applicable; no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-9
Total Potential Carcinogenic Risks for Recreational Visitor Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks		
	Hypothetical Future Park Land/Green Space		
	Surface Soil	Outdoor Air	Total
Dioxin			
2,3,7,8-TCDD-TEQ	6.E-09	3E-16	6E-09
Inorganics			
Arsenic	4.E-08	3E-14	4E-08
Cobalt	NA	3E-12	3E-12
Manganese	NA	NA	NC
Nickel	NA	8E-15	8E-15
Thallium	ND	ND	NC
Vanadium	NA	NA	NC
PCBs			
Total PCBs	4.E-09	1E-16	4E-09
SVOCs			
Benzo(a)anthracene	9.E-10	8E-17	9E-10
Benzo(a)pyrene	9.E-09	7E-16	9E-09
Benzo(b)fluoranthene	1.E-09	1E-16	1E-09
Benzo(k)fluoranthene	4.E-11	4E-18	4E-11
Chrysene	1.E-11	8E-19	1E-11
Dibenzo(a,h)anthracene	2.E-09	2E-16	2E-09
Indeno(1,2,3-cd)pyrene	7.E-10	6E-17	7E-10
Naphthalene	NA	2E-18	2E-18
TPH			
Diesel Range Organics (C10-C20)	NA	NA	NC
Total	7.E-08	3E-12	7E-08

Notes:
NA - Not applicable/no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

Table 6-10
Total Potential Hazard Index for Recreational Visitor Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	**Potential Hazard Index**		
	Hypothetical Future Park Land/Green Space		
	Surface Soil	**Outdoor Air**	**Total**
Dioxin			
2,3,7,8-TCDD-TEQ	4.E-04	1E-09	4E-04
Inorganics			
Arsenic	5.E-04	3E-06	5E-04
Cobalt	4.E-02	3E-04	4E-02
Manganese	8.E-04	6E-05	9E-04
Nickel	6.E-05	2E-06	6E-05
Thallium	ND	ND	NC
Vanadium	1.E-03	9E-06	1E-03
PCBs			
Total PCBs	5.E-04	NA	5E-04
SVOCs			
Benzo(a)anthracene	NA	NA	NC
Benzo(a)pyrene	7.E-05	1E-06	7E-05
Benzo(b)fluoranthene	NA	NA	NC
Benzo(k)fluoranthene	NA	NA	NC
Chrysene	NA	NA	NC
Dibenzo(a,h)anthracene	NA	NA	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NC
Naphthalene	1.E-07	9E-11	1E-07
TPH			
Diesel Range Organics (C10-C20)	1.E-04	2E-09	1E-04
Total	5.E-02	4E-04	5E-02
Highest Target Endpoint Hazard Index (a)	--	--	4E-02

Notes:
NA - Not applicable/no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-11
Total Potential Carcinogenic Risks for Recreational Visitor Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks		
	Hypothetical Future Park Land/Green Space		
	Surface Soil	Outdoor Air	Total
Dioxin			
2,3,7,8-TCDD-TEQ	5.E-10	2E-17	5E-10
Inorganics			
Arsenic	4.E-09	3E-15	4E-09
Cobalt	NA	3E-13	3E-13
Manganese	NA	NA	NC
Nickel	NA	9E-16	9E-16
Thallium	ND	ND	NC
Vanadium	NA	NA	NC
PCBs			
Total PCBs	2.E-10	8E-18	2E-10
SVOCs			
Benzo(a)anthracene	9.E-11	7E-18	9E-11
Benzo(a)pyrene	1.E-09	8E-17	1E-09
Benzo(b)fluoranthene	1.E-10	8E-18	1E-10
Benzo(k)fluoranthene	4.E-12	3E-19	4E-12
Chrysene	1.E-12	7E-20	1E-12
Dibenzo(a,h)anthracene	2.E-10	2E-17	2E-10
Indeno(1,2,3-cd)pyrene	7.E-11	5E-18	7E-11
Naphthalene	NA	1E-19	1E-19
TPH			
Diesel Range Organics (C10-C20)	NA	NA	NC
Total	7.E-09	3E-13	7E-09

Notes:
NA - Not applicable/no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

Table 6-12
Total Potential Hazard Index for Recreational Visitor Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index		
	Hypothetical Future Park Land/Green Space		
	Surface Soil	Outdoor Air	Total
Dioxin			
2,3,7,8-TCDD-TEQ	7.E-05	2E-10	7E-05
Inorganics			
Arsenic	1.E-04	6E-07	1E-04
Cobalt	9.E-03	7E-05	9E-03
Manganese	1.E-04	9E-06	1E-04
Nickel	1.E-05	4E-07	1E-05
Thallium	ND	ND	NC
Vanadium	2.E-04	1E-06	2E-04
PCBs			
Total PCBs	7.E-05	NA	7E-05
SVOCs			
Benzo(a)anthracene	NA	NA	NC
Benzo(a)pyrene	2.E-05	3E-07	2E-05
Benzo(b)fluoranthene	NA	NA	NC
Benzo(k)fluoranthene	NA	NA	NC
Chrysene	NA	NA	NC
Dibenzo(a,h)anthracene	NA	NA	NC
Indeno(1,2,3-cd)pyrene	NA	NA	NC
Naphthalene	2.E-08	2E-11	2E-08
TPH			
Diesel Range Organics (C10-C20)	3.E-05	5E-10	3E-05
Total	1.E-02	8E-05	1E-02
Highest Target Endpoint Hazard Index (a)	NA	NA	9E-03

Notes:
NA - Not applicable/no dose-response value.
NC - Not calculated.
ND - Not detected in this area.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
TPH - Total Petroleum Hydrocarbon.
Values are presented to one significant figure.

(a) See Attachment H.

Table 6-13
Total Potential Carcinogenic Risks for the Angler Receptors - Mixed Fish Diet (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks												
	Adult Angler				Young Child Angler				Sum of Adult and Young Child Angler	Older Child/Teen Angler			
	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (a)	Total		Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total
Dioxin													
2,3,7,8-TCDD-TEQ	6E-07	3E-10	NCOPC	6E-07	1E-06	4E-10	NCOPC	1E-06	2E-06	4E-07	2E-10	NCOPC	4E-07
Metals													
Aluminum	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Antimony	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Arsenic	2E-07	6E-09	NCOPC	2E-07	3E-07	7E-09	NCOPC	3E-07	4E-07	1E-07	5E-09	NCOPC	1E-07
Arsenic, organic	NCOPC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NCOPC	NC	NC	NCOPC	NCOPC	NCOPC	NC
Cobalt	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NC	NA	NA	NCOPC	NC
Cyanide	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Manganese	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NC	NA	NA	NCOPC	NC
Mercury	NCOPC	NCOPC	NA	NC	NCOPC	NCOPC	NA	NC	NC	NCOPC	NCOPC	NA	NC
Nickel	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Thallium	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Vanadium	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Pesticides													
4,4'-DDT	NCOPC	2E-12	NCOPC	2E-12	NCOPC	3E-12	NCOPC	3E-12	4E-12	NCOPC	2E-12	NCOPC	2E-12
4,4'-DDD	NCOPC	NCOPC	2E-07	2E-07	NCOPC	NCOPC	8E-08	8E-08	2E-07	NCOPC	NCOPC	9E-08	9E-08
4,4'-DDE	NCOPC	NCOPC	3E-07	3E-07	NCOPC	NCOPC	1E-07	1E-07	4E-07	NCOPC	NCOPC	2E-07	2E-07
Aldrin	NCOPC	NCOPC	2E-07	2E-07	NCOPC	NCOPC	1E-07	1E-07	3E-07	NCOPC	NCOPC	1E-07	1E-07
alpha-Chlordane	NCOPC	NCOPC	3E-07	3E-07	NCOPC	NCOPC	2E-07	2E-07	5E-07	NCOPC	NCOPC	2E-07	2E-07
cis-Nonachlor	NCOPC	NCOPC	1E-07	1E-07	NCOPC	NCOPC	6E-08	6E-08	2E-07	NCOPC	NCOPC	7E-08	7E-08
Dieldrin	NCOPC	NCOPC	3E-06	3E-06	NCOPC	NCOPC	2E-06	2E-06	5E-06	NCOPC	NCOPC	2E-06	2E-06
gamma-Chlordane	NCOPC	NCOPC	6E-08	6E-08	NCOPC	NCOPC	3E-08	3E-08	1E-07	NCOPC	NCOPC	4E-08	4E-08
Heptachlor epoxide	NCOPC	NCOPC	6E-07	6E-07	NCOPC	NCOPC	3E-07	3E-07	9E-07	NCOPC	NCOPC	4E-07	4E-07
Mirex	NCOPC	NCOPC	2E-07	2E-07	NCOPC	NCOPC	9E-08	9E-08	3E-07	NCOPC	NCOPC	1E-07	1E-07
Oxychlordane	NCOPC	NCOPC	3E-08	3E-08	NCOPC	NCOPC	2E-08	2E-08	5E-08	NCOPC	NCOPC	2E-08	2E-08
trans-Nonachlor	NCOPC	NCOPC	2E-07	2E-07	NCOPC	NCOPC	1E-07	1E-07	3E-07	NCOPC	NCOPC	1E-07	1E-07
PCBs													
Total PCBs	6E-08	1E-11	2E-05	2E-05	8E-08	2E-11	1E-05	1E-05	3E-05	4E-08	1E-11	1E-05	1E-05
PCB-TEQ	--	--	9E-06	9E-06	NCOPC	NCOPC	4E-06	4E-06	1E-05	NCOPC	NCOPC	5E-06	5E-06
SVOCs													
Benzo(a)anthracene	6E-09	NCOPC	NCOPC	6E-09	3E-08	NCOPC	NCOPC	3E-08	4E-08	1E-08	NCOPC	NCOPC	1E-08
Benzo(a)pyrene	4E-08	NCOPC	NCOPC	4E-08	2E-07	NCOPC	NCOPC	2E-07	2E-07	6E-08	NCOPC	NCOPC	6E-08
Benzo(b)fluoranthene	6E-09	NCOPC	NCOPC	6E-09	3E-08	NCOPC	NCOPC	3E-08	4E-08	9E-09	NCOPC	NCOPC	9E-09
Benzo(k)fluoranthene	2E-10	NCOPC	NCOPC	2E-10	1E-09	NCOPC	NCOPC	1E-09	1E-09	3E-10	NCOPC	NCOPC	3E-10
Chrysene	5E-11	NCOPC	NCOPC	5E-11	3E-10	NCOPC	NCOPC	3E-10	3E-10	8E-11	NCOPC	NCOPC	8E-11
Dibenzo(a,h)anthracene	9E-09	NCOPC	NCOPC	9E-09	5E-08	NCOPC	NCOPC	5E-08	6E-08	1E-08	NCOPC	NCOPC	1E-08
Indeno(1,2,3-cd)pyrene	3E-09	NCOPC	NCOPC	3E-09	2E-08	NCOPC	NCOPC	2E-08	2E-08	5E-09	NCOPC	NCOPC	5E-09
TPH													
Diesel Range Organics (C10-C20)	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Total (Total PCBs) (b)	9E-07	6E-09	3E-05	3E-05	2E-06	8E-09	1E-05	2E-05	4E-05	7E-07	5E-09	2E-05	2E-05
Total (includes PCB-TEQ for fish) (c)	9E-07	6E-09	1E-05	2E-05	2E-06	8E-09	7E-06	9E-06	2E-05	7E-07	5E-09	9E-06	9E-06

Notes:
Values are presented to one significant figure.

NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

(a) Calculated based on data from Pinkney (2017). The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.
(b) Total (includes Total PCBs for fringe surface sediment, surface water, and fish).
(c) Total (includes Total PCBs for fringe surface sediment and surface water and PCB-TEQ for fish).

Table 6-14
Total Potential Hazard Index for the Angler Receptors - Mixed Fish Diet (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index											
	Adult Angler				Young Child Angler				Older Child/Teen Angler			
	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total
Dioxin												
2,3,7,8-TCDD-TEQ	2E-02	1E-05	NCOPC	2E-02	1E-01	5E-05	NCOPC	1E-01	3E-02	2E-05	NCOPC	3E-02
Metals												
Aluminum	4E-04	NCOPC	NCOPC	4E-04	4E-03	NCOPC	NCOPC	4E-03	6E-04	NCOPC	NCOPC	6E-04
Antimony	7E-04	NCOPC	NCOPC	7E-04	7E-03	NCOPC	NCOPC	7E-03	1E-03	NCOPC	NCOPC	1E-03
Arsenic	1E-03	5E-05	NCOPC	1E-03	7E-03	2E-04	NCOPC	7E-03	1E-03	6E-05	NCOPC	2E-03
Arsenic, organic	NCOPC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NCOPC	NC
Cobalt	2E-03	4E-05	NCOPC	2E-03	2E-02	2E-04	NCOPC	2E-02	4E-03	7E-05	NCOPC	4E-03
Cyanide	2E-04	NCOPC	NCOPC	2E-04	2E-03	NCOPC	NCOPC	2E-03	4E-04	NCOPC	NCOPC	4E-04
Manganese	4E-04	6E-04	NCOPC	1E-03	4E-03	2E-03	NCOPC	6E-03	7E-04	7E-04	NCOPC	1E-03
Mercury	NCOPC	NCOPC	2E-01	2E-01	NCOPC	NCOPC	3E-01	3E-01	NCOPC	NCOPC	2E-01	2E-01
Nickel	1E-04	NCOPC	NCOPC	1E-04	1E-03	NCOPC	NCOPC	1E-03	2E-04	NCOPC	NCOPC	2E-04
Thallium	1E-03	NCOPC	NCOPC	1E-03	1E-02	NCOPC	NCOPC	1E-02	2E-03	NCOPC	NCOPC	2E-03
Vanadium	1E-03	NCOPC	NCOPC	1E-03	1E-02	NCOPC	NCOPC	1E-02	2E-03	NCOPC	NCOPC	2E-03
Pesticides												
4,4'-DDT	NCOPC	4E-08	NCOPC	4E-08	NCOPC	2E-07	NCOPC	2E-07	NCOPC	6E-08	NCOPC	6E-08
4,4'-DDD	NCOPC	NCOPC	8E-02	8E-02	NCOPC	NCOPC	1E-01	1E-01	NCOPC	NCOPC	8E-02	8E-02
4,4'-DDE	NCOPC	NCOPC	1E-02	1E-02	NCOPC	NCOPC	2E-02	2E-02	NCOPC	NCOPC	1E-02	1E-02
Aldrin	NCOPC	NCOPC	1E-03	1E-03	NCOPC	NCOPC	2E-03	2E-03	NCOPC	NCOPC	1E-03	1E-03
alpha-Chlordane	NCOPC	NCOPC	7E-03	7E-03	NCOPC	NCOPC	1E-02	1E-02	NCOPC	NCOPC	7E-03	7E-03
cis-Nonachlor	NCOPC	NCOPC	3E-03	3E-03	NCOPC	NCOPC	4E-03	4E-03	NCOPC	NCOPC	2E-03	2E-03
Dieldrin	NCOPC	NCOPC	1E-02	1E-02	NCOPC	NCOPC	2E-02	2E-02	NCOPC	NCOPC	1E-02	1E-02
gamma-Chlordane	NCOPC	NCOPC	1E-03	1E-03	NCOPC	NCOPC	2E-03	2E-03	NCOPC	NCOPC	1E-03	1E-03
Heptachlor epoxide	NCOPC	NCOPC	2E-02	2E-02	NCOPC	NCOPC	3E-02	3E-02	NCOPC	NCOPC	2E-02	2E-02
Mirex	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	3E-04	3E-04	NCOPC	NCOPC	2E-04	2E-04
Oxychlordane	NCOPC	NCOPC	6E-04	6E-04	NCOPC	NCOPC	1E-03	1E-03	NCOPC	NCOPC	6E-04	6E-04
trans-Nonachlor	NCOPC	NCOPC	4E-03	4E-03	NCOPC	NCOPC	7E-03	7E-03	NCOPC	NCOPC	4E-03	4E-03
PCBs												
Total PCBs	6E-03	5E-06	2E+00	2E+00	2E-02	3E-05	3E+00	3E+00	6E-03	8E-06	2E+00	2E+00
PCB-TEQ	--	--	3E-01	3E-01	NCOPC	NCOPC	6E-01	6E-01	--	--	3E-01	3E-01
SVOCs												
Benzo(a)anthracene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Benzo(a)pyrene	4E-04	NCOPC	NCOPC	4E-04	2E-03	NCOPC	NCOPC	2E-03	5E-04	NCOPC	NCOPC	5E-04
Benzo(b)fluoranthene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Chrysene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
TPH												
Diesel Range Organics (C10-C20)	6E-04	NCOPC	NCOPC	6E-04	5E-03	NCOPC	NCOPC	5E-03	8E-04	NCOPC	NCOPC	8E-04
Total (Total PCBs) (b)	4E-02	7E-04	2E+00	2E+00	2E-01	2E-03	4E+00	4E+00	5E-02	8E-04	2E+00	2E+00
Total (includes PCB-TEQ for fish) (c)	4E-02	7E-04	7E-01	7E-01	2E-01	2E-03	1E+00	1E+00	5E-02	8E-04	7E-01	7E-01
Highest TE HI (Total PCBs) (b,d)	2E-02	6E-04	2E+00	2E+00	2E-01	2E-03	3E+00	3E+00	3E-02	7E-04	2E+00	2E+00
Highest TE HI (PCB-TEQ) (c,d)	2E-02	6E-04	4E-01	4E-01	2E-01	2E-03	6E-01	7E-01	3E-02	7E-04	3E-01	4E-01

Notes:
Values are presented to one significant figure.

NA - Not Applicable; no dose-response value.
HI - Hazard Index.
NC - Not calculated.

NCOPC - Not a Chemical of Potential Concern in this media.
TE - Target Endpoint.

(a) Calculated based on data from Pinkney (2017). The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.
(b) Total (includes Total PCBs for fringe surface sediment, surface water, and fish).
(c) Total (includes Total PCBs for fringe surface sediment and surface water and PCB-TEQ for fish).
(d) See Attachment H.

Table 6-15
Total Potential Carcinogenic Risks for the Angler Receptors - Mixed Fish Diet (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks												
	Adult Angler				Young Child Angler				Sum of Adult and Young Child Angler	Older Child/Teen Angler			
	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total		Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total
Dioxin													
2,3,7,8-TCDD-TEQ	4E-08	1E-11	NCOPC	4E-08	4E-08	2E-10	NCOPC	4E-08	7E-08	2E-08	1E-11	NCOPC	2E-08
Metals													
Aluminum	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Arsenic	3E-08	4E-10	NCOPC	3E-08	2E-08	6E-09	NCOPC	3E-08	6E-08	2E-08	4E-10	NCOPC	2E-08
Arsenic, organic	NCOPC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NCOPC	NC	NC	NCOPC	NCOPC	NCOPC	NC
Antimony	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Cobalt	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NC	NA	NA	NCOPC	NC
Cyanide	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Manganese	NA	NA	NCOPC	NC	NA	NA	NCOPC	NC	NC	NA	NA	NCOPC	NC
Mercury	NCOPC	NCOPC	NA	NC	NCOPC	NCOPC	NA	NC	NC	NCOPC	NCOPC	NA	NC
Nickel	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Thallium	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Vanadium	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Pesticides													
4,4'-DDT	NCOPC	1E-13	NCOPC	1E-13	NCOPC	2E-12	NCOPC	2E-12	2E-12	NCOPC	1E-13	NCOPC	1E-13
4,4'-DDD	NCOPC	NCOPC	4E-09	4E-09	NCOPC	NCOPC	1E-09	1E-09	5E-09	NCOPC	NCOPC	3E-09	3E-09
4,4'-DDE	NCOPC	NCOPC	2E-08	2E-08	NCOPC	NCOPC	5E-09	5E-09	2E-08	NCOPC	NCOPC	1E-08	1E-08
Aldrin	NCOPC	NCOPC	8E-09	8E-09	NCOPC	NCOPC	2E-09	2E-09	1E-08	NCOPC	NCOPC	5E-09	5E-09
alpha-Chlordane	NCOPC	NCOPC	1E-08	1E-08	NCOPC	NCOPC	3E-09	3E-09	1E-08	NCOPC	NCOPC	6E-09	6E-09
cis-Nonachlor	NCOPC	NCOPC	4E-09	4E-09	NCOPC	NCOPC	1E-09	1E-09	6E-09	NCOPC	NCOPC	3E-09	3E-09
Dieldrin	NCOPC	NCOPC	1E-07	1E-07	NCOPC	NCOPC	4E-08	4E-08	2E-07	NCOPC	NCOPC	9E-08	9E-08
gamma-Chlordane	NCOPC	NCOPC	4E-09	4E-09	NCOPC	NCOPC	1E-09	1E-09	5E-09	NCOPC	NCOPC	2E-09	2E-09
Heptachlor epoxide	NCOPC	NCOPC	4E-08	4E-08	NCOPC	NCOPC	1E-08	1E-08	5E-08	NCOPC	NCOPC	2E-08	2E-08
Mirex	NCOPC	NCOPC	1E-08	1E-08	NCOPC	NCOPC	3E-09	3E-09	1E-08	NCOPC	NCOPC	6E-09	6E-09
Oxychlordane	NCOPC	NCOPC	2E-09	2E-09	NCOPC	NCOPC	5E-10	5E-10	2E-09	NCOPC	NCOPC	1E-09	1E-09
trans-Nonachlor	NCOPC	NCOPC	1E-08	1E-08	NCOPC	NCOPC	3E-09	3E-09	1E-08	NCOPC	NCOPC	7E-09	7E-09
PCBs													
Total PCBs	1E-08	1E-12	1E-06	1E-06	7E-09	2E-11	3E-07	3E-07	2E-06	6E-09	9E-13	8E-07	8E-07
PCB-TEQ	--	--	4E-07	4E-07	NCOPC	NCOPC	1E-07	1E-07	5E-07	--	--	2E-07	2E-07
SVOCs													
Benzo(a)anthracene	6E-10	NCOPC	NCOPC	6E-10	2E-09	NCOPC	NCOPC	2E-09	3E-09	1E-09	NCOPC	NCOPC	1E-09
Benzo(a)pyrene	7E-09	NCOPC	NCOPC	7E-09	2E-08	NCOPC	NCOPC	2E-08	3E-08	1E-08	NCOPC	NCOPC	1E-08
Benzo(b)fluoranthene	1E-09	NCOPC	NCOPC	1E-09	3E-09	NCOPC	NCOPC	3E-09	4E-09	2E-09	NCOPC	NCOPC	2E-09
Benzo(k)fluoranthene	4E-11	NCOPC	NCOPC	4E-11	1E-10	NCOPC	NCOPC	1E-10	2E-10	6E-11	NCOPC	NCOPC	6E-11
Chrysene	1E-11	NCOPC	NCOPC	1E-11	3E-11	NCOPC	NCOPC	3E-11	4E-11	1E-11	NCOPC	NCOPC	1E-11
Dibenzo(a,h)anthracene	2E-09	NCOPC	NCOPC	2E-09	5E-09	NCOPC	NCOPC	5E-09	6E-09	2E-09	NCOPC	NCOPC	2E-09
Indeno(1,2,3-cd)pyrene	6E-10	NCOPC	NCOPC	6E-10	2E-09	NCOPC	NCOPC	2E-09	2E-09	9E-10	NCOPC	NCOPC	9E-10
TPH													
Diesel Range Organics (C10-C20)	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NC	NA	NCOPC	NCOPC	NC
Total (Total PCBs) (b)	8E-08	5E-10	1E-06	2E-06	1E-07	7E-09	4E-07	5E-07	2E-06	6E-08	4E-10	9E-07	1E-06
Total (includes PCB-TEQ for fish) (c)	8E-08	5E-10	6E-07	7E-07	9E-08	7E-09	2E-07	3E-07	1E-06	6E-08	4E-10	4E-07	5E-07

Notes:
Values are presented to one significant figure.

NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

(a) Calculated based on data from Pinkney (2017). The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.
(b) Total (includes Total PCBs for fringe surface sediment, surface water, and fish).
(c) Total (includes Total PCBs for fringe surface sediment and surface water and PCB-TEQ for fish).

Table 6-16
Total Potential Hazard Index for the Angler Receptors - Mixed Fish Diet (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index											
	Adult Angler				Young Child Angler				Older Child/Teen Angler			
	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total	Fringe Surface Sediment	Surface Water	Fish Tissue Upper Anacostia (d)	Total
Dioxin												
2,3,7,8-TCDD-TEQ	3E-03	1E-06	NCOPC	3E-03	1.E-02	3E-05	NCOPC	1E-02	3E-03	2E-06	NCOPC	3E-03
Metals												
Aluminum	9E-05	NCOPC	NCOPC	9E-05	8.E-04	NCOPC	NCOPC	8E-04	1E-04	NCOPC	NCOPC	1E-04
Antimony	5E-05	NCOPC	NCOPC	5E-05	5.E-04	NCOPC	NCOPC	5E-04	1E-04	NCOPC	NCOPC	1E-04
Arsenic	4E-04	7E-06	NCOPC	4E-04	2.E-03	2E-04	NCOPC	2E-03	4E-04	9E-06	NCOPC	4E-04
Arsenic, organic	NCOPC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NCOPC	NC
Cobalt	6E-04	7E-06	NCOPC	6E-04	5.E-03	2E-04	NCOPC	5E-03	8E-04	1E-05	NCOPC	9E-04
Cyanide	2E-05	NCOPC	NCOPC	2E-05	1.E-04	NCOPC	NCOPC	1E-04	2E-05	NCOPC	NCOPC	2E-05
Manganese	1E-04	1E-04	NCOPC	2E-04	9.E-04	2E-03	NCOPC	2E-03	1E-04	1E-04	NCOPC	3E-04
Mercury	NCOPC	NCOPC	3E-02	3E-02	NCOPC	NCOPC	5E-02	5E-02	NCOPC	NCOPC	4E-02	4E-02
Nickel	3E-05	NCOPC	NCOPC	3E-05	3.E-04	NCOPC	NCOPC	3E-04	4E-05	NCOPC	NCOPC	4E-05
Thallium	2E-04	NCOPC	NCOPC	2E-04	2.E-03	NCOPC	NCOPC	2E-03	4E-04	NCOPC	NCOPC	4E-04
Vanadium	2E-04	NCOPC	NCOPC	2E-04	2.E-03	NCOPC	NCOPC	2E-03	3E-04	NCOPC	NCOPC	3E-04
Pesticides												
4,4'-DDT	NCOPC	5E-09	NCOPC	5E-09	NCOPC	1E-07	NCOPC	1E-07	NCOPC	7E-09	NCOPC	7E-09
4,4'-DDD	NCOPC	NCOPC	4E-03	4E-03	NCOPC	NCOPC	5E-03	5E-03	NCOPC	NCOPC	4E-03	4E-03
4,4'-DDE	NCOPC	NCOPC	1E-03	1E-03	NCOPC	NCOPC	2E-03	2E-03	NCOPC	NCOPC	1E-03	1E-03
Aldrin	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	1E-04	1E-04
alpha-Chlordane	NCOPC	NCOPC	4E-04	4E-04	NCOPC	NCOPC	6E-04	6E-04	NCOPC	NCOPC	4E-04	4E-04
cis-Nonachlor	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	2E-04	2E-04
Dieldrin	NCOPC	NCOPC	1E-03	1E-03	NCOPC	NCOPC	2E-03	2E-03	NCOPC	NCOPC	1E-03	1E-03
gamma-Chlordane	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	2E-04	2E-04	NCOPC	NCOPC	2E-04	2E-04
Heptachlor epoxide	NCOPC	NCOPC	2E-03	2E-03	NCOPC	NCOPC	3E-03	3E-03	NCOPC	NCOPC	2E-03	2E-03
Mirex	NCOPC	NCOPC	2E-05	2E-05	NCOPC	NCOPC	3E-05	3E-05	NCOPC	NCOPC	2E-05	2E-05
Oxychlordane	NCOPC	NCOPC	8E-05	8E-05	NCOPC	NCOPC	1E-04	1E-04	NCOPC	NCOPC	8E-05	8E-05
trans-Nonachlor	NCOPC	NCOPC	5E-04	5E-04	NCOPC	NCOPC	6E-04	6E-04	NCOPC	NCOPC	5E-04	5E-04
PCBs												
Total PCBs	2E-03	8E-07	2E-01	2E-01	6.E-03	3E-05	3E-01	3E-01	2E-03	1E-06	2E-01	2E-01
PCB-TEQ	--	--	3E-02	3E-02	NCOPC	NCOPC	4E-02	4E-02	--	--	3E-02	3E-02
SVOCs												
Benzo(a)anthracene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Benzo(a)pyrene	2E-04	NCOPC	NCOPC	2E-04	6.E-04	NCOPC	NCOPC	6E-04	2E-04	NCOPC	NCOPC	2E-04
Benzo(b)fluoranthene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Chrysene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC	NA	NCOPC	NCOPC	NC
TPH												
Diesel Range Organics (C10-C20)	1E-04	NCOPC	NCOPC	1E-04	1.E-03	NCOPC	NCOPC	1E-03	2E-04	NCOPC	NCOPC	2E-04
Total (Total PCBs) (b)	7E-03	1E-04	3E-01	3E-01	4E-02	2E-03	4E-01	4E-01	8E-03	2E-04	3E-01	3E-01
Total (includes PCB-TEQ for fish) (c)	7E-03	1E-04	7E-02	8E-02	4E-02	2E-03	1E-01	1E-01	8E-03	2E-04	8E-02	9E-02
Highest TE HI (Total PCBs) (b,d)	3E-03	1E-04	2E-01	2E-01	2E-02	2E-03	3E-01	3E-01	3E-03	1E-04	2E-01	2E-01
Highest TE HI (PCB-TEQ) (c,d)	3E-03	1E-04	3E-02	3E-02	2E-02	2E-03	5E-02	6E-02	3E-03	1E-04	4E-02	4E-02

Notes:
Values are presented to one significant figure.

NA - Not Applicable; no dose-response value.
HI - Hazard Index.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
TE - Target Endpoint.

(a) Calculated based on data from Pinkney (2017). The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.
(b) Total (includes Total PCBs for fringe surface sediment, surface water, and fish).
(c) Total (includes Total PCBs for fringe surface sediment and surface water and PCB-TEQ for fish).
(d) See Attachment H.

Table 6-17
Total Potential Carcinogenic Risk for the Angler Receptors - Mixed Fish Diet - Regional Areas (RME
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risk - Fish Tissue - Mixed Fish Diet															
	Adult Angler				Young Child Angler (a)				Sum of Adult and Young Child Angler				Older Child/Teen Angler			
	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia
Dioxin																
2,3,7,8-TCDD-TEQ	NCOPC	NCOPC	3.95E-07	NCOPC	NCOPC	NCOPC	1.95E-07	NCOPC	NCOPC	NCOPC	5.90E-07	NCOPC	NCOPC	NCOPC	2.32E-07	NCOPC
Inorganics																
Arsenic	2.13E-06	1.99E-05	4.06E-07	1.31E-06	1.05E-06	9.82E-06	2.01E-07	6.49E-07	3.19E-06	2.97E-05	6.07E-07	1.96E-06	1.26E-06	1.17E-05	2.39E-07	7.73E-07
Arsenic, organic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC
Pesticides (d)																
4,4'-DDD	3.26E-07	6.40E-08	NCOPC	2.56E-07	1.61E-07	3.16E-08	NCOPC	1.27E-07	4.86E-07	9.56E-08	NCOPC	3.83E-07	1.92E-07	3.76E-08	NCOPC	1.51E-07
4,4'-DDE	2.66E-06	4.48E-07	NCOPC	7.23E-07	1.31E-06	2.21E-07	NCOPC	3.57E-07	3.97E-06	6.69E-07	NCOPC	1.08E-06	1.56E-06	2.64E-07	NCOPC	4.26E-07
Aldrin	6.56E-07	NCOPC	NCOPC	2.20E-07	3.24E-07	NCOPC	NCOPC	1.09E-07	9.80E-07	NCOPC	NCOPC	3.28E-07	3.86E-07	NCOPC	NCOPC	1.29E-07
alpha-Chlordane	5.74E-07	1.73E-07	NCOPC	4.05E-07	2.84E-07	8.56E-08	NCOPC	2.00E-07	8.57E-07	2.59E-07	NCOPC	6.06E-07	3.38E-07	1.02E-07	NCOPC	2.39E-07
beta-BHC	1.00E-07	NCOPC	NCOPC	NCOPC	4.95E-08	NCOPC	NCOPC	NCOPC	1.50E-07	NCOPC	NCOPC	NCOPC	5.89E-08	NCOPC	NCOPC	NCOPC
cis-Nonachlor	2.48E-07	NCOPC	NCOPC	1.74E-07	1.22E-07	NCOPC	NCOPC	8.59E-08	3.70E-07	NCOPC	NCOPC	2.60E-07	1.46E-07	NCOPC	NCOPC	1.02E-07
Chlordane	NCOPC	NCOPC	2.94E-07	NCOPC	NCOPC	NCOPC	9.95E-08	NCOPC	NCOPC	NCOPC	3.93E-07	NCOPC	NCOPC	NCOPC	1.73E-07	NCOPC
Dieldrin	1.48E-05	3.40E-06	1.01E-06	9.15E-06	7.29E-06	1.68E-06	1.06E-08	4.52E-06	2.21E-05	5.09E-06	1.02E-06	1.37E-05	8.69E-06	2.00E-06	5.97E-07	5.39E-06
gamma-Chlordane	5.22E-08	8.97E-08	NCOPC	2.23E-07	2.58E-08	4.43E-08	NCOPC	1.10E-07	7.80E-08	1.34E-07	NCOPC	3.33E-07	3.07E-08	5.28E-08	NCOPC	1.31E-07
Heptachlor epoxide	9.92E-07	9.10E-07	5.02E-07	1.25E-06	4.90E-07	4.49E-07	4.63E-07	6.17E-07	1.48E-06	1.36E-06	9.65E-07	1.86E-06	5.84E-07	5.36E-07	2.95E-07	7.35E-07
Hexachlorobenzene	7.97E-08	NCOPC	NCOPC	NCOPC	3.94E-08	NCOPC	NCOPC	NCOPC	1.19E-07	NCOPC	NCOPC	NCOPC	4.69E-08	NCOPC	NCOPC	NCOPC
Mirex	1.99E-07	NCOPC	NCOPC	2.27E-07	9.85E-08	NCOPC	NCOPC	1.12E-07	2.98E-07	NCOPC	NCOPC	3.39E-07	1.17E-07	NCOPC	NCOPC	1.34E-07
Oxychlordane	6.19E-08	4.34E-08	NCOPC	9.15E-08	3.06E-08	2.15E-08	NCOPC	4.52E-08	9.24E-08	6.49E-08	NCOPC	1.37E-07	3.64E-08	2.56E-08	NCOPC	5.38E-08
trans-Nonachlor	7.04E-07	2.18E-07	NCOPC	5.04E-07	3.48E-07	1.08E-07	NCOPC	2.49E-07	1.05E-06	3.26E-07	NCOPC	7.53E-07	4.15E-07	1.28E-07	NCOPC	2.97E-07
PCBs																
Total PCBs	9.99E-05	1.57E-05	2.06E-06	3.28E-05	4.94E-05	7.74E-06	1.02E-06	1.62E-05	1.49E-04	2.34E-05	3.08E-06	4.90E-05	5.88E-05	9.22E-06	1.21E-06	1.93E-05
PCB-TEQ	1.41E-04	1.80E-05	2.89E-06	4.62E-05	6.96E-05	8.89E-06	1.43E-06	2.28E-05	2.10E-04	2.69E-05	4.31E-06	6.90E-05	8.29E-05	1.06E-05	1.70E-06	2.72E-05
Total (Total PCBs) (b)	1E-04	4E-05	5E-06	5E-05	6E-05	2E-05	2E-06	2E-05	2E-04	6E-05	7E-06	7E-05	7E-05	2E-05	3E-06	3E-05
Total (PCB-TEQ) (c)	2E-04	4E-05	5E-06	6E-05	8E-05	2E-05	2E-06	3E-05	2E-04	6E-05	8E-06	9E-05	1E-04	3E-05	3E-06	4E-05

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Values are presented to one significant figure.
(a) The young child is assumed to not accompany the adult or older child anglers on fishing trips to the river, but is assumed to eat river fish that is brought home.
(b) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(c) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.
(d) Tissue samples from the tidal Anacostia and Potomac Rivers were analyzed for individual chlordane isomers, and tissue samples from the Non-Tidal Anacostia River were analyzed for Chlordane (technical).

Table 6-18
Total Potential Hazard Index for the Angler Receptors - Mixed Fish Diet - Regional Areas (RME
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index - Fish Tissue - Mixed Fish Diet											
	Adult Angler				Young Child Angler (a)				Older Child/Teen Angler			
	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia
Dioxin												
2,3,7,8-TCDD-TEQ	NCOPC	NCOPC	1.52E-02	NCOPC	NCOPC	NCOPC	2.50E-02	NCOPC	NCOPC	NCOPC	1.49E-02	NCOPC
Inorganics												
Arsenic	1.66E-02	1.55E-01	3.16E-03	1.02E-02	2.73E-02	2.55E-01	5.20E-03	1.68E-02	1.63E-02	1.52E-01	3.10E-03	1.00E-02
Arsenic, organic	2.24E-03	2.09E-02	4.26E-04	1.38E-03	3.69E-03	3.44E-02	7.02E-04	2.27E-03	2.20E-03	2.05E-02	4.18E-04	1.35E-03
Cobalt	NCOPC	NCOPC	6.75E-03	NCOPC	NCOPC	NCOPC	1.11E-02	NCOPC	NCOPC	NCOPC	6.62E-03	NCOPC
Mercury	2.01E-01	1.38E-01	3.73E-01	1.22E-01	3.31E-01	2.26E-01	6.14E-01	2.01E-01	1.97E-01	1.35E-01	3.65E-01	1.20E-01
Thallium	NCOPC	NCOPC	4.81E-02	NCOPC	NCOPC	NCOPC	7.93E-02	NCOPC	NCOPC	NCOPC	4.72E-02	NCOPC
Pesticides (e)												
4,4'-DDD	1.58E-01	3.11E-02	NCOPC	1.25E-01	2.61E-01	5.12E-02	NCOPC	2.05E-01	1.55E-01	3.05E-02	NCOPC	1.22E-01
4,4'-DDE	9.11E-02	1.54E-02	NCOPC	2.48E-02	1.50E-01	2.53E-02	NCOPC	4.09E-02	8.94E-02	1.51E-02	NCOPC	2.44E-02
Aldrin	4.50E-03	NCOPC	NCOPC	1.51E-03	7.41E-03	NCOPC	NCOPC	2.48E-03	4.42E-03	NCOPC	NCOPC	1.48E-03
alpha-Chlordane	1.15E-02	3.47E-03	NCOPC	8.11E-03	1.89E-02	5.71E-03	NCOPC	1.34E-02	1.13E-02	3.40E-03	NCOPC	7.96E-03
beta-BHC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC
cis-Nonachlor	4.95E-03	NCOPC	NCOPC	3.48E-03	8.15E-03	NCOPC	NCOPC	5.73E-03	4.86E-03	NCOPC	NCOPC	3.41E-03
Chlordane	NCOPC	NCOPC	5.87E-03	NCOPC	NCOPC	NCOPC	1.61E-01	NCOPC	NCOPC	NCOPC	5.76E-03	NCOPC
Dieldrin	6.46E-02	1.49E-02	4.44E-03	4.01E-02	1.06E-01	2.45E-02	1.22E-03	6.60E-02	6.34E-02	1.46E-02	4.35E-03	3.93E-02
gamma-Chlordane	1.04E-03	1.79E-03	NCOPC	4.46E-03	1.72E-03	2.95E-03	NCOPC	7.35E-03	1.02E-03	1.76E-03	NCOPC	4.38E-03
Heptachlor epoxide	2.93E-02	2.69E-02	1.48E-02	3.69E-02	4.83E-02	4.43E-02	1.06E-02	6.08E-02	2.88E-02	2.64E-02	1.46E-02	3.62E-02
Hexachlorobenzene	2.18E-04	NCOPC	NCOPC	NCOPC	3.59E-04	NCOPC	NCOPC	NCOPC	2.14E-04	NCOPC	NCOPC	NCOPC
Mirex	1.94E-04	NCOPC	NCOPC	2.21E-04	3.19E-04	NCOPC	NCOPC	3.63E-04	1.90E-04	NCOPC	NCOPC	2.16E-04
Oxychlordane	1.24E-03	8.69E-04	NCOPC	1.83E-03	2.04E-03	1.43E-03	NCOPC	3.01E-03	1.21E-03	8.52E-04	NCOPC	1.79E-03
trans-Nonachlor	1.41E-02	4.37E-03	NCOPC	1.01E-02	2.32E-02	7.19E-03	NCOPC	1.66E-02	1.38E-02	4.28E-03	NCOPC	9.89E-03
PCBs												
Total PCBs	8.75E+00	1.37E+00	1.80E-01	2.87E+00	1.44E+01	2.26E+00	2.97E-01	4.73E+00	8.58E+00	1.34E+00	1.77E-01	2.82E+00
PCB-TEQ	5.42E+00	6.92E-01	1.11E-01	1.78E+00	8.92E+00	1.14E+00	1.83E-01	2.92E+00	5.32E+00	6.79E-01	1.09E-01	1.74E+00
Total (Total PCBs) (b)	9E+00	2E+00	7E-01	3E+00	2E+01	3E+00	1E+00	5E+00	9E+00	2E+00	6E-01	3E+00
Total (PCB-TEQ) (c)	6E+00	1E+00	6E-01	2E+00	1E+01	2E+00	1E+00	4E+00	6E+00	1E+00	6E-01	2E+00
Highest TE HI (Total PCBs) (b,d)	9E+00	1E+00	4E-01	3E+00	1E+01	2E+00	6E-01	5E+00	9E+00	1E+00	4E-01	3E+00
Highest TE HI (PCB-TEQ) (c,d)	6E+00	7E-01	4E-01	2E+00	9E+00	1E+00	6E-01	3E+00	5E+00	7E-01	4E-01	2E+00

Notes:
HI - Hazard Index.
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
TE - Target Endpoint.

Values are presented to one significant figure.
(a) The young child is assumed to not accompany the adult or older child anglers on fishing trips to the river, but is assumed to eat river fish that is brought home.
(b) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(c) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.
(d) See Attachment H.
(e) Tissue samples from the tidal Anacostia and Potomac Rivers were analyzed for individual chlordane isomers, and tissue samples from the Non-Tidal Anacostia River were analyzed for Chlordane (technical).

Table 6-19
Total Potential Carcinogenic Risk for the Angler Receptors - Mixed Fish Diet - Regional Areas (CTE
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risk - Fish Tissue - Mixed Fish Diet															
	Adult Angler				Young Child Angler (a)				Sum of Adult and Young Child Angler				Older Child/Teen Angler			
	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia
Dioxin																
2,3,7,8-TCDD-TEQ	NCOPC	NCOPC	2.94E-08	NCOPC	NCOPC	NCOPC	8.30E-09	NCOPC	NCOPC	NCOPC	3.77E-08	NCOPC	NCOPC	NCOPC	1.86E-08	NCOPC
Inorganics																
Arsenic	1.60E-07	3.37E-07	4.31E-08	1.64E-07	4.52E-08	9.51E-08	1.22E-08	4.63E-08	2.05E-07	4.32E-07	5.52E-08	2.10E-07	1.01E-07	2.14E-07	2.73E-08	1.04E-07
Arsenic, organic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC
Pesticides (d)																
4,4'-DDD	7.50E-09	2.52E-09	NCOPC	7.89E-09	2.12E-09	7.12E-10	NCOPC	2.23E-09	9.62E-09	3.23E-09	NCOPC	1.01E-08	4.76E-09	1.60E-09	NCOPC	5.00E-09
4,4'-DDE	6.44E-08	1.76E-08	NCOPC	3.75E-08	1.82E-08	4.98E-09	NCOPC	1.06E-08	8.26E-08	2.26E-08	NCOPC	4.81E-08	4.08E-08	1.12E-08	NCOPC	2.38E-08
Aldrin	1.14E-08	NCOPC	NCOPC	1.05E-08	3.22E-09	NCOPC	NCOPC	2.97E-09	1.46E-08	NCOPC	NCOPC	1.35E-08	7.24E-09	NCOPC	NCOPC	6.67E-09
alpha-Chlordane	1.31E-08	6.07E-09	NCOPC	2.01E-08	3.69E-09	1.71E-09	NCOPC	5.67E-09	1.68E-08	7.78E-09	NCOPC	2.58E-08	8.29E-09	3.85E-09	NCOPC	1.27E-08
beta-BHC	3.78E-09	NCOPC	NCOPC	NCOPC	1.07E-09	NCOPC	NCOPC	NCOPC	4.84E-09	NCOPC	NCOPC	NCOPC	2.39E-09	NCOPC	NCOPC	NCOPC
cis-Nonachlor	4.11E-09	NCOPC	NCOPC	7.57E-09	1.16E-09	NCOPC	NCOPC	2.14E-09	5.27E-09	NCOPC	NCOPC	9.71E-09	2.61E-09	NCOPC	NCOPC	4.80E-09
Chlordane	NCOPC	NCOPC	2.29E-08	NCOPC	NCOPC	NCOPC	6.48E-09	NCOPC	NCOPC	NCOPC	2.94E-08	NCOPC	NCOPC	NCOPC	1.45E-08	NCOPC
Dieldrin	3.54E-07	1.86E-07	7.48E-08	3.02E-07	9.98E-08	5.24E-08	2.11E-08	8.52E-08	4.53E-07	2.38E-07	9.60E-08	3.87E-07	2.24E-07	1.18E-07	4.75E-08	1.91E-07
gamma-Chlordane	2.70E-09	2.96E-09	NCOPC	9.64E-09	7.62E-10	8.37E-10	NCOPC	2.72E-09	3.46E-09	3.80E-09	NCOPC	1.24E-08	1.71E-09	1.88E-09	NCOPC	6.11E-09
Heptachlor epoxide	5.44E-08	3.78E-08	3.42E-08	6.49E-08	1.54E-08	1.07E-08	9.65E-09	1.83E-08	6.98E-08	4.85E-08	4.38E-08	8.33E-08	3.45E-08	2.40E-08	2.17E-08	4.12E-08
Hexachlorobenzene	3.62E-09	NCOPC	NCOPC	NCOPC	1.02E-09	NCOPC	NCOPC	NCOPC	4.65E-09	NCOPC	NCOPC	NCOPC	2.30E-09	NCOPC	NCOPC	NCOPC
Mirex	9.54E-09	NCOPC	NCOPC	1.16E-08	2.69E-09	NCOPC	NCOPC	3.27E-09	1.22E-08	NCOPC	NCOPC	1.49E-08	6.05E-09	NCOPC	NCOPC	7.34E-09
Oxychlordane	1.99E-09	1.79E-09	NCOPC	3.73E-09	5.61E-10	5.04E-10	NCOPC	1.05E-09	2.55E-09	2.29E-09	NCOPC	4.79E-09	1.26E-09	1.13E-09	NCOPC	2.37E-09
trans-Nonachlor	1.12E-08	8.30E-09	NCOPC	2.09E-08	3.15E-09	2.34E-09	NCOPC	5.90E-09	1.43E-08	1.06E-08	NCOPC	2.68E-08	7.07E-09	5.26E-09	NCOPC	1.33E-08
PCBs																
Total PCBs	2.87E-06	1.02E-06	1.78E-07	1.98E-06	8.10E-07	2.89E-07	5.01E-08	5.59E-07	3.68E-06	1.31E-06	2.28E-07	2.54E-06	1.82E-06	6.49E-07	1.13E-07	1.25E-06
PCB-TEQ	4.46E-06	1.03E-06	2.01E-07	2.46E-06	1.26E-06	2.90E-07	5.66E-08	6.94E-07	5.72E-06	1.32E-06	2.57E-07	3.15E-06	2.83E-06	6.52E-07	1.27E-07	1.56E-06
Total (Total PCBs) (b)	4E-06	2E-06	4E-07	3E-06	1E-06	5E-07	1E-07	7E-07	5E-06	2E-06	5E-07	3E-06	2E-06	1E-06	2E-07	2E-06
Total (PCB-TEQ) (c)	5E-06	2E-06	4E-07	3E-06	1E-06	5E-07	1E-07	9E-07	7E-06	2E-06	5E-07	4E-06	3E-06	1E-06	3E-07	2E-06

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Values are presented to one significant figure.
(a) The young child is assumed to not accompany the adult or older child anglers on fishing trips to the river, but is assumed to eat river fish that is brought home.
(b) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(c) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.
(d) Tissue samples from the tidal Anacostia and Potomac Rivers were analyzed for individual chlordane isomers, and tissue samples from the Non-Tidal Anacostia River were analyzed for Chlordane (technical).

Table 6-20
Total Potential Hazard Index for the Angler Receptors - Mixed Fish Diet - Regional Areas (CTE
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index - Fish Tissue - Mixed Fish Diet											
	Adult Angler				Young Child Angler (a)				Older Child/Teen Angler			
	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia	Upper Potomac	Lower Potomac	Non-Tidal Anacostia	Lower Anacostia
Dioxin												
2,3,7,8-TCDD-TEQ	NCOPC	NCOPC	2.26E-03	NCOPC	NCOPC	NCOPC	3.19E-03	NCOPC	NCOPC	NCOPC	2.39E-03	NCOPC
Inorganics												
Arsenic	2.49E-03	5.24E-03	6.70E-04	2.55E-03	3.51E-03	7.40E-03	9.46E-04	3.60E-03	2.63E-03	5.54E-03	7.08E-04	2.70E-03
Arsenic, organic	3.36E-04	7.08E-04	9.05E-05	3.45E-04	4.74E-04	9.99E-04	1.28E-04	4.86E-04	3.55E-04	7.48E-04	9.56E-05	3.64E-04
Cobalt	NCOPC	NCOPC	1.26E-03	NCOPC	NCOPC	NCOPC	1.78E-03	NCOPC	NCOPC	NCOPC	1.33E-03	NCOPC
Mercury	3.84E-02	2.60E-02	8.03E-02	2.25E-02	5.43E-02	3.67E-02	1.13E-01	3.18E-02	4.06E-02	2.74E-02	2.83E-02	2.38E-02
Thallium	NCOPC	NCOPC	1.07E-02	NCOPC	NCOPC	NCOPC	1.51E-02	NCOPC	NCOPC	NCOPC	1.13E-02	NCOPC
Pesticides (e)												
4,4'-DDD	7.30E-03	2.45E-03	NCOPC	7.67E-03	1.03E-02	3.46E-03	NCOPC	1.08E-02	7.71E-03	2.59E-03	NCOPC	8.10E-03
4,4'-DDE	4.42E-03	1.21E-03	NCOPC	2.57E-03	6.24E-03	1.71E-03	NCOPC	3.63E-03	4.67E-03	1.28E-03	NCOPC	2.72E-03
Aldrin	1.57E-04	NCOPC	NCOPC	1.45E-04	2.21E-04	NCOPC	NCOPC	2.04E-04	1.66E-04	NCOPC	NCOPC	1.53E-04
alpha-Chlordane	5.23E-04	2.43E-04	NCOPC	8.04E-04	7.38E-04	3.43E-04	NCOPC	1.13E-03	5.52E-04	2.56E-04	NCOPC	8.49E-04
beta-BHC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC	NA	NCOPC	NCOPC	NCOPC
cis-Nonachlor	1.64E-04	NCOPC	NCOPC	3.03E-04	2.32E-04	NCOPC	NCOPC	4.28E-04	1.74E-04	NCOPC	NCOPC	3.20E-04
Chlordane	NCOPC	NCOPC	9.18E-04	NCOPC	NCOPC	NCOPC	1.30E-03	NCOPC	NCOPC	NCOPC	9.70E-04	NCOPC
Dieldrin	3.09E-03	1.62E-03	6.55E-04	2.64E-03	4.37E-03	2.29E-03	9.25E-04	3.73E-03	3.27E-03	1.72E-03	6.92E-04	2.79E-03
gamma-Chlordane	1.08E-04	1.19E-04	NCOPC	3.86E-04	1.52E-04	1.67E-04	NCOPC	5.44E-04	1.14E-04	1.25E-04	NCOPC	4.07E-04
Heptachlor epoxide	3.22E-03	2.24E-03	2.02E-03	3.84E-03	4.55E-03	3.16E-03	2.85E-03	5.42E-03	3.40E-03	2.37E-03	2.14E-03	4.06E-03
Hexachlorobenzene	1.98E-05	NCOPC	NCOPC	NCOPC	2.80E-05	NCOPC	NCOPC	NCOPC	2.09E-05	NCOPC	NCOPC	NCOPC
Mirex	1.86E-05	NCOPC	NCOPC	2.25E-05	2.62E-05	NCOPC	NCOPC	3.18E-05	1.96E-05	NCOPC	NCOPC	2.38E-05
Oxychlordane	7.95E-05	7.14E-05	NCOPC	1.49E-04	1.12E-04	1.01E-04	NCOPC	2.11E-04	8.40E-05	7.54E-05	NCOPC	1.58E-04
trans-Nonachlor	4.46E-04	3.32E-04	NCOPC	8.37E-04	6.30E-04	4.69E-04	NCOPC	1.18E-03	4.72E-04	3.51E-04	NCOPC	8.84E-04
PCBs												
Total PCBs	5.02E-01	1.79E-01	3.11E-02	3.46E-01	7.08E-01	2.53E-01	4.39E-02	4.89E-01	5.30E-01	1.89E-01	3.28E-02	3.66E-01
PCB-TEQ	3.43E-01	7.91E-02	1.54E-02	1.89E-01	4.84E-01	1.12E-01	2.18E-02	2.67E-01	3.62E-01	8.36E-02	1.63E-02	2.00E-01
Total (Total PCBs) (b)	6E-01	2E-01	1E-01	4E-01	8E-01	3E-01	2E-01	6E-01	6E-01	2E-01	8E-02	4E-01
Total (PCB-TEQ) (c)	4E-01	1E-01	1E-01	2E-01	6E-01	2E-01	2E-01	3E-01	4E-01	1E-01	6E-02	2E-01
Highest TE HI (Total PCBs) (b,d)	5E-01	2E-01	8E-02	3E-01	7E-01	3E-01	1E-01	5E-01	5E-01	2E-01	3E-02	4E-01
Highest TE HI (PCB-TEQ) (c,d)	3E-01	8E-02	8E-02	2E-01	5E-01	1E-01	1E-01	3E-01	4E-01	8E-02	3E-02	2E-01

Notes:
NA - Not Applicable; no dose-response value.
NC - Not calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Values are presented to one significant figure.
(a) The young child is assumed to not accompany the adult or older child anglers on fishing trips to the river, but is assumed to eat river fish that is brought home.
(b) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(c) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.
(d) See Attachment H.
(e) Tissue samples from the tidal Anacostia and Potomac Rivers were analyzed for individual chlordane isomers, and tissue samples from the Non-Tidal Anacostia River were analyzed for Chlordane (technical).

Table 6-21
Total Potential Carcinogenic Risks for the Swimmer Receptors (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks									
	Adult Swimmer			Young Child Swimmer			Sum of Adult and Child Swimmer	Older Child/Teen Swimmer		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total		Fringe Surface Sediment	Surface Water	Total
Dioxin										
2,3,7,8-TCDD-TEQ	3.E-07	4.E-07	7.E-07	6.E-07	9.E-10	6.E-07	1.E-06	4.E-07	7.E-10	4.E-07
Metals										
Aluminum	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Antimony	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Arsenic	8.E-08	8.E-09	9.E-08	1.E-07	2.E-08	2.E-07	2.E-07	1.E-07	1.E-08	1.E-07
Cobalt	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Cyanide	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Manganese	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Nickel	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Thallium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Vanadium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
PCBs										
Total PCBs	3.E-08	1.E-08	5.E-08	4.E-08	4.E-11	4.E-08	8.E-08	4.E-08	3.E-11	4.E-08
SVOCs										
Benzo(a)anthracene	3.E-09	NCOPC	3.E-09	2.E-08	NCOPC	2.E-08	2.E-08	1.E-08	NCOPC	1.E-08
Benzo(a)pyrene	2.E-08	NCOPC	2.E-08	1.E-07	NCOPC	1.E-07	1.E-07	6.E-08	NCOPC	6.E-08
Benzo(b)fluoranthene	3.E-09	NCOPC	3.E-09	1.E-08	NCOPC	1.E-08	2.E-08	9.E-09	NCOPC	9.E-09
Benzo(k)fluoranthene	1.E-10	NCOPC	1.E-10	5.E-10	NCOPC	5.E-10	6.E-10	3.E-10	NCOPC	3.E-10
Chrysene	3.E-11	NCOPC	3.E-11	1.E-10	NCOPC	1.E-10	2.E-10	8.E-11	NCOPC	8.E-11
Dibenzo(a,h)anthracene	5.E-09	NCOPC	5.E-09	2.E-08	NCOPC	2.E-08	3.E-08	1.E-08	NCOPC	1.E-08
Indeno(1,2,3-cd)pyrene	2.E-09	NCOPC	2.E-09	9.E-09	NCOPC	9.E-09	1.E-08	5.E-09	NCOPC	5.E-09
Pesticides										
4,4'-DDT	NCOPC	2.E-09	2.E-09	NCOPC	6.E-12	6.E-12	2.E-09	NCOPC	4.E-12	4.E-12
TPH										
Diesel Range Organics (C10-C20)	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Diesel Range Organics (C10-C28)	NCOPC	NCOPC	NC	NCOPC	NCOPC	NC	NC	NCOPC	NCOPC	NC
Totals	4.E-07	5.E-07	9.E-07	9.E-07	2.E-08	9.E-07	2.E-06	7.E-07	1.E-08	7.E-07

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 6-22
Total Potential Hazard Index for the Swimmer Receptors (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index								
	Adult Swimmer			Young Child Swimmer			Older Child/Teen Swimmer		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total
Dioxin									
2,3,7,8-TCDD-TEQ	1E-02	2.E-02	3.E-02	7.E-02	1.E-04	7.E-02	3.E-02	4.E-05	3E-02
Metals									
Aluminum	2E-04	NCOPC	2.E-04	2.E-03	NCOPC	2.E-03	6.E-04	NCOPC	6E-04
Antimony	4E-04	NCOPC	4.E-04	3.E-03	NCOPC	3.E-03	1.E-03	NCOPC	1E-03
Arsenic	6E-04	6.E-05	7.E-04	4.E-03	4.E-04	4.E-03	1.E-03	2.E-04	2E-03
Cobalt	1E-03	6.E-05	1.E-03	1.E-02	4.E-04	1.E-02	4.E-03	2.E-04	4E-03
Cyanide	1E-04	NCOPC	1.E-04	1.E-03	NCOPC	1.E-03	4.E-04	NCOPC	4E-04
Manganese	2E-04	8.E-04	1.E-03	2.E-03	2.E-03	4.E-03	7.E-04	2.E-03	2E-03
Nickel	7E-05	NCOPC	7.E-05	6.E-04	NCOPC	6.E-04	2.E-04	NCOPC	2E-04
Thallium	5E-04	NCOPC	5.E-04	5.E-03	NCOPC	5.E-03	2.E-03	NCOPC	2E-03
Vanadium	7E-04	NCOPC	7.E-04	6.E-03	NCOPC	6.E-03	2.E-03	NCOPC	2E-03
PCBs									
Total PCBs	3E-03	6.E-03	9.E-03	1.E-02	6.E-05	1.E-02	6.E-03	2.E-05	6E-03
SVOCs									
Benzo(a)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(a)pyrene	2E-04	NCOPC	2.E-04	9.E-04	NCOPC	9.E-04	5.E-04	NCOPC	5E-04
Benzo(b)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Chrysene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Pesticides									
4,4'-DDT	NCOPC	4.E-05	4.E-05	NCOPC	4.E-07	4.E-07	NCOPC	2.E-07	2E-07
TPH									
Diesel Range Organics (C10-C20)	3E-04	NCOPC	3.E-04	3.E-03	NCOPC	3.E-03	8.E-04	NCOPC	8E-04
Diesel Range Organics (C10-C28)	NCOPC	NCOPC	NC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NC
Totals	2E-02	2.E-02	4.E-02	1.E-01	3.E-03	1.E-01	5.E-02	2.E-03	5E-02
Highest Target Endpoint Hazard Index (a)	1.E-02	2.E-02	3.E-02	8.E-02	2.E-03	8.E-02	3.E-02	2.E-03	3.E-02

Notes:

Values are presented to one significant figure.

NA - Not Applicable.

NC - Not Calculated.

NCOPC - Not a Chemical of Potential Concern in this media.

(a) See Attachment H.

Table 6-23
Total Potential Carcinogenic Risks for the Swimmer Receptors (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks									
	Adult Swimmer			Young Child Swimmer			Sum of Adult and Child Swimmer	Older Child/Teen Swimmer		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total		Fringe Surface Sediment	Surface Water	Total
Dioxin										
2,3,7,8-TCDD-TEQ	2E-08	9E-12	2E-08	2E-08	2E-11	2E-08	4E-08	2E-08	4E-11	2E-08
Metals										
Aluminum	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Antimony	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Arsenic	1E-08	4E-10	1E-08	1E-08	5E-10	1E-08	3E-08	2E-08	1E-09	2E-08
Cobalt	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Cyanide	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Manganese	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Nickel	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Thallium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Vanadium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
PCBs										
Total PCBs	5E-09	6E-13	5E-09	3E-09	1E-12	3E-09	9E-09	6E-09	3E-12	6E-09
SVOCs		NCOPC								
Benzo(a)anthracene	3E-10	NCOPC	3E-10	9E-10	NCOPC	9E-10	1E-09	1E-09	NCOPC	1E-09
Benzo(a)pyrene	4E-09	NCOPC	4E-09	1E-08	NCOPC	1E-08	1E-08	1E-08	NCOPC	1E-08
Benzo(b)fluoranthene	5E-10	NCOPC	5E-10	2E-09	NCOPC	2E-09	2E-09	2E-09	NCOPC	2E-09
Benzo(k)fluoranthene	2E-11	NCOPC	2E-11	6E-11	NCOPC	6E-11	8E-11	6E-11	NCOPC	6E-11
Chrysene	5E-12	NCOPC	5E-12	1E-11	NCOPC	1E-11	2E-11	1E-11	NCOPC	1E-11
Dibenzo(a,h)anthracene	8E-10	NCOPC	8E-10	2E-09	NCOPC	2E-09	3E-09	2E-09	NCOPC	2E-09
Indeno(1,2,3-cd)pyrene	3E-10	NCOPC	3E-10	9E-10	NCOPC	9E-10	1E-09	9E-10	NCOPC	9E-10
Pesticides										
4,4'-DDT	NCOPC	7E-14	7E-14	NCOPC	2E-13	2E-13	2E-13	NCOPC	3E-13	3E-13
TPH					NCOPC					
Diesel Range Organics (C10-C20)	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Diesel Range Organics (C10-C28)	NCOPC	NCOPC	NC	NCOPC	NCOPC	NC	NC	NCOPC	NCOPC	NC
Totals	4E-08	4E-10	4E-08	5E-08	5E-10	5E-08	9E-08	6E-08	1E-09	7E-08

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 6-24
Total Potential Hazard Index for the Swimmer Receptors (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index								
	Adult Swimmer			Young Child Swimmer			Older Child/Teen Swimmer		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total
Dioxin									
2,3,7,8-TCDD-TEQ	1E-03	7E-07	1E-03	7E-03	7E-06	7E-03	3E-03	5E-06	3E-03
Metals									
Aluminum	4E-05	NCOPC	4E-05	4E-04	NCOPC	4E-04	1E-04	NCOPC	1E-04
Antimony	3E-05	NCOPC	3E-05	3E-04	NCOPC	3E-04	8E-05	NCOPC	8E-05
Arsenic	2E-04	6E-06	2E-04	9E-04	4E-05	1E-03	4E-04	3E-05	5E-04
Cyanide	8E-06	NCOPC	8E-06	7E-05	NCOPC	7E-05	2E-05	NCOPC	2E-05
Cobalt	3E-04	5E-06	3E-04	3E-03	4E-05	3E-03	8E-04	3E-05	9E-04
Manganese	5E-05	2E-04	2E-04	5E-04	4E-04	8E-04	1E-04	4E-04	6E-04
Nickel	1E-05	NCOPC	1E-05	1E-04	NCOPC	1E-04	4E-05	NCOPC	4E-05
Thallium	1E-04	NCOPC	1E-04	1E-03	NCOPC	1E-03	4E-04	NCOPC	4E-04
Vanadium	1E-04	NCOPC	1E-04	9E-04	NCOPC	9E-04	3E-04	NCOPC	3E-04
PCBs									
Total PCBs	9E-04	5E-07	9E-04	3E-03	6E-06	3E-03	2E-03	4E-06	2E-03
SVOCs		NCOPC							
Benzo(a)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(a)pyrene	8E-05	NCOPC	8E-05	3E-04	NCOPC	3E-04	2E-04	NCOPC	2E-04
Benzo(b)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Chrysene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Pesticides	NCOPC								
4,4'-DDT	NCOPC	3E-09	3E-09	NCOPC	3E-08	3E-08	NCOPC	2E-08	2E-08
TPH									
Diesel Range Organics (C10-C20)	5E-05	NCOPC	5E-05	5E-04	NCOPC	5E-04	2E-04	NCOPC	2E-04
Diesel Range Organics (C10-C28)	NCOPC	NCOPC	NC	NCOPC	NCOPC	NC	NCOPC	NCOPC	NC
Totals	3E-03	2E-04	3E-03	2E-02	5E-04	2E-02	8E-03	5E-04	8E-03
Highest Target Endpoint Hazard Index (a)	1E-03	2E-04	1E-03	8E-03	4E-04	8E-03	3E-03	4E-04	3E-03

Notes:

Values are presented to one significant figure.

NA - Not Applicable.

NC - Not Calculated.

NCOPC - Not a Chemical of Potential Concern in this media.

(a) See Attachment H.

Table 6-25
Total Potential Carcinogenic Risks for the Wader Receptors (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks									
	Adult Wader			Child Wader			Sum of Adult and Child Wader	Teen Wader		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total		Fringe Surface Sediment	Surface Water	Total
Dioxin										
2,3,7,8-TCDD-TEQ	8E-07	3E-07	1E-06	2E-06	5E-10	2E-06	3E-06	7E-07	4E-10	7E-07
Metals										
Aluminum	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Antimony	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Arsenic	2E-07	8E-09	2E-07	4E-07	1E-08	4E-07	6E-07	2E-07	8E-09	2E-07
Cobalt	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Cyanide	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Manganese	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Nickel	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Thallium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Vanadium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
PCBs										
Total PCBs	9E-08	1E-08	9E-08	1E-07	2E-11	1E-07	2E-07	7E-08	2E-11	7E-08
SVOCs										
Benzo(a)anthracene	8E-09	NCOPC	8E-09	4E-08	NCOPC	4E-08	5E-08	2E-08	NCOPC	2E-08
Benzo(a)pyrene	5E-08	NCOPC	5E-08	3E-07	NCOPC	3E-07	3E-07	1E-07	NCOPC	1E-07
Benzo(b)fluoranthene	8E-09	NCOPC	8E-09	4E-08	NCOPC	4E-08	5E-08	1E-08	NCOPC	1E-08
Benzo(k)fluoranthene	3E-10	NCOPC	3E-10	1E-09	NCOPC	1E-09	2E-09	5E-10	NCOPC	5E-10
Chrysene	7E-11	NCOPC	7E-11	4E-10	NCOPC	4E-10	4E-10	1E-10	NCOPC	1E-10
Dibenzo(a,h)anthracene	1E-08	NCOPC	1E-08	6E-08	NCOPC	6E-08	8E-08	2E-08	NCOPC	2E-08
Indeno(1,2,3-cd)pyrene	4E-09	NCOPC	4E-09	2E-08	NCOPC	2E-08	3E-08	9E-09	NCOPC	9E-09
Pesticides										
4,4'-DDT	NCOPC	1E-09	1E-09	NCOPC	3E-12	3E-12	1E-09	NCOPC	3E-12	3E-12
TPH										
Diesel Range Organics (C10-C20)	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Totals	1E-06	3E-07	2E-06	2E-06	1E-08	2E-06	4E-06	1E-06	9E-09	1E-06

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 6-26
Total Potential Hazard Index for the Wader Receptors (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index								
	Adult Wader			Child Wader			Teen Wader		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total
Dioxin									
2,3,7,8-TCDD-TEQ	3E-02	1E-02	4E-02	2E-01	6E-05	2E-01	5E-02	3E-05	5E-02
Metals									
Aluminum	5E-04	NCOPC	5E-04	5E-03	NCOPC	5E-03	1E-03	NCOPC	1E-03
Antimony	1E-03	NCOPC	1E-03	9E-03	NCOPC	9E-03	2E-03	NCOPC	2E-03
Arsenic	2E-03	6E-05	2E-03	1E-02	3E-04	1E-02	2E-03	1E-04	3E-03
Cobalt	3E-03	6E-05	3E-03	3E-02	3E-04	3E-02	6E-03	1E-04	6E-03
Cyanide	3E-04	NCOPC	3E-04	3E-03	NCOPC	3E-03	6E-04	NCOPC	6E-04
Manganese	6E-04	8E-04	1E-03	6E-03	2E-03	8E-03	1E-03	1E-03	2E-03
Nickel	2E-04	NCOPC	2E-04	2E-03	NCOPC	2E-03	3E-04	NCOPC	3E-04
Thallium	1E-03	NCOPC	1E-03	1E-02	NCOPC	1E-02	3E-03	NCOPC	3E-03
Vanadium	2E-03	NCOPC	2E-03	2E-02	NCOPC	2E-02	3E-03	NCOPC	3E-03
PCBs									
Total PCBs	7E-03	4E-03	1E-02	3E-02	3E-05	3E-02	1E-02	1E-05	1E-02
SVOCs									
Benzo(a)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(a)pyrene	6E-04	NCOPC	6E-04	3E-03	NCOPC	3E-03	8E-04	NCOPC	8E-04
Benzo(b)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Chrysene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Pesticides									
4,4'-DDT	NCOPC	2E-05	2E-05	NCOPC	2E-07	2E-07	NCOPC	9E-08	9E-08
TPH									
Diesel Range Organics (C10-C20)	7E-04	NCOPC	7E-04	7E-03	NCOPC	7E-03	1E-03	NCOPC	1E-03
Totals	5E-02	2E-02	7E-02	3E-01	3E-03	3E-01	8E-02	1E-03	8E-02
Highest Target Endpoint Hazard Index (a)	3E-02	1E-02	4E-02	2E-01	2E-03	2E-01	5E-02	1E-03	5E-02

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

(a) See Attachment H.

Table 6-27
Total Potential Carcinogenic Risks for the Wader Receptors (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks									
	Adult Wader			Child Wader			Sum of Adult and Child Wader	Teen Wader		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total		Fringe Surface Sediment	Surface Water	Total
Dioxin										
2,3,7,8-TCDD-TEQ	5E-08	2E-11	5E-08	5E-08	2E-11	5E-08	1E-07	4E-08	2E-11	4E-08
Metals										
Aluminum	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Antimony	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Arsenic	3E-08	6E-10	4E-08	3E-08	5E-10	3E-08	7E-08	3E-08	6E-10	3E-08
Cobalt	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Cyanide	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Manganese	NA	NA	NC	NA	NA	NC	NC	NA	NA	NC
Nickel	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Thallium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Vanadium	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
PCBs										
Total PCBs	1E-08	1E-12	1E-08	9E-09	1E-12	9E-09	2E-08	1E-08	1E-12	1E-08
SVOCs										
Benzo(a)anthracene	9E-10	NCOPC	9E-10	2E-09	NCOPC	2E-09	3E-09	2E-09	NCOPC	2E-09
Benzo(a)pyrene	1E-08	NCOPC	1E-08	3E-08	NCOPC	3E-08	4E-08	2E-08	NCOPC	2E-08
Benzo(b)fluoranthene	1E-09	NCOPC	1E-09	4E-09	NCOPC	4E-09	5E-09	3E-09	NCOPC	3E-09
Benzo(k)fluoranthene	5E-11	NCOPC	5E-11	1E-10	NCOPC	1E-10	2E-10	1E-10	NCOPC	1E-10
Chrysene	1E-11	NCOPC	1E-11	4E-11	NCOPC	4E-11	5E-11	2E-11	NCOPC	2E-11
Dibenzo(a,h)anthracene	2E-09	NCOPC	2E-09	6E-09	NCOPC	6E-09	8E-09	4E-09	NCOPC	4E-09
Indeno(1,2,3-cd)pyrene	8E-10	NCOPC	8E-10	2E-09	NCOPC	2E-09	3E-09	2E-09	NCOPC	2E-09
Pesticides										
4,4'-DDT	NCOPC	1E-13	1E-13	NCOPC	1E-13	1E-13	3E-13	NCOPC	2E-13	2E-13
TPH										
Diesel Range Organics (C10-C20)	NA	NCOPC	NC	NA	NCOPC	NC	NC	NA	NCOPC	NC
Totals	1E-07	6E-10	1E-07	1E-07	5E-10	1E-07	2E-07	1E-07	6E-10	1E-07

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 6-28
Total Potential Hazard Index for the Wader Receptors (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index								
	Adult Wader			Child Wader			Teen Wader		
	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total	Fringe Surface Sediment	Surface Water	Total
Dioxin									
2,3,7,8-TCDD-TEQ	4E-03	1E-06	4E-03	2E-02	6E-06	2E-02	5E-03	3E-06	5E-03
Metals									
Aluminum	1E-04	NCOPC	1E-04	1E-03	NCOPC	1E-03	2E-04	NCOPC	2E-04
Antimony	7E-05	NCOPC	7E-05	7E-04	NCOPC	7E-04	1E-04	NCOPC	1E-04
Arsenic	5E-04	9E-06	5E-04	2E-03	4E-05	2E-03	7E-04	2E-05	8E-04
Cyanide	2E-05	NCOPC	2E-05	2E-04	NCOPC	2E-04	4E-05	NCOPC	4E-05
Cobalt	7E-04	9E-06	8E-04	7E-03	4E-05	7E-03	1E-03	2E-05	1E-03
Manganese	1E-04	2E-04	3E-04	1E-03	5E-04	2E-03	2E-04	3E-04	5E-04
Nickel	4E-05	NCOPC	4E-05	4E-04	NCOPC	4E-04	7E-05	NCOPC	7E-05
Thallium	3E-04	NCOPC	3E-04	3E-03	NCOPC	3E-03	6E-04	NCOPC	6E-04
Vanadium	3E-04	NCOPC	3E-04	2E-03	NCOPC	2E-03	5E-04	NCOPC	5E-04
PCBs									
Total PCBs	2E-03	1E-06	2E-03	8E-03	5E-06	8E-03	3E-03	2E-06	3E-03
SVOCs									
Benzo(a)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(a)pyrene	2E-04	NCOPC	2E-04	8E-04	NCOPC	8E-04	3E-04	NCOPC	3E-04
Benzo(b)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Chrysene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NC	NA	NCOPC	NC	NA	NCOPC	NC
Pesticides									
4,4'-DDT	NCOPC	6E-09	6E-09	NCOPC	3E-08	3E-08	NCOPC	1E-08	1E-08
TPH									
Diesel Range Organics (C10-C20)	1E-04	NCOPC	1E-04	1E-03	NCOPC	1E-03	3E-04	NCOPC	3E-04
Totals	9E-03	2E-04	9E-03	5E-02	6E-04	5E-02	1E-02	3E-04	1E-02
Highest Target Endpoint Hazard Index (a)	4E-03	2E-04	4E-03	2E-02	5E-04	2E-02	6E-03	3E-04	6E-03

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

(a) See Attachment H.

Table 6-29
Total Potential Carcinogenic Risks for the Shoreline Worker Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks		
	Shoreline Worker		
	Fringe Surface Sediment	Surface Water	Total
Dioxin			
2,3,7,8-TCDD-TEQ	2E-06	7E-07	3E-06
Metals			
Aluminum	NA	NCOPC	NC
Antimony	NA	NCOPC	NC
Arsenic	6E-07	2E-08	6E-07
Cobalt	NA	NA	NC
Cyanide	NA	NCOPC	NC
Manganese	NA	NA	NC
Nickel	NA	NCOPC	NC
Thallium	NA	NCOPC	NC
Vanadium	NA	NCOPC	NC
Pesticides			
4,4'-DDT	NCOPC	3E-09	3E-09
PCBs			
Total PCBs	2E-07	2E-08	2E-07
SVOCs			
Benzo(a)anthracene	2E-08	NCOPC	2E-08
Benzo(a)pyrene	1E-07	NCOPC	1E-07
Benzo(b)fluoranthene	2E-08	NCOPC	2E-08
Benzo(k)fluoranthene	6E-10	NCOPC	6E-10
Chrysene	1E-10	NCOPC	1E-10
Dibenzo(a,h)anthracene	3E-08	NCOPC	3E-08
Indeno(1,2,3-cd)pyrene	1E-08	NCOPC	1E-08
TPH			
Diesel Range Organics (C10-C20)	NA	NCOPC	NC
Totals	**3E-06**	**8E-07**	**4E-06**

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 6-30
Total Potential Hazard Index for the Shoreline Receptor (RME)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index		
	Shoreline Worker		
	Fringe Surface Sediment	Surface Water	Total
Dioxin			
2,3,7,8-TCDD-TEQ	7E-02	2E-02	9E-02
Metals			
Aluminum	2E-03	NCOPC	2E-03
Antimony	3E-03	NCOPC	3E-03
Arsenic	3E-03	1E-04	4E-03
Cobalt	9E-03	9E-05	9E-03
Cyanide	9E-04	NCOPC	9E-04
Manganese	2E-03	2E-03	4E-03
Nickel	5E-04	NCOPC	5E-04
Thallium	4E-03	NCOPC	4E-03
Vanadium	5E-03	NCOPC	5E-03
Pesticides			
4,4'-DDT	NCOPC	5E-05	5E-05
PCBs			
Total PCBs	1E-02	8E-03	2E-02
SVOCs			
Benzo(a)anthracene	NA	NCOPC	NC
Benzo(a)pyrene	1E-03	NCOPC	1E-03
Benzo(b)fluoranthene	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NC
Chrysene	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NC
TPH			NC
Diesel Range Organics (C10-C20)	2E-03	NCOPC	2E-03
Totals	**1E-01**	**3E-02**	**1E-01**
Highest Target Endpoint Hazard Index (a)	**7E-02**	**2E-02**	**9E-02**

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.
(a) See Attachment H…

Table 6-31
Total Potential Carcinogenic Risks for the Shoreline Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Carcinogenic Risks		
	Shoreline Worker		
	Fringe Surface Sediment	Surface Water	Total
Dioxin			
2,3,7,8-TCDD-TEQ	6E-08	2E-11	6E-08
Metals			
Aluminum	NA	NCOPC	NC
Antimony	NA	NCOPC	NC
Arsenic	4E-08	7E-10	4E-08
Cobalt	NA	NA	NC
Cyanide	NA	NCOPC	NC
Manganese	NA	NA	NC
Nickel	NA	NCOPC	NC
Thallium	NA	NCOPC	NC
Vanadium	NA	NCOPC	NC
Pesticides			
4,4'-DDT	NCOPC	1E-13	1E-13
PCBs			
Total PCBs	1E-08	1E-12	1E-08
SVOCs			
Benzo(a)anthracene	9E-10	NCOPC	9E-10
Benzo(a)pyrene	1E-08	NCOPC	1E-08
Benzo(b)fluoranthene	1E-09	NCOPC	1E-09
Benzo(k)fluoranthene	5E-11	NCOPC	5E-11
Chrysene	1E-11	NCOPC	1E-11
Dibenzo(a,h)anthracene	2E-09	NCOPC	2E-09
Indeno(1,2,3-cd)pyrene	9E-10	NCOPC	9E-10
TPH			
Diesel Range Organics (C10-C20)	NA	NCOPC	NC
Totals	**1E-07**	**7E-10**	**1E-07**

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 6-32
Total Potential Hazard Index for the Shoreline Worker Receptor (CTE)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Chemical of Potential Concern	Potential Hazard Index		
	Shoreline Worker		
	Fringe Surface Sediment	Surface Water	Total
Dioxin			
2,3,7,8-TCDD-TEQ	7E-03	2E-06	7E-03
Metals			
Aluminum	3E-04	NCOPC	3E-04
Antimony	2E-04	NCOPC	2E-04
Arsenic	1E-03	2E-05	1E-03
Cobalt	2E-03	2E-05	2E-03
Cyanide	6E-05	NCOPC	6E-05
Manganese	4E-04	5E-04	8E-04
Nickel	1E-04	NCOPC	1E-04
Thallium	9E-04	NCOPC	9E-04
Vanadium			
Pesticides			
4,4'-DDT	NCOPC	9E-09	9E-09
PCBs			
Total PCBs	4E-03	2E-06	4E-03
SVOCs			
Benzo(a)anthracene	NA	NCOPC	NC
Benzo(a)pyrene	3E-04	NCOPC	3E-04
Benzo(b)fluoranthene	NA	NCOPC	NC
Benzo(k)fluoranthene	NA	NCOPC	NC
Chrysene	NA	NCOPC	NC
Dibenzo(a,h)anthracene	NA	NCOPC	NC
Indeno(1,2,3-cd)pyrene	NA	NCOPC	NC
TPH			NC
Diesel Range Organics (C10-C20)	4E-04	NCOPC	4E-04
Totals	**2E-02**	**5E-04**	**2E-02**
Highest Target Endpoint Hazard Index (a)	**8E-03**	**5E-04**	**8E-03**

Notes:
Values are presented to one significant figure.
NA - Not Applicable.
NC - Not Calculated.
NCOPC - Not a Chemical of Potential Concern in this media.

Table 7-1
Comparison of PCB Congener Results to PCB Aroclor Results for Soil
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Sample Area	Sample Location	Sample ID	Sample Date	Task Code	Surface or Subsurface	Start Depth (feet)	End Depth (feet)	Total Congeners (mg/kg)	Total Aroclors (mg/kg)	Ratio of Total Congener to Total Aroclor
Anacostia Park Property	KMY-DU01	SUSNPSMI0100N	4/12/2017	WP#3-2017	Surface	0	1	0.11	0.031	3.5
Anacostia Park Property	KMY-DU02	SUSNPSMI0200N	4/12/2017	WP#3-2017	Surface	0	1	0.25	0.083	3.0
Anacostia Park Property	KMY-DU03	SUSNPSMI0300N	4/13/2017	WP#3-2017	Surface	0	1	0.11	0.054	2.0
Maintenance	SUSDP15	DPS15F10-15N	2/2/2017	WP#3-2017	Subsurface	10	15	2.2	Not detected	--
Maintenance	SUSDP15	DPS15F05-10N	2/2/2017	WP#3-2017	Subsurface	5	10	0.58	0.16	3.6
Maintenance	SUSDP15	DPS15F01N	1/30/2017	WP#3-2017	Subsurface	1	2	1.9	1.3	1.5
Maintenance	SUSDP15	DPS1510N	6/6/2013	Phase2-2013	Subsurface	9.5	10.5	1.18	1.1	1.1
Maintenance	SUSDP48	SUS48F00N	1/26/2017	WP#3-2017	Surface	0	1	1.8	2	0.9
Maintenance	SUSDP48	DPS48F05-10N	1/27/2017	WP#3-2017	Subsurface	5	10	0.29	0.23	1.3
Salvage	SUSDP10	SUS1000N	2/5/2013	Phase1-2013	Surface	0.5	1	4.71	1	4.7
Salvage	SUSDP12	SUS1200N	2/6/2013	Phase1-2013	Surface	0	1	5.18	2.9	1.8
Salvage	SUSDP12	DPS12F02-05N	1/26/2017	WP#3-2017	Subsurface	2	5	2	1.1	1.8
Salvage	SUSDP43	SUS43F00N	1/26/2017	WP#3-2017	Surface	0	1	3.3	2.7	1.2
Salvage	SUSDP43	DPS43F05-10N	1/30/2017	WP#3-2017	Subsurface	5	10	0.71	0.27	2.6
Salvage	SUSDP43	DPS43F02-05N	1/26/2017	WP#3-2017	Subsurface	2	5	3.3	1.4	2.4
Salvage	SUSDP44	DPS44F01N	1/27/2017	WP#3-2017	Subsurface	2.5	3.5	6.8	4.6	1.5
Salvage	SUSDP44	DPS4403N	5/21/2013	Phase2-2013	Subsurface	2.5	3.5	2.39	3.1	0.8
Substation #7	SUSDP20	SUS2000N	2/7/2013	Phase1-2013	Surface	0.42	1	6.45	5.1	1.3
Transformer Shop	SUSDP21	SUS2100N	2/7/2013	Phase1-2013	Surface (a)	1	1.75	4.84	7.2	0.7
Transformer Shop	SUSDP21	DPS21F01N	1/27/2017	WP#3-2017	Subsurface	1	2	1.3	1	1.3
Transformer Shop	SUSDP21-3G	SUS213G00N	8/28/2017	WP#3-2017	Surface	0	1	520000	8800	59.1
Transformer Shop	SUSDP21-3M	SUS213M00N	8/28/2017	WP#3-2017	Surface	0	1	4600	130	35.4
Vehicle Refueling	SUSDP39	DPS39F01N	1/25/2017	WP#3-2017	Subsurface	1	2	0.12	0.11	1.1
Warehouse	SUSDP04	DPS04F02-05N	1/25/2017	WP#3-2017	Subsurface	2	5	7.1	4.8	1.5
Warehouse	SUSDP05	SUS0500N	2/4/2013	Phase1-2013	Surface	0	1	9.56	5.7	1.7
Warehouse	SUSDP05	DPS0515N	5/21/2013	Phase2-2013	Subsurface	14.5	15.5	0.11	0.19	0.6
Warehouse	SUSDP06	SUS0600N	2/5/2013	Phase1-2013	Surface	0	1	4.22	1.9	2.2
Warehouse	SUSDP08	SUS0800N	2/5/2013	Phase1-2013	Surface	0	1	1.24	0.84	1.5
Warehouse	SUSDP08	DPS08F05-10N	1/24/2017	WP#3-2017	Subsurface	5	10	0.045	0.14	0.3
Warehouse	SUSDP08	DPS08F01N	1/24/2017	WP#3-2017	Subsurface	1	2	0.79	0.97	0.8
Warehouse	SUSDP11	DPS11F01N	1/25/2017	WP#3-2017	Subsurface	1	2	15	11	1.4

Summary Statistics

Minimum	0.045	0.03	0.3
Maximum	520000	8800	59.1
Mean	16925	300	4.7
Median	2	1.20	1.5

Notes:
Soil samples collected at depths greater than 16 feet bgs were not included in the BHHRA data set.
PCB - Polychlorinated Biphenyl.
(a) Sample collected beneath an obstruction (e.g., concrete or pavement). Sample depth measured from top of slab. Sample was collected immediately below slab and is therefore considered surface soil for potential future exposures.

Exposure Areas:

Maintenance: Stores and Fleet Maintenance Area
Salvage: Salvage Yard and Waste Storage Area
Substation #7: Substation #7
Transformer Shop: Transformer Shop
Vehicle Refueling: Vehicle Refueling Area
Warehouse: Warehouse and Laydown Area

Table 7-2
Comparison of PCB Congener Results to PCB Aroclor Results for Fringe Surface Sediment
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

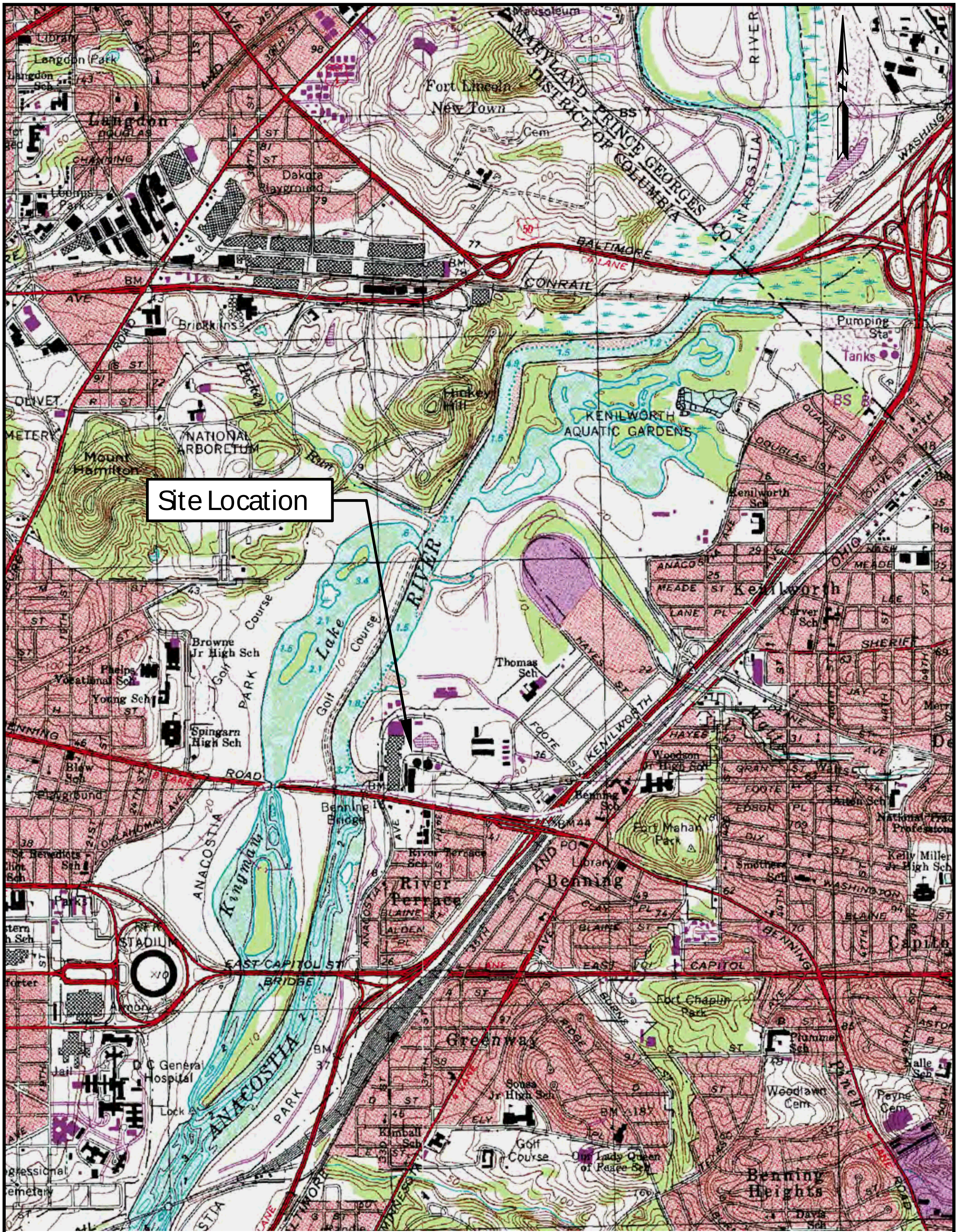
Sample Area	Sample Location	Sample ID	Sample Date	Task Code	Start Depth (feet)	End Depth (feet)	Total Congeners (mg/kg)	Total Aroclors (mg/kg)	Ratio of Total Congener to Total Aroclor
Waterside	R5-03	RI-R5-03-SS	7/25/2014	DOEE_Phase1	0	0.5	0.16	0.097	1.6
Waterside	R5-05	RI-R5-05-SS	7/30/2014	DOEE_Phase1	0	0.5	0.24	0.11	2.2
Waterside	R6-04	RI-R6-04-SS	7/28/2014	DOEE_Phase1	0	0.5	3.71	0.98	3.8
Waterside	R6-05	RI-R6-05-SS	8/4/2014	DOEE_Phase1	0	0.5	1.3	1.4	0.9
Waterside	R6-06	RI-R6-06-SS	8/4/2014	DOEE_Phase1	0	0.5	0.13	0.0845	1.5
Waterside	R6-18	RI-R6-18-SS	4/30/2015	DOEE_Phase1	0	0.5	0.19	0.088	2.2
Waterside	R6-21	RI-R6-21-SS	4/29/2015	DOEE_Phase1	0	0.5	0.96	0.42	2.3
Waterside	R6-22	RI-R6-22-SS	4/30/2015	DOEE_Phase1	0	0.5	0.19	0.089	2.1
Waterside	R6-23	RI-R6-23-SS	4/30/2015	DOEE_Phase1	0	0.5	0.15	0.066	2.3
Waterside	SED1.5C	SED1.5C00AN	6/21/2017	WP#3-2017 Waterside	0	0.33	0.18	0.087	2.1
Waterside	SED6.5E	SED6.5E00EN	6/8/2017	WP#3-2017 Waterside	0	0.33	0.76	0.25	3.0
Waterside	SED7.5E	SED7.5E00EN	6/8/2017	WP#3-2017 Waterside	0	0.33	1.4	0.78	1.8
Waterside	SED7.5E	SED7.5E00N	11/25/2013	Phase2-2013	0	0.5	11.8	1.9	6.2
Waterside	SED7E	SED7E00EN	6/8/2017	WP#3-2017 Waterside	0	0.33	0.98	0.63	1.6
Waterside	SED7F	SED7F00EN	6/8/2017	WP#3-2017 Waterside	0	0.33	1	0.3	3.3
Waterside	SED9.5B	SED9.5B00N	11/11/2013	Phase2-2013	0	0.5	0.17	0.38	0.4

Summary Statistics

	Total Congeners (mg/kg)	Total Aroclors (mg/kg)	Ratio of Total Congener to Total Aroclor
Minimum	0.1279	0.066	0.45
Maximum	11.8	1.9	6.2
Mean	1	0.5	2.3
Median	0.5	0.275	2.1

Notes:
PCB - Polychlorinated Biphenyl.

Figures



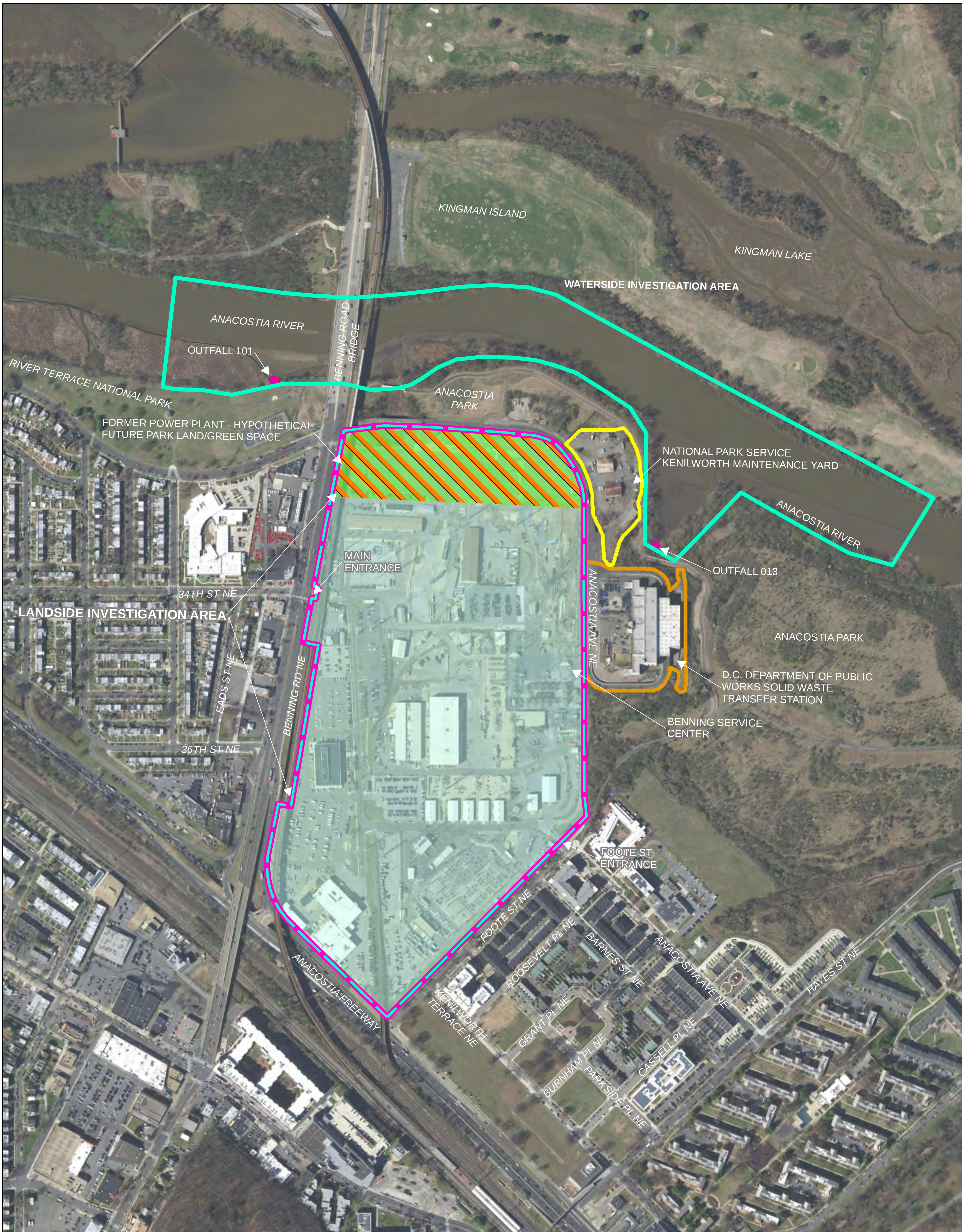
AECOM

Source:
USGS 7.5 Minute Topographic Map
Washington East Quadrangle

0 1000 2000 4000
SCALE IN FEET

Benning Road Facility RI/FS Project 3400 Benning Rd., NE Washington, DC 20019	Site Location Map

DATE: 09/16/2016	DRAWN BY: LAD	CHECKED BY: RD	FIGURE 1-1



LEGEND

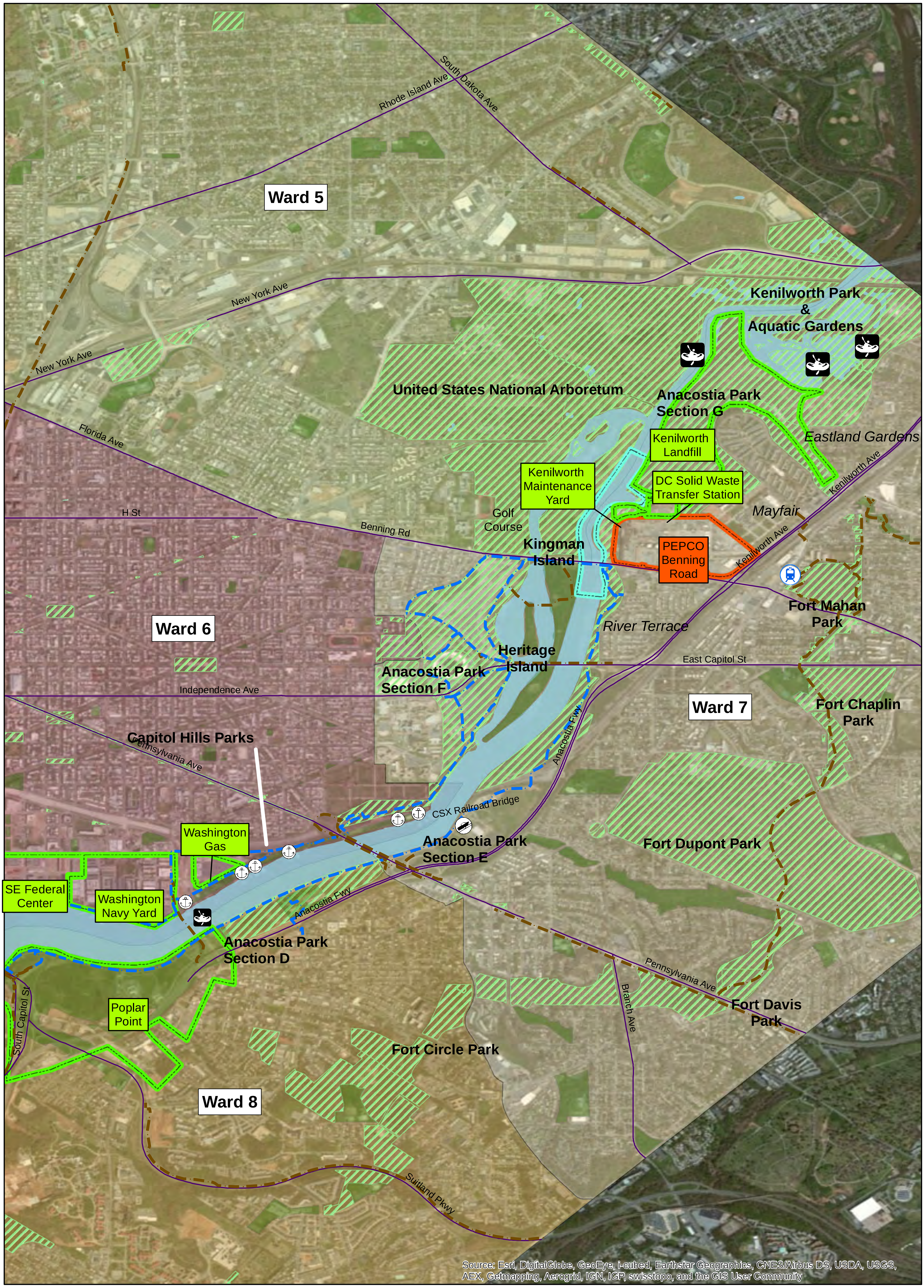
- INVESTIGATION
- BENNING ROAD FACILITY PROPERTY
- BENNING SERVICE CENTER
- FORMER POWER PLANT - HYPOTHETICAL FUTURE PARK LAND/GREEN SPACE
- D.C. SOLID WASTE TRANSFER
- NATIONAL PARK SERVICE KENILWORTH MAINTENANCE YARD

AECOM

0 400 Feet

BENNING ROAD FACILITY RI/FS PROJECT 3400 BENNING RD., NE WASHINGTON, DC 20019			SITE PLAN AND INVESTIGATION AREAS	
Date: 5/1/2019	Drawn By: KNS	Checked By: SED		FIGURE 1-2

Path: J:\Indl_Service\Project Files\Pepco Benning Road RI_FS\GIS\MXD\Anacostia_Land use_3162015.mxd

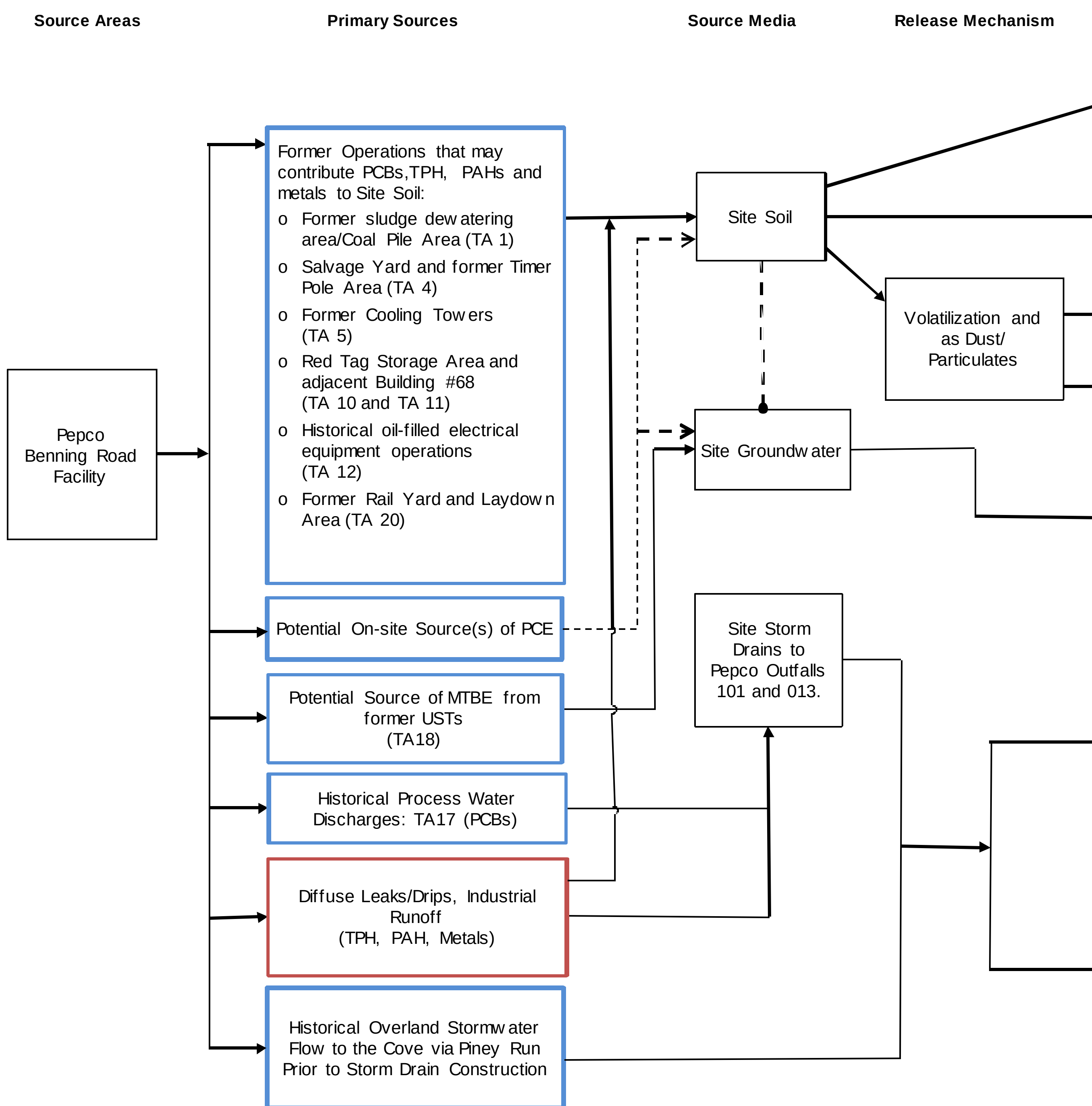


Property Boundaries
Waterside Investigation Area
Benning Road Facility
Minnesota Ave Metrorail WMATA Stationl
National Parks
DC Parks
Major Roads
Trails
Anacostia Riverwalk Trail
Marina
Boat Launch
Canoe Launch
Neighborhood

AECOM

0 625 1,250 2,500 3,750 5,000 Feet

Benning Road Facility RI/FS Project 3400 Benning Rd., NE Washington, DC 20019			**Land Use Along the Anacostia River**
03/19/2015	CMH		FIGURE 2-1



Exposure Media	Potential Exposure Route	LANDSIDE – Potential Human Receptors/Exposure Pathways				WATERSIDE – Potential Human Receptors/Exposure Pathways			
		Current On-Site Worker	Current/ Future Construction Worker	Current/ Future Recreational Visitor	Future On-site Worker	Current/ Future Swimmer	Current/ Future Wader	Current/ Future Angler	Current/ Future Shoreline Worker
Surface Soil (0-1 ft bgs)[a]	Incidental Ingestion	o	●	●	●	--	--	--	--
	Dermal Contact	o	●	●	●	--	--	--	--
Subsurface Soil (1-15 ft bgs)[a]	Incidental Ingestion	o	●	o	o	--	--	--	--
	Dermal Contact	o	●	o	o	--	--	--	--
Outdoor Air	Inhalation	o	●	o	o	--	--	--	--
Indoor Air (via soil vapor)	Inhalation	o	o	o	o	--	--	--	--
Groundwater	Ingestion as Drinking Water	o	o	o	o	--	--	--	--
	Dermal Contact	o	o	o	o	--	--	--	--
	Incidental Ingestion	o	o	o	o	--	--	--	--
Trench Air	Inhalation	o	●	o	o	--	--	--	--
River Sediment	Incidental Ingestion	--	--	--	--	●	●	●	●
	Dermal Contact	--	--	--	--	●	●	●	●
Fish Tissue	Ingestion	--	--	--	--	o	o	●	o
Surface Water	Incidental Ingestion	--	--	--	--	●	●	●	●
	Dermal Contact	--	--	--	--	●	●	●	●

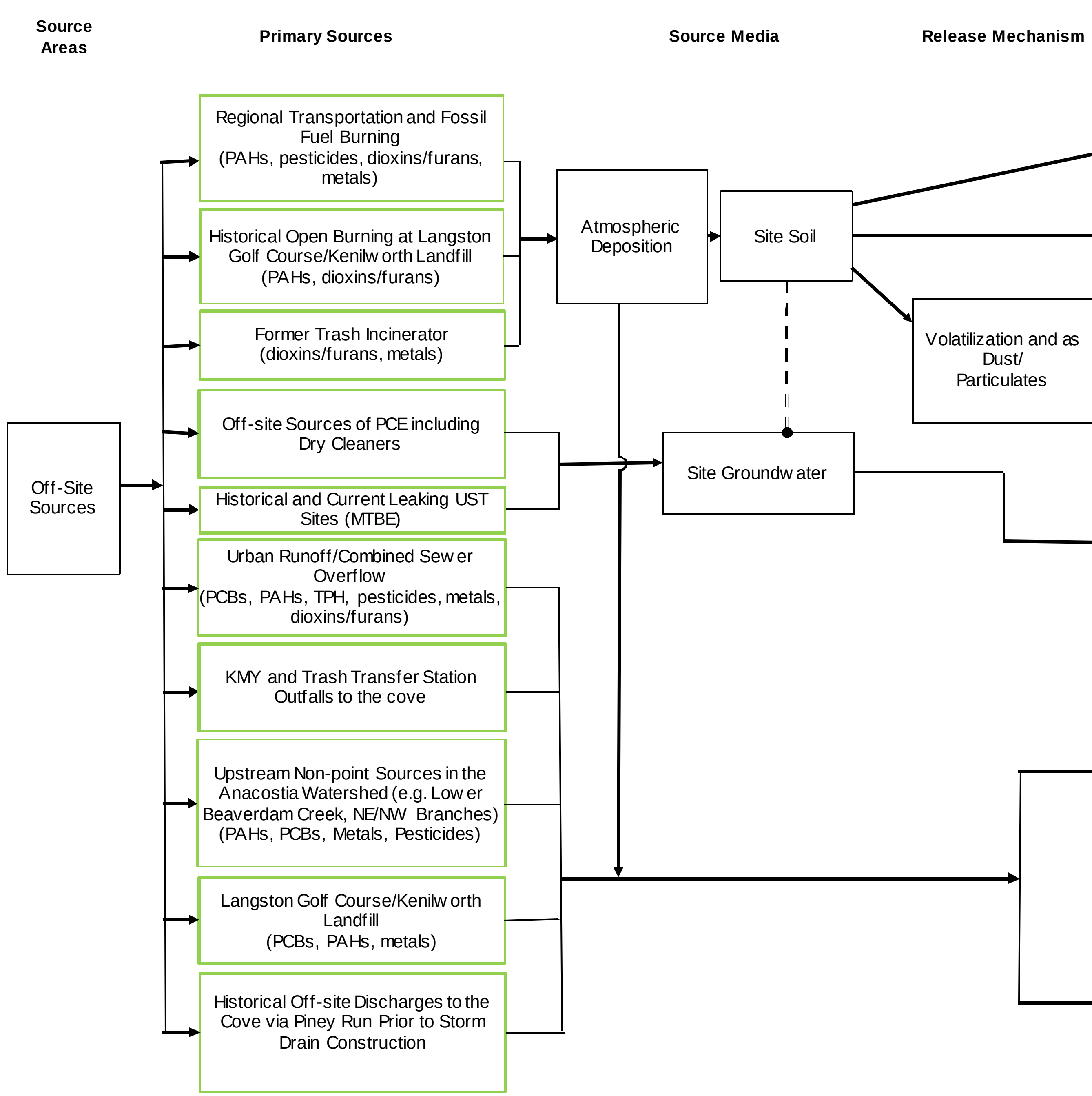
Notes:
bgs - Below ground surface.
[a]In some cases, sample collected beneath an obstruction (e.g., concrete or pavement) and sample depth measured from top of slab. Samples were collected immediately below slab and are considered surface soil even if the bottom depth exceeds 1 foot.

Potential historical/former source (blue box)
Potential historical/current source (red box)
Potentially complete pathway (solid arrow)
Unconfirmed pathway (dashed arrow)
Insignificant pathway (dashed line ending in dot)

● Potentially complete exposure pathway
o Exposure Pathway considered to be incomplete or insignificant
-- Not Applicable

AECOM

Benning Road Facility RI/FS Project 3400 Benning Rd., NE Washington, DC 20019	Conceptual Site Model - On-site Sources Human Health Risk Assessment
DATE: 5/2/19	**FIGURE 2-2**



Exposure Media	Potential Exposure Route	LANDSIDE – Potential Human Receptors/Exposure Pathways: Current On-Site Worker	Current/ Future Construction Worker	Current/ Future Recreational Visitor	Future On-site Worker	WATERSIDE – Potential Human Receptors/Exposure Pathways: Current/ Future Swimmer	Current/ Future Wader	Current/ Future Angler	Current/ Future Shoreline Worker
Surface Soil (0-1 ft bgs)[a]	Incidental Ingestion	o	●	●	●	--	--	--	--
	Dermal Contact	o	●	●	●	--	--	--	--
Subsurface Soil (1-15 ft bgs)[a]	Incidental Ingestion	o	●	o	o	--	--	--	--
	Dermal Contact	o	●	o	o	--	--	--	--
Outdoor Air	Inhalation	o	●	o	o	--	--	--	--
Indoor Air (via soil vapor)	Inhalation	o	o	o	o	--	--	--	--
Groundwater	Ingestion as Drinking Water	o	o	o	o	--	--	--	--
	Dermal Contact	o	o	o	o	--	--	--	--
	Incidental Ingestion	o	o	o	o	--	--	--	--
Trench Air	Inhalation	o	●	o	o	--	--	--	--
River Sediment	Incidental Ingestion	--	--	--	--	●	●	●	●
	Dermal Contact	--	--	--	--	●	●	●	●
Fish Tissue	Ingestion	--	--	--	--	o	o	●	o
Surface Water	Incidental Ingestion	--	--	--	--	●	●	●	●
	Dermal Contact	--	--	--	--	●	●	●	●

Notes:
bgs - Below ground surface.
[a]In some cases, sample collected beneath an obstruction (e.g., concrete or pavement) and sample depth measured from top of slab. Samples were collected immediately below slab and are considered surface soil even if the bottom depth exceeds 1 foot.

Legend
- → Potentially complete pathway.
- - - → Unconfirmed pathway.
- - - ● Insignificant pathway
- ● Potentially complete exposure pathway.
- o Exposure Pathway considered to be incomplete or insignificant.
- -- Not Applicable.

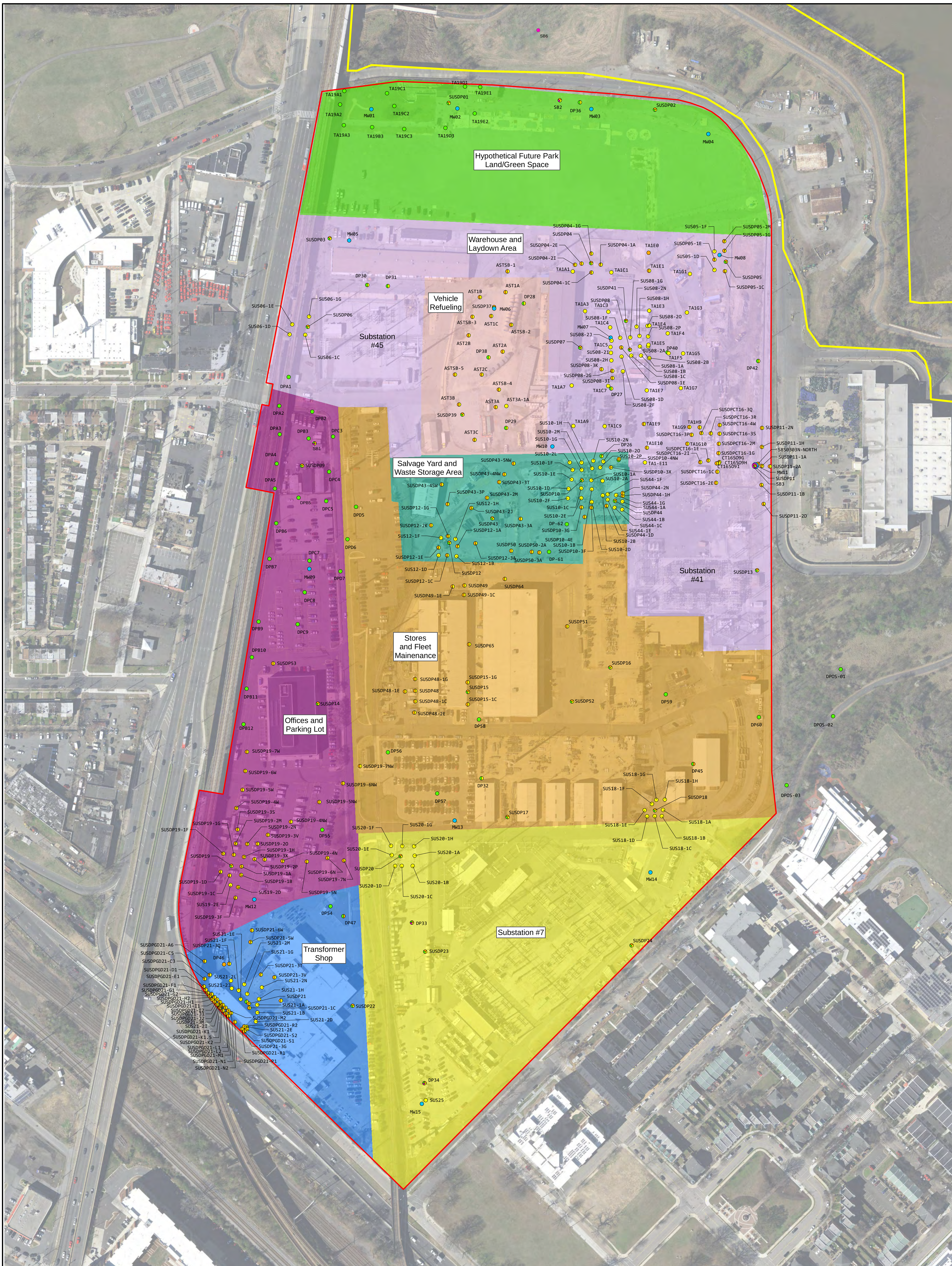
AECOM

Benning Road Facility RI/FS Project
3400 Benning Rd., NE
Washington, DC 20019

Conceptual Site Model - Off-site Sources Human Health Risk Assessment

DATE: 5-2-19

FIGURE 2-3



LEGEND

- SURFACE SOILS
- SUBSURFACE SOILS
- DIRECT PUSH WATER
- MONITORING WELL WATER
- GEOTECHNICAL BORING
- NATIONAL PARK SERVICE KENILWORTH MAINTENANCE YARD
- PROPERTY BOUNDARY
- HYPOTHETICAL FUTURE PARK LAND/GREEN SPACE
- OFFICES AND PARKING LOT
- SALVAGE YARD AND WASTE STORAGE AREA
- STORES AND FLEET MAINTENANCE
- SUBSTATION #7
- TRANSFORMER SHOP
- VEHICLE REFUELING
- WAREHOUSE AND LAYDOWN AREA

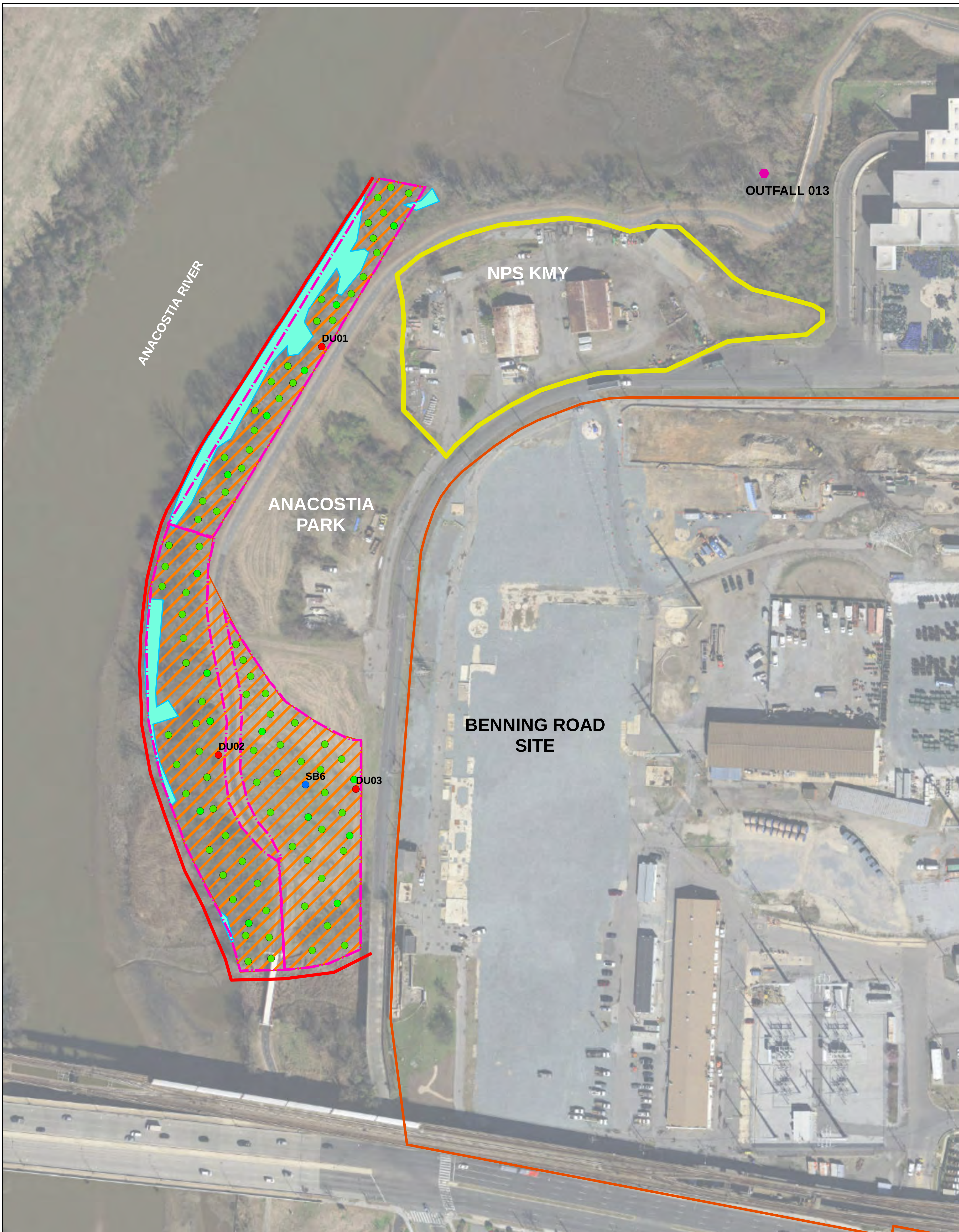
AECOM

0 400 Feet

BENNING ROAD FACILITY RI/FS PROJECT
3400 BENNING RD., NE
WASHINGTON, DC 20019

LANDSIDE INVESTIGATION AREA
SAMPLE LOCATIONS
SOIL AND GROUNDWATER

Date: 5/1/2019 | Drawn By: KNS | Checked By: SED | FIGURE 3-1



LEGEND

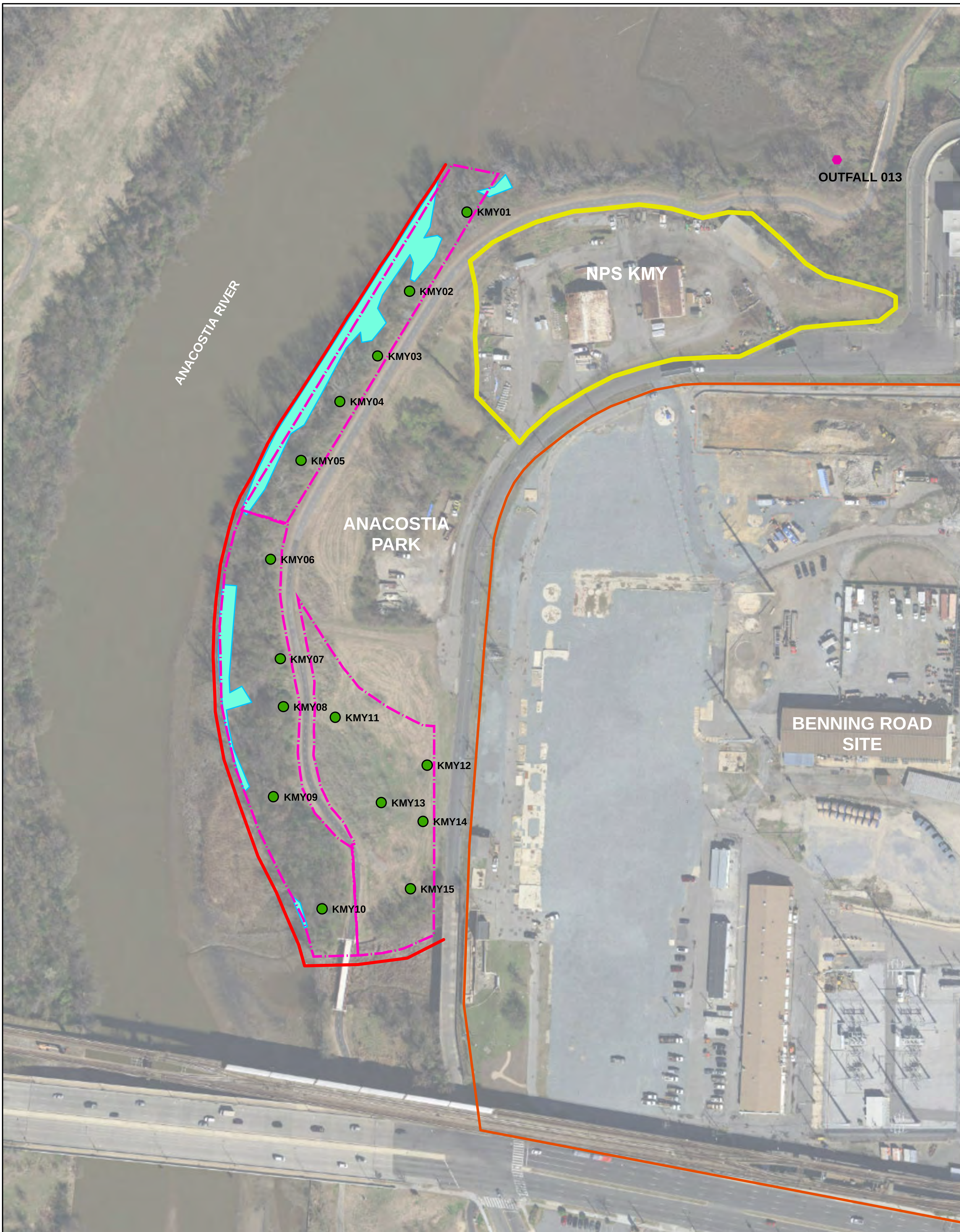
- Direct Push Soil Sample Location
- Geotechnical Soil Boring Location
- Surface Soil Sample Location (Approximate)
- Decision Unit Boundary
- Proposed 1967 Dredge Spoils Area
- National Park Service Property Boundary
- PFOB Wetland A
- Benning Road Facility Property Boundary
- Approximate Location of Sea Wall

AECOM

0 150 Feet

N E S W

BENNING ROAD FACILITY RI/FS PROJECT 3400 BENNING RD., NE WASHINGTON, DC 20019	ANACOSTIA PARK INCREMENTAL SOIL SAMPLE LOCATIONS
Date: 10/30/2018 · Drawn By: KNS · Checked By: SED	FIGURE 3-2



LEGEND

- Soil Sample Location
- Approximate Location of Sea Wall
- National Park Service Property Boundary
- Benning Road Facility Property Boundary
- Decision Unit Boundary
- Wetland

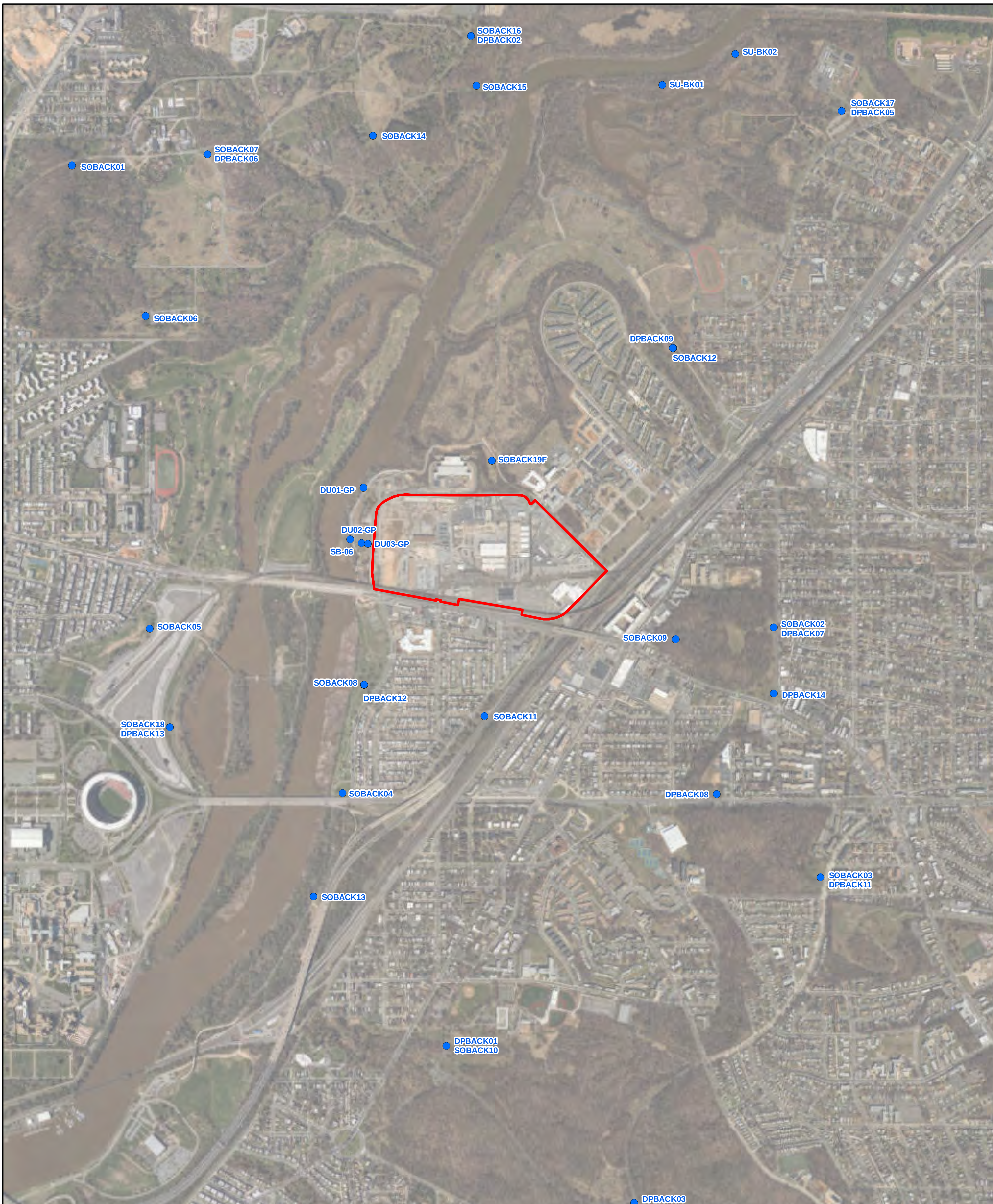
AECOM

0 150 Feet

N E S W

BENNING ROAD FACILITY RI/FS PROJECT 3400 BENNING RD., NE WASHINGTON, DC 20019	ANACOSTIA PARK SURFACE SOIL SAMPLE LOCATIONS

Date: 10/18/2018	Drawn By: KNS	Checked By: SED		FIGURE 3-3



LEGEND

- GPS LOCATIONS
- PROPERTY BOUNDARY

AECOM

0 1,200 Feet

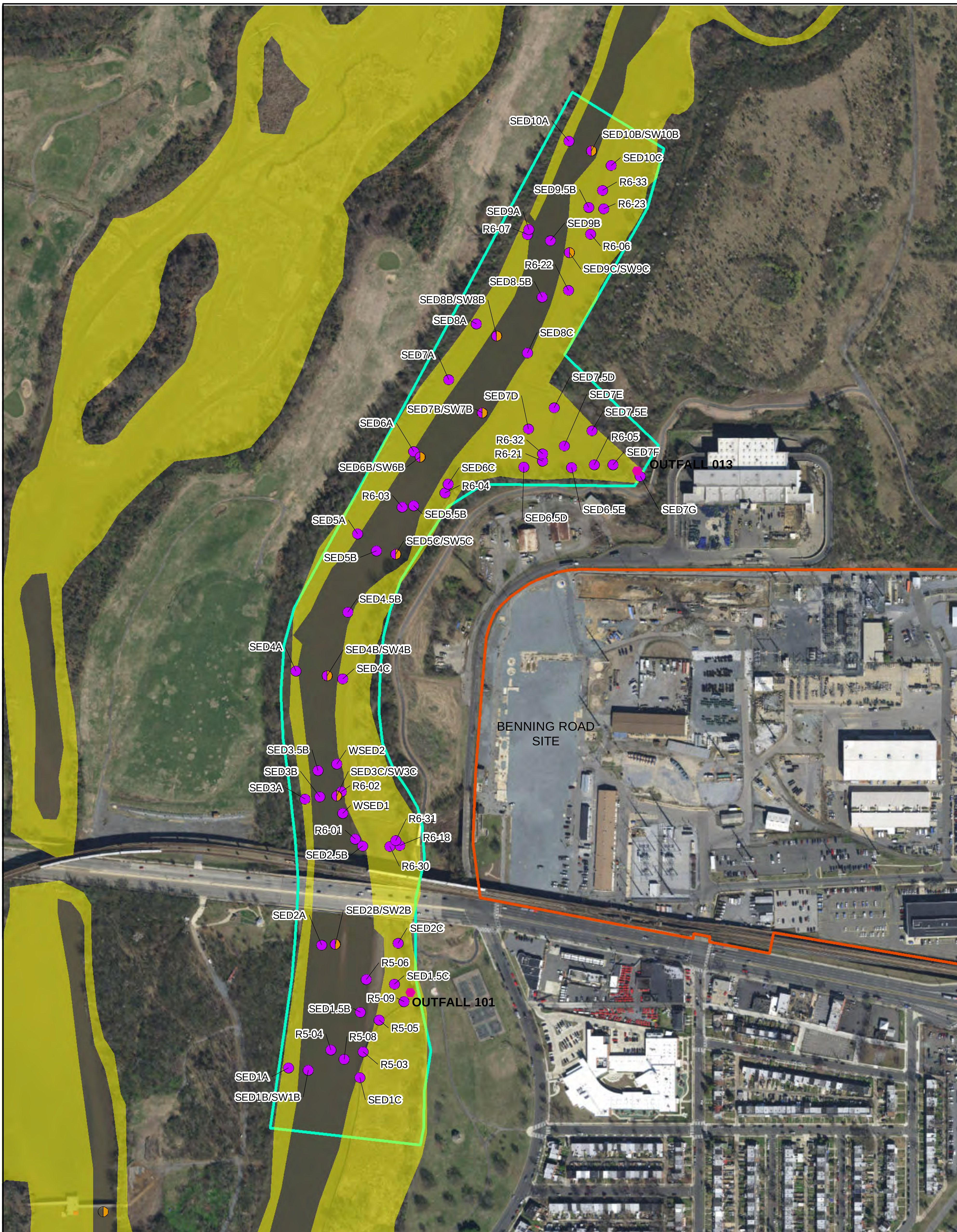
N S E W

BENNING ROAD FACILITY RI/FS PROJECT
3400 BENNING RD., NE
WASHINGTON, DC 20019

BACKGROUND SOIL AND GROUNDWATER SAMPLE LOCATIONS

Date: 4/26/2017 | Drawn By: JM

FIGURE 3-4



LEGEND

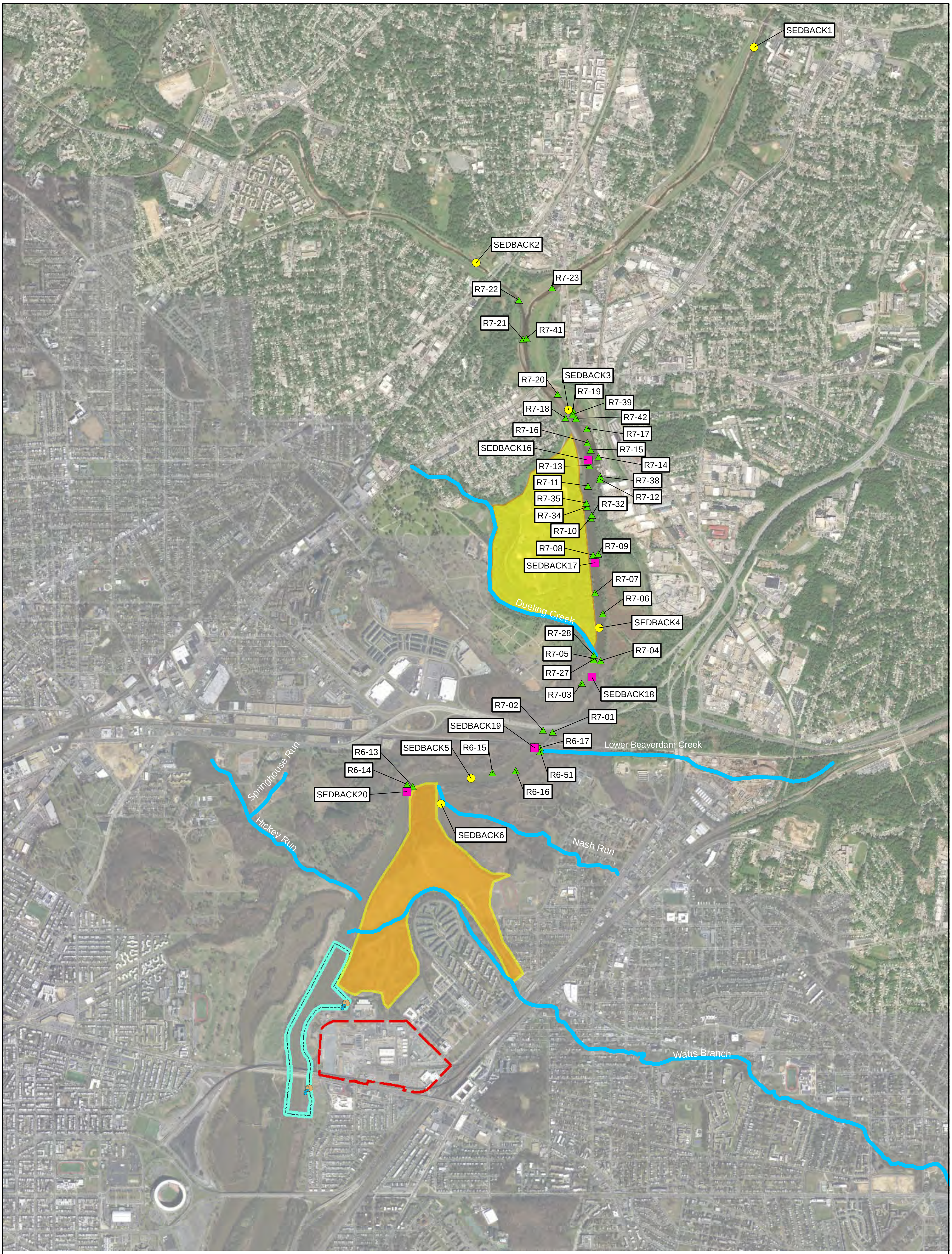
- Outfalls
- Surface Sediment Sampling Location
- Surface Water Sampling Location
- Digitized Fringe Sediment - Low Tide Minus 1 Foot
- Waterside Investigation Area
- Benning Road Facility Property Boundary

AECOM

0 400 Feet

N E S W

BENNING ROAD FACILITY RI/FS PROJECT 3400 BENNING RD., NE WASHINGTON, DC 20019			FRINGE SURFACE SEDIMENT AND SURFACE WATER LOCATIONS LOW TIDE MINUS ONE FOOT	
Date: 9/17/2018	Drawn By: KNS	Checked By: SED		FIGURE 3-5



LEGEND

- Pepco Sediment Background Location (2017)
- Pepco 2013 Background Location - Co-located Sediment/Surface Water
- DOEE Background Location - Sediment
- Outfalls
- Selected Tributaries
- Colmar Manner Landfill
- Kenilworth Landfill
- Waterside Investigation Area
- Benning Road Facility Property Boundary

0 1,500 Feet

AECOM

BENNING ROAD FACILITY RI/FS PROJECT 3400 BENNING RD., NE WASHINGTON, DC 20019			SURFICIAL SEDIMENT AND SURFACE WATER DOEE AND PEPCO BACKGROUND LOCATIONS	
Date: 5/2/2019	Drawn By: KNS	Checked By: SED		FIGURE 3-6

Path: P:\Jobs\Water\QA_Group\Pepco\GIS\MXD\2019Revisions\ Figure_3_6_BHHRA

J:\Indl_Service\Project Files\Pepco Benning Road RI_FS\GIS\MXD\2018\MXD\anacostia_081618_Fish_SampleLocations.mxd

Summary of Upper Anacostia Sampling Area

Collection Date	Species	Number of Composite Samples Per Species	Number of Individuals Per Composite Sample
2013	Brown Bullhead	1	7
	Blue catfish	1	4
	Carp	1	3
	Channel Catfish	1	4
	Largemouth Bass	1	3
	Northern Snakehead	1	3
	Sunfish	1	8

Summary of Lower Anacostia Sampling Area

Collection Date	Species	Number of Composite Samples Per Species	Number of Individuals Per Composite Sample
2013	American Eel	1	4
	Blue catfish	1	4
	Carp	1	4
	Channel Catfish	1	4
	Largemouth Bass	1	4
	Sunfish	1	9

N W E S

Fish Tissue Sampling Locations on the Anacostia River
Pepco – Benning Road Facility
Washington, DC

0 0.425 0.85 1.7 Miles

Legend
- Property Boundaries
- Waterside Investigation Area
- Benning Road Facility
- Upper Anacostia River Sampling Area (US Fish and Wildlife Service)
- Lower Anacostia River Sampling Area (US Fish and Wildlife Service)

AECOM

Figure 3-7

J:\Indl_Service\Project Files\Pepco Benning Road RI_FS\GIS\MXD\2018\MXD\Potomac_081418_Fish_SampleLocations.mxd

Summary of Upper Potomac Sampling Area

Collection Date	Fish Species	Number of Composite Samples per Species	Number of Individuals per Composite Sample
2013	American eel	1	4
	Brown bullhead	1	2
	Carp	1	5
	Channel catfish	1	6
	Largemouth bass	1	6
	Northern snakehead	1	3
	Striped bass	1	3
	Sunfish	1	10
	White perch	1	10

Summary of Lower Potomac Sampling Area

Collection Date	Fish Species	Number of Composite Samples per Species	Number of Individuals per Composite Sample
2013	American eel	2	4 in one composite, and one large individual
	American shad	1	4
	Brown bullhead	1	6
	Blue catfish	1	6
	Carp	1	4
	Channel catfish	1	6
	Largemouth bass	1	6
	Sunfish	1	8

N
W E
S

Fish Tissue Sampling Locations on the Potomac River
Pepco – Benning Road Facility
Washington, DC

0 0.75 1.5 3 Miles

Legend

Upper Potomac River Fish Fillet Sampling Area
Lower Potomac River Fish Fillet Sampling Area
Upper Anacostia River Sampling Area
Lower Anacostia River Sampling Area

AECOM

Figure 3-8

Collection Date	Fish Species	Number of Samples per Species*
2016	Indian Creek (IC)	
	Largemouth bass	3
	Striped bass	3

Collection Date	Fish Species	Number of Samples per Species*
2016	Paint Branch (PC)	
	Largemouth bass	3

Collection Date	Fish Species	Number of Samples per Species*
2016	Northeast Branch (NEBAR)	
	Largemouth bass	3

Collection Date	Fish Species	Number of Samples per Species*
2016	Northwest Branch (NWBAR)	
	Largemouth bass	10
	Smallmouth bass	6
	Northern snakehead	1

Non-Tidal Fish Tissue Sampling Locations
Background Locations
Pepco – Benning Road Facility
Washington, DC

0 0.5 1 2 Miles

Legend

- Property Boundaries
- Waterside Investigation Area
- Benning Road Facility
- Upper Anacostia River Sampling Area (US Fish and Wildlife Service)
- Background Fish Tissue Sampling Reach

AECOM

Figure 3-9

Attachments

Attachment A

Fringe Surface Sediment and Fish Tissue Data Used in the BHHRA

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R5-03	R5-05	R5-09	R6-04	R6-04	R6-05	R6-06	R6-06	R6-18	R6-21
			Sample ID	RI-R5-03-SS	RI-R5-05-SS	P2-R5-09-SS	RI-R6-04-SS	RI-R6-80-SS	RI-R6-05-SS	RI-R6-06-SS	RI-R6-100-SS	RI-R6-18-SS	RI-R6-21-SS
			Sample Type	N	N	N	N	FD	N	N	FD	N	N
			Parent Sample ID					RI-R6-04-SS			RI-R6-06-SS		
			Sample Date	7/25/2014	7/30/2014	6/28/2016	7/28/2014	7/28/2014	8/4/2014	8/4/2014	8/4/2014	4/30/2015	4/29/2015
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Dioxins/Furans													
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	mg/kg	TRG			2.2E-05 J						2.1E-05 J	0.00013
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	mg/kg	TRG			0.00012						0.00012	0.00048
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	mg/kg	TRG			1.7E-06 J						1.7E-06 J	2.1E-05
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	mg/kg	TRG			3.1E-06 J						4.5E-06 J	5.8E-05
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	mg/kg	TRG			2.3E-06 J						2.7E-06 J	3.4E-05
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	mg/kg	TRG			2.3E-06 J						4.3E-06 J	3.2E-05 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	mg/kg	TRG			5.1E-06						5.9E-06	5.9E-05
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	mg/kg	TRG			5.9E-08 U						1.5E-07 U	3.2E-06 J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	mg/kg	TRG			5.9E-06						6.8E-06	8.6E-05
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	TRG			6.3E-07 J						1.3E-06 J	1.4E-05
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	mg/kg	TRG			1.5E-06 J						2.2E-06 J	2.7E-05 J
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	mg/kg	TRG			2E-06 J						2.6E-06 J	3.6E-05 J
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	mg/kg	TRG			1.7E-06 J						2.6E-06 J	2.6E-05
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	mg/kg	TRG			1.1E-06						2E-06 J	8.7E-06
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG			3.4E-07 J						7.2E-07 J	4.6E-06
Octachlorochlorodibenzofuran	39001-02-0	mg/kg	TRG			4.6E-05						3.9E-05	0.00012 J
Octachlorochlorodibenzo-p-dioxin	3268-87-9	mg/kg	TRG			0.0034						0.0036	0.0036
TCDD TEQ HH	DFTEQ-HH	mg/kg	CALC			7.02E-06						9.14E-06	7.89E-05
Total HpCDD	37871-00-4	mg/kg	TRG										
Total HpCDF	38998-75-3	mg/kg	TRG										
Total HxCDD	34465-46-8	mg/kg	TRG										
Total HxCDF	55684-94-1	mg/kg	TRG										
Total PeCDD	36088-22-9	mg/kg	TRG										
Total PeCDF	30402-15-4	mg/kg	TRG										
Total TCDD	41903-57-5	mg/kg	TRG										
Total TCDF	55722-27-5	mg/kg	TRG										
Inorganics													
Aluminum	7429-90-5	mg/kg	TRG	7500	8000		15500		4400	7100		12000	6000
Antimony	7440-36-0	mg/kg	TRG	0.62 J	0.39 J		0.64 J		1.7	0.46		0.58	0.67 J
Arsenic	7440-38-2	mg/kg	TRG	3.2 J	2.3		9.05 J		7.1	2.9		5.1	5.1 J
Barium	7440-39-3	mg/kg	TRG	62	63		105		130	66.5		98	88
Beryllium	7440-41-7	mg/kg	TRG	0.88	0.83		1.5		0.43	0.905		1.1	0.66
Cadmium	7440-43-9	mg/kg	TRG	0.65	0.63		1.15		2.8	0.56		0.9	1.2 J
Calcium	7440-70-2	mg/kg	TRG	2500	2100		12000 J		3600	2750		2900	1900
Chromium	7440-47-3	mg/kg	TRG	25	29		69 J		48	24.5		49	24
Cobalt	7440-48-4	mg/kg	TRG	11	10 J		19.5		6.9	11		25	9.8
Copper	7440-50-8	mg/kg	TRG	30 J	28 J		70 J		64	32.5		58	40 J
Iron	7439-89-6	mg/kg	TRG	15000	15000 J		28000		14000	15000		28000	16000
Lead	7439-92-1	mg/kg	TRG	48	46		120		140	42.5		78	61
Magnesium	7439-95-4	mg/kg	TRG	3200	3100		3700 J		4400	2400		3700	1800 J
Manganese	7439-96-5	mg/kg	TRG	170	180		305		150	210		370	120
Mercury	7439-97-6	mg/kg	TRG	0.068	0.11		0.22		0.32	0.0945		0.24	0.13
Nickel	7440-02-0	mg/kg	TRG	22	20		59 J		110	24		42	28 J
Potassium	7440-09-7	mg/kg	TRG	1100	1000 J		1300		390	1250		1900	650
Selenium	7782-49-2	mg/kg	TRG	0.32 J	0.19 J		0.875		0.32 J	0.345 J		0.97	0.6
Silver	7440-22-4	mg/kg	TRG	0.2	0.2		0.5		1.2	0.5		0.29	0.46 J
Sodium	7440-23-5	mg/kg	TRG	170 J	140 J		300 J		130	145		370	210
Thallium	7440-28-0	mg/kg	TRG	0.16	0.15		0.33		0.13	0.175		0.28 J+	0.15 J
Vanadium	7440-62-2	mg/kg	TRG	33 J	27 J		140 J		180	22		42	59 J
Zinc	7440-66-6	mg/kg	TRG	160 J	140 J		285		260	140		250	170 J
Cyanide	57-12-5	ug/kg	TRG	140 U	180 J		295 J		270 J	620 J		4900	170 U
Pesticides													
4,4'-DDD	72-54-8	mg/kg	TRG	0.0037 J	0.0045 J		0.0057 J		0.0027 J	0.0052		0.0039 J	0.0019 J
4,4'-DDE	72-55-9	mg/kg	TRG	0.0067	0.0089		0.018		0.0028 J	0.00575		0.007 J	0.003 J
4,4'-DDT	50-29-3	mg/kg	TRG	0.0011 J	0.0013 J		0.038		0.07	0.0025 J		0.0014 J	0.0026 J
Aldrin	309-00-2	mg/kg	TRG	0.00041 J	0.00053 J		0.00037 J		0.00022 J	0.000575		0.00051 J	0.0002 J
alpha-BHC	319-84-6	mg/kg	TRG	0.00013 U	0.00013 U		0.00016 U		5.6E-05 U	7.4E-05 U		8.8E-05 U	7E-05 U
beta-BHC	319-85-7	mg/kg	TRG	0.0002 U	0.0005 J		0.000855 J		0.0039 J	0.00027 U		0.00014 U	0.00011 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R5-03	R5-05	R5-09	R6-04	R6-04	R6-05	R6-06	R6-06	R6-18	R6-21
			Sample ID	RI-R5-03-SS	RI-R5-05-SS	P2-R5-09-SS	RI-R6-04-SS	RI-R6-80-SS	RI-R6-05-SS	RI-R6-06-SS	RI-R6-100-SS	RI-R6-18-SS	RI-R6-21-SS
			Sample Type	N	N	N	N	FD	N	N	FD	N	N
			Parent Sample ID					RI-R6-04-SS			RI-R6-06-SS		
			Sample Date	7/25/2014	7/30/2014	6/28/2016	7/28/2014	7/28/2014	8/4/2014	8/4/2014	8/4/2014	4/30/2015	4/29/2015
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Chlordane (Technical)	12789-03-6	mg/kg	TRG	0.045	0.071		0.084		0.00015 U	0.059		0.059 J	0.042 J
cis-Chlordane	5103-71-9	mg/kg	TRG										
delta-BHC	319-86-8	mg/kg	TRG	0.00075 J	0.00012 U		0.00015 U		5.3E-05 U	0.00046 J		0.00052 J	0.002 J
Dieldrin	60-57-1	mg/kg	TRG	0.0013 J	0.0013 J		0.014 J		0.0048 J	0.002 J		0.0014 J	0.0036 J
Endosulfan I	959-98-8	mg/kg	TRG	0.00015 U	0.00015 U		0.00045 J		0.00074 J	8.6E-05 U		0.0001 U	0.00037 J
Endosulfan II	33213-65-9	mg/kg	TRG	0.00077 J	0.00056 J		0.0068		0.0042 J	0.00094 J		0.00079 J	0.003 J
Endosulfan Sulfate	1031-07-8	mg/kg	TRG	0.00098	0.0013		0.00355 J		0.011	0.00061		0.0011 J	0.0027 J
Endrin	72-20-8	mg/kg	TRG	0.0021 J	0.0041		0.00765 J		0.021 J	0.00215		0.00036 J	0.0055 J
Endrin aldehyde	7421-93-4	mg/kg	TRG	0.00039 J	0.00015 U		0.00075 J		0.0015 J	0.00077		0.00017 J	0.00068 J
Endrin ketone	53494-70-5	mg/kg	TRG										
gamma-BHC (Lindane)	58-89-9	mg/kg	TRG	0.00016 J	0.00024 J		0.00027 U		0.00066 J	0.00073 U		0.00011 J	0.00036 J
Heptachlor	76-44-8	mg/kg	TRG	0.00069 J	0.0012 J		0.0033 J		0.00097 J	0.000655		0.00079 J	0.00048 J
Heptachlor Epoxide	1024-57-3	mg/kg	TRG	0.00061 J	0.00067 J		0.0033 J		0.0065 J	0.00064 J		0.00068 J	0.0023 J
Methoxychlor	72-43-5	mg/kg	TRG										
Toxaphene	8001-35-2	mg/kg	TRG	0.0052 U	0.0052 U		0.0065 U		0.0023 U	0.003 U		0.0036 U	0.0029 U
trans-Chlordane	5103-74-2	mg/kg	TRG										
Pyrethroids													
Allethrin	584-79-2	mg/kg	TRG			0.019 UJ							
BAYTHROID	68359-37-5	mg/kg	TRG			0.019 U							
BIPHENTHRIN (TALSTAR)	82657-04-3	mg/kg	TRG			0.019 U							
CYPERMETHRIN	52315-07-8	mg/kg	TRG			0.019 U							
DANITOL	39515-41-8	mg/kg	TRG			0.019 U							
DELTAMETHRIN/TRALOMETHRIN	52820-00-5	mg/kg	TRG			0.019 U							
Dichloran	99-30-9	mg/kg	TRG			0.019 U							
Fenvalerate	51630-58-1	mg/kg	TRG			0.019 U							
LAMBDA CYHALOTHRIN	91465-08-6	mg/kg	TRG			0.019 U							
Penoxalin	40487-42-1	mg/kg	TRG			0.019 UJ							
Permethrin	52645-53-1	mg/kg	TRG			0.019 U							
PRALLETHRIN	23031-36-9	mg/kg	TRG			0.019 UJ							
SUMITHRIN	26002-80-2	mg/kg	TRG			0.019 U							
TEFLUTHRIN	79538-32-2	mg/kg	TRG			0.019 UJ							
PCB Aroclors													
Aroclor-1016	12674-11-2	mg/kg	TRG	0.00058 U	0.00058 U		0.0014 U		0.001 U	0.0014 U		0.0011 U	8.7E-05 U
Aroclor-1221	11104-28-2	mg/kg	TRG	0.00075 U	0.00074 U		0.0019 U		0.0013 U	0.0017 U		0.0014 U	0.0011 U
Aroclor-1232	11141-16-5	mg/kg	TRG	0.00067 U	0.00067 U		0.0017 U		0.0012 U	0.0016 U		0.0019 U	0.0015 U
Aroclor-1242	53469-21-9	mg/kg	TRG	0.00064 U	0.00063 U		0.0016 U		0.0011 U	0.0015 U		0.0014 U	0.0011 U
Aroclor-1248	12672-29-6	mg/kg	TRG	0.048	0.063		0.38		0.81	0.051		0.056 J	0.26
Aroclor-1254	11097-69-1	mg/kg	TRG	0.00056 U	0.00055 U		0.0014 U		0.00098 U	0.0013 U		0.0013 U	0.001 U
Aroclor-1260	11096-82-5	mg/kg	TRG	0.049	0.045		0.6		0.6	0.0335		0.032 J	0.16 J
Aroclor-1262	37324-23-5	mg/kg	TRG										
Aroclor-1268	11100-14-4	mg/kg	TRG										
PCB, Total Aroclors	TOT-PCB-ARO-C	mg/kg	CALC	0.097	0.11		0.98		1.4	0.0845		0.088	0.42
TPH													
Diesel Range Organics (C10-C20)	C10C20	mg/kg	TRG										
Oil Range Organics (C20-C36)	C20C36	mg/kg	TRG										
SVOCs													
1,1'-Biphenyl	92-52-4	mg/kg	TRG										
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	TRG										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG	0.017 U	0.017 U		0.043 U		0.023 U	0.036 U		0.024 U	0.019 U
2,2'-oxybis(1-Chloropropane)	108-60-1	mg/kg	TRG	0.0067 U	0.0067 U		0.017 UJ		0.009 U	0.014 U		0.0093 U	0.0074 U
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	TRG										
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG	0.31 U	0.31 U		0.77 U		0.41 U	0.64 U			
2,4,5-Trichlorophenol	95-95-4	mg/kg	TRG										
2,4,6-Trichlorophenol	88-06-2	mg/kg	TRG	0.047 U	0.047 U		0.12 U		0.062 U	0.096 U		0.064 U	0.051 U
2,4-Dichlorophenol	120-83-2	mg/kg	TRG	0.0063 U	0.0062 U		0.016 U		0.0083 U	0.013 U		0.0086 U	0.0069 U
2,4-Dimethylphenol	105-67-9	mg/kg	TRG	0.049 U	0.049 U		0.12 U		0.065 U	0.1 U		0.067 U	0.054 U
2,4-Dinitrophenol	51-28-5	mg/kg	TRG	0.37 UJ	0.37 UJ		0.93 U		0.5 U	0.77 U		0.51 U	0.41 U
2,4-Dinitrotoluene	121-14-2	mg/kg	TRG	0.025 U	0.025 U		0.063 U		0.034 U	0.052 U		0.035 U	0.028 U
2,6-Dinitrotoluene	606-20-2	mg/kg	TRG	0.032 U	0.032 U		0.08 U		0.043 U	0.066 U		0.044 U	0.035 U

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Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R5-03	R5-05	R5-09	R6-04	R6-04	R6-05	R6-06	R6-06	R6-18	R6-21
			Sample ID	RI-R5-03-SS	RI-R5-05-SS	P2-R5-09-SS	RI-R6-04-SS	RI-R6-80-SS	RI-R6-05-SS	RI-R6-06-SS	RI-R6-100-SS	RI-R6-18-SS	RI-R6-21-SS
			Sample Type	N	N	N	N	FD	N	N	FD	N	N
			Parent Sample ID					RI-R6-04-SS			RI-R6-06-SS		
			Sample Date	7/25/2014	7/30/2014	6/28/2016	7/28/2014	7/28/2014	8/4/2014	8/4/2014	8/4/2014	4/30/2015	4/29/2015
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
2-Chloronaphthalene	91-58-7	mg/kg	TRG	0.0065 U	0.0065 U		0.016 U		0.0087 U	0.013 U		0.009 U	0.0071 U
2-Chlorophenol	95-57-8	mg/kg	TRG	0.026 U	0.025 U		0.064 U		0.034 U	0.053 U		0.035 U	0.028 U
2-Methylnaphthalene	91-57-6	mg/kg	TRG										
2-Methylphenol	95-48-7	mg/kg	TRG										
2-Nitroaniline	88-74-4	mg/kg	TRG										
2-Nitrophenol	88-75-5	mg/kg	TRG	0.034 U	0.034 U		0.086 U		0.046 U	0.071 U		0.047 U	0.038 U
3,3'-Dichlorobenzidine	91-94-1	mg/kg	TRG	0.033 U	0.033 U		0.082 U		0.044 U	0.068 U		0.045 U	0.036 U
3-Nitroaniline	99-09-2	mg/kg	TRG										
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	TRG	0.13 U	0.12 U		0.31 U		0.17 U	0.26 U		0.17 U	0.14 U
4-Bromophenyl-phenylether	101-55-3	mg/kg	TRG	0.027 U	0.027 U		0.068 UJ		0.036 U	0.056 U		0.037 U	0.03 U
4-Chloro-3-methylphenol	59-50-7	mg/kg	TRG	0.029 U	0.029 U		0.072 U		0.038 U	0.059 U		0.04 U	0.032 U
4-Chloroaniline	106-47-8	mg/kg	TRG										
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	TRG	0.035 U	0.035 U		0.087 U		0.046 U	0.071 U		0.048 U	0.038 U
4-Methylphenol	106-44-5	mg/kg	TRG										
4-Nitroaniline	100-01-6	mg/kg	TRG										
4-Nitrophenol	100-02-7	mg/kg	TRG	0.11 U	0.11 U		0.28 U		0.15 U	0.23 U		0.16 U	0.12 U
Acenaphthene	83-32-9	mg/kg	TRG	0.051 J	0.061 J		0.051 J		0.43	0.0215 J		0.086	0.036 J
Acenaphthylene	208-96-8	mg/kg	TRG	0.12	0.076		0.1 J		0.051 J	0.053 J		0.075 J	0.026 J
Acetophenone	98-86-2	mg/kg	TRG										
Anthracene	120-12-7	mg/kg	TRG	0.16	0.2		0.105 J		0.86	0.0725 J		0.22	0.069 J
Atrazine	1912-24-9	mg/kg	TRG										
Benzaldehyde	100-52-7	mg/kg	TRG										
Benzidine	92-87-5	mg/kg	TRG	1.3 U	1.3 UJ		3.3 U		1.7 U	2.7 U		1.8 U	1.4 U
Benzo(a)anthracene	56-55-3	mg/kg	TRG	0.8	0.85		0.35		2.3	0.37		1	0.21 J
Benzo(a)pyrene	50-32-8	mg/kg	TRG	0.94	0.99		0.43		2	0.43		1.1	0.24 J
Benzo(b)fluoranthene	205-99-2	mg/kg	TRG	1.4	1.4		0.65		2.6	0.69		1.7	0.37 J
Benzo(g,h,i)perylene	191-24-2	mg/kg	TRG	1.2	1.2		0.515		1.7	0.515		1.4	0.26 J
Benzo(k)fluoranthene	207-08-9	mg/kg	TRG	0.43	0.59		0.295		0.96	0.245		0.42	0.13 J
Benzoic acid	65-85-0	mg/kg	TRG	0.13 U	0.13 U		1.2 J		0.17 U	0.27 U		1.2 J	0.14 U
bis-(2-chloroethoxy)methane	111-91-1	mg/kg	TRG	0.021 U	0.02 U		0.051 U		0.027 U	0.042 U		0.028 U	0.023 U
bis-(2-Chloroethyl)ether	111-44-4	mg/kg	TRG	0.0084 U	0.0083 U		0.021 U		0.011 U	0.017 U		0.012 U	0.0092 U
bis-(2-Ethylhexyl)phthalate	117-81-7	mg/kg	TRG	1.9	1.6		1.7 J		0.74 J	0.615 J		4	10
Butylbenzylphthalate	85-68-7	mg/kg	TRG	0.089 J	0.078 J		0.11 U		0.057 U	0.052 U		0.11 J	0.22 J
Caprolactam	105-60-2	mg/kg	TRG										
Carbazole	86-74-8	mg/kg	TRG										
Chrysene	218-01-9	mg/kg	TRG	1.3	1.3		0.575		2.4	0.575		1.3	0.34 J
Dibenzo(a,h)anthracene	53-70-3	mg/kg	TRG	0.22	0.25		0.13 U		0.47	0.11 J		0.27	0.058 J
Dibenzofuran	132-64-9	mg/kg	TRG										
Diethylphthalate	84-66-2	mg/kg	TRG	0.034 U	0.034 U		0.085 U		0.045 U	0.07 U		0.048 J	0.037 U
Dimethylphthalate	131-11-3	mg/kg	TRG	0.034 U	0.034 U		0.085 U		0.045 U	0.07 U		0.047 U	0.037 U
Di-n-butylphthalate	84-74-2	mg/kg	TRG	0.039 U	0.039 U		0.098 U		0.052 U	0.081 U		0.054 U	0.043 U
Di-n-octylphthalate	117-84-0	mg/kg	TRG	0.033 U	0.033 U		0.082 UJ		0.044 U	0.068 U		0.4 J	0.036 U
Diphenylhydrazine-1,2	122-66-7	mg/kg	TRG	0.04 U	0.04 U		0.1 U		0.053 U	0.082 U		0.055 U	0.044 U
Fluoranthene	206-44-0	mg/kg	TRG	2.2	2.3		0.72		6	1		2.1	0.54 J
Fluorene	86-73-7	mg/kg	TRG	0.083	0.084		0.059 U		0.41	0.035 J		0.094	0.051 J
Hexachlorobenzene	118-74-1	mg/kg	TRG	0.0067 U	0.0066 U		0.017 UJ		0.0089 U	0.014 U		0.0092 U	0.0073 U
Hexachlorobutadiene	87-68-3	mg/kg	TRG	0.007 U	0.007 U		0.017 UJ		0.0093 U	0.014 U		0.0096 U	0.0077 U
Hexachlorocyclo-pentadiene	77-47-4	mg/kg	TRG	0.034 U	0.034 U		0.084 U		0.045 U	0.069 U		0.046 U	0.037 U
Hexachloroethane	67-72-1	mg/kg	TRG	0.022 U	0.022 U		0.056 U		0.03 U	0.046 U		0.031 U	0.025 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	TRG	0.95	0.94		0.38		1.4	0.41		1.1	0.18 J
Isophorone	78-59-1	mg/kg	TRG	0.024 U	0.023 U		0.059 U		0.031 U	0.048 U		0.032 U	0.026 U
Naphthalene	91-20-3	mg/kg	TRG	0.082	0.022 J		0.039 J		0.13	0.011 U		0.039 J	0.0059 U
Nitrobenzene	98-95-3	mg/kg	TRG	0.026 U	0.026 U		0.065 U		0.035 U	0.054 U		0.036 U	0.029 U
Nitrosodimethylamine-n	62-75-9	mg/kg	TRG	0.027 U	0.027 U		0.067 U		0.036 U	0.055 U		0.037 U	0.029 U
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	TRG	0.0073 U	0.0073 U		0.018 U		0.0098 U	0.015 U		0.01 U	0.008 U
N-Nitrosodiphenylamine	86-30-6	mg/kg	TRG	0.029 U	0.029 U		0.072 U		0.038 U	0.06 U		0.04 U	0.032 U
Pentachlorophenol	87-86-5	mg/kg	TRG	0.028 U	0.028 U		0.07 UJ		0.037 U	0.058 U		0.038 U	0.031 U
Phenanthrene	85-01-8	mg/kg	TRG	0.72	0.66		0.305		4.4	0.325		0.81	0.19 J
Phenol	108-95-2	mg/kg	TRG	0.0074 U	0.0073 U		0.018 U		0.0098 U	0.015 U		0.01 U	0.0081 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
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			Location ID	R5-03	R5-05	R5-09	R6-04	R6-04	R6-05	R6-06	R6-06	R6-18	R6-21
			Sample ID	RI-R5-03-SS	RI-R5-05-SS	P2-R5-09-SS	RI-R6-04-SS	RI-R6-80-SS	RI-R6-05-SS	RI-R6-06-SS	RI-R6-100-SS	RI-R6-18-SS	RI-R6-21-SS
			Sample Type	N	N	N	N	FD	N	N	FD	N	N
			Parent Sample ID					RI-R6-04-SS			RI-R6-06-SS		
			Sample Date	7/25/2014	7/30/2014	6/28/2016	7/28/2014	7/28/2014	8/4/2014	8/4/2014	8/4/2014	4/30/2015	4/29/2015
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Pyrene	129-00-0	mg/kg	TRG	1.3	1.4		0.775		4	0.66		1.5	0.4 J
Polybrominated Diphenyl Ethers													
PBDE47	5436-43-1	mg/kg	TRG			0.11 U							
PBDE99	60348-60-9	mg/kg	TRG			0.11 U							
PBDE-100	189084-64-8	mg/kg	TRG			0.11 U							
PBDE153	68631-49-2	mg/kg	TRG			0.11 U							
PBDE-154	207122-15-4	mg/kg	TRG			0.11 U							
VOCs													
1,1,1-Trichloroethane	71-55-6	mg/kg	TRG	0.00091 U	0.00092 U		0.0011 U		0.00081 U	0.0011 U		0.0013 U	0.001 U
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	TRG	0.0014 U	0.0014 U		0.0017 U		0.0012 U	0.0016 U		0.0019 U	0.0015 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	mg/kg	TRG										
1,1,2-Trichloroethane	79-00-5	mg/kg	TRG	0.0016 U	0.0016 U		0.0019 U		0.0014 U	0.0018 U		0.0022 U	0.0017 U
1,1-Dichloroethane	75-34-3	mg/kg	TRG	0.0011 U	0.0011 U		0.0013 U		0.00096 U	0.0013 U		0.0015 U	0.0012 U
1,1-Dichloroethene	75-35-4	mg/kg	TRG	0.0016 U	0.0016 U		0.002 U		0.0014 U	0.0019 U		0.0022 U	0.0017 U
1,2,3-Trichlorobenzene	87-61-6	mg/kg	TRG										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG										
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	TRG										
1,2-Dibromoethane	106-93-4	mg/kg	TRG										
1,2-Dichlorobenzene	95-50-1	mg/kg	TRG	0.0015 U	0.0015 U		0.0019 U		0.0013 U	0.0018 U		0.0021 U	0.0016 U
1,2-Dichloroethane	107-06-2	mg/kg	TRG	0.0012 U	0.0012 U		0.0014 U		0.001 U	0.0013 U		0.0016 U	0.0013 U
1,2-Dichloropropane	78-87-5	mg/kg	TRG	0.001 U	0.001 U		0.0013 U		0.0009 U	0.0012 U		0.0014 U	0.0011 U
1,3-Dichlorobenzene	541-73-1	mg/kg	TRG	0.0012 U	0.0012 U		0.0015 U		0.0011 U	0.0014 U		0.0017 U	0.0013 U
1,4-Dichlorobenzene	106-46-7	mg/kg	TRG	0.0012 U	0.0012 U		0.0015 U		0.0011 U	0.0014 U		0.0016 U	0.0013 U
1,4-Dioxane	123-91-1	mg/kg	TRG										
2-Butanone	78-93-3	mg/kg	TRG										
2-Hexanone	591-78-6	mg/kg	TRG										
4-Methyl-2-pentanone	108-10-1	mg/kg	TRG										
Acetone	67-64-1	mg/kg	TRG										
Acrolein	107-02-8	mg/kg	TRG	0.013 U	0.013 U		0.016 U		0.012 U	0.015 U		0.018 U	0.014 U
Acrylonitrile	107-13-1	mg/kg	TRG	0.019 U	0.02 UJ		0.024 U		0.017 U	0.023 U		0.027 U	0.021 U
Benzene	71-43-2	mg/kg	TRG	0.0013 U	0.0013 U		0.0016 U		0.0011 U	0.0015 U		0.0017 U	0.0014 U
Bromochloromethane	74-97-5	mg/kg	TRG										
Bromodichloromethane	75-27-4	mg/kg	TRG	0.0011 U	0.0011 U		0.0013 U		0.00093 U	0.0012 U		0.0015 U	0.0012 U
Bromoform	75-25-2	mg/kg	TRG	0.00083 U	0.00083 U		0.001 U		0.00074 U	0.00097 U		0.0011 U	0.00091 U
Bromomethane	74-83-9	mg/kg	TRG	0.0014 U	0.0014 U		0.0017 U		0.0012 U	0.0016 U		0.0019 U	0.0015 U
Carbon Disulfide	75-15-0	mg/kg	TRG										
Carbon Tetrachloride	56-23-5	mg/kg	TRG	0.00084 U	0.00084 UJ		0.001 U		0.00074 U	0.00098 U		0.0012 U	0.00092 U
Chlorobenzene	108-90-7	mg/kg	TRG	0.0014 U	0.0014 U		0.0018 U		0.0013 U	0.0017 U		0.002 U	0.0016 U
Chloroethane	75-00-3	mg/kg	TRG	0.0029 U	0.0029 U		0.0036 U		0.0026 UJ	0.0034 UJ		0.004 U	0.0032 U
Chloroform	67-66-3	mg/kg	TRG	0.0011 U	0.0011 U		0.0014 U		0.00097 U	0.0013 U		0.0015 U	0.0012 U
Chloromethane	74-87-3	mg/kg	TRG	0.0016 U	0.0016 U		0.002 U		0.0014 U	0.0019 U		0.0022 U	0.0017 U
cis-1,2-Dichloroethylene	156-59-2	mg/kg	TRG										
cis-1,3-Dichloropropene	10061-01-5	mg/kg	TRG	0.0013 U	0.0013 U		0.0016 U		0.0011 U	0.0015 U		0.0018 U	0.0014 U
Cyclohexane	110-82-7	mg/kg	TRG										
Dibromochloromethane	124-48-1	mg/kg	TRG	0.0013 U	0.0013 U		0.0017 U		0.0012 U	0.0016 U		0.0018 U	0.0015 U
Dichlorodifluoromethane	75-71-8	mg/kg	TRG										
Dichloropropene, 1,3-	542-75-6	mg/kg	TRG	0.0024	0.0024		0.003		0.00209	0.0028		0.0033	0.0026
Ethylbenzene	100-41-4	mg/kg	TRG	0.0012 U	0.0012 U		0.0015 U		0.0011 U	0.0014 U		0.0017 U	0.0013 U
Isopropylbenzene	98-82-8	mg/kg	TRG										
m, p-Xylene	XYLMP	mg/kg	TRG										
Methyl Acetate	79-20-9	mg/kg	TRG										
Methyl tert-Butyl Ether (MTBE)	1634-04-4	mg/kg	TRG										
Methylcyclohexane	108-87-2	mg/kg	TRG										
Methylene Chloride	75-09-2	mg/kg	TRG	0.0013 U	0.0013 U		0.0028 U		0.0011 U	0.0015 U		0.0066 U	0.0053 U
o-Xylene	95-47-6	mg/kg	TRG										
Styrene	100-42-5	mg/kg	TRG										
Tetrachloroethylene	127-18-4	mg/kg	TRG	0.0013 U	0.0013 U		0.0016 U		0.0011 U	0.0015 U		0.0018 U	0.0014 U
Toluene	108-88-3	mg/kg	TRG	0.0014 U	0.0014 U		0.0017 U		0.0012 U	0.0016 U		0.0019 U	0.0015 U
trans-1,2-Dichloroethene	156-60-5	mg/kg	TRG	0.0011 U	0.0011 U		0.0014 U		0.00099 U	0.0013 U		0.0015 U	0.0012 U

Table A-1
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Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R5-03	R5-05	R5-09	R6-04	R6-04	R6-05	R6-06	R6-06	R6-18	R6-21
			Sample ID	RI-R5-03-SS	RI-R5-05-SS	P2-R5-09-SS	RI-R6-04-SS	RI-R6-80-SS	RI-R6-05-SS	RI-R6-06-SS	RI-R6-100-SS	RI-R6-18-SS	RI-R6-21-SS
			Sample Type	N	N	N	N	FD	N	N	FD	N	N
			Parent Sample ID					RI-R6-04-SS			RI-R6-06-SS		
			Sample Date	7/25/2014	7/30/2014	6/28/2016	7/28/2014	7/28/2014	8/4/2014	8/4/2014	8/4/2014	4/30/2015	4/29/2015
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1	DOEE_Phase1
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
trans-1,3-Dichloropropene	10061-02-6	mg/kg	TRG	0.0011 U	0.0011 U		0.0014 U		0.00099 U	0.0013 U		0.0015 U	0.0012 U
Trichloroethene	79-01-6	mg/kg	TRG	0.0012 U	0.0012 U		0.0015 U		0.0011 U	0.0014 U		0.0017 U	0.0013 U
Trichlorofluoromethane	75-69-4	mg/kg	TRG										
Vinyl Chloride	75-01-4	mg/kg	TRG	0.00088 U	0.00088 U		0.0011 U		0.00078 U	0.001 U		0.0012 U	0.00096 U
Vinyl ether, 2-chloroethyl	110-75-8	mg/kg	TRG	0.0015 UJ	0.0015 UJ		0.0018 U		0.0013 UJ	0.0017 UJ		0.002 U	0.0016 U
Xylenes (total)	1330-20-7	mg/kg	CALC										

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
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Location ID				R6-22	R6-23	R6-30	R6-30	R6-31	R6-32	R6-33	SED1.5C	SED1.5C	SED10C
Sample ID				RI-R6-22-SS	RI-R6-23-SS	P2-R6-30-SS	P2-R6-40-SS	P2-R6-31-SS	P2-R6-32-SS	P2-R6-33-SS	SED1.5C00AN	SED1.5C00AR	SED10C00N
Sample Type				N	N	N	FD	N	N	N	N	FD	N
Parent Sample ID							P2-R6-30-SS					SED1.5C00AN	
Sample Date				4/30/2015	4/30/2015	6/9/2016	6/9/2016	6/28/2016	6/28/2016	6/28/2016	6/21/2017	6/21/2017	11/11/2013
Task Code				DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013
Depth Interval				0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Dioxins/Furans													
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	mg/kg	TRG	3E-05 J	2.7E-05 J	4.65E-05 J		1.8E-05	0.00055	3.9E-06 J			
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	mg/kg	TRG	0.00019	0.00015	0.00028		0.00011	0.0022	2.4E-05			
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	mg/kg	TRG	2.5E-06 J	1.8E-06 J	4.1E-06 U		1.4E-06 U	8.3E-05	9.5E-08 U			
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	mg/kg	TRG	5.7E-06	3.6E-06 J	1.3E-05 U		3.4E-06 J	0.00023 J	6.9E-07 U			
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	mg/kg	TRG	4E-06 J	2.8E-06 J	7.6E-06 U		2.2E-06 J	0.00016	4.3E-07 U			
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	mg/kg	TRG	3.3E-08 U	3.1E-08 U	7.6E-06 U		2.7E-06 J	0.00013 J	5.4E-07 U			
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	mg/kg	TRG	7.8E-06	6.3E-06	1.3E-05		4.6E-06 J	0.00031	9.8E-07 J			
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	mg/kg	TRG	2.2E-07 J	2.1E-07 J	4.3E-07 U		6.2E-08 U	1.3E-05	3.6E-08 U			
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	mg/kg	TRG	1E-05	6.9E-06	2.1E-05		5.5E-06 J	0.00042	1.1E-06 U			
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	TRG	1.4E-06 J	8.2E-07 J	2.9E-06 U		1.5E-06 J	6.2E-05	1.5E-07 U			
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	mg/kg	TRG	2.5E-06 J	1.6E-06 J	6.3E-06 U		2E-06 J	0.00013	3.6E-07 U			
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	mg/kg	TRG	3.1E-06 J	2.2E-06 J	6.4E-06 U		1.7E-06 J	0.00015 J	3E-07 U			
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	mg/kg	TRG	2.8E-06 J	1.8E-06 J	5.8E-06 U		2.2E-06 J	0.00013	3.7E-07 U			
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	mg/kg	TRG	2.4E-06	1.7E-06	2.85E-06		1.5E-06	3.5E-05	5.8E-07 J			
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG	8.4E-07 J	4.7E-07 J	9.9E-07 J		5.4E-07 J	2.1E-05	8.8E-08 J			
Octachlorochlorodibenzofuran	39001-02-0	mg/kg	TRG	6.6E-05	5.5E-05	9.9E-05		3.4E-05	0.0005 J	1E-05 U			
Octachlorochlorodibenzo-p-dioxin	3268-87-9	mg/kg	TRG	0.0072 J	0.0053 J	0.0102 J		0.0035	0.012 J	0.00063			
TCDD TEQ HH	DFTEQ-HH	mg/kg	CALC	1.19E-05	8.4E-06	1.1E-05		7.75E-06	0.000369	7.12E-07			
Total HpCDD	37871-00-4	mg/kg	TRG										
Total HpCDF	38998-75-3	mg/kg	TRG										
Total HxCDD	34465-46-8	mg/kg	TRG										
Total HxCDF	55684-94-1	mg/kg	TRG										
Total PeCDD	36088-22-9	mg/kg	TRG										
Total PeCDF	30402-15-4	mg/kg	TRG										
Total TCDD	41903-57-5	mg/kg	TRG										
Total TCDF	55722-27-5	mg/kg	TRG										
Inorganics													
Aluminum	7429-90-5	mg/kg	TRG	12000	12000	7500 J		8200 J	4300 J	6300 J	5600		5300
Antimony	7440-36-0	mg/kg	TRG	0.48 J+	0.47 J+	0.785 J		0.82	1.2	0.68	0.6 J		0.31 J-
Arsenic	7440-38-2	mg/kg	TRG	4.3	3.8	4.55 J		4.1 J	4 J	3.3 J	3		2.1 J-
Barium	7440-39-3	mg/kg	TRG	85	78	69 J		83	54	70	52		63
Beryllium	7440-41-7	mg/kg	TRG	1.1	0.99	0.955 J		0.98 J	0.58 J	0.9 J	0.75		0.85
Cadmium	7440-43-9	mg/kg	TRG	0.65	0.63	0.705 J		0.71	1.9	0.54	0.77		0.6
Calcium	7440-70-2	mg/kg	TRG	3200	3500	2950 J		2300 J	2000 J	2500 J	1900		2700
Chromium	7440-47-3	mg/kg	TRG	42	38	34 J		36 J	24 J	29 J	28 J		24 J+
Cobalt	7440-48-4	mg/kg	TRG	18	18	14.5 J		14 J	9.6 J	14 J	13		16
Copper	7440-50-8	mg/kg	TRG	50	45	44.5 J		48	56	38	37 J		40
Iron	7439-89-6	mg/kg	TRG	27000	26000	21500 J		22000 J	12000 J	18000 J	15000		17000
Lead	7439-92-1	mg/kg	TRG	59	52	47.5 J		52	74	43	43		44
Magnesium	7439-95-4	mg/kg	TRG	3900	3800	2850 J		2700 J	2300 J	2700 J	2500		2500
Manganese	7439-96-5	mg/kg	TRG	260	230	220 J		200 J	97 J	170 J	130 J		210 J+
Mercury	7439-97-6	mg/kg	TRG	0.19	0.12	0.16 J		0.18	0.26	0.1	0.1 J		0.1 J
Nickel	7440-02-0	mg/kg	TRG	36	33	27.5 J		29 J	50 J	25 J	23		26
Potassium	7440-09-7	mg/kg	TRG	1700	1800	1045 J		1000 J	570 J	1000 J	1100		1000
Selenium	7782-49-2	mg/kg	TRG	0.88	0.79	2.75 J		2.4 J	1.3 J	2 J	0.59 J		0.76 J-
Silver	7440-22-4	mg/kg	TRG	0.26	0.2	0.235 J		0.28	0.79	0.29	0.52		0.18
Sodium	7440-23-5	mg/kg	TRG	280	300	245 J		180 J	150 J	140 J	110		100
Thallium	7440-28-0	mg/kg	TRG	0.25 J+	0.22 J+	0.18 J		0.19	0.13	0.16	0.15		0.17
Vanadium	7440-62-2	mg/kg	TRG	40	36	34 J		35 J	75 J	28 J	27		23
Zinc	7440-66-6	mg/kg	TRG	190	170	175 J		180 J	250 J	150 J	180		160 J
Cyanide	57-12-5	ug/kg	TRG	740	1800	895 J		380 J	550	480			
Pesticides													
4,4'-DDD	72-54-8	mg/kg	TRG	0.003 J	0.0028 J	0.0055 J		0.0046 J	0.0057 J	0.003 J			
4,4'-DDE	72-55-9	mg/kg	TRG	0.0056 J	0.0046 J	0.01 J		0.0083	0.0079 J	0.0031 J			
4,4'-DDT	50-29-3	mg/kg	TRG	0.001 J	0.00086 J	0.0029 J		5.7E-05 U	4.4E-05 U	0.0011 J			
Aldrin	309-00-2	mg/kg	TRG	0.00033 J	0.00048 J	0.00073 J+		5.8E-05 U	4.5E-05 U	4.1E-05 UJ			
alpha-BHC	319-84-6	mg/kg	TRG	6.9E-05 U	7.1E-05 U	0.00011 UJ		0.00016 U	0.00013 U	0.00011 UJ			
beta-BHC	319-85-7	mg/kg	TRG	0.00011 U	0.00011 U	0.00018 UJ		0.00012 U	9.6E-05 U	8.7E-05 UJ			

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R6-22	R6-23	R6-30	R6-30	R6-31	R6-32	R6-33	SED1.5C	SED1.5C	SED10C
			Sample ID	RI-R6-22-SS	RI-R6-23-SS	P2-R6-30-SS	P2-R6-40-SS	P2-R6-31-SS	P2-R6-32-SS	P2-R6-33-SS	SED1.5C00AN	SED1.5C00AR	SED10C00N
			Sample Type	N	N	N	FD	N	N	N	N	FD	N
			Parent Sample ID				P2-R6-30-SS					SED1.5C00AN	
			Sample Date	4/30/2015	4/30/2015	6/9/2016	6/9/2016	6/28/2016	6/28/2016	6/28/2016	6/21/2017	6/21/2017	11/11/2013
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Chlordane (Technical)	12789-03-6	mg/kg	TRG	0.049 J	0.051 J								
cis-Chlordane	5103-71-9	mg/kg	TRG										
delta-BHC	319-86-8	mg/kg	TRG	0.0004 J	0.0003 J	0.00077 J		0.0002 U	0.00015 U	0.00014 UJ			
Dieldrin	60-57-1	mg/kg	TRG	0.00083 J	0.001 J	0.0021 J		5.2E-05 U	4E-05 U	0.00041 J			
Endosulfan I	959-98-8	mg/kg	TRG	7.9E-05 U	8.2E-05 U	0.00013 UJ		3.5E-05 U	2.7E-05 U	2.5E-05 UJ			
Endosulfan II	33213-65-9	mg/kg	TRG	0.00071 J	0.00035 J	0.00059 J		0.00017 U	0.003 J	0.00012 UJ			
Endosulfan Sulfate	1031-07-8	mg/kg	TRG	0.00049 J	0.00025 J	0.00125 J		7E-05 U	5.4E-05 U	5E-05 UJ			
Endrin	72-20-8	mg/kg	TRG	0.0017 J	0.0012 J	0.0026 J		0.0021 J	0.01 J	0.00073 J			
Endrin aldehyde	7421-93-4	mg/kg	TRG	8.2E-05 U	0.0011 J	0.00014 UJ		0.00016 U	0.00013 U	0.00011 UJ			
Endrin ketone	53494-70-5	mg/kg	TRG										
gamma-BHC (Lindane)	58-89-9	mg/kg	TRG	7.4E-05 U	7.6E-05 U	0.00075 J+		0.00024 J	0.0014 J	8E-05 UJ			
Heptachlor	76-44-8	mg/kg	TRG	0.00089 J	0.00071 J	0.00015 UJ		4.8E-05 U	3.7E-05 U	3.4E-05 UJ			
Heptachlor Epoxide	1024-57-3	mg/kg	TRG	0.00044 J	0.00052 J	0.00093 J		0.00067 J	0.0035 J	4.7E-05 UJ			
Methoxychlor	72-43-5	mg/kg	TRG										
Toxaphene	8001-35-2	mg/kg	TRG	0.0028 U	0.0029 U	0.0047 UJ		0.018 U	0.014 U	0.013 UJ			
trans-Chlordane	5103-74-2	mg/kg	TRG										
Pyrethroids													
Allethrin	584-79-2	mg/kg	TRG			0.02 U		0.0041 UJ	0.0043 UJ	0.0092 UJ			
BAYTHROID	68359-37-5	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
BIPHENTHRIN (TALSTAR)	82657-04-3	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
CYPERMETHRIN	52315-07-8	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
DANITOL	39515-41-8	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
DELTAMETHRIN/TRALOMETHRIN	52820-00-5	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
Dichloran	99-30-9	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
Fenvalerate	51630-58-1	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
LAMBDA CYHALOTHRIN	91465-08-6	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
Penoxalin	40487-42-1	mg/kg	TRG			0.02 U		0.0041 UJ	0.0043 UJ	0.0092 UJ			
Permethrin	52645-53-1	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
PRALLETHRIN	23031-36-9	mg/kg	TRG			0.02 U		0.0041 UJ	0.0043 UJ	0.0092 UJ			
SUMITHRIN	26002-80-2	mg/kg	TRG			0.02 U		0.0041 U	0.0043 U	0.0092 U			
TEFLUTHRIN	79538-32-2	mg/kg	TRG			0.02 U		0.0041 UJ	0.0043 UJ	0.0092 UJ			
PCB Aroclors													
Aroclor-1016	12674-11-2	mg/kg	TRG	0.00086 U	0.00089 U	0.0064 UJ		0.0051 U	0.0039 U	0.0036 U	0.0036 U		0.0078 U
Aroclor-1221	11104-28-2	mg/kg	TRG	0.0011 U	0.0011 U	0.01 UJ		0.008 U	0.0062 U	0.0056 U	0.0036 U		0.0078 U
Aroclor-1232	11141-16-5	mg/kg	TRG	0.0015 U	0.0015 U	0.0035 UJ		0.0028 U	0.0021 U	0.002 U	0.0036 U		0.0078 U
Aroclor-1242	53469-21-9	mg/kg	TRG	0.0011 U	0.0011 U	0.0052 UJ		0.0041 U	0.25	0.0029 U	0.0036 U		0.0078 U
Aroclor-1248	12672-29-6	mg/kg	TRG	0.061 J	0.051 J	0.092 J		0.0026 U	0.002 U	0.0018 U	0.035 J+		0.046 J
Aroclor-1254	11097-69-1	mg/kg	TRG	0.001 U	0.001 U	0.076 J		0.0041 U	0.22	0.0029 U	0.032 J+		0.0078 U
Aroclor-1260	11096-82-5	mg/kg	TRG	0.028 J	0.015 J	0.072 J		0.043	0.26	0.022	0.02 J+		0.031 J
Aroclor-1262	37324-23-5	mg/kg	TRG								0.0036 U		0.0078 U
Aroclor-1268	11100-14-4	mg/kg	TRG								0.0036 U		0.0078 U
PCB, Total Aroclors	TOT-PCB-ARO-C	mg/kg	CALC	0.089	0.066	0.24		0.043	0.73	0.022	0.087		0.077
TPH													
Diesel Range Organics (C10-C20)	C10C20	mg/kg	TRG								48		
Oil Range Organics (C20-C36)	C20C36	mg/kg	TRG								420		
SVOCs													
1,1'-Biphenyl	92-52-4	mg/kg	TRG										
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	TRG										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG	0.019 U	0.019 U	0.093 UJ		0.024 U	0.019 U	0.017 U			
2,2'-oxybis(1-Chloropropane)	108-60-1	mg/kg	TRG	0.0073 U	0.0075 U	0.036 UJ		0.0095 U	0.0074 U	0.0068 U			
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	TRG										
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG			1.7 UJ		0.43 U	0.34 U	0.31 U			
2,4,5-Trichlorophenol	95-95-4	mg/kg	TRG										
2,4,6-Trichlorophenol	88-06-2	mg/kg	TRG	0.051 U	0.052 U	0.25 UJ		0.066 U	0.051 U	0.047 U			
2,4-Dichlorophenol	120-83-2	mg/kg	TRG	0.0068 U	0.0069 U	0.034 UJ		0.0088 U	0.0069 U	0.0063 U			
2,4-Dimethylphenol	105-67-9	mg/kg	TRG	0.053 U	0.054 U	0.26 UJ		0.069 U	0.053 U	0.049 U			
2,4-Dinitrophenol	51-28-5	mg/kg	TRG	0.4 U	0.41 U			0.52 U	0.41 U	0.37 U			
2,4-Dinitrotoluene	121-14-2	mg/kg	TRG	0.027 U	0.028 U	0.14 UJ		0.035 U	0.028 U	0.025 U			
2,6-Dinitrotoluene	606-20-2	mg/kg	TRG	0.035 U	0.036 U	0.17 UJ		0.045 U	0.035 U	0.032 U			

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R6-22	R6-23	R6-30	R6-30	R6-31	R6-32	R6-33	SED1.5C	SED1.5C	SED10C
			Sample ID	RI-R6-22-SS	RI-R6-23-SS	P2-R6-30-SS	P2-R6-40-SS	P2-R6-31-SS	P2-R6-32-SS	P2-R6-33-SS	SED1.5C00AN	SED1.5C00AR	SED10C00N
			Sample Type	N	N	N	FD	N	N	N	N	FD	N
			Parent Sample ID				P2-R6-30-SS					SED1.5C00AN	
			Sample Date	4/30/2015	4/30/2015	6/9/2016	6/9/2016	6/28/2016	6/28/2016	6/28/2016	6/21/2017	6/21/2017	11/11/2013
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
2-Chloronaphthalene	91-58-7	mg/kg	TRG	0.0071 U	0.0072 U	0.035 UJ		0.0092 U	0.0071 U	0.0066 U			
2-Chlorophenol	95-57-8	mg/kg	TRG	0.028 U	0.028 U	0.14 UJ		0.036 U	0.028 U	0.026 U			
2-Methylnaphthalene	91-57-6	mg/kg	TRG										
2-Methylphenol	95-48-7	mg/kg	TRG										
2-Nitroaniline	88-74-4	mg/kg	TRG										
2-Nitrophenol	88-75-5	mg/kg	TRG	0.037 U	0.038 U	0.19 UJ		0.048 U	0.038 U	0.035 U			
3,3'-Dichlorobenzidine	91-94-1	mg/kg	TRG	0.036 U	0.037 U			0.046 U	0.036 U	0.033 U			
3-Nitroaniline	99-09-2	mg/kg	TRG										
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	TRG	0.14 U	0.14 U			0.18 U	0.14 U	0.13 U			
4-Bromophenyl-phenylether	101-55-3	mg/kg	TRG	0.029 U	0.03 U	0.15 UJ		0.038 U	0.03 U	0.027 U			
4-Chloro-3-methylphenol	59-50-7	mg/kg	TRG	0.031 U	0.032 U	0.15 UJ		0.04 U	0.031 U	0.029 U			
4-Chloroaniline	106-47-8	mg/kg	TRG										
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	TRG	0.038 U	0.038 U	0.19 UJ		0.049 U	0.038 U	0.035 U			
4-Methylphenol	106-44-5	mg/kg	TRG										
4-Nitroaniline	100-01-6	mg/kg	TRG										
4-Nitrophenol	100-02-7	mg/kg	TRG	0.12 U	0.13 U	0.61 UJ		0.16 U	0.12 U	0.11 U			
Acenaphthene	83-32-9	mg/kg	TRG	0.031 J	0.039 J	0.032 UJ		0.035 J	0.069	0.027 J	0.15 U		0.024 J
Acenaphthylene	208-96-8	mg/kg	TRG	0.067 J	0.065 J	0.11 J		0.097	0.11	0.083	0.15 U		0.033 J
Acetophenone	98-86-2	mg/kg	TRG										
Anthracene	120-12-7	mg/kg	TRG	0.11	0.15	0.17 J		0.13	0.2	0.12	0.078 J		0.082
Atrazine	1912-24-9	mg/kg	TRG										
Benzaldehyde	100-52-7	mg/kg	TRG										
Benzidine	92-87-5	mg/kg	TRG	1.4 U	1.5 U	7 UJ		1.8 U	1.4 U	1.3 U			
Benzo(a)anthracene	56-55-3	mg/kg	TRG	0.6	0.72	0.56 J		0.58	1	0.52	0.4		0.48
Benzo(a)pyrene	50-32-8	mg/kg	TRG	0.73	0.79	0.76 J		0.67	1.1 J	0.58 J	0.56		0.58
Benzo(b)fluoranthene	205-99-2	mg/kg	TRG	1.1	1.1	1.2 J		1.1	1.7 J	0.94 J	0.88		0.84
Benzo(g,h,i)perylene	191-24-2	mg/kg	TRG	1	1.1	1.2 J		0.84	1.1 J	0.68 J	0.52		0.49 J
Benzo(k)fluoranthene	207-08-9	mg/kg	TRG	0.32	0.42	0.43 J		0.43	0.58 J	0.3 J	0.31		0.35
Benzoic acid	65-85-0	mg/kg	TRG	1 J	1.1 J	0.7 UJ		0.97 J	0.84 J	0.75 J			
bis-(2-chloroethoxy)methane	111-91-1	mg/kg	TRG	0.022 U	0.023 U	0.11 UJ		0.029 U	0.022 U	0.021 U			
bis-(2-Chloroethyl)ether	111-44-4	mg/kg	TRG	0.0091 U	0.0093 U	0.045 UJ		0.012 U	0.0092 U	0.0084 U			
bis-(2-Ethylhexyl)phthalate	117-81-7	mg/kg	TRG	1.2	1.1	1.8 J		1.8	2.3	1.1			
Butylbenzylphthalate	85-68-7	mg/kg	TRG	0.086 J	0.059 J	0.23 UJ		0.06 U	2.5	0.082 J			
Caprolactam	105-60-2	mg/kg	TRG										
Carbazole	86-74-8	mg/kg	TRG										
Chrysene	218-01-9	mg/kg	TRG	0.94	1.1	1 J		0.98	1.5	0.81	0.65		0.7
Dibenzo(a,h)anthracene	53-70-3	mg/kg	TRG	0.2	0.19	0.037 UJ		0.16	0.25 J	0.15 J	0.13 J		0.14
Dibenzofuran	132-64-9	mg/kg	TRG										
Diethylphthalate	84-66-2	mg/kg	TRG	0.037 U	0.038 U	0.18 UJ		0.048 U	0.037 U	0.034 U			
Dimethylphthalate	131-11-3	mg/kg	TRG	0.037 U	0.038 U	0.18 UJ		0.048 U	0.037 U	0.034 U			
Di-n-butylphthalate	84-74-2	mg/kg	TRG	0.042 U	0.043 U	0.21 UJ		0.055 U	0.056 J	0.039 U			
Di-n-octylphthalate	117-84-0	mg/kg	TRG	0.036 U	0.036 U	0.18 UJ		0.046 U	0.34 J	0.29 J			
Diphenylhydrazine-1,2	122-66-7	mg/kg	TRG	0.043 U	0.044 U	0.21 UJ		0.056 U	0.044 U	0.04 U			
Fluoranthene	206-44-0	mg/kg	TRG	1.4	1.8	1.7 J		1.3	2.4	1.4	0.96		1.1
Fluorene	86-73-7	mg/kg	TRG	0.052 J	0.059 J	0.073 J		0.05 J	0.087	0.047 J	0.15 U		0.026 J
Hexachlorobenzene	118-74-1	mg/kg	TRG	0.0072 U	0.0074 U	0.036 UJ		0.0094 U	0.0073 U	0.0067 U			
Hexachlorobutadiene	87-68-3	mg/kg	TRG	0.0076 U	0.0078 U	0.038 UJ		0.0098 U	0.0076 U	0.007 U			
Hexachlorocyclo-pentadiene	77-47-4	mg/kg	TRG	0.037 U	0.037 U			0.047 U	0.037 U	0.034 U			
Hexachloroethane	67-72-1	mg/kg	TRG	0.024 U	0.025 U	0.12 UJ		0.032 U	0.025 U	0.023 U			
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	TRG	0.8	0.86	0.92 J		0.65	0.91 J	0.55 J	0.44		0.42
Isophorone	78-59-1	mg/kg	TRG	0.026 U	0.026 U	0.13 UJ		0.033 U	0.026 U	0.024 U			
Naphthalene	91-20-3	mg/kg	TRG	0.0058 U	0.006 U	0.029 UJ		0.027 J	0.064 J	0.018 J	0.15 U		0.013 J
Nitrobenzene	98-95-3	mg/kg	TRG	0.028 U	0.029 U	0.14 UJ		0.037 U	0.028 U	0.026 U			
Nitrosodimethylamine-n	62-75-9	mg/kg	TRG	0.029 U	0.03 U	0.14 UJ		0.038 U	0.029 U	0.027 U			
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	TRG	0.0079 U	0.0081 U	0.039 UJ		0.01 U	0.008 U	0.0074 U			
N-Nitrosodiphenylamine	86-30-6	mg/kg	TRG	0.031 U	0.032 U	0.16 UJ		0.041 U	0.032 U	0.029 U			
Pentachlorophenol	87-86-5	mg/kg	TRG	0.03 U	0.031 U			0.039 U	0.031 U	0.028 U			
Phenanthrene	85-01-8	mg/kg	TRG	0.4	0.61	0.53 J		0.4	0.8	0.41	0.31		0.38
Phenol	108-95-2	mg/kg	TRG	0.008 U	0.0082 U	0.04 UJ		0.041 J	0.034 J	0.0074 U			

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R6-22	R6-23	R6-30	R6-30	R6-31	R6-32	R6-33	SED1.5C	SED1.5C	SED10C
			Sample ID	RI-R6-22-SS	RI-R6-23-SS	P2-R6-30-SS	P2-R6-40-SS	P2-R6-31-SS	P2-R6-32-SS	P2-R6-33-SS	SED1.5C00AN	SED1.5C00AR	SED10C00N
			Sample Type	N	N	N	FD	N	N	N	N	FD	N
			Parent Sample ID				P2-R6-30-SS					SED1.5C00AN	
			Sample Date	4/30/2015	4/30/2015	6/9/2016	6/9/2016	6/28/2016	6/28/2016	6/28/2016	6/21/2017	6/21/2017	11/11/2013
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Pyrene	129-00-0	mg/kg	TRG	0.96	1.1	1.2 J		1.1	1.9	0.97	0.79		0.83
Polybrominated Diphenyl Ethers													
PBDE47	5436-43-1	mg/kg	TRG			0.024 U		0.024 U	0.023 U	0.022 U			
PBDE99	60348-60-9	mg/kg	TRG			0.024 U		0.024 U	0.023 U	0.022 U			
PBDE-100	189084-64-8	mg/kg	TRG			0.024 U		0.024 U	0.023 U	0.022 U			
PBDE153	68631-49-2	mg/kg	TRG			0.024 U		0.024 U	0.023 U	0.022 U			
PBDE-154	207122-15-4	mg/kg	TRG			0.024 U		0.024 U	0.023 U	0.022 U			
VOCs													
1,1,1-Trichloroethane	71-55-6	mg/kg	TRG	0.00099 U	0.001 U			0.0029 U	0.0022 U	0.002 U			
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	TRG	0.0015 U	0.0015 U			0.011 U	0.0082 U	0.0075 U			
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	mg/kg	TRG										
1,1,2-Trichloroethane	79-00-5	mg/kg	TRG	0.0017 U	0.0017 U			0.0074 U	0.0058 U	0.0053 U			
1,1-Dichloroethane	75-34-3	mg/kg	TRG	0.0012 U	0.0012 U			0.003 U	0.0023 U	0.0021 U			
1,1-Dichloroethene	75-35-4	mg/kg	TRG	0.0017 U	0.0018 U			0.0038 U	0.003 U	0.0027 U			
1,2,3-Trichlorobenzene	87-61-6	mg/kg	TRG										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG										
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	TRG										
1,2-Dibromoethane	106-93-4	mg/kg	TRG										
1,2-Dichlorobenzene	95-50-1	mg/kg	TRG	0.0016 U	0.0017 U			0.0086 U	0.0067 U	0.0061 U			
1,2-Dichloroethane	107-06-2	mg/kg	TRG	0.0012 U	0.0013 U			0.003 U	0.0023 U	0.0021 U			
1,2-Dichloropropane	78-87-5	mg/kg	TRG	0.0011 U	0.0011 U			0.005 U	0.0038 U	0.0035 U			
1,3-Dichlorobenzene	541-73-1	mg/kg	TRG	0.0013 U	0.0014 U			0.0079 U	0.0061 U	0.0056 U			
1,4-Dichlorobenzene	106-46-7	mg/kg	TRG	0.0013 U	0.0013 U			0.0079 U	0.0061 U	0.0056 U			
1,4-Dioxane	123-91-1	mg/kg	TRG										
2-Butanone	78-93-3	mg/kg	TRG										
2-Hexanone	591-78-6	mg/kg	TRG										
4-Methyl-2-pentanone	108-10-1	mg/kg	TRG										
Acetone	67-64-1	mg/kg	TRG										
Acrolein	107-02-8	mg/kg	TRG	0.014 U	0.015 U			0.24 U	0.18 U	0.17 U			
Acrylonitrile	107-13-1	mg/kg	TRG	0.021 U	0.022 U			0.066 U	0.051 U	0.047 U			
Benzene	71-43-2	mg/kg	TRG	0.0014 U	0.0014 U			0.008 U	0.0062 U	0.0057 U			
Bromochloromethane	74-97-5	mg/kg	TRG										
Bromodichloromethane	75-27-4	mg/kg	TRG	0.0011 U	0.0012 U			0.0053 U	0.0041 U	0.0038 U			
Bromoform	75-25-2	mg/kg	TRG	0.0009 U	0.00092 U			0.012 U	0.0094 U	0.0086 UJ			
Bromomethane	74-83-9	mg/kg	TRG	0.0015 U	0.0015 U			0.0046 U	0.0035 U	0.0032 U			
Carbon Disulfide	75-15-0	mg/kg	TRG										
Carbon Tetrachloride	56-23-5	mg/kg	TRG	0.00091 U	0.00093 U			0.0036 U	0.0028 U	0.0026 U			
Chlorobenzene	108-90-7	mg/kg	TRG	0.0015 U	0.0016 U			0.0059 U	0.0046 U	0.0042 U			
Chloroethane	75-00-3	mg/kg	TRG	0.0031 U	0.0032 U			0.0057 U	0.0044 U	0.004 U			
Chloroform	67-66-3	mg/kg	TRG	0.0012 U	0.0012 U			0.0033 U	0.0026 U	0.0024 U			
Chloromethane	74-87-3	mg/kg	TRG	0.0017 U	0.0018 U			0.007 U	0.0054 U	0.005 U			
cis-1,2-Dichloroethylene	156-59-2	mg/kg	TRG										
cis-1,3-Dichloropropene	10061-01-5	mg/kg	TRG	0.0014 U	0.0014 U			0.0058 U	0.0045 U	0.0041 U			
Cyclohexane	110-82-7	mg/kg	TRG										
Dibromochloromethane	124-48-1	mg/kg	TRG	0.0014 U	0.0015 U			0.0066 U	0.0051 U	0.0047 U			
Dichlorodifluoromethane	75-71-8	mg/kg	TRG										
Dichloropropene, 1,3-	542-75-6	mg/kg	TRG	0.0026	0.0026			0.0122 U	0.0094 U	0.0086 U			
Ethylbenzene	100-41-4	mg/kg	TRG	0.0013 U	0.0013 U			0.0053 U	0.0041 U	0.0037 U			
Isopropylbenzene	98-82-8	mg/kg	TRG										
m, p-Xylene	XYLMP	mg/kg	TRG										
Methyl Acetate	79-20-9	mg/kg	TRG										
Methyl tert-Butyl Ether (MTBE)	1634-04-4	mg/kg	TRG										
Methylcyclohexane	108-87-2	mg/kg	TRG										
Methylene Chloride	75-09-2	mg/kg	TRG	0.0045 U	0.0047 U			0.0072 U	0.0048 U	0.0055 U			
o-Xylene	95-47-6	mg/kg	TRG										
Styrene	100-42-5	mg/kg	TRG										
Tetrachloroethylene	127-18-4	mg/kg	TRG	0.0014 U	0.0014 U			0.0033 U	0.0026 U	0.0023 U			
Toluene	108-88-3	mg/kg	TRG	0.0015 U	0.0015 U			0.0096 U	0.0075 U	0.0069 U			
trans-1,2-Dichloroethene	156-60-5	mg/kg	TRG	0.0012 U	0.0012 U			0.0027 U	0.0021 U	0.0019 U			

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	R6-22	R6-23	R6-30	R6-30	R6-31	R6-32	R6-33	SED1.5C	SED1.5C	SED10C
			Sample ID	RI-R6-22-SS	RI-R6-23-SS	P2-R6-30-SS	P2-R6-40-SS	P2-R6-31-SS	P2-R6-32-SS	P2-R6-33-SS	SED1.5C00AN	SED1.5C00AR	SED10C00N
			Sample Type	N	N	N	FD	N	N	N	N	FD	N
			Parent Sample ID				P2-R6-30-SS					SED1.5C00AN	
			Sample Date	4/30/2015	4/30/2015	6/9/2016	6/9/2016	6/28/2016	6/28/2016	6/28/2016	6/21/2017	6/21/2017	11/11/2013
			Task Code	DOEE_Phase1	DOEE_Phase1	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	DOEE_Phase2	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
trans-1,3-Dichloropropene	10061-02-6	mg/kg	TRG	0.0012 U	0.0012 U			0.0064 U	0.0049 U	0.0045 U			
Trichloroethene	79-01-6	mg/kg	TRG	0.0013 U	0.0014 U			0.003 U	0.0023 U	0.0021 U			
Trichlorofluoromethane	75-69-4	mg/kg	TRG										
Vinyl Chloride	75-01-4	mg/kg	TRG	0.00095 U	0.00098 U			0.0068 U	0.0053 U	0.0048 U			
Vinyl ether, 2-chloroethyl	110-75-8	mg/kg	TRG	0.0016 U	0.0016 U			0.012 U	0.0093 U	0.0085 U			
Xylenes (total)	1330-20-7	mg/kg	CALC										

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
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			Location ID	SED1C	SED2.5B	SED2C	SED4C	SED6.5D	SED6.5D	SED6.5E	SED6.5E	SED6C	SED6C
			Sample ID	SED1C00N	SED2.5B00N	SED2C00N	SED4C00N	SED6.5D00EN	SED6.5D00N	SED6.5E00EN	SED6.5E00N	SED6C00EN	SED6C00N
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	11/7/2013	11/7/2013	11/6/2013	11/12/2013	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/7/2017	11/14/2013
			Task Code	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Dioxins/Furans													
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	mg/kg	TRG			0.000155		2.33E-05		6.58E-05	0.000307	2.51E-05	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	mg/kg	TRG			0.000181		9.74E-05		0.000237	0.00108	0.000143	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	mg/kg	TRG			4.83E-06 JN		2.16E-06		7.66E-06	4.16E-05	2.14E-06 JN	
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	mg/kg	TRG			0.000128 J		4.9E-06		1.62E-05	0.000158 JN	4.14E-06	
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	mg/kg	TRG			1.28E-05		4.59E-06		1.48E-05	8.35E-05	3.63E-06	
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	mg/kg	TRG			3.58E-05 JN		5.37E-06		1.74E-05	8.54E-05	4.63E-06	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	mg/kg	TRG			1.79E-05		8.94E-06		2.69E-05	0.000131	7.98E-06	
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	mg/kg	TRG			7.98E-07 JN		3.85E-07 JN		2.53E-06 J	6.56E-06	4.55E-07 JN	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	mg/kg	TRG			3.32E-05 J		7.44E-06		2.35E-05	0.000196	6.07E-06	
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	TRG			1.71E-05		3.13E-06 J		1.05E-05 J	4.59E-05	2.09E-06 J	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	mg/kg	TRG			1.05E-05		4.43E-06		1.54E-05	7.6E-05	3.18E-06	
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	mg/kg	TRG			2.66E-05 JN		7.04E-06		2.22E-05	8.13E-05 JN	6.01E-06	
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	mg/kg	TRG			2.83E-05		6.82E-06 J		2.12E-05 J	6.65E-05	8.32E-06 J	
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	mg/kg	TRG			9.98E-06		2.29E-06		7.58E-06	2.56E-05 JN	2.23E-06	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG			2.08E-06 JN		9.18E-07		3.05E-06	1.37E-05	7.43E-07	
Octachlorochlorodibenzofuran	39001-02-0	mg/kg	TRG			3.9E-05		2.55E-05		8.39E-05	0.000289	5.52E-05	
Octachlorochlorodibenzo-p-dioxin	3268-87-9	mg/kg	TRG			0.00318		0.00107		0.00242	0.00861 J	0.00379	
TCDD TEQ HH	DFTEQ-HH	mg/kg	CALC			5.25E-05		1.31E-05		4.21E-05	0.000205	1.29E-05	
Total HpCDD	37871-00-4	mg/kg	TRG			0.000373		0.000202		0.000483	0.00204	0.000293	
Total HpCDF	38998-75-3	mg/kg	TRG			0.000211 JN		4.6E-05		0.000132	0.000597	6.46E-05	
Total HxCDD	34465-46-8	mg/kg	TRG			0.000203		0.0001		0.000293	0.0015	8.62E-05	
Total HxCDF	55684-94-1	mg/kg	TRG			0.000472 JN		6.35E-05		0.000198	0.000885 JN	7.76E-05	
Total PeCDD	36088-22-9	mg/kg	TRG			0.00031 JN		6.95E-05		0.000225	0.00216 JN	4.47E-05	
Total PeCDF	30402-15-4	mg/kg	TRG			0.000591 JN		7.15E-05		0.000243	0.00097 JN	9.08E-05	
Total TCDD	41903-57-5	mg/kg	TRG			7.13E-05 JN		3.34E-05		0.000114	0.000512 JN	2.02E-05	
Total TCDF	55722-27-5	mg/kg	TRG			0.000593 JN		5.97E-05		0.000235	0.000849 JN	6.25E-05	
Inorganics													
Aluminum	7429-90-5	mg/kg	TRG	5200	6500	6200	10000	8200	13000	7000	6000	13000	9800
Antimony	7440-36-0	mg/kg	TRG	0.39	0.39	0.5 J-	0.64 J-	1.3	0.77 J-	2.8	1.4 J-	1	0.49 J-
Arsenic	7440-38-2	mg/kg	TRG	2	1.9	2.6	3.4 J-	7	14 J-	6.1	5.9 J-	6.4	3.6 J-
Barium	7440-39-3	mg/kg	TRG	53	60	61	110	81	120 J-	70	79	110	89
Beryllium	7440-41-7	mg/kg	TRG	0.63	0.8	0.82	1.4	1.1	1.8	0.89	0.73	1.7	1.3
Cadmium	7440-43-9	mg/kg	TRG	0.58	0.52	0.92	1.1	2.5	2.8 J-	2.4	3.8 J-	0.99	1.2
Calcium	7440-70-2	mg/kg	TRG	1900	2300	2500	3500	3600	1400 J-	3000	3000	4400	2800 J-
Chromium	7440-47-3	mg/kg	TRG	24	30	29 J+	45	40	47 J-	31	31	51	45
Cobalt	7440-48-4	mg/kg	TRG	11	12	18	19	16	17 J-	16	16	22	19
Copper	7440-50-8	mg/kg	TRG	28	33	40 J+	66	74	130	71	96	72	65
Iron	7439-89-6	mg/kg	TRG	14000	17000	19000	27000	20000	17000	17000	16000	33000	26000
Lead	7439-92-1	mg/kg	TRG	37	44	61	80	99	140	160	130	62	71
Magnesium	7439-95-4	mg/kg	TRG	2600	2800	2800	3600	3500	1800	2900	2400	4400	2500
Manganese	7439-96-5	mg/kg	TRG	160	210	200	390	190	130 J-	160	150	430	390
Mercury	7439-97-6	mg/kg	TRG	0.11	0.086	0.15	0.24	0.26	0.27 J	0.23	0.23 J	0.24	0.23 J+
Nickel	7440-02-0	mg/kg	TRG	19	22	29	37	47	91 J-	47	65 J-	42	36
Potassium	7440-09-7	mg/kg	TRG	1000	1100	1000	1200	1000	590	810	610	1400	1100
Selenium	7782-49-2	mg/kg	TRG	0.53	0.62	0.84	1.3 J-	0.97	1.5 J-	0.86	0.78 J-	1.4	1.3 J-
Silver	7440-22-4	mg/kg	TRG	0.15	0.16	0.27	0.43	0.99	0.8	0.63	1.5 J-	0.39	0.58
Sodium	7440-23-5	mg/kg	TRG	110	120	140	160	220	140	190	140	250	120 J-
Thallium	7440-28-0	mg/kg	TRG	0.15	0.16	0.19	0.25	0.22	0.53	0.18	0.16 J-	0.24	0.23 J-
Vanadium	7440-62-2	mg/kg	TRG	21	22	27	41	63	250 J+	77	120	48	37
Zinc	7440-66-6	mg/kg	TRG	140	130	200	260 J-	340	300 J-	340	420	290	260
Cyanide	57-12-5	ug/kg	TRG										
Pesticides													
4,4'-DDD	72-54-8	mg/kg	TRG			0.0041 J		0.0044 J		0.004 J	0.0024 J	0.0063 J	
4,4'-DDE	72-55-9	mg/kg	TRG			0.0065 J		0.0058 J		0.0061 J	0.0035 J	0.02 J+	
4,4'-DDT	50-29-3	mg/kg	TRG			0.0028 J		0.00093 U		0.001 U	0.0019 J	0.0013 U	
Aldrin	309-00-2	mg/kg	TRG			0.00046 J		0.00093 U		0.001 U	0.00025 J	0.0013 U	
alpha-BHC	319-84-6	mg/kg	TRG			0.00083 U		0.00093 U		0.001 U	0.00076 U	0.0013 U	
beta-BHC	319-85-7	mg/kg	TRG			0.00058 J		0.00093 U		0.001 U	0.00094 J	0.0013 U	

Table A-1
Fringe Surface Sediment Data used in BHHRA
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			Location ID	SED1C	SED2.5B	SED2C	SED4C	SED6.5D	SED6.5D	SED6.5E	SED6.5E	SED6C	SED6C
			Sample ID	SED1C00N	SED2.5B00N	SED2C00N	SED4C00N	SED6.5D00EN	SED6.5D00N	SED6.5E00EN	SED6.5E00N	SED6C00EN	SED6C00N
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	11/7/2013	11/7/2013	11/6/2013	11/12/2013	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/7/2017	11/14/2013
			Task Code	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Chlordane (Technical)	12789-03-6	mg/kg	TRG										
cis-Chlordane	5103-71-9	mg/kg	TRG			0.0064 J		0.0078		0.0086	0.0058	0.01 J	
delta-BHC	319-86-8	mg/kg	TRG			0.00083 U		0.00093 U		0.001 U	0.0017 J	0.0013 U	
Dieldrin	60-57-1	mg/kg	TRG			0.0015 J		0.00093 U		0.001 U	0.0013 J	0.0035 J	
Endosulfan I	959-98-8	mg/kg	TRG			0.00083 U		0.00093 U		0.001 U	0.00076 U	0.0013 U	
Endosulfan II	33213-65-9	mg/kg	TRG			0.0012		0.00093 U		0.001 U	0.0015 J	0.0013 U	
Endosulfan Sulfate	1031-07-8	mg/kg	TRG			0.0015		0.00093 U		0.001 U	0.0029	R	
Endrin	72-20-8	mg/kg	TRG			0.0053		0.00093 U		0.001 U	0.0055 J	0.0013 U	
Endrin aldehyde	7421-93-4	mg/kg	TRG			0.0006 J		0.00093 U		0.001 U	0.00049 J	0.0013 U	
Endrin ketone	53494-70-5	mg/kg	TRG			0.0024 J		0.00093 U		0.001 U	0.0027 J	R	
gamma-BHC (Lindane)	58-89-9	mg/kg	TRG			0.0002 J		0.00093 U		0.001 U	0.0004 J	0.0013 U	
Heptachlor	76-44-8	mg/kg	TRG			0.0013 J		0.00093 U		0.001 U	0.0008 J	0.0013 U	
Heptachlor Epoxide	1024-57-3	mg/kg	TRG			0.00072 J		0.0012 J		0.0023 J	0.0021 J	0.0011 J	
Methoxychlor	72-43-5	mg/kg	TRG			0.013 J		0.00093 U		0.001 U	0.007 J	R	
Toxaphene	8001-35-2	mg/kg	TRG			0.033 U		0.037 U		0.041 U	0.031 U	0.05 U	
trans-Chlordane	5103-74-2	mg/kg	TRG			0.011		0.0082		0.001 U	0.0077	0.014	
Pyrethroids													
Allethrin	584-79-2	mg/kg	TRG										
BAYTHROID	68359-37-5	mg/kg	TRG										
BIPHENTHRIN (TALSTAR)	82657-04-3	mg/kg	TRG										
CYPERMETHRIN	52315-07-8	mg/kg	TRG										
DANITOL	39515-41-8	mg/kg	TRG										
DELTAMETHRIN/TRALOMETHRIN	52820-00-5	mg/kg	TRG										
Dichloran	99-30-9	mg/kg	TRG										
Fenvalerate	51630-58-1	mg/kg	TRG										
LAMBDA CYHALOTHRIN	91465-08-6	mg/kg	TRG										
Penoxalin	40487-42-1	mg/kg	TRG										
Permethrin	52645-53-1	mg/kg	TRG										
PRALLETHRIN	23031-36-9	mg/kg	TRG										
SUMITHRIN	26002-80-2	mg/kg	TRG										
TEFLUTHRIN	79538-32-2	mg/kg	TRG										
PCB Aroclors													
Aroclor-1016	12674-11-2	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.0047 U	0.008 U	0.0051 U	0.0076 U	0.0063 U	0.011 U
Aroclor-1221	11104-28-2	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.0047 U	0.008 U	0.0051 U	0.0076 U	0.0063 U	0.011 U
Aroclor-1232	11141-16-5	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.0047 U	0.008 U	0.0051 U	0.0076 U	0.0063 U	0.011 U
Aroclor-1242	53469-21-9	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.0047 U	0.008 U	0.0051 U	0.0076 U	0.0063 U	0.011 U
Aroclor-1248	12672-29-6	mg/kg	TRG	0.071 J	0.053 J	0.13 J	0.28 J	0.0047 U	0.77 J	0.056 J+	0.24 J	0.078 J+	0.13 J
Aroclor-1254	11097-69-1	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.081 J+	0.008 U	0.082 J+	0.0076 UJ	0.11 J+	0.011 U
Aroclor-1260	11096-82-5	mg/kg	TRG	0.038 J	0.023 J	0.097 J	0.11 J	0.081 J+	1 J	0.11 J+	0.16 J	0.1 J+	0.11 J
Aroclor-1262	37324-23-5	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.0047 U	0.008 U	0.0051 U	0.0076 UJ	0.0063 U	0.011 U
Aroclor-1268	11100-14-4	mg/kg	TRG	0.0069 U	0.0074 U	0.0042 U	0.011 U	0.0047 U	0.008 U	0.0051 U	0.0076 UJ	0.0063 U	0.011 U
PCB, Total Aroclors	TOT-PCB-ARO-C	mg/kg	CALC	0.11	0.076	0.23	0.39	0.16	1.8	0.25	0.4	0.29	0.24
TPH													
Diesel Range Organics (C10-C20)	C10C20	mg/kg	TRG					87		100		88	
Oil Range Organics (C20-C36)	C20C36	mg/kg	TRG					700		640		600	
SVOCs													
1,1'-Biphenyl	92-52-4	mg/kg	TRG			1.3 U					0.3 U		
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	TRG			1.3 U					0.3 U		
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG										
2,2'-oxybis(1-Chloropropane)	108-60-1	mg/kg	TRG			0.27 U					0.061 U		
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	TRG			1.3 U					0.3 U		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG										
2,4,5-Trichlorophenol	95-95-4	mg/kg	TRG			1.3 U					0.3 U		
2,4,6-Trichlorophenol	88-06-2	mg/kg	TRG			1.3 U					0.3 U		
2,4-Dichlorophenol	120-83-2	mg/kg	TRG			0.27 U					0.061 U		
2,4-Dimethylphenol	105-67-9	mg/kg	TRG			1.3 U					0.3 U		
2,4-Dinitrophenol	51-28-5	mg/kg	TRG			6.8 U					1.6 U		
2,4-Dinitrotoluene	121-14-2	mg/kg	TRG			1.3 U					0.3 U		
2,6-Dinitrotoluene	606-20-2	mg/kg	TRG			1.3 U					0.3 U		

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED1C	SED2.5B	SED2C	SED4C	SED6.5D	SED6.5D	SED6.5E	SED6.5E	SED6C	SED6C
			Sample ID	SED1C00N	SED2.5B00N	SED2C00N	SED4C00N	SED6.5D00EN	SED6.5D00N	SED6.5E00EN	SED6.5E00N	SED6C00EN	SED6C00N
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	11/7/2013	11/7/2013	11/6/2013	11/12/2013	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/7/2017	11/14/2013
			Task Code	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
2-Chloronaphthalene	91-58-7	mg/kg	TRG			0.27 U					0.061 U		
2-Chlorophenol	95-57-8	mg/kg	TRG			1.3 U					0.3 U		
2-Methylnaphthalene	91-57-6	mg/kg	TRG			0.27 U					0.074		
2-Methylphenol	95-48-7	mg/kg	TRG			1.3 U					0.3 U		
2-Nitroaniline	88-74-4	mg/kg	TRG			6.8 U					1.6 U		
2-Nitrophenol	88-75-5	mg/kg	TRG			1.3 U					0.3 U		
3,3'-Dichlorobenzidine	91-94-1	mg/kg	TRG			1.3 U					0.3 U		
3-Nitroaniline	99-09-2	mg/kg	TRG			6.8 U					1.6 U		
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	TRG			6.8 U					1.6 U		
4-Bromophenyl-phenylether	101-55-3	mg/kg	TRG			1.3 U					0.3 U		
4-Chloro-3-methylphenol	59-50-7	mg/kg	TRG			1.3 U					0.3 U		
4-Chloroaniline	106-47-8	mg/kg	TRG			1.3 U					0.3 U		
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	TRG			1.3 U					0.3 U		
4-Methylphenol	106-44-5	mg/kg	TRG			1.3 U					0.055 J		
4-Nitroaniline	100-01-6	mg/kg	TRG			6.8 U					1.6 U		
4-Nitrophenol	100-02-7	mg/kg	TRG			6.8 U					1.6 U		
Acenaphthene	83-32-9	mg/kg	TRG	0.22 U	0.24 U	0.27 U	0.022 J		0.057 J		0.061 U		0.019 J
Acenaphthylene	208-96-8	mg/kg	TRG	0.22 U	0.24 U	0.067 J	0.08 J		0.035 J		0.048 J		0.061 J
Acetophenone	98-86-2	mg/kg	TRG			1.3 U					0.044 J		
Anthracene	120-12-7	mg/kg	TRG	0.082 J	0.12 J	0.13 J	0.087 J		0.06 J		0.089		0.061 J
Atrazine	1912-24-9	mg/kg	TRG			1.3 U					0.3 U		
Benzaldehyde	100-52-7	mg/kg	TRG			1.3 UJ					0.064 J		
Benzidine	92-87-5	mg/kg	TRG										
Benzo(a)anthracene	56-55-3	mg/kg	TRG	0.49	0.61	0.59	0.47		0.19		0.4		0.42 J
Benzo(a)pyrene	50-32-8	mg/kg	TRG	0.55	0.71	0.67	0.55		0.19		0.46		0.53 J
Benzo(b)fluoranthene	205-99-2	mg/kg	TRG	0.73	1	0.73	0.94		0.32		0.73		0.85 J
Benzo(g,h,i)perylene	191-24-2	mg/kg	TRG	0.47	0.76	0.73	0.74		0.19		0.53		0.35 J
Benzo(k)fluoranthene	207-08-9	mg/kg	TRG	0.4	0.47	0.56	0.32		0.096 J		0.25		0.33 J
Benzoic acid	65-85-0	mg/kg	TRG										
bis-(2-chloroethoxy)methane	111-91-1	mg/kg	TRG			1.3 U					0.3 U		
bis-(2-Chloroethyl)ether	111-44-4	mg/kg	TRG			0.27 U					0.061 U		
bis-(2-Ethylhexyl)phthalate	117-81-7	mg/kg	TRG			1.5 J					1.3		
Butylbenzylphthalate	85-68-7	mg/kg	TRG			1.3 U					0.3 U		
Caprolactam	105-60-2	mg/kg	TRG			6.8 U					1.6 U		
Carbazole	86-74-8	mg/kg	TRG			0.067 J					0.06 J		
Chrysene	218-01-9	mg/kg	TRG	0.71	0.94	0.9	0.83		0.32		0.74		0.85 J
Dibenzo(a,h)anthracene	53-70-3	mg/kg	TRG	0.11 J	0.17 J	0.2 J	0.16		0.052 J		0.14		0.089 J
Dibenzofuran	132-64-9	mg/kg	TRG			1.3 U					0.3 U		
Diethylphthalate	84-66-2	mg/kg	TRG			1.3 U					0.3 U		
Dimethylphthalate	131-11-3	mg/kg	TRG			1.3 U					0.3 U		
Di-n-butylphthalate	84-74-2	mg/kg	TRG			1.3 U					0.041 J		
Di-n-octylphthalate	117-84-0	mg/kg	TRG			1.3 U					0.3 U		
Diphenylhydrazine-1,2	122-66-7	mg/kg	TRG										
Fluoranthene	206-44-0	mg/kg	TRG	1	1.4	1.3	1		0.37		1		1.1 J
Fluorene	86-73-7	mg/kg	TRG	0.22 U	0.24 U	0.27 U	0.039 J		0.063 J		0.05 J		0.044 J
Hexachlorobenzene	118-74-1	mg/kg	TRG			0.27 U					0.061 U		
Hexachlorobutadiene	87-68-3	mg/kg	TRG			0.27 U					0.061 U		
Hexachlorocyclo-pentadiene	77-47-4	mg/kg	TRG			1.3 U					0.3 U		
Hexachloroethane	67-72-1	mg/kg	TRG			1.3 U					0.3 U		
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	TRG	0.4	0.61	0.58	0.59		0.14 J		0.42		0.35 J
Isophorone	78-59-1	mg/kg	TRG			1.3 U					0.3 U		
Naphthalene	91-20-3	mg/kg	TRG	0.22 U	0.24 U	0.27 U	0.022 J		0.052 J		0.033 J		0.022 J
Nitrobenzene	98-95-3	mg/kg	TRG			2.7 U					0.61 U		
Nitrosodimethylamine-n	62-75-9	mg/kg	TRG										
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	TRG			0.27 U					0.061 U		
N-Nitrosodiphenylamine	86-30-6	mg/kg	TRG			1.3 U					0.3 U		
Pentachlorophenol	87-86-5	mg/kg	TRG			1.3 U					0.3 U		
Phenanthrene	85-01-8	mg/kg	TRG	0.37	0.55	0.38	0.32		0.19		0.37		0.3 J
Phenol	108-95-2	mg/kg	TRG			0.27 U					0.061 U		

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED1C	SED2.5B	SED2C	SED4C	SED6.5D	SED6.5D	SED6.5E	SED6.5E	SED6C	SED6C
			Sample ID	SED1C00N	SED2.5B00N	SED2C00N	SED4C00N	SED6.5D00EN	SED6.5D00N	SED6.5E00EN	SED6.5E00N	SED6C00EN	SED6C00N
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	11/7/2013	11/7/2013	11/6/2013	11/12/2013	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/7/2017	11/14/2013
			Task Code	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
Pyrene	129-00-0	mg/kg	TRG	0.96	1.2	1	0.84		0.41		0.91		0.86 J
Polybrominated Diphenyl Ethers													
PBDE47	5436-43-1	mg/kg	TRG										
PBDE99	60348-60-9	mg/kg	TRG										
PBDE-100	189084-64-8	mg/kg	TRG										
PBDE153	68631-49-2	mg/kg	TRG										
PBDE-154	207122-15-4	mg/kg	TRG										
VOCs													
1,1,1-Trichloroethane	71-55-6	mg/kg	TRG			0.0082 U					0.011 U		
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	TRG			0.0082 U					0.011 U		
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	mg/kg	TRG			0.0082 U					0.011 U		
1,1,2-Trichloroethane	79-00-5	mg/kg	TRG			0.0082 U					0.011 U		
1,1-Dichloroethane	75-34-3	mg/kg	TRG			0.0082 U					0.011 U		
1,1-Dichloroethene	75-35-4	mg/kg	TRG			0.0082 U					0.011 U		
1,2,3-Trichlorobenzene	87-61-6	mg/kg	TRG			0.0082 U					0.011 U		
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG			0.0082 U					0.011 U		
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	TRG			0.0082 U					0.011 U		
1,2-Dibromoethane	106-93-4	mg/kg	TRG			0.0082 U					0.011 U		
1,2-Dichlorobenzene	95-50-1	mg/kg	TRG			0.0082 U					0.011 U		
1,2-Dichloroethane	107-06-2	mg/kg	TRG			0.0082 U					0.011 U		
1,2-Dichloropropane	78-87-5	mg/kg	TRG			0.0082 U					0.011 U		
1,3-Dichlorobenzene	541-73-1	mg/kg	TRG			0.0082 U					0.011 U		
1,4-Dichlorobenzene	106-46-7	mg/kg	TRG			0.0082 U					0.011 U		
1,4-Dioxane	123-91-1	mg/kg	TRG			1.6 U					2.1 U		
2-Butanone	78-93-3	mg/kg	TRG			0.012					0.011 U		
2-Hexanone	591-78-6	mg/kg	TRG			0.0082 U					0.011 U		
4-Methyl-2-pentanone	108-10-1	mg/kg	TRG			0.0082 U					0.011 U		
Acetone	67-64-1	mg/kg	TRG			0.055					0.043 U		
Acrolein	107-02-8	mg/kg	TRG										
Acrylonitrile	107-13-1	mg/kg	TRG										
Benzene	71-43-2	mg/kg	TRG			0.0082 U					0.011 U		
Bromochloromethane	74-97-5	mg/kg	TRG			0.0082 U					0.011 U		
Bromodichloromethane	75-27-4	mg/kg	TRG			0.0082 U					0.011 U		
Bromoform	75-25-2	mg/kg	TRG			0.0082 U					0.011 U		
Bromomethane	74-83-9	mg/kg	TRG			0.0082 U					0.011 U		
Carbon Disulfide	75-15-0	mg/kg	TRG			0.0082 U					0.011 U		
Carbon Tetrachloride	56-23-5	mg/kg	TRG			0.0082 U					0.011 U		
Chlorobenzene	108-90-7	mg/kg	TRG			0.0082 U					0.011 U		
Chloroethane	75-00-3	mg/kg	TRG			0.0082 U					0.011 U		
Chloroform	67-66-3	mg/kg	TRG			0.0082 U					0.011 U		
Chloromethane	74-87-3	mg/kg	TRG			0.0082 U					0.011 U		
cis-1,2-Dichloroethylene	156-59-2	mg/kg	TRG			0.0082 U					0.011 U		
cis-1,3-Dichloropropene	10061-01-5	mg/kg	TRG			0.0082 U					0.011 U		
Cyclohexane	110-82-7	mg/kg	TRG			0.0082 U					0.011 U		
Dibromochloromethane	124-48-1	mg/kg	TRG			0.0082 U					0.011 U		
Dichlorodifluoromethane	75-71-8	mg/kg	TRG			0.0082 U					0.011 U		
Dichloropropene, 1,3-	542-75-6	mg/kg	TRG										
Ethylbenzene	100-41-4	mg/kg	TRG			0.0082 U					0.011 U		
Isopropylbenzene	98-82-8	mg/kg	TRG			0.0082 U					0.011 U		
m, p-Xylene	XYLMP	mg/kg	TRG			0.016 U					0.021 U		
Methyl Acetate	79-20-9	mg/kg	TRG			0.0082 U					0.011 U		
Methyl tert-Butyl Ether (MTBE)	1634-04-4	mg/kg	TRG			0.0082 U					0.011 U		
Methylcyclohexane	108-87-2	mg/kg	TRG			0.0082 U					0.011 U		
Methylene Chloride	75-09-2	mg/kg	TRG			0.0082 U					0.011 U		
o-Xylene	95-47-6	mg/kg	TRG			0.0082 U					0.011 U		
Styrene	100-42-5	mg/kg	TRG			0.0082 U					0.011 U		
Tetrachloroethylene	127-18-4	mg/kg	TRG			0.0082 U					0.011 U		
Toluene	108-88-3	mg/kg	TRG			0.0082 U					0.011 U		
trans-1,2-Dichloroethene	156-60-5	mg/kg	TRG			0.0082 U					0.011 U		

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
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			Location ID	SED1C	SED2.5B	SED2C	SED4C	SED6.5D	SED6.5D	SED6.5E	SED6.5E	SED6C	SED6C
			Sample ID	SED1C00N	SED2.5B00N	SED2C00N	SED4C00N	SED6.5D00EN	SED6.5D00N	SED6.5E00EN	SED6.5E00N	SED6C00EN	SED6C00N
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	11/7/2013	11/7/2013	11/6/2013	11/12/2013	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/7/2017	11/14/2013
			Task Code	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type										
trans-1,3-Dichloropropene	10061-02-6	mg/kg	TRG			0.0082 U					0.011 U		
Trichloroethene	79-01-6	mg/kg	TRG			0.0082 U					0.011 U		
Trichlorofluoromethane	75-69-4	mg/kg	TRG			0.0082 U					0.011 U		
Vinyl Chloride	75-01-4	mg/kg	TRG			0.0082 U					0.011 U		
Vinyl ether, 2-chloroethyl	110-75-8	mg/kg	TRG										
Xylenes (total)	1330-20-7	mg/kg	CALC			0.016 U					0.021 U		

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Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7.5D	SED7.5D	SED7.5E	SED7.5E	SED7D	SED7D	SED7E	SED7E	SED7E	SED7F
			Sample ID	SED7.5D00EN	SED7.5D00N	SED7.5E00EN	SED7.5E00N	SED7D00EN	SED7D00N	SED7E00AN	SED7E00EN	SED7E00N	SED7F00EN
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/9/2017	11/25/2013	6/22/2017	6/8/2017	11/25/2013	6/8/2017
			Task Code	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside
			Depth Interval	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft
Chemical	CAS	Units	Result Type										
Dioxins/Furans													
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	mg/kg	TRG	9.36E-05		6.67E-05		5.1E-05			6.11E-05		4.92E-05
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	mg/kg	TRG	0.000382		0.000244		0.000254			0.000204		0.000166
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	mg/kg	TRG	1.2E-05		7.79E-06		5.2E-06			6.2E-06		5.58E-06
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	mg/kg	TRG	1.86E-05		1.21E-05		8.71E-06			1.14E-05		9.35E-06
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	mg/kg	TRG	1.96E-05		1.45E-05		9.6E-06			1.04E-05		1.06E-05
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	mg/kg	TRG	2.08E-05		1.49E-05		1E-05			1.2E-05		1.05E-05
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	mg/kg	TRG	4E-05		2.64E-05		2.01E-05			2.11E-05		1.9E-05
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	mg/kg	TRG	1E-06 J		1.19E-06 J		9.61E-07 J			1.95E-06		8.42E-07 JN
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	mg/kg	TRG	3.24E-05		2.11E-05		1.65E-05			1.73E-05		1.51E-05
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	TRG	1.01E-05 J		7.29E-06 J		4.54E-06 J			6.09E-06 J		4.99E-06 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	mg/kg	TRG	1.84E-05		1.35E-05		8.79E-06			1.01E-05		9.72E-06
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	mg/kg	TRG	2.95E-05		2E-05		1.39E-05			1.89E-05		1.48E-05
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	mg/kg	TRG	2.63E-05 J		2.01E-05 J		1.37E-05 J			2.27E-05 J		1.48E-05 J
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	mg/kg	TRG	7.35E-06		5.24E-06		3.93E-06			5.06E-06		3.56E-06
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG	3.94E-06		2.36E-06		1.65E-06			1.93E-06		1.6E-06
Octachlorochlorodibenzofuran	39001-02-0	mg/kg	TRG	0.000129		9.57E-05		8.72E-05			8.21E-05		6.25E-05
Octachlorochlorodibenzo-p-dioxin	3268-87-9	mg/kg	TRG	0.00457		0.00203		0.00437			0.00157		0.00139
TCDD TEQ HH	DFTEQ-HH	mg/kg	CALC	5.37E-05		3.75E-05		2.75E-05			3.2E-05		2.69E-05
Total HpCDD	37871-00-4	mg/kg	TRG	0.000758		0.00054		0.000578			0.000414		0.000353
Total HpCDF	38998-75-3	mg/kg	TRG	0.000197		0.000141		0.000114			0.000127		0.000102
Total HxCDD	34465-46-8	mg/kg	TRG	0.000461		0.000294		0.000224			0.000244		0.000219
Total HxCDF	55684-94-1	mg/kg	TRG	0.000248		0.000186		0.000132			0.000181		0.000128
Total PeCDD	36088-22-9	mg/kg	TRG	0.000321		0.000217		0.000138			0.00018		0.000167
Total PeCDF	30402-15-4	mg/kg	TRG	0.000259		0.000209		0.000136			0.000208		0.000136
Total TCDD	41903-57-5	mg/kg	TRG	0.000152		0.000102		6.19E-05			8.73E-05		7.08E-05
Total TCDF	55722-27-5	mg/kg	TRG	0.000212		0.000159		9.86E-05			0.00015		0.000105
Inorganics													
Aluminum	7429-90-5	mg/kg	TRG	12000	13000	8900	15000	10000	7300	3700	4000	4500	7500
Antimony	7440-36-0	mg/kg	TRG	1.7	0.43 J-	2.3	1 J-	1.1	0.69 J-	1.4 J	1.1	1.2 J-	43
Arsenic	7440-38-2	mg/kg	TRG	6.8	11 J-	17	17 J-	5.7	4.3 J-	5.6 J	5.1	4.6 J-	7.2
Barium	7440-39-3	mg/kg	TRG	110	97 J-	110	150 J-	97	110 J-	54	52	72 J-	87
Beryllium	7440-41-7	mg/kg	TRG	1.6	1.7	1.1	2.2	1.4	1	0.54	0.51	0.71	1
Cadmium	7440-43-9	mg/kg	TRG	2	1.3 J-	3.3	5.2 J-	1.5	4.7 J-	2.4 J	1.7	3.7 J-	2.6
Calcium	7440-70-2	mg/kg	TRG	4500	1400 J-	5700	2500 J-	3700	2000 J-	3500 J	3300	4200 J-	4000
Chromium	7440-47-3	mg/kg	TRG	50	80 J-	62	76 J-	46	36 J-	19	29	29 J-	40
Cobalt	7440-48-4	mg/kg	TRG	20	15 J-	23	32 J-	19	16 J-	4.9	9.3	13 J-	14
Copper	7440-50-8	mg/kg	TRG	94	160	150	240	73	64	45 J	64	110	130
Iron	7439-89-6	mg/kg	TRG	29000	19000	25000	25000	28000	17000	7500	13000	14000	20000
Lead	7439-92-1	mg/kg	TRG	97	150	140	230	71	170	120	76	130	130
Magnesium	7439-95-4	mg/kg	TRG	4400	1800	5100	3100	4300	2700	2900 J	3100	3200	3900
Manganese	7439-96-5	mg/kg	TRG	250	180 J-	190	230 J-	270	180 J-	86	100	120 J-	200
Mercury	7439-97-6	mg/kg	TRG	0.3	0.28 J	0.44	0.69 J	0.29	0.24 J	0.21 J	0.18	0.27 J	0.36
Nickel	7440-02-0	mg/kg	TRG	57	59 J-	97	150 J-	46	50 J-	38 J	56	120 J-	75
Potassium	7440-09-7	mg/kg	TRG	1300	650	990	760	1400	1100	390	460	450	870
Selenium	7782-49-2	mg/kg	TRG	1.2	1 J-	1.4	1.8 J-	1.1	0.72 J-	0.5 J	0.61	0.54 J-	0.93
Silver	7440-22-4	mg/kg	TRG	0.82	0.89	1.3	3.3	0.45	1.3	0.7 J	0.55	0.92	1.6
Sodium	7440-23-5	mg/kg	TRG	230	110	270	220	220	100	91 J	140	110	200
Thallium	7440-28-0	mg/kg	TRG	0.26	0.35	0.27	0.63	0.24	0.25	0.14	0.13	0.15	0.2
Vanadium	7440-62-2	mg/kg	TRG	88	180 J+	160	360 J+	56	110 J+	94 J	110	150 J+	140
Zinc	7440-66-6	mg/kg	TRG	410	280 J-	600	580 J-	320	380 J-	180 J	280	430 J-	470
Cyanide	57-12-5	ug/kg	TRG										
Pesticides													
4,4'-DDD	72-54-8	mg/kg	TRG	0.0035 J		0.0044 J		0.0032 J			0.0035 J		0.0034 J
4,4'-DDE	72-55-9	mg/kg	TRG	0.0061 J		0.01 J		0.0083			0.0042 J		0.0051 J
4,4'-DDT	50-29-3	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Aldrin	309-00-2	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00013 J		0.00096 U
alpha-BHC	319-84-6	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
beta-BHC	319-85-7	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7.5D	SED7.5D	SED7.5E	SED7.5E	SED7D	SED7D	SED7E	SED7E	SED7E	SED7F
			Sample ID	SED7.5D00EN	SED7.5D00N	SED7.5E00EN	SED7.5E00N	SED7D00EN	SED7D00N	SED7E00AN	SED7E00EN	SED7E00N	SED7F00EN
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/9/2017	11/25/2013	6/22/2017	6/8/2017	11/25/2013	6/8/2017
			Task Code	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside
			Depth Interval	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft
Chemical	CAS	Units	Result Type										
Chlordane (Technical)	12789-03-6	mg/kg	TRG										
cis-Chlordane	5103-71-9	mg/kg	TRG	0.0094		0.0096		0.0099			0.0077		0.008
delta-BHC	319-86-8	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Dieldrin	60-57-1	mg/kg	TRG	0.00098 U		0.0012 U		0.002 J			0.00073 U		0.00096 U
Endosulfan I	959-98-8	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Endosulfan II	33213-65-9	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Endosulfan Sulfate	1031-07-8	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Endrin	72-20-8	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Endrin aldehyde	7421-93-4	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Endrin ketone	53494-70-5	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
gamma-BHC (Lindane)	58-89-9	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Heptachlor	76-44-8	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Heptachlor Epoxide	1024-57-3	mg/kg	TRG	0.0018 J		0.0049 J		0.0012 J			0.0041 J		0.0022 J
Methoxychlor	72-43-5	mg/kg	TRG	0.00098 U		0.0012 U		0.001 U			0.00073 U		0.00096 U
Toxaphene	8001-35-2	mg/kg	TRG	0.039 U		0.047 U		0.041 U			0.029 U		0.038 U
trans-Chlordane	5103-74-2	mg/kg	TRG	0.0095		0.0012 U		0.0093			0.00073 U		0.00096 U
Pyrethroids													
Allethrin	584-79-2	mg/kg	TRG										
BAYTHROID	68359-37-5	mg/kg	TRG										
BIPHENTHRIN (TALSTAR)	82657-04-3	mg/kg	TRG										
CYPERMETHRIN	52315-07-8	mg/kg	TRG										
DANITOL	39515-41-8	mg/kg	TRG										
DELTAMETHRIN/TRALOMETHRIN	52820-00-5	mg/kg	TRG										
Dichloran	99-30-9	mg/kg	TRG										
Fenvalerate	51630-58-1	mg/kg	TRG										
LAMBDA CYHALOTHRIN	91465-08-6	mg/kg	TRG										
Penoxalin	40487-42-1	mg/kg	TRG										
Permethrin	52645-53-1	mg/kg	TRG										
PRALLETHRIN	23031-36-9	mg/kg	TRG										
SUMITHRIN	26002-80-2	mg/kg	TRG										
TEFLUTHRIN	79538-32-2	mg/kg	TRG										
PCB Aroclors													
Aroclor-1016	12674-11-2	mg/kg	TRG	0.0049 U	0.0077 U	0.0059 U	0.012 U	0.0051 U	0.0074 U	0.0029 UJ	0.0037 U	0.0072 U	0.0048 U
Aroclor-1221	11104-28-2	mg/kg	TRG	0.0049 U	0.0077 U	0.0059 U	0.012 U	0.0051 U	0.0074 U	0.0029 U	0.0037 U	0.0072 U	0.0048 U
Aroclor-1232	11141-16-5	mg/kg	TRG	0.0049 U	0.0077 U	0.0059 U	0.012 U	0.0051 U	0.0074 U	0.0029 U	0.0037 U	0.0072 U	0.0048 U
Aroclor-1242	53469-21-9	mg/kg	TRG	0.0049 U	0.0077 U	0.0059 U	0.012 U	0.0051 U	0.0074 U	0.0029 U	0.0037 U	0.0072 U	0.0048 U
Aroclor-1248	12672-29-6	mg/kg	TRG	0.12 J+	0.39 J	0.17 J+	0.89 J	0.0051 U	0.4 J	0.2 J+	0.17 J+	0.55 J	0.067 J+
Aroclor-1254	11097-69-1	mg/kg	TRG	0.17 J+	0.0077 U	0.25 J+	0.012 U	0.029 J+	0.0074 U	0.24 J	0.17 J+	0.0072 UJ	0.1 J+
Aroclor-1260	11096-82-5	mg/kg	TRG	0.25 J+	0.48 J	0.36 J+	0.97 J	0.024 J+	0.22 J	0.35 J+	0.29 J+	0.41 J	0.13 J+
Aroclor-1262	37324-23-5	mg/kg	TRG	0.0049 U	0.0077 U	0.0059 U	0.012 U	0.0051 U	0.0074 U	0.0029 U	0.0037 U	0.0072 UJ	0.0048 U
Aroclor-1268	11100-14-4	mg/kg	TRG	0.0049 U	0.0077 U	0.0059 U	0.012 U	0.0051 U	0.0074 U	0.0029 U	0.0037 U	0.0072 UJ	0.0048 U
PCB, Total Aroclors	TOT-PCB-ARO-C	mg/kg	CALC	0.54	0.87	0.78	1.9	0.053	0.62	0.79	0.63	0.96	0.3
TPH													
Diesel Range Organics (C10-C20)	C10C20	mg/kg	TRG	79		100		51		220 J	110 J		69
Oil Range Organics (C20-C36)	C20C36	mg/kg	TRG	590		860		500		1100	790		610
SVOCs													
1,1'-Biphenyl	92-52-4	mg/kg	TRG										
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	TRG										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG										
2,2'-oxybis(1-Chloropropane)	108-60-1	mg/kg	TRG										
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	TRG										
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG										
2,4,5-Trichlorophenol	95-95-4	mg/kg	TRG										
2,4,6-Trichlorophenol	88-06-2	mg/kg	TRG										
2,4-Dichlorophenol	120-83-2	mg/kg	TRG										
2,4-Dimethylphenol	105-67-9	mg/kg	TRG										
2,4-Dinitrophenol	51-28-5	mg/kg	TRG										
2,4-Dinitrotoluene	121-14-2	mg/kg	TRG										
2,6-Dinitrotoluene	606-20-2	mg/kg	TRG										

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			Sample ID	SED7.5D00EN	SED7.5D00N	SED7.5E00EN	SED7.5E00N	SED7D00EN	SED7D00N	SED7E00AN	SED7E00EN	SED7E00N	SED7F00EN
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/9/2017	11/25/2013	6/22/2017	6/8/2017	11/25/2013	6/8/2017
			Task Code	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside
			Depth Interval	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft
Chemical	CAS	Units	Result Type										
2-Chloronaphthalene	91-58-7	mg/kg	TRG										
2-Chlorophenol	95-57-8	mg/kg	TRG										
2-Methylnaphthalene	91-57-6	mg/kg	TRG										
2-Methylphenol	95-48-7	mg/kg	TRG										
2-Nitroaniline	88-74-4	mg/kg	TRG										
2-Nitrophenol	88-75-5	mg/kg	TRG										
3,3'-Dichlorobenzidine	91-94-1	mg/kg	TRG										
3-Nitroaniline	99-09-2	mg/kg	TRG										
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	TRG										
4-Bromophenyl-phenylether	101-55-3	mg/kg	TRG										
4-Chloro-3-methylphenol	59-50-7	mg/kg	TRG										
4-Chloroaniline	106-47-8	mg/kg	TRG										
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	TRG										
4-Methylphenol	106-44-5	mg/kg	TRG										
4-Nitroaniline	100-01-6	mg/kg	TRG										
4-Nitrophenol	100-02-7	mg/kg	TRG										
Acenaphthene	83-32-9	mg/kg	TRG		0.035 J		0.059		0.035 J	0.1		0.046 J	
Acenaphthylene	208-96-8	mg/kg	TRG		0.028 J		0.047 J		0.07 J	0.017 J		0.027 J	
Acetophenone	98-86-2	mg/kg	TRG										
Anthracene	120-12-7	mg/kg	TRG		0.047 J		0.12		0.11 J	0.2		0.13 J	
Atrazine	1912-24-9	mg/kg	TRG										
Benzaldehyde	100-52-7	mg/kg	TRG										
Benzidine	92-87-5	mg/kg	TRG										
Benzo(a)anthracene	56-55-3	mg/kg	TRG		0.16		0.36		0.48	0.55		0.49	
Benzo(a)pyrene	50-32-8	mg/kg	TRG		0.16		0.31		0.54	0.44		0.52	
Benzo(b)fluoranthene	205-99-2	mg/kg	TRG		0.29		0.5		0.86	0.65		0.85	
Benzo(g,h,i)perylene	191-24-2	mg/kg	TRG		0.17		0.29		0.47	0.31		0.47	
Benzo(k)fluoranthene	207-08-9	mg/kg	TRG		0.1		0.14		0.19	0.22		0.27	
Benzoic acid	65-85-0	mg/kg	TRG										
bis-(2-chloroethoxy)methane	111-91-1	mg/kg	TRG										
bis-(2-Chloroethyl)ether	111-44-4	mg/kg	TRG										
bis-(2-Ethylhexyl)phthalate	117-81-7	mg/kg	TRG										
Butylbenzylphthalate	85-68-7	mg/kg	TRG										
Caprolactam	105-60-2	mg/kg	TRG										
Carbazole	86-74-8	mg/kg	TRG										
Chrysene	218-01-9	mg/kg	TRG		0.27		0.49		0.63	0.62		0.76	
Dibenzo(a,h)anthracene	53-70-3	mg/kg	TRG		0.04 J		0.055		0.086 J	0.084		0.094 J	
Dibenzofuran	132-64-9	mg/kg	TRG										
Diethylphthalate	84-66-2	mg/kg	TRG										
Dimethylphthalate	131-11-3	mg/kg	TRG										
Di-n-butylphthalate	84-74-2	mg/kg	TRG										
Di-n-octylphthalate	117-84-0	mg/kg	TRG										
Diphenylhydrazine-1,2	122-66-7	mg/kg	TRG										
Fluoranthene	206-44-0	mg/kg	TRG		0.32		0.8		0.87	0.9		1.2	
Fluorene	86-73-7	mg/kg	TRG		0.044 J		0.11		0.053 J	0.085		0.055 J	
Hexachlorobenzene	118-74-1	mg/kg	TRG										
Hexachlorobutadiene	87-68-3	mg/kg	TRG										
Hexachlorocyclo-pentadiene	77-47-4	mg/kg	TRG										
Hexachloroethane	67-72-1	mg/kg	TRG										
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	TRG		0.12		0.23		0.37	0.26		0.38	
Isophorone	78-59-1	mg/kg	TRG										
Naphthalene	91-20-3	mg/kg	TRG		0.047 J		0.094		0.046 J	0.024 J		0.031 J	
Nitrobenzene	98-95-3	mg/kg	TRG										
Nitrosodimethylamine-n	62-75-9	mg/kg	TRG										
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	TRG										
N-Nitrosodiphenylamine	86-30-6	mg/kg	TRG										
Pentachlorophenol	87-86-5	mg/kg	TRG										
Phenanthrene	85-01-8	mg/kg	TRG		0.2		0.47		0.35	0.91		0.5	
Phenol	108-95-2	mg/kg	TRG										

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7.5D	SED7.5D	SED7.5E	SED7.5E	SED7D	SED7D	SED7E	SED7E	SED7E	SED7F
			Sample ID	SED7.5D00EN	SED7.5D00N	SED7.5E00EN	SED7.5E00N	SED7D00EN	SED7D00N	SED7E00AN	SED7E00EN	SED7E00N	SED7F00EN
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/9/2017	11/25/2013	6/22/2017	6/8/2017	11/25/2013	6/8/2017
			Task Code	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside
			Depth Interval	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft
Chemical	CAS	Units	Result Type										
Pyrene	129-00-0	mg/kg	TRG		0.34		0.73		0.95	1.1		1	
Polybrominated Diphenyl Ethers													
PBDE47	5436-43-1	mg/kg	TRG										
PBDE99	60348-60-9	mg/kg	TRG										
PBDE-100	189084-64-8	mg/kg	TRG										
PBDE153	68631-49-2	mg/kg	TRG										
PBDE-154	207122-15-4	mg/kg	TRG										
VOCs													
1,1,1-Trichloroethane	71-55-6	mg/kg	TRG										
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	TRG										
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	mg/kg	TRG										
1,1,2-Trichloroethane	79-00-5	mg/kg	TRG										
1,1-Dichloroethane	75-34-3	mg/kg	TRG										
1,1-Dichloroethene	75-35-4	mg/kg	TRG										
1,2,3-Trichlorobenzene	87-61-6	mg/kg	TRG										
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG										
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	TRG										
1,2-Dibromoethane	106-93-4	mg/kg	TRG										
1,2-Dichlorobenzene	95-50-1	mg/kg	TRG										
1,2-Dichloroethane	107-06-2	mg/kg	TRG										
1,2-Dichloropropane	78-87-5	mg/kg	TRG										
1,3-Dichlorobenzene	541-73-1	mg/kg	TRG										
1,4-Dichlorobenzene	106-46-7	mg/kg	TRG										
1,4-Dioxane	123-91-1	mg/kg	TRG										
2-Butanone	78-93-3	mg/kg	TRG										
2-Hexanone	591-78-6	mg/kg	TRG										
4-Methyl-2-pentanone	108-10-1	mg/kg	TRG										
Acetone	67-64-1	mg/kg	TRG										
Acrolein	107-02-8	mg/kg	TRG										
Acrylonitrile	107-13-1	mg/kg	TRG										
Benzene	71-43-2	mg/kg	TRG										
Bromochloromethane	74-97-5	mg/kg	TRG										
Bromodichloromethane	75-27-4	mg/kg	TRG										
Bromoform	75-25-2	mg/kg	TRG										
Bromomethane	74-83-9	mg/kg	TRG										
Carbon Disulfide	75-15-0	mg/kg	TRG										
Carbon Tetrachloride	56-23-5	mg/kg	TRG										
Chlorobenzene	108-90-7	mg/kg	TRG										
Chloroethane	75-00-3	mg/kg	TRG										
Chloroform	67-66-3	mg/kg	TRG										
Chloromethane	74-87-3	mg/kg	TRG										
cis-1,2-Dichloroethylene	156-59-2	mg/kg	TRG										
cis-1,3-Dichloropropene	10061-01-5	mg/kg	TRG										
Cyclohexane	110-82-7	mg/kg	TRG										
Dibromochloromethane	124-48-1	mg/kg	TRG										
Dichlorodifluoromethane	75-71-8	mg/kg	TRG										
Dichloropropene, 1,3-	542-75-6	mg/kg	TRG										
Ethylbenzene	100-41-4	mg/kg	TRG										
Isopropylbenzene	98-82-8	mg/kg	TRG										
m, p-Xylene	XYLMP	mg/kg	TRG										
Methyl Acetate	79-20-9	mg/kg	TRG										
Methyl tert-Butyl Ether (MTBE)	1634-04-4	mg/kg	TRG										
Methylcyclohexane	108-87-2	mg/kg	TRG										
Methylene Chloride	75-09-2	mg/kg	TRG										
o-Xylene	95-47-6	mg/kg	TRG										
Styrene	100-42-5	mg/kg	TRG										
Tetrachloroethylene	127-18-4	mg/kg	TRG										
Toluene	108-88-3	mg/kg	TRG										
trans-1,2-Dichloroethene	156-60-5	mg/kg	TRG										

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7.5D	SED7.5D	SED7.5E	SED7.5E	SED7D	SED7D	SED7E	SED7E	SED7E	SED7F
			Sample ID	SED7.5D00EN	SED7.5D00N	SED7.5E00EN	SED7.5E00N	SED7D00EN	SED7D00N	SED7E00AN	SED7E00EN	SED7E00N	SED7F00EN
			Sample Type	N	N	N	N	N	N	N	N	N	N
			Parent Sample ID										
			Sample Date	6/9/2017	11/25/2013	6/8/2017	11/25/2013	6/9/2017	11/25/2013	6/22/2017	6/8/2017	11/25/2013	6/8/2017
			Task Code	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside	WP#3-2017 Waterside	Phase2-2013	WP#3-2017 Waterside
			Depth Interval	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.33 ft
Chemical	CAS	Units	Result Type										
trans-1,3-Dichloropropene	10061-02-6	mg/kg	TRG										
Trichloroethene	79-01-6	mg/kg	TRG										
Trichlorofluoromethane	75-69-4	mg/kg	TRG										
Vinyl Chloride	75-01-4	mg/kg	TRG										
Vinyl ether, 2-chloroethyl	110-75-8	mg/kg	TRG										
Xylenes (total)	1330-20-7	mg/kg	CALC										

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7F	SED7G	SED8C	SED8C	SED8C	SED9.5B	SED9C
			Sample ID	SED7F00N	SED7G00N	SED8C00EN	SED8C00N	SED8C00R	SED9.5B00N	SED9C00N
			Sample Type	N	N	N	N	FD	N	N
			Parent Sample ID					SED8C00N		
			Sample Date	11/25/2013	1/30/2014	6/7/2017	11/14/2013	11/14/2013	11/11/2013	11/11/2013
			Task Code	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type							
Dioxins/Furans										
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	mg/kg	TRG	0.00108	1.83E-05 JN	2.14E-05	7.04E-06 JN	1.39E-05 JN		2.73E-06 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	mg/kg	TRG	0.0041 J	4.89E-05	0.000125	3.68E-05 J	6.46E-05 J		1.38E-05
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	mg/kg	TRG	0.000151 JN	1.77E-06 J	1.77E-06 J	1.03E-06 JN	1.31E-06 JN		3.25E-07 JN
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	mg/kg	TRG	0.00047 JN	2.39E-06 J	2.75E-06	1.4E-06 JN	2.47E-06 JN		3.51E-07 JN
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	mg/kg	TRG	0.000289	2.47E-06 J	2.57E-06	7.47E-07 J	1.43E-06 J		3.93E-07 JN
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	mg/kg	TRG	0.000272 JN	3.65E-06 JN	2.82E-06	2.65E-06 JN	4.43E-06 JN		5.55E-07 JN
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	mg/kg	TRG	0.000548	4.11E-06 J	5.4E-06	2.09E-06 J	3.56E-06 J		6.53E-07 JN
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	mg/kg	TRG	2.43E-05 J	2.97E-07 U	2.42E-07 U	1.25E-07 J	1.31E-07 JN		2.1E-08 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	mg/kg	TRG	0.000705 J	6.05E-06	4.83E-06	1.92E-06 J	3.77E-06 J		8.78E-07 JN
1,2,3,7,8-PeCDF	57117-41-6	mg/kg	TRG	0.000124	9.72E-07 J	1.29E-06 J	5.33E-07 JN	6.99E-07 JN		1.13E-07 JN
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	mg/kg	TRG	0.000277 JN	6.9E-06 JN	1.71E-06 JN	9.24E-07 JN	1.55E-06 JN		5.09E-07 JN
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	mg/kg	TRG	0.000285	3.05E-06 J	4.06E-06	9.04E-07 JN	1.46E-06 J		3.39E-07 JN
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	mg/kg	TRG	0.000217	2.18E-06 J	5.56E-06 J	1E-06 JN	1.95E-06 JN		3.45E-07 J
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	mg/kg	TRG	5.67E-05	9E-07 J	1.73E-06	7.66E-07 JN	1.56E-06		1.27E-07 JN
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG	3.82E-05	5.2E-07 U	4.97E-07	5.02E-08 JN	5.78E-07 J		1.5E-08 U
Octachlorochlorodibenzofuran	39001-02-0	mg/kg	TRG	0.001 JN	2.18E-05	4.72E-05	1.3E-05 JN	1.92E-05		4.21E-06 J
Octachlorochlorodibenzo-p-dioxin	3268-87-9	mg/kg	TRG	0.0147	0.000341	0.00366	0.000973 J	0.00181 J		0.000338
TCDD TEQ HH	DFTEQ-HH	mg/kg	CALC	0.000707	1.06E-05	8.92E-06	3.09E-06	5.96E-06		1.22E-06
Total HpCDD	37871-00-4	mg/kg	TRG	0.00785 J	0.000101	0.000267	8.12E-05 J	0.000144 J		3.24E-05 JN
Total HpCDF	38998-75-3	mg/kg	TRG	0.00217 JN	3.69E-05 JN	5.22E-05	1.95E-05 JN	3.36E-05 JN		7.2E-06 JN
Total HxCDD	34465-46-8	mg/kg	TRG	0.00593 JN	4.92E-05 JN	6.29E-05	1.98E-05 JN	3.53E-05 JN		7.04E-06 JN
Total HxCDF	55684-94-1	mg/kg	TRG	0.00289 JN	6.18E-05 JN	4.89E-05	4.1E-05 JN	6.52E-05 JN		9.97E-06 JN
Total PeCDD	36088-22-9	mg/kg	TRG	0.00644 JN	0.000553 JN	2.74E-05	6.93E-05 JN	9.62E-05 JN		1.49E-05 JN
Total PeCDF	30402-15-4	mg/kg	TRG	0.00269 JN	9.83E-05 JN	5.7E-05	7.45E-05 JN	0.000122 JN		1.37E-05 JN
Total TCDD	41903-57-5	mg/kg	TRG	0.00165 JN	9.21E-06 JN	1.29E-05	5.15E-06 JN	1.05E-05 JN		1.4E-06 JN
Total TCDF	55722-27-5	mg/kg	TRG	0.00224 JN	0.000122 JN	4.17E-05	0.000122 JN	0.0002 JN		2.13E-05 JN
Inorganics										
Aluminum	7429-90-5	mg/kg	TRG	7300	2400	10000	6600	7700	4500	6300
Antimony	7440-36-0	mg/kg	TRG	2.8 J-	0.38	0.89	0.35 J-	0.31 J-	0.27 J-	0.48 J-
Arsenic	7440-38-2	mg/kg	TRG	11 J-	2.5	5.1	3 J-	3.6 J-	2.1 J-	2.5 J-
Barium	7440-39-3	mg/kg	TRG	100	17	99	63	71	44 J+	66 J+
Beryllium	7440-41-7	mg/kg	TRG	0.95	0.15	1.4	0.85	1	0.67	0.91
Cadmium	7440-43-9	mg/kg	TRG	4.4 J-	0.74	0.82	0.8	0.89	0.35	0.59
Calcium	7440-70-2	mg/kg	TRG	2300	17000	3600	2200 J-	2400 J-	1500 J-	1900 J-
Chromium	7440-47-3	mg/kg	TRG	46	33	42	37	41	18 J+	24 J+
Cobalt	7440-48-4	mg/kg	TRG	13	7.1	18	14	16	9.1 J	12 J
Copper	7440-50-8	mg/kg	TRG	190	54	59	44	52	21	30
Iron	7439-89-6	mg/kg	TRG	21000	12000	27000	19000	21000	12000	17000
Lead	7439-92-1	mg/kg	TRG	320	48	55	56	62	36 J	49 J
Magnesium	7439-95-4	mg/kg	TRG	2800	12000	3600	2000	2300	1900	2500
Manganese	7439-96-5	mg/kg	TRG	200	120	350	280	330	140	230
Mercury	7439-97-6	mg/kg	TRG	0.46 J	0.041	0.21	0.16 J+	0.17 J+	0.2	0.15
Nickel	7440-02-0	mg/kg	TRG	160 J-	84	35	25	28	15	20
Potassium	7440-09-7	mg/kg	TRG	580	230	1200	870	980	670	880
Selenium	7782-49-2	mg/kg	TRG	1.1 J-	0.034 J	1	1 J-	1.2 J-	0.19 J	0.53
Silver	7440-22-4	mg/kg	TRG	3.5 J-	0.083	0.27	0.29	0.43	0.15	0.18
Sodium	7440-23-5	mg/kg	TRG	160	420	200	89 J-	89 J-	74	97
Thallium	7440-28-0	mg/kg	TRG	0.13 J-	0.037 J	0.22	0.16 J-	0.18 J-	0.12	0.16
Vanadium	7440-62-2	mg/kg	TRG	440	56	39	29	36	25 J+	29 J+
Zinc	7440-66-6	mg/kg	TRG	630	260	240	180	210	97 J+	130 J+
Cyanide	57-12-5	ug/kg	TRG							
Pesticides										
4,4'-DDD	72-54-8	mg/kg	TRG	0.012 J	0.009	0.0051 J	0.0093 J	0.0039 J		0.003 J
4,4'-DDE	72-55-9	mg/kg	TRG	0.0059 J	0.0013 U	0.013	0.03 J	0.011 J		0.0071
4,4'-DDT	50-29-3	mg/kg	TRG	0.011 J	0.00091 J	0.0011 U	0.0055 J	0.00084 UJ		0.0025 J
Aldrin	309-00-2	mg/kg	TRG	0.00075 J	0.0013 U	0.0011 U	0.00023 J	0.00076 J		0.0006 J
alpha-BHC	319-84-6	mg/kg	TRG	0.0019 U	0.0013 U	0.0011 U	0.00078 U	0.00084 U		0.00082 U
beta-BHC	319-85-7	mg/kg	TRG	0.002 J	0.0013 U	0.0011 U	0.00079 J	0.00054 J		0.00082 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
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			Location ID	SED7F	SED7G	SED8C	SED8C	SED8C	SED9.5B	SED9C
			Sample ID	SED7F00N	SED7G00N	SED8C00EN	SED8C00N	SED8C00R	SED9.5B00N	SED9C00N
			Sample Type	N	N	N	N	FD	N	N
			Parent Sample ID					SED8C00N		
			Sample Date	11/25/2013	1/30/2014	6/7/2017	11/14/2013	11/14/2013	11/11/2013	11/11/2013
			Task Code	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type							
Chlordane (Technical)	12789-03-6	mg/kg	TRG							
cis-Chlordane	5103-71-9	mg/kg	TRG	0.01	0.0017 J	0.016	0.0056 J	0.0049 J		0.0066 J
delta-BHC	319-86-8	mg/kg	TRG	0.0055 J	0.0024 J	0.0011 U	0.0015 J	0.00032 J		0.00082 U
Dieldrin	60-57-1	mg/kg	TRG	0.0049 J	0.0023 J	0.004	0.00078 U	0.0023		0.0014 J
Endosulfan I	959-98-8	mg/kg	TRG	0.0012 J	0.0015 J	0.0011 U	0.00078 U	0.00084 U		0.00082 U
Endosulfan II	33213-65-9	mg/kg	TRG	0.005 J	0.0013 U	0.0011 U	0.0012 J	0.00055 J		0.00023 J
Endosulfan Sulfate	1031-07-8	mg/kg	TRG	0.01	0.0036	0.0011 U	0.0027	0.0012		0.00028 J
Endrin	72-20-8	mg/kg	TRG	0.022 J	0.0023 J	0.0011 U	0.0054 J	0.0025 J		0.0029
Endrin aldehyde	7421-93-4	mg/kg	TRG	0.0014 J	0.001 J	0.0011 U	0.0013 J	0.00061 J		0.00068 J
Endrin ketone	53494-70-5	mg/kg	TRG	0.008 J	0.0013 U	0.0011 U	0.00078 U	0.0018 J		0.0031
gamma-BHC (Lindane)	58-89-9	mg/kg	TRG	0.00077 J	0.0016 J	0.0011 U	0.0003 J	0.00084 U		0.00023 J
Heptachlor	76-44-8	mg/kg	TRG	0.001 J	0.00065 J	0.0011 U	0.0022 J	0.0013 J		0.0015
Heptachlor Epoxide	1024-57-3	mg/kg	TRG	0.0062 J	0.00062 J	0.00085 J	0.0019 J	0.00084 J		0.00065 J
Methoxychlor	72-43-5	mg/kg	TRG	0.023 J	0.019 J	0.0011 U	0.012 J	0.011 J		0.013
Toxaphene	8001-35-2	mg/kg	TRG	0.075 U	0.05 U	0.043 U	0.031 U	0.034 U		0.033 U
trans-Chlordane	5103-74-2	mg/kg	TRG	0.0082 J	0.0019	0.013	0.0095	0.0077		0.011
Pyrethroids										
Allethrin	584-79-2	mg/kg	TRG							
BAYTHROID	68359-37-5	mg/kg	TRG							
BIPHENTHRIN (TALSTAR)	82657-04-3	mg/kg	TRG							
CYPERMETHRIN	52315-07-8	mg/kg	TRG							
DANITOL	39515-41-8	mg/kg	TRG							
DELTAMETHRIN/TRALOMETHRIN	52820-00-5	mg/kg	TRG							
Dichloran	99-30-9	mg/kg	TRG							
Fenvalerate	51630-58-1	mg/kg	TRG							
LAMBDA CYHALOTHRIN	91465-08-6	mg/kg	TRG							
Penoxalin	40487-42-1	mg/kg	TRG							
Permethrin	52645-53-1	mg/kg	TRG							
PRALLETHRIN	23031-36-9	mg/kg	TRG							
SUMITHRIN	26002-80-2	mg/kg	TRG							
TEFLUTHRIN	79538-32-2	mg/kg	TRG							
PCB Aroclors										
Aroclor-1016	12674-11-2	mg/kg	TRG	0.0075 U	0.005 U	0.0055 U	0.0078 U	0.0084 U	0.0084 U	0.0082 U
Aroclor-1221	11104-28-2	mg/kg	TRG	0.0075 U	0.005 U	0.0055 U	0.0078 U	0.0084 U	0.0084 U	0.0082 U
Aroclor-1232	11141-16-5	mg/kg	TRG	0.0075 U	0.005 U	0.0055 U	0.0078 U	0.0084 U	0.0084 U	0.0082 U
Aroclor-1242	53469-21-9	mg/kg	TRG	0.0075 U	0.005 U	0.0055 U	0.0078 U	0.0084 U	0.0084 U	0.0082 U
Aroclor-1248	12672-29-6	mg/kg	TRG	0.39 J	0.1 J	0.064 J+	0.38 J	0.29 J	0.3 J	0.12 J
Aroclor-1254	11097-69-1	mg/kg	TRG	0.0075 U	0.005 U	0.081 J+	0.0078 U	0.0084 U	0.0084 U	0.0082 U
Aroclor-1260	11096-82-5	mg/kg	TRG	0.38 J	0.13 J	0.11 J+	0.21 J	0.12 J	0.084 J	0.054 J
Aroclor-1262	37324-23-5	mg/kg	TRG	0.0075 U	0.005 U	0.0055 U	0.0078 U	0.0084 U	0.0084 U	0.0082 U
Aroclor-1268	11100-14-4	mg/kg	TRG	0.0075 U	0.005 U	0.0055 U	0.0078 U	0.0084 U	0.0084 U	0.0082 U
PCB, Total Aroclors	TOT-PCB-ARO-C	mg/kg	CALC	0.77	0.23	0.26	0.59	0.41	0.38	0.17
TPH										
Diesel Range Organics (C10-C20)	C10C20	mg/kg	TRG			50				
Oil Range Organics (C20-C36)	C20C36	mg/kg	TRG			490				
SVOCs										
1,1'-Biphenyl	92-52-4	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
1,2,4,5-Tetrachlorobenzene	95-94-3	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG							
2,2'-oxybis(1-Chloropropane)	108-60-1	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
2,3,4,6-Tetrachlorophenol	58-90-2	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	mg/kg	TRG							
2,4,5-Trichlorophenol	95-95-4	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2,4,6-Trichlorophenol	88-06-2	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2,4-Dichlorophenol	120-83-2	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
2,4-Dimethylphenol	105-67-9	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2,4-Dinitrophenol	51-28-5	mg/kg	TRG	1.5 U	1 U		0.79 U	1.7 U		1.7 U
2,4-Dinitrotoluene	121-14-2	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2,6-Dinitrotoluene	606-20-2	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7F	SED7G	SED8C	SED8C	SED8C	SED9.5B	SED9C
			Sample ID	SED7F00N	SED7G00N	SED8C00EN	SED8C00N	SED8C00R	SED9.5B00N	SED9C00N
			Sample Type	N	N	N	N	FD	N	N
			Parent Sample ID					SED8C00N		
			Sample Date	11/25/2013	1/30/2014	6/7/2017	11/14/2013	11/14/2013	11/11/2013	11/11/2013
			Task Code	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type							
2-Chloronaphthalene	91-58-7	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
2-Chlorophenol	95-57-8	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2-Methylnaphthalene	91-57-6	mg/kg	TRG	0.067	0.068		0.033	0.023 J		0.0092 J
2-Methylphenol	95-48-7	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
2-Nitroaniline	88-74-4	mg/kg	TRG	1.5 U	1 U		0.79 U	1.7 U		1.7 U
2-Nitrophenol	88-75-5	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
3,3'-Dichlorobenzidine	91-94-1	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
3-Nitroaniline	99-09-2	mg/kg	TRG	1.5 U	1 U		0.79 U	1.7 U		1.7 U
4,6-Dinitro-2-methylphenol	534-52-1	mg/kg	TRG	1.5 U	1 U		0.79 U	1.7 U		1.7 U
4-Bromophenyl-phenylether	101-55-3	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
4-Chloro-3-methylphenol	59-50-7	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
4-Chloroaniline	106-47-8	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
4-Chlorophenyl-phenylether	7005-72-3	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
4-Methylphenol	106-44-5	mg/kg	TRG	0.3 U	0.11 J		0.15 U	0.33 U		0.32 U
4-Nitroaniline	100-01-6	mg/kg	TRG	1.5 U	1 U		0.79 U	1.7 U		1.7 U
4-Nitrophenol	100-02-7	mg/kg	TRG	1.5 U	1 U		0.79 U	1.7 U		1.7 U
Acenaphthene	83-32-9	mg/kg	TRG	0.064	0.14		0.0089 J	0.067 U	0.017 J	0.016 J
Acenaphthylene	208-96-8	mg/kg	TRG	0.043 J	0.023 J		0.034	0.06 J	0.049 J	0.056 J
Acetophenone	98-86-2	mg/kg	TRG	0.03 J	0.027 J		0.15 U	0.33 U		0.32 U
Anthracene	120-12-7	mg/kg	TRG	0.14	0.21		0.049	0.077	0.087	0.095
Atrazine	1912-24-9	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Benzaldehyde	100-52-7	mg/kg	TRG	0.3 UJ	0.19 J		0.057 J	R		0.063 J
Benzidine	92-87-5	mg/kg	TRG							
Benzo(a)anthracene	56-55-3	mg/kg	TRG	0.59	0.95		0.32	0.45	0.45	0.48
Benzo(a)pyrene	50-32-8	mg/kg	TRG	0.6	0.89		0.39	0.63	0.54	0.62
Benzo(b)fluoranthene	205-99-2	mg/kg	TRG	0.86	1.2		0.24 J	0.92 J	0.88	0.99
Benzo(g,h,i)perylene	191-24-2	mg/kg	TRG	0.64	0.78		0.3 J	0.77 J	0.56	0.74
Benzo(k)fluoranthene	207-08-9	mg/kg	TRG	0.3	0.43		0.57	0.41	0.2	0.29
Benzoic acid	65-85-0	mg/kg	TRG							
bis-(2-chloroethoxy)methane	111-91-1	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
bis-(2-Chloroethyl)ether	111-44-4	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
bis-(2-Ethylhexyl)phthalate	117-81-7	mg/kg	TRG	0.59 J	0.55		1.3	1.8		1.5
Butylbenzylphthalate	85-68-7	mg/kg	TRG	0.12 J	0.18 J		0.041 J	0.084 J		0.32 U
Caprolactam	105-60-2	mg/kg	TRG	1.5 U	1 U		0.39 J	1.7 U		1.7 U
Carbazole	86-74-8	mg/kg	TRG	0.1	0.25		0.03 J	0.075		0.09
Chrysene	218-01-9	mg/kg	TRG	0.89	1.2		0.53	0.75	0.79	0.88
Dibenzo(a,h)anthracene	53-70-3	mg/kg	TRG	0.16	0.15		0.031 U	0.16	0.12	0.14
Dibenzofuran	132-64-9	mg/kg	TRG	0.042 J	0.11 J		0.15 U	0.33 U		0.32 U
Diethylphthalate	84-66-2	mg/kg	TRG	0.3 U	0.2 U		0.035 J	0.12 J		0.32 U
Dimethylphthalate	131-11-3	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Di-n-butylphthalate	84-74-2	mg/kg	TRG	0.3 U	0.2 U		0.023 J	0.33 U		0.32 U
Di-n-octylphthalate	117-84-0	mg/kg	TRG	0.3 U	0.15 J		0.15 U	0.33 U		0.32 U
Diphenylhydrazine-1,2	122-66-7	mg/kg	TRG							
Fluoranthene	206-44-0	mg/kg	TRG	1.3	2.6		0.67	0.97	0.92	0.95
Fluorene	86-73-7	mg/kg	TRG	0.063	0.1		0.026 J	0.033 J	0.022 J	0.032 J
Hexachlorobenzene	118-74-1	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
Hexachlorobutadiene	87-68-3	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
Hexachlorocyclo-pentadiene	77-47-4	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Hexachloroethane	67-72-1	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Indeno(1,2,3-cd)pyrene	193-39-5	mg/kg	TRG	0.51	0.64		0.27 J	0.62 J	0.43	0.57
Isophorone	78-59-1	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Naphthalene	91-20-3	mg/kg	TRG	0.038 J	0.095		0.022 J	0.067 U	0.067 U	0.066 U
Nitrobenzene	98-95-3	mg/kg	TRG	0.6 U	0.4 U		0.31 U	0.67 U		0.66 U
Nitrosodimethylamine-n	62-75-9	mg/kg	TRG							
N-Nitroso-di-n-propylamine	621-64-7	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U
N-Nitrosodiphenylamine	86-30-6	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Pentachlorophenol	87-86-5	mg/kg	TRG	0.3 U	0.2 U		0.15 U	0.33 U		0.32 U
Phenanthrene	85-01-8	mg/kg	TRG	0.56	2		0.22	0.31	0.37	0.39
Phenol	108-95-2	mg/kg	TRG	0.06 U	0.041 U		0.031 U	0.067 U		0.066 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7F	SED7G	SED8C	SED8C	SED8C	SED9.5B	SED9C
			Sample ID	SED7F00N	SED7G00N	SED8C00EN	SED8C00N	SED8C00R	SED9.5B00N	SED9C00N
			Sample Type	N	N	N	N	FD	N	N
			Parent Sample ID					SED8C00N		
			Sample Date	11/25/2013	1/30/2014	6/7/2017	11/14/2013	11/14/2013	11/11/2013	11/11/2013
			Task Code	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type							
Pyrene	129-00-0	mg/kg	TRG	1.1	2.1		0.66	0.93	0.92	1.1
Polybrominated Diphenyl Ethers										
PBDE47	5436-43-1	mg/kg	TRG							
PBDE99	60348-60-9	mg/kg	TRG							
PBDE-100	189084-64-8	mg/kg	TRG							
PBDE153	68631-49-2	mg/kg	TRG							
PBDE-154	207122-15-4	mg/kg	TRG							
VOCs										
1,1,1-Trichloroethane	71-55-6	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,1,2,2-Tetrachloroethane	79-34-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,1,2-Trichloroethane	79-00-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,1-Dichloroethane	75-34-3	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,1-Dichloroethene	75-35-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2,3-Trichlorobenzene	87-61-6	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2,4-Trichlorobenzene	120-82-1	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2-Dibromo-3-chloropropane	96-12-8	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2-Dibromoethane	106-93-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2-Dichlorobenzene	95-50-1	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2-Dichloroethane	107-06-2	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,2-Dichloropropane	78-87-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,3-Dichlorobenzene	541-73-1	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,4-Dichlorobenzene	106-46-7	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
1,4-Dioxane	123-91-1	mg/kg	TRG	2.9 U	1.2 U		2.2 U	2.9 U		2.3 U
2-Butanone	78-93-3	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
2-Hexanone	591-78-6	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
4-Methyl-2-pentanone	108-10-1	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Acetone	67-64-1	mg/kg	TRG	0.057 U	0.023 U		0.045 U	0.057 U		0.045 U
Acrolein	107-02-8	mg/kg	TRG							
Acrylonitrile	107-13-1	mg/kg	TRG							
Benzene	71-43-2	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Bromochloromethane	74-97-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Bromodichloromethane	75-27-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Bromoform	75-25-2	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Bromomethane	74-83-9	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Carbon Disulfide	75-15-0	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Carbon Tetrachloride	56-23-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Chlorobenzene	108-90-7	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Chloroethane	75-00-3	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Chloroform	67-66-3	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Chloromethane	74-87-3	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
cis-1,2-Dichloroethylene	156-59-2	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
cis-1,3-Dichloropropene	10061-01-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Cyclohexane	110-82-7	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Dibromochloromethane	124-48-1	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Dichlorodifluoromethane	75-71-8	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Dichloropropene, 1,3-	542-75-6	mg/kg	TRG							
Ethylbenzene	100-41-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Isopropylbenzene	98-82-8	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
m, p-Xylene	XYLMP	mg/kg	TRG	0.029 U	0.012 U		0.022 U	0.029 U		0.023 U
Methyl Acetate	79-20-9	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Methyl tert-Butyl Ether (MTBE)	1634-04-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Methylcyclohexane	108-87-2	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Methylene Chloride	75-09-2	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
o-Xylene	95-47-6	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Styrene	100-42-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Tetrachloroethylene	127-18-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Toluene	108-88-3	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
trans-1,2-Dichloroethene	156-60-5	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U

Table A-1
Fringe Surface Sediment Data used in BHHRA
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Location ID	SED7F	SED7G	SED8C	SED8C	SED8C	SED9.5B	SED9C
			Sample ID	SED7F00N	SED7G00N	SED8C00EN	SED8C00N	SED8C00R	SED9.5B00N	SED9C00N
			Sample Type	N	N	N	N	FD	N	N
			Parent Sample ID					SED8C00N		
			Sample Date	11/25/2013	1/30/2014	6/7/2017	11/14/2013	11/14/2013	11/11/2013	11/11/2013
			Task Code	Phase2-2013	Phase2-2013	WP#3-2017 Waterside	Phase2-2013	Phase2-2013	Phase2-2013	Phase2-2013
			Depth Interval	0 - 0.5 ft	0 - 0.5 ft	0 - 0.33 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft
Chemical	CAS	Units	Result Type							
trans-1,3-Dichloropropene	10061-02-6	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Trichloroethene	79-01-6	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Trichlorofluoromethane	75-69-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Vinyl Chloride	75-01-4	mg/kg	TRG	0.014 U	0.0058 U		0.011 U	0.014 U		0.011 U
Vinyl ether, 2-chloroethyl	110-75-8	mg/kg	TRG							
Xylenes (total)	1330-20-7	mg/kg	CALC	0.029 U	0.012 U		0.022 U	0.029 U		0.023 U

Table A-2
Fish Fillet Data used in BHHRA for the Upper (Tidal) Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Anacostia River (Encompasses Waterside Investigation Area) (a)													
CHEMICAL	CAS #	Units	UABB01 Brown bullhead 9/26/2013		UABC01 Blue catfish 9/26/2013		UACA01 Carp 9/26/2013		UACC01 Channel catfish 9/26/2013		UALB01 Largemouth bass 9/26/2013		UANS01 Northern snakehead 9/26/2013		UASF01 Sunfish 9/23/2013	
Inorganics																
ALUMINUM	7429-90-5	mg/kg	1.4		0.4	U	0.5	U	0.4	U	0.4	U	0.4	U	1.5	
ARSENIC	7440-38-2	mg/kg	0.092	U	0.093	U	0.113	U	0.094	U	0.101	U	0.109	U	0.094	U
BARIUM	7440-39-3	mg/kg	0.192		0.0252		0.128		0.0407		0.0161		0.0238		0.0668	
BERYLLIUM	7440-41-7	mg/kg	0.004	U	0.004	U	0.005	U	0.004	U	0.004	U	0.004	U	0.004	U
CADMIUM	7440-43-9	mg/kg	0.004	U	0.004	U	0.005	U	0.004	U	0.004	U	0.004	U	0.004	U
CALCIUM	7440-70-2	mg/kg	148		238		508		364		134		131		311	
CHROMIUM	7440-47-3	mg/kg	0.04	U	0.04	U	0.05	U	0.04	U	0.04	U	0.04	U	0.04	U
COBALT	7440-48-4	mg/kg	0.019		0.004	U	0.016		0.004	U	0.007		0.007		0.014	
COPPER	7440-50-8	mg/kg	0.25		0.201		0.777		0.227		0.164		0.19		0.155	
IRON	7439-89-6	mg/kg	5.6		3.6		35.2		4.5		2.8		2.7		2.3	
LEAD	7439-92-1	mg/kg	0.021		0.006		0.021		0.007		0.004	U	0.004	U	0.005	
MAGNESIUM	7439-95-4	mg/kg	241		242		224		235		284		260		256	
MANGANESE	7439-96-5	mg/kg	0.173		0.211		0.266		0.19		0.0957		0.105		0.583	
MERCURY	7439-97-6	mg/kg	0.033		0.121		0.063		0.125		0.236		0.124		0.055	
NICKEL	7440-02-0	mg/kg	0.11		0.04	U	0.05	U	0.04	U	0.11		0.04	U	0.17	
SELENIUM	7782-49-2	mg/kg	0.18	U	0.19	U	0.54		0.19	U	0.26		0.29		0.29	
SODIUM	7440-23-5	mg/kg	567		480		541		589		400		351		720	
THALLIUM	7440-28-0	mg/kg	0.004	U	0.004	U	0.005	U	0.004	U	0.004	U	0.004	U	0.004	U
VANADIUM	7440-62-2	mg/kg	0.04	U	0.04	U	0.05	U	0.04	U	0.04	U	0.04	U	0.04	U
ZINC	7440-66-6	mg/kg	4.68		5.47		12.8		6.96		7.79		7.16		10.4	
Pesticides																
1,2,3,4-TETRACHLOROBENZENE	634-66-2	ug/kg	0.048	U	0.0494	U	0.126		0.087		0.0487	U	0.0494	U	0.146	
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ug/kg	0.373		0.424		1.18		0.355		0.0487	U	0.284		0.655	
2,4'-DDD	53-19-0	ug/kg	0.253		0.477		2.66		1.37		0.48		0.169		0.0502	U
2,4'-DDE	3424-82-6	ug/kg	3.72		4.6		6.01		10.9		5.78		0.0494	U	0.133	
2,4'-DDT	789-02-6	ug/kg	0.115		0.53		1.83		1.26		0.306		0.112		0.286	
4,4'-DDD	72-54-8	ug/kg	1.87		2.76		21.89		7.2		2.29		1.38		0.92	
4,4'-DDE	72-55-9	ug/kg	4.29		13.5		44.3		29.04		9.37		4.94		3.46	
4,4'-DDT	50-29-3	ug/kg	0.048	U	0.28		0.0497	U	1.25		0.37		0.21		0.0502	U
ALDRIN	309-00-2	ug/kg	0.056		0.0494	U	0.06		0.351		0.069		0.382		0.0502	U
ALPHA-BHC	319-84-6	ug/kg	0.11		0.142		0.09		0.119		0.095		0.126		0.054	
ALPHA-CHLORDANE	5103-71-9	ug/kg	5.41		7.03		30.97		15.1		4.65		2.65		1.23	
BETA-BHC	319-85-7	ug/kg	0.599		0.894		0.54		0.518		0.652		0.777		0.68	
CHLORPYRIFOS	2921-88-2	ug/kg	0.048	U	0.0494	U	0.824		0.0434	U	0.117		0.0494	U	0.0502	U
CIS-NONACHLOR	5103-73-1	ug/kg	1.44		2.48		12.9		6.08		3.11		1.64		1.29	
DELTA-BHC	319-86-8	ug/kg	0.048	U	0.0494	U	0.072		0.0434	U	0.0487	U	0.0494	U	0.0502	U
DIELDRIN	60-57-1	ug/kg	1.19		1.69		8.49		2.49		2.53		2.8		1.03	
ENDOSULFAN II	33213-65-9	ug/kg	0.048	U	0.0494	U	0.0483	U	0.0434	U	0.0487	U	0.0494	U	0.0502	U
ENDRIN	72-20-8	ug/kg	0.048	U	0.0494	U	0.28		0.044		0.0487	U	0.0494	U	0.095	
GAMMA CHLORDANE	5566-34-7	ug/kg	3.98		4.34		4.37		9.19		1.76		0.459		0.217	
GAMMA-BHC (LINDANE)	58-89-9	ug/kg	0.06		0.077		0.0483	U	0.082		0.0487	U	0.0494	U	0.0502	U
HEPTACHLOR	76-44-8	ug/kg	0.048	U	0.0494	U	0.0483	U	0.0434	U	0.0487	U	0.0494	U	0.0502	U
HEPTACHLOR EPOXIDE	1024-57-3	ug/kg	0.593		0.737		3.69		1.12		1.07		1.63		0.357	
HEXACHLOROBENZENE	118-74-1	ug/kg	0.175		0.207		0.999		0.378		0.139		0.156		0.126	
MIREX	2385-85-5	ug/kg	0.051		0.135		0.541		0.268		0.138		0.0494	U	0.0502	U
OXYCHLORDANE	27304-13-8	ug/kg	0.635		1.01		4.82		1.71		2.1		1.72		0.723	
PENTACHLOROANISOLE	1825-21-4	ug/kg	0.172		0.189		0.815		0.359		0.109		0.069		0.107	

Table A-2
Fish Fillet Data used in BHHRA for the Upper (Tidal) Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Anacostia River (Encompasses Waterside Investigation Area) (a)													
			UABB01		UABC01		UACA01		UACC01		UALB01		UANS01		UASF01	
			Brown bullhead		Blue catfish		Carp		Channel catfish		Largemouth bass		Northern snakehead		Sunfish	
CHEMICAL	CAS #	Units	9/26/2013		9/26/2013		9/26/2013		9/26/2013		9/26/2013		9/26/2013		9/23/2013	
Semivolatile Organic Compounds																
2,3,5-TRIMETHYLNAPHTHALENE	2245-38-7	ug/kg	5.62		1.82		7.59		3.92		2.01		0.988	U	1.07	
1-METHYLNAPHTHALENE	90-12-0	ug/kg	2.53		2.74		18.8		5.89		3.24		0.988	U	1.01	
1-METHYLPHENANTHRENE	832-69-9	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
2,6-DIMETHYLNAPHTHALENE	581-42-0	ug/kg	4.36		2.26		11.5		5.33		3.7		0.988	U	1.12	
2-METHYLNAPHTHALENE	91-57-6	ug/kg	3.17		3.67		23.3		7.55		4.57		0.7	J	1.35	
ACENAPHTHENE	83-32-9	ug/kg	1.63	J+	1.38	J+	7.8		3.4	J+	2.04	J+	0.988	U	1.01	U
ACENAPHTHYLENE	208-96-8	ug/kg	1.13		0.8	J	2.7		1.81		0.4	J	0.988	U	1.01	U
ANTHRACENE	120-12-7	ug/kg	2.12		1.34		5.8		3.14		0.974	U	0.988	U	1.01	U
BENZO(A)ANTHRACENE	56-55-3	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
BENZO(A)PYRENE	50-32-8	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
BENZO(B)FLUORANTHENE	205-99-2	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
BENZO(E)PYRENE	192-97-2	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
BENZO(G,H,I)PERYLENE	191-24-2	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
BENZO(K)FLUORANTHENE	207-08-9	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
BIPHENYL	92-52-4	ug/kg	1.02		1.22		4		2.26		1.43		0.988	U	1.01	U
C1-CHRYSENES	TTNUS145	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
C1-DIBENZOTHIOPHENES	TTNUS146	ug/kg	1.91		0.988	U	2.15		1.87		0.974	U	0.988	U	1.01	U
C1-FLUORANTHENES/PYRENES	TTNUS147	ug/kg	1.56		1.1		4.7		0.869	U	0.974	U	0.988	U	1.01	U
C1-FLUORENES	TTNUS148	ug/kg	4.5		2.34		10.2		4.31		3.08		1.22		1.01	U
C1-NAPHTHALENES	TTNUS149	ug/kg	5.7		6.41		42.1		13.4		7.81		1.17		2.36	
C1-PHENANTHRENES/ANTHRACENES	TTNUS150	ug/kg	2.09		1.01		3.1		1.59		0.5	J	0.988	U	1.01	U
C2-CHRYSENES	TTNUS154	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
C2-DIBENZOTHIOPHENES	TTNUS155	ug/kg	1.31		0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
C2-FLUORENES	TTNUS156	ug/kg	3.15		1.15		6.8		2.12		1.31		0.988	U	1.01	U
C2-NAPHTHALENES	TTNUS157	ug/kg	11.5		8.41		37.6		19.6		10.5		1.01		3.67	
C2-PHENANTHRENES/ANTHRACENES	TTNUS158	ug/kg	1.75		0.7	J	3.3		1.42		0.5	J	0.988	U	1.01	U
C3-CHRYSENES	TTNUS159	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
C3-DIBENZOTHIOPHENES	TTNUS160	ug/kg	0.99		0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
C3-FLUORENES	TTNUS161	ug/kg	2.23		1		3.8		2.15		1.18		0.988	U	1.01	U
C3-NAPHTHALENES	TTNUS162	ug/kg	12.9		5.91		22.6		11.1		5.77		1.6		3.79	
C3-PHENANTHRENES/ANTHRACENES	TTNUS163	ug/kg	1.38		2.68		8.8		5.93		1.05		0.988	U	1.01	U
C4-CHRYSENES	TTNUS164	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
C4-NAPHTHALENES	TTNUS165	ug/kg	8.38		2.8		12.2		4.43		2.26		0.988	U	2.5	
C4-PHENANTHRENES/ANTHRACENES	TTNUS166	ug/kg	0.98		0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
CHRYSENE	218-01-9	ug/kg	1.31		0.988	U	1.3		1.28		0.974	U	0.988	U	1.01	U
DIBENZO(A,H)ANTHRACENE	53-70-3	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
DIBENZOTHIOPHENE	132-65-0	ug/kg	1.25		0.988	U	1.69		0.96		0.974	U	0.988	U	1.01	U
FLUORANTHENE	206-44-0	ug/kg	6.96		1.29	J+	6.6		3.17		1.39	J+	0.988	U	2.01	
FLUORENE	86-73-7	ug/kg	2.62	J+	1.54	J+	7.2	J+	3.55	J+	2.4	J+	0.988	U	1.3	J+
INDENO(1,2,3-CD)PYRENE	193-39-5	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
NAPHTHALENE	91-20-3	ug/kg	2.4		2.41		10.8		3.95		4.47		2.42		4.68	
PERYLENE	198-55-0	ug/kg	0.96	U	0.988	U	0.965	U	0.869	U	0.974	U	0.988	U	1.01	U
PHENANTHRENE	85-01-8	ug/kg	5.82	J+	1.83	J+	10.5		3.86	J+	2.92	J+	0.988	U	2.15	J+
PYRENE	129-00-0	ug/kg	3.37		0.988	U	2.8		1.15		0.974	U	0.988	U	1.01	U

Table A-2
Fish Fillet Data used in BHHRA for the Upper (Tidal) Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Anacostia River (Encompasses Waterside Investigation Area) (a)													
			UABB01		UABC01		UACA01		UACC01		UALB01		UANS01		UASF01	
			Brown bullhead		Blue catfish		Carp		Channel catfish		Largemouth bass		Northern snakehead		Sunfish	
CHEMICAL	**CAS #**	**Units**	9/26/2013		9/26/2013		9/26/2013		9/26/2013		9/26/2013		9/26/2013		9/23/2013	
Polybrominated diphenyl ethers																
PBDE-1	7025-06-1	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-2	6876-00-2	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-3	101-55-3	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-7	171977-44-9	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-8/11	TTPBDE8.11	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-10	51930-04-2	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-12	189084-59-1	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-13	83694-71-7	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-15	2050-47-7	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-17	147217-75-2	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-25	147217-77-4	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-28	41318-75-6	ug/kg	0.15		0.19		5.92		0.25		0.35		0.22		0.126	U
PBDE-30	155999-95-4	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-32	189084-60-4	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-33	147217-78-5	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-35	147217-80-9	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-37	147217-81-0	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-47	5436-43-1	ug/kg	3.71		8.27		72.5		24.9		10.2		5.9		2.94	
PBDE-49	243982-82-3	ug/kg	0.37		0.24		5.14		0.78		0.86		0.22		0.48	
PBDE-66	189084-61-5	ug/kg	0.12	U	0.32		0.121	U	0.65		0.45		0.124	U	0.16	
PBDE-71	189084-62-6	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-75	189084-63-7	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-77	93703-48-1	ug/kg	0.12	U	0.124	U	0.121	U	0.109	U	0.122	U	0.124	U	0.126	U
PBDE-85	182346-21-0	ug/kg	0.18	U	0.185	U	0.181	U	0.28		0.183	U	0.185	U	0.188	U
PBDE-99	60348-60-9	ug/kg	3.62		6.11		0.181	U	14.3		7.54		0.185	U	1.93	
PBDE-100	189084-64-8	ug/kg	0.91		2.28		11.6		7.54		2.35		0.89		0.73	
PBDE-116	189084-65-9	ug/kg	0.18	U	0.185	U	0.181	U	0.163	U	0.183	U	0.185	U	0.188	U
PBDE-118	446254-80-4	ug/kg	0.18	U	0.185	U	0.181	U	0.21		0.183	U	0.185	U	0.188	U
PBDE-119	189084-66-0	ug/kg	0.18	U	0.185	U	0.181	U	0.163	U	0.183	U	0.185	U	0.188	U
PBDE-126	366791-32-4	ug/kg	0.18	U	0.185	U	0.181	U	0.163	U	0.183	U	0.185	U	0.188	U
PBDE-138	182677-30-1	ug/kg	0.24	U	0.247	U	0.241	U	0.217	U	0.244	U	0.247	U	0.251	U
PBDE-153	68631-49-2	ug/kg	0.46		0.97		0.241	U	1.75		1.04		0.247	U	0.33	
PBDE-154	207122-15-4	ug/kg	0.3		0.61		3.35		1.53		0.64		0.247	U	0.251	U
PBDE-155	35854-94-5	ug/kg	0.24	U	0.247	U	0.92		0.27		0.244	U	0.247	U	0.251	U
PBDE-166	189084-58-0	ug/kg	0.24	U	0.247	U	0.241	U	0.217	U	0.244	U	0.247	U	0.251	U
PBDE-181	189084-67-1	ug/kg	0.3	U	0.309	U	0.302	U	0.272	U	0.305	U	0.309	U	0.314	U
PBDE-183	207122-16-5	ug/kg	0.3	U	0.309	U	0.302	U	0.272	U	0.305	U	0.309	U	0.314	U
PBDE-190	189084-68-2	ug/kg	0.3	U	0.309	U	0.302	U	0.272	U	0.305	U	0.309	U	0.314	U
PBDE-209	1163-19-5	ug/kg	19.2	U	19.8	U	19.3	U	17.4	U	19.5	U	19.8	U	20.1	U
Total PBDEs	TotalPBDE	ug/kg	**9.52**		**18.99**		**99.43**		**52.46**		**23.43**		**7.23**		**6.57**	
PCB Aroclors																
AROCLOR-1242	53469-21-9	ug/kg	13.5		0.988	U	0.995	U	0.869	U	0.975	U	9.57		7.47	
AROCLOR-1248	12672-29-6	ug/kg	12.4		44.1		275		45.5		39.9		10.4		8.97	
AROCLOR-1254	11097-69-1	ug/kg	7.87		0.988	U	137		65		0.975	U	3.48		6.73	
AROCLOR-1260	11096-82-5	ug/kg	22.5		88.2		268		143		79.7		26.1		18.7	
AROCLOR-1268	11100-14-4	ug/kg	0.961	U	8.82		0.995	U	0.869	U	0.975	U	0.988	U	1.01	U
Total Aroclors	TotalAroclor	ug/kg	**56.27**		**141.12**		**680.00**		**253.50**		**119.60**		**49.55**		**41.87**	

Table A-2
Fish Fillet Data used in BHHRA for the Upper (Tidal) Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Anacostia River (Encompasses Waterside Investigation Area) (a)						
CHEMICAL	CAS #	Units	UABB01 Brown bullhead 9/26/2013	UABC01 Blue catfish 9/26/2013	UACA01 Carp 9/26/2013	UACC01 Channel catfish 9/26/2013	UALB01 Largemouth bass 9/26/2013	UANS01 Northern snakehead 9/26/2013	UASF01 Sunfish 9/23/2013
PCB Congeners									
PCB-1	2051-60-7	ug/kg	0.047	0.00988 U	0.202	0.021	0.109	0.05	0.01 U
PCB-7/9	TT_PCBC042	ug/kg	0.00961 U	0.00988 U	0.225	0.00869 U	0.00975 U	0.022	0.109
PCB-8/5	TT_PCBC045	ug/kg	0.577	0.535	1.85	0.386	0.452	0.419	0.292
PCB-15	2050-68-2	ug/kg	0.086	0.00988 U	0.00965 U	0.03	0.00975 U	0.032	0.01 U
PCB-16/32	TT_PCBC014	ug/kg	0.00961 U	0.608	5.85	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-18/17	TT_PCBC019	ug/kg	1.13	1.03	8.33	1.26	0.979	0.121	0.614
PCB-22/51	TT_PCBC025	ug/kg	0.158	0.536	3.8	0.637	0.428	0.095	0.404
PCB-24/27	TT_PCBC026	ug/kg	0.00961 U	0.079	1.86	0.00869 U	0.00975 U	0.081	0.01 U
PCB-25	55712-37-3	ug/kg	2.08	2.37	0.00965 U	3.25	2.59	1.66	1.5
PCB-26	TT_PCBC027	ug/kg	1.57	1.53	0.00965 U	1.79	1.77	1.58	1.67
PCB-28	TT_PCBC028	ug/kg	2.7	3.08	17.2	4.44	3.38	1.62	1.52
PCB-29	TT_PCBC029	ug/kg	0.00961 U	0.012	0.271	0.054	0.058	0.00988 U	0.06
PCB-30	TT_PCBC030	ug/kg	0.026	0.028	0.00965 U	0.026	0.029	0.00988 U	0.054
PCB-31	16606-02-3	ug/kg	0.549	0.363	4.34	0.087	0.556	0.00988 U	0.495
PCB-33/20	TT_PCBC031	ug/kg	0.012	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-39	38444-88-1	ug/kg	0.00961 U	0.058	0.00965 U	0.00869 U	0.243	0.267	0.01 U
PCB-40	TT_PCBC032	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.016	0.032	0.013
PCB-41/64	TT_PCBC033	ug/kg	0.00961 U	0.371	3.8	0.439	0.336	0.00988 U	0.138
PCB-42/59/37	TT_PCBC034	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.076	0.00988 U	0.19
PCB-44	TT_PCBC035	ug/kg	2.43	1.35	18.9	3.57	1.65	0.905	0.854
PCB-45	TT_PCBC036	ug/kg	0.182	0.166	3.28	0.472	0.246	0.00988 U	0.092
PCB-46	41464-47-5	ug/kg	0.092	0.03	1.16	0.704	0.363	0.121	0.175
PCB-47/75	TT_PCBC037	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.044
PCB-48	70362-47-9	ug/kg	1.61	2.67	20.5	5.66	2.52	0.835	0.671
PCB-49	TT_PCBC038	ug/kg	2.19	3.05	21.6	5.11	2.67	0.513	1.08
PCB-52	35693-99-3	ug/kg	3.34 J+	3.31 J+	27.7	3.61 J+	3.5 J+	1.39 J+	1.56 J+
PCB-53	TT_PCBC039	ug/kg	0.15	0.39	3.2	0.372	0.588	0.087	0.159
PCB-60/56	TT_PCBC040	ug/kg	0.00961 U	0.00988 U	16.1	0.00869 U	0.00975 U	0.748	0.013
PCB-63	74472-34-7	ug/kg	0.047	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-66	32598-10-0	ug/kg	1.56	2.3	16.2	4.73	2.48	0.863	0.649
PCB-67	73575-53-8	ug/kg	0.032	0.00988 U	0.00965 U	0.00869 U	0.061	0.00988 U	0.01 U
PCB-69	TT_PCBC041	ug/kg	0.042	0.00988 U	0.149	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-70	TT_PCBC043	ug/kg	0.191	0.159	28.2	0.404	0.00975 U	0.853	0.063
PCB-72	41464-42-0	ug/kg	0.062	0.00988 U	0.00965 U	0.00869 U	0.016	0.00988 U	0.01 U
PCB-74/61	TT_PCBC044	ug/kg	0.00961 U	0.00988 U	24.5	0.00869 U	0.00975 U	1.18	0.01 U
PCB-77	32598-13-3	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-81	70362-50-4	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-82	52663-62-4	ug/kg	0.344	0.15	3.5	0.6	0.371	0.058	0.183
PCB-83	TT_PCBC046	ug/kg	0.065	0.00988 U	0.442	0.00869 U	0.028	0.00988 U	0.01 U
PCB-84	52663-60-2	ug/kg	0.00961 U	0.916	5.6	0.00869 U	0.00975 U	3.42	0.381
PCB-85	TT_PCBC047	ug/kg	0.034	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-87/115	TT_PCBC048	ug/kg	0.919	1.03	12.2	2.46	1.24	0.367	0.677
PCB-92	52663-61-3	ug/kg	0.496	0.00988 U	4.14	1.39	0.323	0.34	0.01 U
PCB-95/80	TT_PCBC049	ug/kg	1.52	1.24	22.3	1.85	1.61	0.532	0.965
PCB-97	TT_PCBC050	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.09	0.114
PCB-99	TT_PCBC051	ug/kg	1.34	4.6	16.9	9.63	2.99	1.22	0.847
PCB-101/90	TT_PCBC001	ug/kg	1.87	4.1	32.5	8.52	4.96	1.68	1.76
PCB-105	32598-14-4	ug/kg	0.804	2.58	10.9	4.55	1.72	0.572	0.806
PCB-107	70424-68-9	ug/kg	0.094	0.877	4.25	1.59	0.546	0.00988 U	0.066
PCB-110	TT_PCBC002	ug/kg	2.67	4.39	26.5	8.74	3.65	1.43	1.62
PCB-114	74472-37-0	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-118	31508-00-6	ug/kg	2.37	8.55	29.9	17.4	5.25	1.87	1.95
PCB-119	TT_PCBC003	ug/kg	0.031	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.03

Table A-2
Fish Fillet Data used in BHHRA for the Upper (Tidal) Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Anacostia River (Encompasses Waterside Investigation Area) (a)						
CHEMICAL	**CAS #**	**Units**	**UABB01 Brown bullhead 9/26/2013**	**UABC01 Blue catfish 9/26/2013**	**UACA01 Carp 9/26/2013**	**UACC01 Channel catfish 9/26/2013**	**UALB01 Largemouth bass 9/26/2013**	**UANS01 Northern snakehead 9/26/2013**	**UASF01 Sunfish 9/23/2013**
PCB-126	57465-28-8	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.05	0.00988 U	0.01 U
PCB-128	TT_PCBC004	ug/kg	0.612	1.99	5.64	3.11	1.08	0.578	0.467
PCB-129	TT_PCBC005	ug/kg	0.00961 U	0.00988 U	0.013	0.021	0.022	0.016	0.01 U
PCB-130	52663-66-8	ug/kg	0.02	0.00988 U	0.07	0.00869 U	0.013	0.024	0.01 U
PCB-135	TT_PCBC006	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.615	0.00988 U	0.01 U
PCB-136	38411-22-2	ug/kg	0.00961 U	0.33	1.79	0.00869 U	0.314	0.16	0.245
PCB-138/160	TT_PCBC007	ug/kg	3.32	18.7	40.9	25	9.79	3.57	2.83
PCB-141/179	TT_PCBC008	ug/kg	1.06	3.38	12.2	2.37	2.12	0.536	0.859
PCB-146	51908-16-8	ug/kg	0.604	3.39	7.44	5.84	1.8	0.823	0.847
PCB-149/123	TT_PCBC009	ug/kg	1.26	3.66	16.8	6.01	2.51	1.1	1.16
PCB-151	TT_PCBC010	ug/kg	0.658	1.9	7.55	4.28	1.35	0.69	0.229
PCB-153/132	TT_PCBC011	ug/kg	2.55	0.00988 U	50.2	42.1	11.9	4.3	3.34
PCB-156	TT_PCBC012	ug/kg	0.35	1.6	4.32	1.77	1.02	0.278	0.228
PCB-157/173/201	TT_PCBC013	ug/kg	0.207	0.663	1.69	1.13	0.347	0.055	0.176
PCB-158	74472-42-7	ug/kg	0.459	2.13	5.89	3.15	1.22	0.441	0.396
PCB-166	TT_PCBC015	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.055	0.019
PCB-167	52663-72-6	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-169	32774-16-6	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-170/190	TT_PCBC016	ug/kg	0.899	5.31	12.4	5.35	3.66	0.872	0.731
PCB-171/202	TT_PCBC017	ug/kg	0.45	1.41	4.42	2.86	1.12	0.355	0.36
PCB-172	52663-74-8	ug/kg	0.243	0.803	1.95	0.762	0.631	0.198	0.136
PCB-174	38411-25-5	ug/kg	0.66	2.26	5.67	2.19	0.95	0.427	0.393
PCB-175	40186-70-7	ug/kg	0.296	0.37	0.545	0.451	0.431	0.268	0.117
PCB-176/137	TT_PCBC018	ug/kg	0.00961 U	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.141
PCB-177	52663-70-4	ug/kg	0.595	1.08	5.41	2.2	0.758	0.432	0.417
PCB-178	52663-67-9	ug/kg	0.192	0.952	2.07	1.82	0.485	0.285	0.215
PCB-180	TT_PCBC020	ug/kg	3.26	16.7	40	18	13.4	3.73	2.42
PCB-183	TT_PCBC021	ug/kg	0.513	2.7	6.77	4.2	2.03	0.586	0.414
PCB-185	TT_PCBC022	ug/kg	0.239	0.452	1.55	0.75	0.247	0.139	0.125
PCB-187	52663-68-0	ug/kg	1.42	6.87	17.6	11.7	5.48	1.73	1.13
PCB-189	39635-31-9	ug/kg	0.04	0.00988 U	0.61	0.214	0.015	0.012	0.014
PCB-191	74472-50-7	ug/kg	0.077	0.00988 U	0.00965 U	0.00869 U	0.00975 U	0.00988 U	0.01 U
PCB-193	TT_PCBC023	ug/kg	0.217	0.858	1.69	1.1	0.698	0.222	0.158
PCB-194	35694-08-7	ug/kg	0.486	2.01	5.35	1.76	1.69	0.391	0.305
PCB-195/208	TT_PCBC024	ug/kg	0.243	1.21	2.74	1.61	0.771	0.214	0.169
PCB-196	42740-50-1	ug/kg	0.507	3.02	6.68	3.96	2.15	0.485	0.489
PCB-197	TTNUS861	ug/kg	0.037	0.174	0.283	0.231	0.123	0.01	0.01 U
PCB-199	52663-75-9	ug/kg	0.573	2.47	5.94	2.6	1.71	0.589	0.566
PCB-200	52663-73-7	ug/kg	0.05	0.00988 U	0.627	0.155	0.068	0.032	0.026
PCB-205	74472-53-0	ug/kg	0.058	0.233	0.506	0.328	0.193	0.034	0.032
PCB-206	40186-72-9	ug/kg	0.24	1	2.81	1.32	0.595	0.21	0.18
PCB-207	52663-79-3	ug/kg	0.04	0.167	0.375	0.24	0.075	0.021	0.01 U
PCB-209	2051-24-3	ug/kg	0.384	0.893	1.72	1.05	0.45	0.629	0.496
Total PCBs	**1336-36-3**	**ug/kg**	**56.239**	**141.143**	**680.568**	**253.414**	**119.685**	**49.550**	**41.648**
PCB-TEQ	**PCB-TEQ**	**ug/kg**	**1.51E-04**	**5.12E-04**	**1.93E-03**	**9.32E-04**	**5.33E-03**	**1.17E-04**	**1.30E-04**

Notes:

(a) The samples collected in the Upper Anacostia River are assumed to reflect overall conditions within the several mile long river reach that was sampled (or the possibly larger home range for some of the fish species sampled), and may not reflect the specific conditions within the Waterside Investigation Area.

Source: Pinkney, A.E. 2017. Analysis of contaminant concentrations in fish tissue collected from the waters of the District of Columbia. Final Report. CBFO-C14-03. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 9/2014. Revised 11/2017.

Table A-3
Fish Fillet Data used in BHHRA for the Lower Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Lower Anacostia River LAAE01 American eel 9/26/2013	LABC01 Blue catfish 9/26/2013	LACA01 Carp 9/26/2013	LACC01 Channel catfish 9/26/2013	LALB01 Largemouth bass 9/26/2013	LASF01 Sunfish 9/26/2013
Inorganics								
ALUMINUM	7429-90-5	mg/kg	1.9	0.4 U	0.6 U	0.4 U	0.4 U	0.4
ARSENIC	7440-38-2	mg/kg	0.146 U	0.091 U	0.245	0.093 U	0.1 U	0.091 U
BARIUM	7440-39-3	mg/kg	1.14	0.0118	0.0364	0.0168	0.0182	0.0603
BERYLLIUM	7440-41-7	mg/kg	0.006 U	0.004 U	0.006 U	0.004 U	0.004 U	0.004 U
CADMIUM	7440-43-9	mg/kg	0.016	0.004 U	0.006 U	0.004 U	0.004 U	0.004 U
CALCIUM	7440-70-2	mg/kg	5800	77.8	215 J	71	276	439
CHROMIUM	7440-47-3	mg/kg	0.08	0.04 U	0.06 U	0.04 U	0.04 U	0.04 U
COBALT	7440-48-4	mg/kg	0.032	0.004 U	0.008	0.004 U	0.006	0.012
COPPER	7440-50-8	mg/kg	0.331	0.36	0.503	0.185	0.172	0.187
IRON	7439-89-6	mg/kg	6.4	1.7	9.8	2.1	2.8	2.3
LEAD	7439-92-1	mg/kg	0.37	0.004 U	0.012	0.005	0.015	0.01
MAGNESIUM	7439-95-4	mg/kg	300	239	230	230	266	246
MANGANESE	7439-96-5	mg/kg	4.56	0.147	0.163	0.1	0.106	0.619
MERCURY	7439-97-6	mg/kg	0.095	0.068	0.025	0.085	0.11	0.049
NICKEL	7440-02-0	mg/kg	0.06	0.04 U	0.06 U	0.04 U	0.05	0.1
SELENIUM	7782-49-2	mg/kg	0.35	0.18 U	0.39	0.19 U	0.31	0.26
SODIUM	7440-23-5	mg/kg	710	410	465	527	481	694
THALLIUM	7440-28-0	mg/kg	0.006 U	0.004 U	0.006 U	0.004 U	0.004 U	0.004 U
VANADIUM	7440-62-2	mg/kg	0.06 U	0.04 U	0.06 U	0.04 U	0.04 U	0.04 U
ZINC	7440-66-6	mg/kg	21.5	3.87	36	5	7.68	11.2
Pesticides								
1,2,3,4-TETRACHLOROBENZENE	634-66-2	ug/kg	0.1 U	0.05 U	0.432	0.0494 U	0.056	0.253
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ug/kg	4.95	1.34	0.0502 U	0.619	0.598	0.964
2,4'-DDD	53-19-0	ug/kg	3.46	0.249	8.53	0.725	0.879	0.292
2,4'-DDE	3424-82-6	ug/kg	0.1 U	0.05 U	27.8	5.17	5.38	1.19
2,4'-DDT	789-02-6	ug/kg	0.1 U	0.865	2.8	0.425	0.524	0.422
4,4'-DDD	72-54-8	ug/kg	33.2	1.97	21.3	4.09	3.46	0.95
4,4'-DDE	72-55-9	ug/kg	100.7	53.1	34.3	13.5	13.4	2.96
4,4'-DDT	50-29-3	ug/kg	4.57	2.14	0.33	0.49	0.05	0.08
ALDRIN	309-00-2	ug/kg	0.1 U	0.089	0.617 J+	0.328	0.0472 U	0.073
ALPHA-BHC	319-84-6	ug/kg	0.1 U	0.636	0.262	0.0494 U	0.156	0.232
ALPHA-CHLORDANE	5103-71-9	ug/kg	52.7	8.16	36.8	8.84	6.02	0.957
BETA-BHC	319-85-7	ug/kg	0.78	0.214	0.562	0.856	0.488	0.067
CHLORPYRIFOS	2921-88-2	ug/kg	1.79	0.152	0.933	0.207	0.0472 U	0.0478 U
CIS-NONACHLOR	5103-73-1	ug/kg	26	0.05 U	10.3	2.38	2.94	1.09
DELTA-BHC	319-86-8	ug/kg	0.1 U	0.216	0.0502 U	0.0494 U	0.0472 U	0.0478 U
DIELDRIN	60-57-1	ug/kg	17.8	2.76	13.4 J+	1.32	1.24	0.753
ENDOSULFAN II	33213-65-9	ug/kg	0.1 U	1.9	0.0502 U	0.0494 U	0.0472 U	0.092
ENDRIN	72-20-8	ug/kg	0.794	3.27	0.406 J+	0.0494 U	0.0472 U	0.114
GAMMA CHLORDANE	5566-34-7	ug/kg	25.1	0.05 U	26.1	0.856	2.18	0.146
GAMMA-BHC (LINDANE)	58-89-9	ug/kg	0.132	0.132	0.162	0.141	0.0472 U	0.0478 U
HEPTACHLOR	76-44-8	ug/kg	0.143	0.455	0.052 J+	0.202	0.0472 U	0.094
HEPTACHLOR EPOXIDE	1024-57-3	ug/kg	5.36	3.36	4.46 J+	0.539	0.192 J+	0.193 J+
HEXACHLOROBENZENE	118-74-1	ug/kg	2.02	1.06	1.51	0.282	0.207	0.195
MIREX	2385-85-5	ug/kg	0.454	0.496	0.077	0.15	0.0472 U	0.0478 U
OXYCHLORDANE	27304-13-8	ug/kg	14.3	0.05 U	4.29	0.777	1.28	0.374
PENTACHLOROANISOLE	1825-21-4	ug/kg	0.752	0.847	1.12	0.219	0.088	0.106

Table A-3
Fish Fillet Data used in BHHRA for the Lower Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Lower Anacostia River LAAE01 American eel 9/26/2013	LABC01 Blue catfish 9/26/2013	LACA01 Carp 9/26/2013	LACC01 Channel catfish 9/26/2013	LALB01 Largemouth bass 9/26/2013	LASF01 Sunfish 9/26/2013
Semivolatile Organic Compounds								
2,3,5-TRIMETHYLNAPHTHALENE	2245-38-7	ug/kg	2 U	1.83	7.31	1.14	0.98	0.956 U
1-METHYLNAPHTHALENE	90-12-0	ug/kg	2 U	4.27	26.6	1.86	2.41	0.7 J
1-METHYLPHENANTHRENE	832-69-9	ug/kg	2 U	1.54	2.18	0.987 U	0.943 U	0.956 U
2,6-DIMETHYLNAPHTHALENE	581-42-0	ug/kg	2 U	1.52	11.1	1.17	1.14	0.956 U
2-METHYLNAPHTHALENE	91-57-6	ug/kg	2.12 J+	3.25 J+	21.2	1.96	1.78	0.7 J
ACENAPHTHENE	83-32-9	ug/kg	18.3	4.51	38.8	2.58 J+	2.89 J+	0.956 U
ACENAPHTHYLENE	208-96-8	ug/kg	2 U	3.1	8.05	1	0.7 J	0.956 U
ANTHRACENE	120-12-7	ug/kg	2 U	5.11	19.1	1.71	1.07	0.956 U
BENZO(A)ANTHRACENE	56-55-3	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
BENZO(A)PYRENE	50-32-8	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
BENZO(B)FLUORANTHENE	205-99-2	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
BENZO(E)PYRENE	192-97-2	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
BENZO(G,H,I)PERYLENE	191-24-2	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
BENZO(K)FLUORANTHENE	207-08-9	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
BIPHENYL	92-52-4	ug/kg	2 U	1 U	2.94	0.987 U	0.943 U	0.956 U
C1-CHRYSENES	TTNUS145	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
C1-DIBENZOTHIOPHENES	TTNUS146	ug/kg	5.13	1.57	3.46	0.987 U	0.943 U	0.956 U
C1-FLUORANTHENES/PYRENES	TTNUS147	ug/kg	6.73	1 U	1 U	0.987 U	0.943 U	0.956 U
C1-FLUORENES	TTNUS148	ug/kg	8.91	2.63	16.7	0.987 U	2.63	1.39
C1-NAPHTHALENES	TTNUS149	ug/kg	4.45	7.52	47.8	3.82	4.19	1.43
C1-PHENANTHRENES/ANTHRACENES	TTNUS150	ug/kg	3.53	1.63	8.49	1.08	0.943 U	0.956 U
C2-CHRYSENES	TTNUS154	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
C2-DIBENZOTHIOPHENES	TTNUS155	ug/kg	4.17	1.8	1 U	0.987 U	0.943 U	0.956 U
C2-FLUORENES	TTNUS156	ug/kg	6.06	2.18	14.5	0.987 U	1.36	0.8 J
C2-NAPHTHALENES	TTNUS157	ug/kg	8.24	6.01	47.1	4.34	3.85	1.03
C2-PHENANTHRENES/ANTHRACENES	TTNUS158	ug/kg	5.91	1 U	7.99	0.7 J	0.5 J	0.956 U
C3-CHRYSENES	TTNUS159	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
C3-DIBENZOTHIOPHENES	TTNUS160	ug/kg	3.68	2.32	1 U	0.987 U	0.943 U	0.956 U
C3-FLUORENES	TTNUS161	ug/kg	2 U	2.33	1 U	0.987 U	1.29	0.956 U
C3-NAPHTHALENES	TTNUS162	ug/kg	11	6.02	27.8	3.78	3.94	1.8
C3-PHENANTHRENES/ANTHRACENES	TTNUS163	ug/kg	14.8	1 U	13.9	2.06	1.68	0.9 J
C4-CHRYSENES	TTNUS164	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
C4-NAPHTHALENES	TTNUS165	ug/kg	8.9	5.35	30.4	3.5	2.76	1.28
C4-PHENANTHRENES/ANTHRACENES	TTNUS166	ug/kg	3.85	1 U	1 U	0.7 J	0.5 J	0.6 J
CHRYSENE	218-01-9	ug/kg	2 U	1 U	1.44	0.987 U	0.943 U	0.956 U
DIBENZO(A,H)ANTHRACENE	53-70-3	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
DIBENZOTHIOPHENE	132-65-0	ug/kg	2 U	1 U	3.64	0.987 U	0.943 U	0.956 U
FLUORANTHENE	206-44-0	ug/kg	2.28 J+	2.29 J+	7.14	1.02 J+	0.9 J+	0.956 U
FLUORENE	86-73-7	ug/kg	2 U	2.69 J+	18	1.34 J+	1.86 J+	1.01 J+
INDENO(1,2,3-CD)PYRENE	193-39-5	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
NAPHTHALENE	91-20-3	ug/kg	14	19.7	68.3	7.25	8.44	4.33
PERYLENE	198-55-0	ug/kg	2 U	1 U	1 U	0.987 U	0.3 J+	0.956 U
PHENANTHRENE	85-01-8	ug/kg	2.04 J+	3.24 J+	15.7	1.44 J+	2.12 J+	1.3 J+
PYRENE	129-00-0	ug/kg	2 U	1 U	3.58	0.987 U	0.943 U	0.956 U

Table A-3
Fish Fillet Data used in BHHRA for the Lower Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Lower Anacostia River LAAE01 American eel 9/26/2013	LABC01 Blue catfish 9/26/2013	LACA01 Carp 9/26/2013	LACC01 Channel catfish 9/26/2013	LALB01 Largemouth bass 9/26/2013	LASF01 Sunfish 9/26/2013
Polybrominated diphenyl ethers								
PBDE-1	7025-06-1	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-2	6876-00-2	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-3	101-55-3	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-7	171977-44-9	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-8/11	TTPBDE8.11	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-10	51930-04-2	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-12	189084-59-1	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-13	83694-71-7	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-15	2050-47-7	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-17	147217-75-2	ug/kg	0.25 U	0.125 U	1.91	0.123 U	0.22	0.12 U
PBDE-25	147217-77-4	ug/kg	0.25 U	0.125 U	0.23	0.123 U	0.118 U	0.12 U
PBDE-28	41318-75-6	ug/kg	1.87	0.42	2.67	0.123 U	0.34	0.12 U
PBDE-30	155999-95-4	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-32	189084-60-4	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-33	147217-78-5	ug/kg	2.05	0.53	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-35	147217-80-9	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-37	147217-81-0	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-47	5436-43-1	ug/kg	21.7	8.71	41.9	7.41	10.3	2.32
PBDE-49	243982-82-3	ug/kg	1.3	0.37	4.57	0.19	1.19	0.35
PBDE-66	189084-61-5	ug/kg	0.25 U	0.17	0.125 U	0.19	0.42	0.13
PBDE-71	189084-62-6	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-75	189084-63-7	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-77	93703-48-1	ug/kg	0.25 U	0.125 U	0.125 U	0.123 U	0.118 U	0.12 U
PBDE-85	182346-21-0	ug/kg	0.375 U	0.188 U	0.188 U	0.185 U	0.177 U	0.179 U
PBDE-99	60348-60-9	ug/kg	0.93	4.11	0.188 U	6.19	4.05	1.51
PBDE-100	189084-64-8	ug/kg	12.4	2.14	5.1	1.91	2.15	0.58
PBDE-116	189084-65-9	ug/kg	0.375 U	0.188 U	0.188 U	0.185 U	0.177 U	0.179 U
PBDE-118	446254-80-4	ug/kg	0.375 U	0.188 U	0.188 U	0.185 U	0.177 U	0.179 U
PBDE-119	189084-66-0	ug/kg	0.375 U	0.188 U	0.188 U	0.185 U	0.177 U	0.179 U
PBDE-126	366791-32-4	ug/kg	0.375 U	0.188 U	0.188 U	0.185 U	0.177 U	0.179 U
PBDE-138	182677-30-1	ug/kg	0.5 U	0.25 U	0.251 U	0.247 U	0.236 U	0.239 U
PBDE-153	68631-49-2	ug/kg	0.76	0.42	0.251 U	0.91	0.49	0.25
PBDE-154	207122-15-4	ug/kg	0.97	0.31	1.47	0.6	0.6	0.239 U
PBDE-155	35854-94-5	ug/kg	0.5 U	0.25 U	0.37	0.247 U	0.236 U	0.239 U
PBDE-166	189084-58-0	ug/kg	0.5 U	0.25 U	0.251 U	0.247 U	0.236 U	0.239 U
PBDE-181	189084-67-1	ug/kg	0.625 U	0.313 U	0.313 U	0.308 U	0.295 U	0.299 U
PBDE-183	207122-16-5	ug/kg	0.625 U	0.313 U	0.313 U	0.308 U	0.295 U	0.299 U
PBDE-190	189084-68-2	ug/kg	0.625 U	0.313 U	0.313 U	0.308 U	0.295 U	0.299 U
PBDE-209	1163-19-5	ug/kg	40 U	20 U	20.1 U	19.7 U	18.9 U	19.1 U
Total PBDEs	TotalPBDE	ug/kg	**41.98**	**17.18**	**58.22**	**17.40**	**19.76**	**5.14**
PCB Aroclors								
AROCLOR-1242	53469-21-9	ug/kg	2 U	1 U	83	9.97	12	6.33
AROCLOR-1248	12672-29-6	ug/kg	215	101	141	21.9	23.9	9.49
AROCLOR-1254	11097-69-1	ug/kg	2 U	88	122	7.97	23.9	6.33
AROCLOR-1260	11096-82-5	ug/kg	430	239	196	79.7	54.3	19
AROCLOR-1268	11100-14-4	ug/kg	2 U	1 U	1 U	0.987 U	0.943 U	0.956 U
Total Aroclors	TotalAroclor	ug/kg	**645.00**	**428.00**	**542.00**	**119.54**	**114.10**	**41.15**

Table A-3
Fish Fillet Data used in BHHRA for the Lower Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Lower Anacostia River LAAE01 American eel 9/26/2013	LABC01 Blue catfish 9/26/2013	LACA01 Carp 9/26/2013	LACC01 Channel catfish 9/26/2013	LALB01 Largemouth bass 9/26/2013	LASF01 Sunfish 9/26/2013
PCB Congeners								
PCB-1	2051-60-7	ug/kg	1.01	0.304	0.01 U	0.038	0.107	0.00956 U
PCB-7/9	TT_PCBC042	ug/kg	0.04	0.01 U	0.01 U	0.00987 U	0.099	0.00956 U
PCB-8/5	TT_PCBC045	ug/kg	0.292	1.17	1.34	0.128	0.436	0.395
PCB-15	2050-68-2	ug/kg	0.588	11.2	0.01 U	0.00987 U	0.00943 U	0.04
PCB-16/32	TT_PCBC014	ug/kg	0.02 U	0.167	6.08 J	0.544	0.00943 U	0.06
PCB-18/17	TT_PCBC019	ug/kg	0.593	0.778	8.26 J+	0.744	1.07	0.242
PCB-22/51	TT_PCBC025	ug/kg	0.092	0.01 U	2.9	0.29	0.183	0.48
PCB-24/27	TT_PCBC026	ug/kg	0.079	0.093	1.33	0.00987 U	0.00943 U	0.147
PCB-25	55712-37-3	ug/kg	31.3	0.01 U	0.01 U	4.21	2.52	0.00956 U
PCB-26	TT_PCBC027	ug/kg	1.53	0.233	4.39	1.94	1.66	1.97
PCB-28	TT_PCBC028	ug/kg	8.67	0.396	13.3 J+	2.7	3.13	1.88
PCB-29	TT_PCBC029	ug/kg	0.211	0.518	1.11 J+	0.025	0.017	0.124
PCB-30	TT_PCBC030	ug/kg	0.02 U	0.561	0.01 U	0.052	0.133	0.038
PCB-31	16606-02-3	ug/kg	0.02 U	8.86	3.99	0.338	0.749	0.56
PCB-33/20	TT_PCBC031	ug/kg	0.025	0.27	0.159	0.00987 U	0.00943 U	0.047
PCB-39	38444-88-1	ug/kg	0.198	0.01 U	0.01 U	0.01	0.093	0.00956 U
PCB-40	TT_PCBC032	ug/kg	0.252	0.01 U	3.47	0.043	0.092	0.092
PCB-41/64	TT_PCBC033	ug/kg	0.315	0.307	5.65	0.329	0.504	0.153
PCB-42/59/37	TT_PCBC034	ug/kg	4.26	0.429	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-44	TT_PCBC035	ug/kg	11.1	0.217	16.1	1.95	2.55	0.919
PCB-45	TT_PCBC036	ug/kg	0.171	0.298	2.3	0.052	0.134	0.222
PCB-46	41464-47-5	ug/kg	0.736	0.01 U	1.47	0.01	0.102	0.00956 U
PCB-47/75	TT_PCBC037	ug/kg	0.02 U	16.7	0.01 U	0.00987 U	0.072	0.00956 U
PCB-48	70362-47-9	ug/kg	14.7	0.01 U	25.1	3.48	3.18	1.2
PCB-49	TT_PCBC038	ug/kg	3.25	0.01 U	18	2.76	3.1	1.32
PCB-52	35693-99-3	ug/kg	21.1	0.892	23.6 J+	2.44 J+	4.37 J+	2.02 J+
PCB-53	TT_PCBC039	ug/kg	0.435	0.535	1.39	0.12	0.259	0.072
PCB-60/56	TT_PCBC040	ug/kg	0.02 U	0.01 U	7.54	0.00987 U	0.00943 U	0.00956 U
PCB-63	74472-34-7	ug/kg	0.02 U	11.9	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-66	32598-10-0	ug/kg	8.52	2.61	6.56 J+	2.23	2.05	0.998
PCB-67	73575-53-8	ug/kg	0.02 U	2.91	0.01 U	0.288	0.00943 U	0.00956 U
PCB-69	TT_PCBC041	ug/kg	0.02 U	0.01 U	0.254	0.00987 U	0.00943 U	0.00956 U
PCB-70	TT_PCBC043	ug/kg	1.18	1.03	21.8 J	0.256	0.00943 U	0.014
PCB-72	41464-42-0	ug/kg	0.25	1.26	0.01 U	0.00987 U	0.00943 U	0.042
PCB-74/61	TT_PCBC044	ug/kg	0.02 U	0.344	14.8	0.00987 U	0.00943 U	0.024
PCB-77	32598-13-3	ug/kg	0.02 U	0.01 U	0.65	0.00987 U	0.00943 U	0.00956 U
PCB-81	70362-50-4	ug/kg	0.02 U	0.01 U	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-82	52663-62-4	ug/kg	2.12	0.01 U	3.41 J	0.11	0.585	0.674
PCB-83	TT_PCBC046	ug/kg	0.02 U	0.122	0.734	0.119	0.091	0.121
PCB-84	52663-60-2	ug/kg	6.3	0.01 U	3.92	1.16	1.28	0.00956 U
PCB-85	TT_PCBC047	ug/kg	0.02 U	0.01 U	1.52	0.00987 U	0.00943 U	0.00956 U
PCB-87/115	TT_PCBC048	ug/kg	4.71	0.141	6.21 J+	0.765	1.56	0.828
PCB-92	52663-61-3	ug/kg	0.02 U	0.01 U	4.1	0.00987 U	0.00943 U	0.00956 U
PCB-95/80	TT_PCBC049	ug/kg	3.2	2.88	18.4 J	0.611	3.03	0.349
PCB-97	TT_PCBC050	ug/kg	0.02 U	0.01 U	1.98	0.307	0.00943 U	0.00956 U
PCB-99	TT_PCBC051	ug/kg	13	48.1	13.7	3.52	3.46	1.09
PCB-101/90	TT_PCBC001	ug/kg	15	52	23.9 J	3.56	6.17	1.39
PCB-105	32598-14-4	ug/kg	10.8	6.14	5.11	1.82	1.54	0.664
PCB-107	70424-68-9	ug/kg	15	0.01 U	1.34 J	0.635	0.657	0.408
PCB-110	TT_PCBC002	ug/kg	27.6	3.74	20.3 J	2.57	4.85	1.81
PCB-114	74472-37-0	ug/kg	0.02 U	0.01 U	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-118	31508-00-6	ug/kg	29.6	0.01 U	15.5 J+	5.87	5.44	1.77
PCB-119	TT_PCBC003	ug/kg	0.02 U	2.35	0.01 U	0.00987 U	0.00943 U	0.109

Table A-3
Fish Fillet Data used in BHHRA for the Lower Anacostia River
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3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Lower Anacostia River LAAE01 American eel 9/26/2013	LABC01 Blue catfish 9/26/2013	LACA01 Carp 9/26/2013	LACC01 Channel catfish 9/26/2013	LALB01 Largemouth bass 9/26/2013	LASF01 Sunfish 9/26/2013
PCB-126	57465-28-8	ug/kg	0.12	0.17	0.06	0.00987 U	0.09	0.01 U
PCB-128	TT_PCBC004	ug/kg	7.43	4.52	3.35 J+	1.35	1.27	0.416
PCB-129	TT_PCBC005	ug/kg	0.127	0.173	0.01 U	0.012	0.033	0.00956 U
PCB-130	52663-66-8	ug/kg	1.48	1.2	0.032	0.339	0.011	0.00956 U
PCB-135	TT_PCBC006	ug/kg	0.02 U	1.89	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-136	38411-22-2	ug/kg	0.02 U	0.01 U	3.1	0.218	0.268	0.5
PCB-138/160	TT_PCBC007	ug/kg	70	39.2	30.9 J	10.9	9.52	2.42
PCB-141/179	TT_PCBC008	ug/kg	13.9	6.73	2.67	1.98	2.1	0.741
PCB-146	51908-16-8	ug/kg	0.02 U	0.01 U	6.22	2.21	1.81	0.00956 U
PCB-149/123	TT_PCBC009	ug/kg	12.6	24.7	19.6	1.52	3.36	1.31
PCB-151	TT_PCBC010	ug/kg	3.26	0.01 U	12.5 J	1.53	1.63	1.01
PCB-153/132	TT_PCBC011	ug/kg	71.7	73.6	39.5 J	17.1	11.7	2.96
PCB-156	TT_PCBC012	ug/kg	3.89	0.01 U	2.08 J	0.899	0.879	0.00956 U
PCB-157/173/201	TT_PCBC013	ug/kg	2.29	1.53	0.758 J+	0.418	0.262	0.138
PCB-158	74472-42-7	ug/kg	0.02 U	4.33	2.77	1.4	1.24	0.00956 U
PCB-166	TT_PCBC015	ug/kg	0.02 U	1.09	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-167	52663-72-6	ug/kg	0.02 U	0.01 U	0.01 U	0.00987 U	0.00943 U	0.035
PCB-169	32774-16-6	ug/kg	0.02 U	0.01 U	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-170/190	TT_PCBC016	ug/kg	17.3	7.2	9.06 J+	3.52	2.3	0.64
PCB-171/202	TT_PCBC017	ug/kg	6.67	6.48	4.12	1.06	0.91	0.448
PCB-172	52663-74-8	ug/kg	3.92	0.01 U	1.23	0.476	0.36	0.313
PCB-174	38411-25-5	ug/kg	5.24	3.96	7.54 J	1.13	0.841	0.446
PCB-175	40186-70-7	ug/kg	1.01	0.928	0.651 J	0.308	0.27	0.29
PCB-176/137	TT_PCBC018	ug/kg	0.02 U	1.11	1.18	0.00987 U	0.00943 U	0.00956 U
PCB-177	52663-70-4	ug/kg	10.5	1.9	6.4 J	0.219	0.709	0.566
PCB-178	52663-67-9	ug/kg	6.02	3.29	3.07	0.726	0.42	0.223
PCB-180	TT_PCBC020	ug/kg	48.1	32.2	29 J	11.3	8.64	2.16
PCB-183	TT_PCBC021	ug/kg	12.3	6.4	5.31	1.98	1.42	0.471
PCB-185	TT_PCBC022	ug/kg	0.02 U	0.01 U	1.33	0.276	0.245	0.189
PCB-187	52663-68-0	ug/kg	56.6	17.4	17.9	4.69	3.8	1.17
PCB-189	39635-31-9	ug/kg	0.02 U	0.045	0.128	0.01	0.00943 U	0.01
PCB-191	74472-50-7	ug/kg	0.02 U	0.097	0.01 U	0.00987 U	0.00943 U	0.00956 U
PCB-193	TT_PCBC023	ug/kg	4.28	0.01 U	0.01 U	0.552	0.419	0.195
PCB-194	35694-08-7	ug/kg	9.37	2.4	3.42	1.19	0.833	0.236
PCB-195/208	TT_PCBC024	ug/kg	4.64	2.06	2.4 J	0.896	0.413	0.14
PCB-196	42740-50-1	ug/kg	12	5.11	5.99 J	2.16	1.19	0.456
PCB-197	TTNUS861	ug/kg	0.664	0.01 U	0.01 U	0.078	0.026	0.079
PCB-199	52663-75-9	ug/kg	13.2	3.4	5.31	1.54	1.08	0.442
PCB-200	52663-73-7	ug/kg	0.02 U	0.01 U	0.657	0.00987 U	0.027	0.00956 U
PCB-205	74472-53-0	ug/kg	0.995	0.374	0.431	0.16	0.144	0.029
PCB-206	40186-72-9	ug/kg	4.08	2.28	1.22	0.71	0.409	0.269
PCB-207	52663-79-3	ug/kg	0.582	0.354	0.305	0.13	0.036	0.021
PCB-209	2051-24-3	ug/kg	2.67	1.58	1.18	0.53	0.218	0.519
Total PCBs	**1336-36-3**	**ug/kg**	**645.165**	**437.156**	**543.039**	**119.541**	**114.156**	**41.114**
PCB-TEQ	**PCB-TEQ**	**ug/kg**	**1.38E-02**	**1.80E-02**	**7.36E-03**	**3.16E-04**	**9.34E-03**	**1.18E-04**

Notes:

Source: Pinkney, A.E. 2017. Analysis of contaminant concentrations in fish tissue collected from the waters of the District of Columbia. Final Report. CBFO-C14-03. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 9/2014. Revised 11/2017.

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Lower Potomac River								
			LPAS01	LPBB01	LPCA01	LPLB01	LPSF01	LPAE01	LPAE02	LPBC01	LPCC01
			American shad	Brown bullhead	Carp	Largemouth bass	Sunfish	American eel	American eel	Blue catfish	Channel catfish
CHEMICAL	CAS #	Units	4/30/2013	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013	9/30/2013	9/23/2013
Metals											
ALUMINUM	7429-90-5	mg/kg	0.5 U	1	0.5 U	0.4 U	7.7	1.7	52	0.4 U	0.7
ARSENIC	7440-38-2	mg/kg	3.71	0.089 U	0.192	0.096 U	0.09 U	0.167 U	0.121 U	0.092 U	0.09 U
BARIUM	7440-39-3	mg/kg	0.0195	0.141	0.133	0.0184	0.0571	0.712	0.206	0.0184	0.0246
BERYLLIUM	7440-41-7	mg/kg	0.005 U	0.004 U	0.005 U	0.004 U	0.004 U	0.007 U	0.005 U	0.004 U	0.004 U
CADMIUM	7440-43-9	mg/kg	0.005 U	0.004 U	0.005 U	0.004 U	0.004 U	0.011	0.005 U	0.004 U	0.004 U
CALCIUM	7440-70-2	mg/kg	489	512	502	419	742	5440	3520	189	92.2
CHROMIUM	7440-47-3	mg/kg	0.05 U	0.05	0.05 U	0.04 U	0.04 U	0.07 U	0.06	0.04 U	0.04 U
COBALT	7440-48-4	mg/kg	0.006	0.02	0.005	0.005	0.005	0.022	0.021	0.004 U	0.004
COPPER	7440-50-8	mg/kg	1.1	0.457	0.289	0.185	0.202	0.313	0.294	0.193	0.261
IRON	7439-89-6	mg/kg	17.7	8.7	6.6	2.8	2.1	5.7	4.6	2.9	3.4
LEAD	7439-92-1	mg/kg	0.005 U	0.014	0.007	0.004 U	0.004 U	0.06	0.027	0.004 U	0.004
MAGNESIUM	7439-95-4	mg/kg	243	237	284	278	259	282	285	261	256
MANGANESE	7439-96-5	mg/kg	0.272	0.394	0.236	0.163	0.724	3.68	2.2	0.19	0.2
MERCURY	7439-97-6	mg/kg	0.039	0.058	0.048	0.143	0.037	0.141	0.127	0.064	0.091
NICKEL	7440-02-0	mg/kg	0.05 U	0.04 U	0.08	0.08	0.11	0.09	0.05 U	0.08	0.04 U
SELENIUM	7782-49-2	mg/kg	0.33	0.18 U	0.35	0.31	0.25	0.33 U	0.24 U	0.18 U	0.18 U
SODIUM	7440-23-5	mg/kg	926	599	324	500	777	813	788	505	515
THALLIUM	7440-28-0	mg/kg	0.005 U	0.004 U	0.005 U	0.004 U	0.004 U	0.007 U	0.005 U	0.004 U	0.004 U
VANADIUM	7440-62-2	mg/kg	0.05 U	0.04 U	0.05 U	0.04 U	0.04 U	0.07 U	0.05 U	0.04 U	0.04 U
ZINC	7440-66-6	mg/kg	4.87	6.1	21.6	10.4	9.61	24.4	27.7	4.49	6.08
Pesticides											
1,2,3,4-TETRACHLOROBENZENE	634-66-2	ug/kg	0.0491 U	0.05 U	0.0497 U	0.0501 U	0.0496 U	0.0791 U	0.125	0.0503 U	0.069
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ug/kg	3.89	3.22	3.85	0.0501 U	0.293	4.63	2.15	2.06	2.54
2,4'-DDD	53-19-0	ug/kg	1.15	1.4	1.17	0.56	0.207	1.37	4.15	0.208	1.84
2,4'-DDE	3424-82-6	ug/kg	0.124	0.05 U	0.0497 U	0.0501 U	0.0496 U	0.0791 U	0.0494 U	0.197	0.0501 U
2,4'-DDT	789-02-6	ug/kg	1.08	1.9	1.78	0.951	0.449	2.32	6.12	1.4	1.46
4,4'-DDD	72-54-8	ug/kg	2.4	1.71	4.2	0.54	0.452	14	3.26	2.93	1.61
4,4'-DDE	72-55-9	ug/kg	7.28	7.54	11	4.14	2.43	60.1	39.6	13.2	8.86
4,4'-DDT	50-29-3	ug/kg	0.88	0.248	0.215	0.144	0.104	6.16	0.986	0.435	0.237
ALDRIN	309-00-2	ug/kg	0.212	0.055	0.0497 U	0.0501 U	0.107	0.186	0.209	0.069	0.096
ALPHA-BHC	319-84-6	ug/kg	0.0491 U	0.05 U	0.149	0.133	0.0496 U	0.413	0.064	0.075	0.065
ALPHA-CHLORDANE	5103-71-9	ug/kg	2.49	2.5	10.1	1.11	0.417	24.1	2.24	5.91	2.54
BETA-BHC	319-85-7	ug/kg	0.475	0.695	0.287	0.32	0.358	0.886	0.389	0.271	0.588
CHLORPYRIFOS	2921-88-2	ug/kg	0.183	0.05 U	0.26	0.0501 U	0.0496 U	0.642	0.535	0.202	0.063
CIS-NONACHLOR	5103-73-1	ug/kg	1.04	1.54	2.68	0.835	0.497	10.7	3.86	2.19	1.45
DELTA-BHC	319-86-8	ug/kg	0.0491 U	0.076	0.0497 U	0.067	0.06	0.0791 U	0.056	0.059	0.0501 U
DIELDRIN	60-57-1	ug/kg	2.67	1.47	5.87	0.817	0.68	14.8	5.11	2.02	0.928
ENDOSULFAN II	33213-65-9	ug/kg	1.11	0.05 U	0.0497 U	0.0501 U	0.404	0.0791 U	0.0494 U	0.0503 U	0.095
ENDRIN	72-20-8	ug/kg	0.343	0.118	0.079	0.0501 U	0.078	0.818	0.11	0.217	0.083
GAMMA CHLORDANE	5566-34-7	ug/kg	1.08	1.38	6.65	0.384	0.0496 U	9.43	0.786	3.55	1.76
GAMMA-BHC (LINDANE)	58-89-9	ug/kg	0.057	0.05 U	0.168	0.054	0.065	0.309	0.0494 U	0.083	0.051
HEPTACHLOR	76-44-8	ug/kg	0.083	0.05 U	0.0497 U	0.0501 U	0.0496 U	0.0791 U	0.164	0.115	0.0501 U
HEPTACHLOR EPOXIDE	1024-57-3	ug/kg	0.798	0.539	2.23	0.414	0.468	5.6	0.752	1.1	0.45
HEXACHLOROBENZENE	118-74-1	ug/kg	0.847	0.064	1.37	0.367	0.261	1.96	0.265	0.139	0.0501 U
MIREX	2385-85-5	ug/kg	0.0491 U	0.05 U	0.13	0.0501 U	0.0496 U	0.21	0.0494 U	0.135	0.058
OXYCHLORDANE	27304-13-8	ug/kg	0.673	0.576	1.49	0.523	0.546	7.25	2.31	0.968	0.773
PENTACHLOROANISOLE	1825-21-4	ug/kg	0.668	0.135	0.722	0.078	0.065	0.836	0.139	0.215	0.175
TOXAPHENE	8001-35-2	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
TRANS-NONACHLOR	39765-80-5	ug/kg	2.81	3.39	6.96	2.18	1.23	35.8	9.48	5.27	3.16

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Lower Potomac River								
			LPAS01	LPBB01	LPCA01	LPLB01	LPSF01	LPAE01	LPAE02	LPBC01	LPCC01
			American shad	Brown bullhead	Carp	Largemouth bass	Sunfish	American eel	American eel	Blue catfish	Channel catfish
CHEMICAL	CAS #	Units	4/30/2013	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013	9/30/2013	9/23/2013
Semivolatile Organic Compounds											
2,3,5-TRIMETHYLNAPHTHALENE	2245-38-7	ug/kg	0.982 U	1 U	3	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
1-METHYLNAPHTHALENE	90-12-0	ug/kg	2.79 J+	1.19 J+	4.41	1 U	0.991 U	1.61 J+	0.987 U	1.01 J+	1 U
1-METHYLPHENANTHRENE	832-69-9	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
2,6-DIMETHYLNAPHTHALENE	581-42-0	ug/kg	1.12 J+	1 U	4.32	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
2-METHYLNAPHTHALENE	91-57-6	ug/kg	4.72 J+	1.59 J+	4.49 J+	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1.03 J+
ACENAPHTHENE	83-32-9	ug/kg	30.8	1 U	4.47	1 U	0.991 U	3.13	0.987 U	1.01 U	1 U
ACENAPHTHYLENE	208-96-8	ug/kg	1.03	1 U	1.35	1 U	0.991 U	1.58 U	0.987 U	1.46	1 U
ANTHRACENE	120-12-7	ug/kg	1.38 J+	1.05 J+	2.35 J+	1 U	0.991 U	1.58 U	0.987 U	2.42 J+	1 U
BENZO(A)ANTHRACENE	56-55-3	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
BENZO(A)PYRENE	50-32-8	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
BENZO(B)FLUORANTHENE	205-99-2	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
BENZO(E)PYRENE	192-97-2	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
BENZO(G,H,I)PERYLENE	191-24-2	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
BENZO(K)FLUORANTHENE	207-08-9	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
BIPHENYL	92-52-4	ug/kg	1.13	1 U	1.31	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C1-CHRYSENES	TTNUS145	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C1-DIBENZOTHIOPHENES	TTNUS146	ug/kg	0.982 U	1 U	1.71	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C1-FLUORANTHENES/PYRENES	TTNUS147	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	3.26	0.987 U	1.01 U	1 U
C1-FLUORENES	TTNUS148	ug/kg	2.82	2.13	5.39	1.83	1.45	2.97	0.987 U	1.01 U	1 U
C1-NAPHTHALENES	TTNUS149	ug/kg	7.51 J+	2.78 J+	8.9 J+	1.06 J+	1.24 J+	3.17 J+	1.23 J+	1.95 J+	1.85 J+
C1-PHENANTHRENES/ANTHRACENES	TTNUS150	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C2-CHRYSENES	TTNUS154	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C2-DIBENZOTHIOPHENES	TTNUS155	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C2-FLUORENES	TTNUS156	ug/kg	2.21	1.31	2.94	1 U	1.3	4.18	0.987 U	1.01 U	1 U
C2-NAPHTHALENES	TTNUS157	ug/kg	3.36	1.8	15	1.18	1.24	2	0.987 U	1.01 U	1.24
C2-PHENANTHRENES/ANTHRACENES	TTNUS158	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.78	0.987 U	1.01 U	1 U
C3-CHRYSENES	TTNUS159	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C3-DIBENZOTHIOPHENES	TTNUS160	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C3-FLUORENES	TTNUS161	ug/kg	0.982 U	1 U	0.994 U	1 U	1.34	3.07	0.987 U	1.01 U	1 U
C3-NAPHTHALENES	TTNUS162	ug/kg	3.55	2.64	12.4	1.01	1.87	4.12	1.85	1.01 U	1 U
C3-PHENANTHRENES/ANTHRACENES	TTNUS163	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	7.45	0.987 U	1.01 U	1 U
C4-CHRYSENES	TTNUS164	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
C4-NAPHTHALENES	TTNUS165	ug/kg	0.982 U	2.95	7.3	1 U	0.991 U	2.46	1.77	1.01 U	1 U
C4-PHENANTHRENES/ANTHRACENES	TTNUS166	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
CHRYSENE	218-01-9	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
DIBENZO(A,H)ANTHRACENE	53-70-3	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
DIBENZOTHIOPHENE	132-65-0	ug/kg	0.982 U	1 U	1.01 J+	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
FLUORANTHENE	206-44-0	ug/kg	3.18 J+	3.78 J+	2.42 J+	1 U	0.991 U	2.8 J+	0.987 U	1.96 J+	1 U
FLUORENE	86-73-7	ug/kg	3.36	1.07 J+	3.78	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
INDENO(1,2,3-CD)PYRENE	193-39-5	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
NAPHTHALENE	91-20-3	ug/kg	4.42 J+	5.42 J+	3.65 J+	2.9 J+	1.64 J+	4.01 J+	1.69 J+	3.04 J+	2.17 J+
PERYLENE	198-55-0	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.8 J+	0.987 U	1.01 U	1 U
PHENANTHRENE	85-01-8	ug/kg	8.49	3.45 J+	4.73 J+	1 U	0.991 U	2.36 J+	0.987 U	1.34 J+	1.1 J+
PYRENE	129-00-0	ug/kg	0.982 U	1.66 J+	1.24 J+	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U

Table A-4
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Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Lower Potomac River LPAS01 American shad 4/30/2013	LPBB01 Brown bullhead 9/23/2013	LPCA01 Carp 9/23/2013 (M)	LPLB01 Largemouth bass 9/23/2013	LPSF01 Sunfish 9/23/2013 (M)	LPAE01 American eel 9/23/2013	LPAE02 American eel 9/23/2013	LPBC01 Blue catfish 9/30/2013	LPCC01 Channel catfish 9/23/2013
Polybrominated Diphenyl Ethers											
PBDE-1	7025-06-1	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-2	6876-00-2	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-3	101-55-3	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-7	171977-44-9	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-8/11	TTPBDE8.11	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-10	51930-04-2	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-12	189084-59-1	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-13	83694-71-7	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-15	2050-47-7	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-17	147217-75-2	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-25	147217-77-4	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-28	41318-75-6	ug/kg	0.123 U	0.125 U	0.35	0.125 U	0.124 U	1.33	0.4	0.126 U	0.125 U
PBDE-30	155999-95-4	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-32	189084-60-4	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-33	147217-78-5	ug/kg	0.123 U	0.125 U	0.54	0.125 U	0.124 U	0.198 U	0.123 U	0.42	0.125 U
PBDE-35	147217-80-9	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-37	147217-81-0	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-47	5436-43-1	ug/kg	1.59	2.19	7.18	2.93	1.22	22.3	4.59	3.38	3.41
PBDE-49	243982-82-3	ug/kg	0.28	0.26	0.76	0.24	0.21	1.08	0.15	0.39	0.125 U
PBDE-66	189084-61-5	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.13
PBDE-71	189084-62-6	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-75	189084-63-7	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-77	93703-48-1	ug/kg	0.123 U	0.125 U	0.124 U	0.125 U	0.124 U	0.198 U	0.123 U	0.126 U	0.125 U
PBDE-85	182346-21-0	ug/kg	0.184 U	0.188 U	0.186 U	0.188 U	0.186 U	0.32	0.185 U	0.189 U	0.188 U
PBDE-99	60348-60-9	ug/kg	0.42	1.54	0.28	0.74	0.4	1.1	0.21	0.92	2.26
PBDE-100	189084-64-8	ug/kg	0.4	0.95	1.05	0.63	0.39	6.64	1.15	1.06	1.51
PBDE-116	189084-65-9	ug/kg	0.184 U	0.188 U	0.186 U	0.188 U	0.186 U	0.297 U	0.185 U	0.189 U	0.188 U
PBDE-118	446254-80-4	ug/kg	0.22	0.188 U	0.186 U	0.188 U	0.186 U	0.297 U	0.185 U	0.189 U	0.188 U
PBDE-119	189084-66-0	ug/kg	0.184 U	0.188 U	0.186 U	0.188 U	0.186 U	0.297 U	0.185 U	0.189 U	0.188 U
PBDE-126	366791-32-4	ug/kg	0.184 U	0.188 U	0.186 U	0.188 U	0.186 U	0.297 U	0.185 U	0.189 U	0.188 U
PBDE-138	182677-30-1	ug/kg	0.246 U	0.25 U	0.249 U	0.25 U	0.248 U	0.396 U	0.247 U	0.252 U	0.25 U
PBDE-153	68631-49-2	ug/kg	0.246 U	0.25 U	0.249 U	0.25 U	0.248 U	0.86	0.247 U	0.252 U	0.44
PBDE-154	207122-15-4	ug/kg	0.246 U	0.25 U	0.42	0.25 U	0.248 U	0.95	0.28	0.252 U	0.37
PBDE-155	35854-94-5	ug/kg	0.246 U	0.25 U	0.249 U	0.25 U	0.248 U	0.396 U	0.247 U	0.252 U	0.25 U
PBDE-166	189084-58-0	ug/kg	0.246 U	0.25 U	0.249 U	0.25 U	0.248 U	0.396 U	0.247 U	0.252 U	0.25 U
PBDE-181	189084-67-1	ug/kg	0.307 U	0.313 U	0.311 U	0.313 U	0.31 U	0.494 U	0.308 U	0.314 U	0.313 U
PBDE-183	207122-16-5	ug/kg	0.307 U	0.313 U	0.311 U	0.313 U	0.31 U	0.494 U	0.308 U	0.314 U	0.313 U
PBDE-190	189084-68-2	ug/kg	0.307 U	0.313 U	0.311 U	0.313 U	0.31 U	0.494 U	0.308 U	0.314 U	0.313 U
PBDE-209	1163-19-5	ug/kg	19.6 U	20 U	19.9 U	20 U	19.8 U	31.6 U	19.7 U	20.1 U	20 U
Total PBDEs	TotalPBDE	ug/kg	**3**	**5**	**11**	**5**	**2**	**35**	**7**	**6**	**8**
PCB Aroclors											
AROCLOR-1242	53469-21-9	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
AROCLOR-1248	12672-29-6	ug/kg	18.7	21.3	23.8	9.33	16.7	20.6	78.2	7.82	10.2
AROCLOR-1254	11097-69-1	ug/kg	11.2	31.9	17.9	12.4	0.991 U	82.4	0.987 U	39.1	40.8
AROCLOR-1260	11096-82-5	ug/kg	22.4	129	59.5	37.3	16.7	206	391	46.9	123
AROCLOR-1268	11100-14-4	ug/kg	0.982 U	1 U	0.994 U	1 U	0.991 U	1.58 U	0.987 U	1.01 U	1 U
TOTAL AROCLORS	TotalAroclor	**ug/kg**	**52**	**182**	**101**	**59**	**33**	**309**	**469**	**94**	**174**

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Lower Potomac River								
			LPAS01	LPBB01	LPCA01	LPLB01	LPSF01	LPAE01	LPAE02	LPBC01	LPCC01
			American shad	Brown bullhead	Carp	Largemouth bass	Sunfish	American eel	American eel	Blue catfish	Channel catfish
CHEMICAL	CAS #	Units	4/30/2013	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013	9/30/2013	9/23/2013
PCB Congeners											
PCB-1	2051-60-7	ug/kg	0.367	0.142	0.122	0.01 U	0.987	0.061	3.76	0.17	0.74
PCB-7/9	TT_PCBC042	ug/kg	0.088	0.218	0.044	0.01 U	0.514	0.097	0.00987 U	0.034	0.409
PCB-8/5	TT_PCBC045	ug/kg	0.384	0.137	0.457	0.459	0.767	0.258	0.21	0.15	0.425
PCB-15	2050-68-2	ug/kg	0.135	0.099	0.23	0.319	0.68	0.638	0.3	0.085	0.342
PCB-16/32	TT_PCBC014	ug/kg	0.163	0.582	0.00994 U	0.01 U	0.248	0.104	0.00987 U	0.074	0.163
PCB-18/17	TT_PCBC019	ug/kg	0.309	0.43	0.877	0.135	0.366	0.188	0.047	0.134	0.363
PCB-22/51	TT_PCBC025	ug/kg	0.278	0.142	0.525	0.01 U	0.11	0.255	0.107	0.063	0.062
PCB-24/27	TT_PCBC026	ug/kg	0.021	0.098	0.00994 U	0.061	0.089	0.041	0.103	0.014	0.041
PCB-25	55712-37-3	ug/kg	0.595	0.718	2.2	0.758	0.924	10.1	1.58	1.45	0.588
PCB-26	TT_PCBC027	ug/kg	1.02	0.27	0.301	0.509	0.572	1.14	0.931	0.616	0.487
PCB-28	TT_PCBC028	ug/kg	0.681	1.6	1.81	0.855	0.878	3.2	3.18	0.98	0.412
PCB-29	TT_PCBC029	ug/kg	0.169	0.055	0.025	0.018	0.00991 U	0.055	0.274	0.133	0.01 U
PCB-30	TT_PCBC030	ug/kg	0.138	0.091	0.075	0.01 U	0.026	0.076	0.032	0.143	0.047
PCB-31	16606-02-3	ug/kg	0.00982 U	0.147	0.764	0.01 U	0.082	0.189	0.194	0.037	0.05
PCB-33/20	TT_PCBC031	ug/kg	0.392	0.01 U	0.023	0.01 U	0.129	0.0158 U	0.258	0.029	0.051
PCB-39	38444-88-1	ug/kg	0.206	0.139	0.023	0.01 U	0.134	0.277	0.286	0.025	0.146
PCB-40	TT_PCBC032	ug/kg	0.223	0.099	0.296	0.18	0.043	0.0158 U	0.085	0.163	0.08
PCB-41/64	TT_PCBC033	ug/kg	0.192	0.245	0.123	0.039	0.089	0.0158 U	0.049	0.0101 U	0.189
PCB-42/59/37	TT_PCBC034	ug/kg	0.723	0.117	0.344	0.116	0.034	1.59	0.00987 U	0.0101 U	0.165
PCB-44	TT_PCBC035	ug/kg	0.763	1.21	3.79	0.711	0.643	1.7	1.6	1.23	1.45
PCB-45	TT_PCBC036	ug/kg	0.373	0.252	0.043	0.01 U	0.067	0.173	0.025	0.071	0.052
PCB-46	41464-47-5	ug/kg	0.1	0.132	0.191	0.01 U	0.087	0.14	0.27	0.085	0.152
PCB-47/75	TT_PCBC037	ug/kg	0.121	0.01 U	0.00994 U	0.01 U	0.00991 U	0.201	0.00987 U	0.077	0.01 U
PCB-48	70362-47-9	ug/kg	0.535	13.6	0.866	2.19	1.25	5.8	31.2	1.6	5.68
PCB-49	TT_PCBC038	ug/kg	1.62	5.08	2.42	1.15	1.04	1.63	1.92	1.63	2.75
PCB-52	35693-99-3	ug/kg	2.27	3.07	3.65	1.55	1.03	8.33	6.62	1.76	2.11
PCB-53	TT_PCBC039	ug/kg	0.00982 U	0.024	0.28	0.01 U	0.101	0.37	0.1	0.095	0.09
PCB-63	74472-34-7	ug/kg	0.161	0.01 U	0.00994 U	0.214	0.074	0.0158 U	0.00987 U	0.205	0.124
PCB-60/56	TT_PCBC040	ug/kg	0.741	0.01 U	0.139	0.256	0.288	0.0158 U	1.01	1.17	0.097
PCB-66	32598-10-0	ug/kg	0.00982 U	1.45	1.04	0.038 J+	0.048	2.06	2.27	0.892	1.06
PCB-67	73575-53-8	ug/kg	0.239	0.126	0.131	0.543	0.109	2.06	0.00987 U	0.099	0.01 U
PCB-69	TT_PCBC041	ug/kg	0.316	0.01 U	0.09	0.01 U	0.126	0.189	0.00987 U	0.0101 U	0.071
PCB-70	TT_PCBC043	ug/kg	0.22	0.01 U	0.418	0.918	0.071	0.331	0.211	0.0101 U	0.01 U
PCB-72	41464-42-0	ug/kg	0.172	0.107	0.104	0.069	0.098	0.0158 U	0.545	0.248	0.111
PCB-74/61	TT_PCBC044	ug/kg	0.634	0.568	0.00994 U	0.01 U	0.615	0.175	2.68	0.063	0.507
PCB-77	32598-13-3	ug/kg	0.00982 U	0.01 U	0.00994 U	0.01 U	0.00991 U	0.0158 U	0.00987 U	0.0101 U	0.02
PCB-81	70362-50-4	ug/kg	0.00982 U	0.01 U	0.00994 U	0.01 U	0.00991 U	0.0158 U	0.00987 U	0.0101 U	0.1
PCB-82	52663-62-4	ug/kg	1.86	0.207	0.385	0.052	0.036	1.13	0.51	0.088	0.064
PCB-83	TT_PCBC046	ug/kg	0.2	0.12	0.085	0.037	0.016	0.0158 U	0.00987 U	0.113	0.078
PCB-84	52663-60-2	ug/kg	0.316	4.7	0.00994 U	1.12	0.715	0.0158 U	0.00987 U	0.0101 U	2.44
PCB-85	TT_PCBC047	ug/kg	0.204	0.067	0.24	0.042	0.032	0.0158 U	0.00987 U	0.0101 U	0.074
PCB-87/115	TT_PCBC048	ug/kg	0.829	1.51	1.4	0.597	0.407	2.48	0.00987 U	0.871	1.16
PCB-92	52663-61-3	ug/kg	0.458	0.01 U	0.00994 U	0.798	0.127	0.0158 U	5.84	0.0101 U	0.01 U
PCB-95/80	TT_PCBC049	ug/kg	0.23	2.32	2.79	0.512	0.135	3.4	0.00987 U	1.82	1.07
PCB-97	TT_PCBC050	ug/kg	0.00982 U	0.039	0.00994 U	0.01 U	0.014	0.0158 U	0.02	0.0101 U	0.101
PCB-99	TT_PCBC051	ug/kg	2.08	3.15	1.07	1.25	2.99	8.63	9.07	2.42	4.56
PCB-101/90	TT_PCBC001	ug/kg	3.4	9.02	4.87	2.97	1.4	11	17.1	3.72	5.78
PCB-105	32598-14-4	ug/kg	0.663	1.64	1.27	0.54	0.344	4.96	3.71	1.37	1.33
PCB-107	70424-68-9	ug/kg	0.537	0.01 U	0.693	0.159	0.184	0.0158 U	0.00987 U	0.205	0.01 U
PCB-110	TT_PCBC002	ug/kg	2.3	4.73	4.13	1.52	0.37	12.6	7.65	2.89	3.56
PCB-114	74472-37-0	ug/kg	0.00982 U	0.01 U	0.00994 U	0.01 U	0.00991 U	0.0158 U	0.00987 U	0.0101 U	0.01 U
PCB-118	31508-00-6	ug/kg	2.24	5.56	3.97	1.85	0.804	12.4	12.7	4.87	5.96
PCB-119	TT_PCBC003	ug/kg	0.074	0.01 U	0.048	0.482	0.062	0.0158 U	0.00987 U	0.073	0.062

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Lower Potomac River								
			LPAS01	LPBB01	LPCA01	LPLB01	LPSF01	LPAE01	LPAE02	LPBC01	LPCC01
			American shad	Brown bullhead	Carp	Largemouth bass	Sunfish	American eel	American eel	Blue catfish	Channel catfish
CHEMICAL	CAS #	Units	4/30/2013	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013 (M)	9/23/2013	9/23/2013	9/30/2013	9/23/2013
PCB-126	57465-28-8	ug/kg	0.00982 U	0.07	0.00994 U	0.01 U	0.02	0.06	0.00987 U	0.05	0.07
PCB-128	TT_PCBC004	ug/kg	0.958	1.67	1.19	0.661	0.317	3.53	5.5	1.2	1.53
PCB-129	TT_PCBC005	ug/kg	0.047	0.044	0.06	0.053	0.027	0.055	0.035	0.055	0.015
PCB-130	52663-66-8	ug/kg	0.047	0.01 U	0.00994 U	0.023	0.014	0.057	0.035	0.0101 U	0.01 U
PCB-135	TT_PCBC006	ug/kg	0.00982 U	0.01 U	0.00994 U	0.01 U	0.018	0.0158 U	0.00987 U	0.0101 U	0.01 U
PCB-136	38411-22-2	ug/kg	0.276	0.849	0.612	0.225	0.00991 U	0.0158 U	0.00987 U	0.311	0.01 U
PCB-138/160	TT_PCBC007	ug/kg	3.95	18	7.88	5.3 J+	2.03	34.1	55.8	8.84	18.5
PCB-141/179	TT_PCBC008	ug/kg	0.173	0.01 U	2.24	1.33	0.718	5.87	9.66	0.0101 U	2.91
PCB-146	51908-16-8	ug/kg	1.22	0.01 U	1.71	1.23	0.618	8.29	14.3	2.48	0.01 U
PCB-149/123	TT_PCBC009	ug/kg	0.00982 U	6.91	3.62	2.07	0.823	9.48	0.00987 U	3.3	4.97
PCB-151	TT_PCBC010	ug/kg	1.18	4.89	1.99	1.12	0.00991 U	2.6	1.76	2.46	3.71
PCB-153/132	TT_PCBC011	ug/kg	4.96	22.2	9.51	6.54 J+	2.45	41.9	73.5	15.9	37.4
PCB-156	TT_PCBC012	ug/kg	0.107	0.903	0.603	0.258	0.00991 U	1.62	2.65	0.613	1.16
PCB-157/173/201	TT_PCBC013	ug/kg	0.156	0.741	0.545	0.178	0.107	0.601	1.49	0.61	0.746
PCB-158	74472-42-7	ug/kg	0.478	1.81	0.00994 U	0.599	0.00991 U	3.3	0.00987 U	1.1	1.94
PCB-166	TT_PCBC015	ug/kg	0.064	0.01 U	0.00994 U	0.128	0.00991 U	0.645	0.00987 U	0.0101 U	0.01 U
PCB-167	52663-72-6	ug/kg	0.088	0.019	0.028	0.068	0.00991 U	0.0158 U	0.00987 U	0.0101 U	0.024
PCB-169	32774-16-6	ug/kg	0.01	0.01 U	0.00994 U	0.01 U	0.00991 U	0.0158 U	0.00987 U	0.0101 U	0.01 U
PCB-170/190	TT_PCBC016	ug/kg	0.352	5.3	2.18	1.54	0.477	6.3	19.1	1.71	3.32
PCB-171/202	TT_PCBC017	ug/kg	0.258	2.23	1.23	0.64	0.332	3.45	7.79	1.24	2.1
PCB-172	52663-74-8	ug/kg	0.00982 U	0.826	0.564	0.01 U	0.00991 U	1.35	0.00987 U	0.443	0.685
PCB-174	38411-25-5	ug/kg	0.247	2.89	1.12	0.636	0.291	2.55	3.19	0.717	2.06
PCB-175	40186-70-7	ug/kg	0.00982 U	0.743	0.695	0.01 U	0.00991 U	0.558	0.00987 U	0.382	0.686
PCB-176/137	TT_PCBC018	ug/kg	0.00982 U	0.554	0.114	0.01 U	0.022	0.0158 U	0.00987 U	0.49	0.101
PCB-177	52663-70-4	ug/kg	0.391	3.93	1.54	0.633	0.341	4.61	12	1.12	2.47
PCB-178	52663-67-9	ug/kg	0.026	2	0.761	0.051	0.00991 U	2.92	0.00987 U	0.91	1.72
PCB-180	TT_PCBC020	ug/kg	1.71	14.1	7.93	5.18	1.7	24.8	45.6	6.23	15.5
PCB-183	TT_PCBC021	ug/kg	1.6	3.04	1.56	1.16	0.421	5.3	16.5	1.64	3.92
PCB-185	TT_PCBC022	ug/kg	0.061	0.932	0.619	0.134	0.142	0.199	0.468	0.543	0.708
PCB-187	52663-68-0	ug/kg	1.9	10.5	3.57	3.06	1.14	23.7	37.4	4.07	10.1
PCB-189	39635-31-9	ug/kg	0.166	0.017	0.037	0.022	0.00991 U	0.0158 U	0.661	0.013	0.01 U
PCB-191	74472-50-7	ug/kg	0.037	0.01 U	0.00994 U	0.01 U	0.00991 U	0.0158 U	0.00987 U	0.154	0.01 U
PCB-193	TT_PCBC023	ug/kg	0.602	1.03	0.475	0.26	0.124	1.82	4.26	0.474	0.985
PCB-194	35694-08-7	ug/kg	0.249	2.04	0.892	0.61	0.226	2.85	9.53	0.529	1.63
PCB-195/208	TT_PCBC024	ug/kg	0.111	1.72	0.708	0.326	0.00991 U	2.07	4.17	0.474	1.35
PCB-196	42740-50-1	ug/kg	0.335	3.64	1.42	0.975	0.376	5.72	12.7	1.24	3.61
PCB-197	TTNUS861	ug/kg	0.016	0.19	0.38	0.01 U	0.00991 U	0.235	0.00987 U	0.249	0.205
PCB-199	52663-75-9	ug/kg	0.00982 U	2.45	1.3	0.728	0.293	6.52	10.7	0.924	2.12
PCB-200	52663-73-7	ug/kg	0.011	0.252	0.285	0.01 U	0.00991 U	0.0158 U	0.00987 U	0.161	0.113
PCB-205	74472-53-0	ug/kg	0.012	0.153	0.174	0.01 U	0.069	0.471	0.586	0.054	0.262
PCB-206	40186-72-9	ug/kg	0.269	0.786	0.385	0.258	0.011	2.5	1.79	0.509	0.701
PCB-207	52663-79-3	ug/kg	0.172	0.145	0.185	0.01 U	0.00991 U	0.289	0.332	0.081	0.153
PCB-209	2051-24-3	ug/kg	0.269	0.182	0.701	0.01 U	0.235	0.746	1.36	0.653	0.757
Total PCBs	1336-36-3	**ug/kg**	**52**	**182**	**101**	**59**	**33**	**309**	**469**	**94**	**174**
PCB-TEQ	PCB-TEQ	**ug/kg**	**4.03E-04**	**7.47E-03**	**3.02E-04**	**1.50E-04**	**2.06E-03**	**6.87E-03**	**6.36E-04**	**5.32E-03**	**7.46E-03**

Source: Pinkney, A.E. 2017. Analysis of contaminant concentrations in fish tissue collected from the waters of the District of Columbia. Final Report. CBFO-C14-03. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 9/2014. Revised 11/2017.

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Upper Potomac River								
			UPBB01 Brown bullhead 9/24/2013	UPCA01 Carp 9/24/2013	UPLB01 Largemouth bass 9/24/2013	UPNS01 N. snakehead 5/13/2013	UPSB01 Striped bass 5/9/2013	UPSF01 Sunfish 9/24/2013	UPWP01 White perch 5/9/2013	UPAE01 American eel 9/24/2013	UPCC01 Channel catfish 9/24/2013
Metals											
ALUMINUM	7429-90-5	mg/kg	0.4	0.5 U	0.4 U	0.4 U	0.5 U	0.3 U	0.5	1	0.4 U
ARSENIC	7440-38-2	mg/kg	0.095 U	0.247	0.101 U	0.108 U	0.846	0.112	0.328	0.235	0.1 U
BARIUM	7440-39-3	mg/kg	0.0851	0.0792	0.0154	0.0183	0.0242	0.0598	0.0357	0.158	0.0175
BERYLLIUM	7440-41-7	mg/kg	0.004 U	0.005 U	0.004 U	0.004 U	0.005 U	0.003 U	0.004 U	0.006 U	0.004 U
CADMIUM	7440-43-9	mg/kg	0.004 U	0.005 U	0.004 U	0.004 U	0.005 U	0.003 U	0.004 U	0.006 U	0.004 U
CALCIUM	7440-70-2	mg/kg	80.4	224	303	121	114	708	338	2980	64.5
CHROMIUM	7440-47-3	mg/kg	0.04 U	0.05 U	0.16	0.04 U	0.05 U	0.03 U	0.04 U	0.07	0.04 U
COBALT	7440-48-4	mg/kg	0.017	0.009	0.005	0.004 U	0.005 U	0.005	0.013	0.008	0.007
COPPER	7440-50-8	mg/kg	0.395	0.744	0.189	0.212	0.508	0.151	0.386	0.201	0.221
IRON	7439-89-6	mg/kg	7.9	22.5	2.4	3.2	6	2.4	3.9	2.5	2.6
LEAD	7439-92-1	mg/kg	0.01	0.008	0.004 U	0.004 U	0.005 U	0.003 U	0.004 U	0.036	0.004 U
MAGNESIUM	7439-95-4	mg/kg	243	244	287	257	260	246	259	221	256
MANGANESE	7439-96-5	mg/kg	0.122	0.175	0.14	0.0977	0.142	0.303	0.224	1.8	0.127
MERCURY	7439-97-6	mg/kg	0.05	0.099	0.241	0.11	0.117	0.097	0.104	0.209	0.076
NICKEL	7440-02-0	mg/kg	0.05	0.05 U	0.15	0.04 U	0.05 U	0.53	0.11	0.06 U	0.04 U
SELENIUM	7782-49-2	mg/kg	0.19 U	0.43	0.36	0.27	0.49	0.28	0.6	0.32 U	0.2 U
SODIUM	7440-23-5	mg/kg	610	491	516	462	496	588	680	583	486
THALLIUM	7440-28-0	mg/kg	0.004 U	0.005 U	0.004 U	0.004 U	0.005 U	0.003 U	0.004 U	0.006 U	0.004 U
VANADIUM	7440-62-2	mg/kg	0.04 U	0.05 U	0.04 U	0.04 U	0.05 U	0.03 U	0.04 U	0.06 U	0.04 U
ZINC	7440-66-6	mg/kg	6.17	31.8	9.78	8.46	6.75	14.7	12.7	19.4	5.17
Pesticides											
1,2,3,4-TETRACHLOROBENZENE	634-66-2	ug/kg	0.142	0.0499 U	0.723	0.0496 U	0.0497 U	0.0492 U	0.0498 U	0.05 U	0.0502 U
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ug/kg	3.64	2.41	4.41	1.91	0.0497 U	2.15	2.91	0.331	2.59
2,4'-DDD	53-19-0	ug/kg	0.07	4.18	0.461	0.096	0.0497 U	0.367	1.2	2.75	2.78
2,4'-DDE	3424-82-6	ug/kg	0.05 U	10.8	0.055	0.127	117	0.0492 U	1.07	0.05 U	6.6
2,4'-DDT	789-02-6	ug/kg	0.154	3.98	0.0494 U	0.493	0.0497 U	0.365	0.458	9.96	1.57
4,4'-DDD	72-54-8	ug/kg	1.08	6.23	0.291	1.88	51.6	0.406	1.27	25.1	4.57
4,4'-DDE	72-55-9	ug/kg	5.15	22.8	4.7	9.67	237	4.16	7.81	243	27.3
4,4'-DDT	50-29-3	ug/kg	0.072	0.091	0.104	0.152	5.51	0.212	0.481	7.06	2.05
ALDRIN	309-00-2	ug/kg	0.05 U	0.0499 U	0.113	0.115	0.067	0.0492 U	0.3	1.2	0.0502 U
ALPHA-BHC	319-84-6	ug/kg	0.051	0.0499 U	0.0494 U	0.0496 U	0.0497 U	0.0492 U	0.0498 U	0.2	0.0502 U
ALPHA-CHLORDANE	5103-71-9	ug/kg	2.84	12	0.796	0.205	53.7	0.53	1.01	29.4	10.1
BETA-BHC	319-85-7	ug/kg	0.496	0.06	0.611	0.44	2.74	0.266	0.722	0.798	0.089
CHLORPYRIFOS	2921-88-2	ug/kg	0.19	0.3	0.139	0.479	0.0497 U	0.345	0.501	1.4	0.072
CIS-NONACHLOR	5103-73-1	ug/kg	1.25	4.98	0.102	0.912	0.0497 U	0.572	1.01	22.2	3.78
DELTA-BHC	319-86-8	ug/kg	0.05 U	0.0499 U	0.405	0.24	0.089	0.215	0.085	0.05 U	0.069
DIELDRIN	60-57-1	ug/kg	1	4.69	0.345	0.589	37.8	0.465	1.01	15.6	4.04
ENDOSULFAN II	33213-65-9	ug/kg	0.058	0.0499 U	0.051	0.057	7.25	0.0492 U	0.068	17.6	0.0502 U
ENDRIN	72-20-8	ug/kg	0.05 U	0.072	0.125	0.165	22.4	0.0492 U	0.194	0.05 U	0.115
GAMMA CHLORDANE	5566-34-7	ug/kg	1.74	5.97	0.221	0.1	0.0497 U	0.057	0.205	8.76	5.72
GAMMA-BHC (LINDANE)	58-89-9	ug/kg	0.05 U	0.07	0.056	0.12	0.163	0.067	0.163	0.05 U	0.0502 U
HEPTACHLOR	76-44-8	ug/kg	0.092	0.0499 U	0.0494 U	0.0496 U	0.0497 U	0.0492 U	0.102	0.529	0.0502 U
HEPTACHLOR EPOXIDE	1024-57-3	ug/kg	0.725	1.58	0.213	0.592	6.9	0.369	0.679	4.53	2.13
HEXACHLOROBENZENE	118-74-1	ug/kg	0.05 U	0.651	0.0494 U	0.0496 U	3.5	0.0492 U	0.0498 U	1.85	0.471
MIREX	2385-85-5	ug/kg	0.05 U	0.0499 U	0.0494 U	0.064	0.371	0.0492 U	0.0498 U	0.785	0.106
OXYCHLORDANE	27304-13-8	ug/kg	0.657	1.74	0.45	0.796	0.118	0.899	0.454	9.85	1.85
PENTACHLOROANISOLE	1825-21-4	ug/kg	0.087	0.611	0.0494 U	0.0496 U	1.28	0.052	0.116	0.581	0.646
TOXAPHENE	8001-35-2	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.984 U	0.996 U	1 U	1 U
TRANS-NONACHLOR	39765-80-5	ug/kg	3.33	10.4	1.95	1.45	0.0497 U	1.37	1.47	62.6	11.6

Table A-4
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			Upper Potomac River								
CHEMICAL	CAS #	Units	UPBB01 Brown bullhead 9/24/2013	UPCA01 Carp 9/24/2013	UPLB01 Largemouth bass 9/24/2013	UPNS01 N. snakehead 5/13/2013	UPSB01 Striped bass 5/9/2013	UPSF01 Sunfish 9/24/2013	UPWP01 White perch 5/9/2013	UPAE01 American eel 9/24/2013	UPCC01 Channel catfish 9/24/2013
Semivolatile Organic Compounds											
2,3,5-TRIMETHYLNAPHTHALENE	2245-38-7	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1.09
1-METHYLNAPHTHALENE	90-12-0	ug/kg	0.999 U	2.68 J+	0.988 U	0.992 U	2.25 J+	0.985 U	0.996 U	2.69 J+	3.14 J+
1-METHYLPHENANTHRENE	832-69-9	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	1.33 J+	0.985 U	0.996 U	1 U	1 U
2,6-DIMETHYLNAPHTHALENE	581-42-0	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1.52
2-METHYLNAPHTHALENE	91-57-6	ug/kg	0.999 U	2.87 J+	0.988 U	0.992 U	3.78 J+	0.985 U	0.996 U	2.13 J+	3.27 J+
ACENAPHTHENE	83-32-9	ug/kg	1.48 J+	4.78	0.988 U	0.992 U	10.6	0.985 U	0.996 U	15.6	8.55
ACENAPHTHYLENE	208-96-8	ug/kg	0.999 U	1.42	0.988 U	0.992 U	5.07	0.985 U	0.996 U	2.15	2.36
ANTHRACENE	120-12-7	ug/kg	0.999 U	2.13 J+	0.988 U	0.992 U	8.44	0.985 U	0.996 U	1.75	3.68 J+
BENZO(A)ANTHRACENE	56-55-3	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
BENZO(A)PYRENE	50-32-8	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
BENZO(B)FLUORANTHENE	205-99-2	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	1.79 J+	0.985 U	0.996 U	1 U	1 U
BENZO(E)PYRENE	192-97-2	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
BENZO(G,H,I)PERYLENE	191-24-2	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
BENZO(K)FLUORANTHENE	207-08-9	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
BIPHENYL	92-52-4	ug/kg	1.73	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
C1-CHRYSENES	TTNUS145	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
C1-DIBENZOTHIOPHENES	TTNUS146	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	3.09	1.05
C1-FLUORANTHENES/PYRENES	TTNUS147	ug/kg	0.999 U	5.48	0.988 U	0.992 U	6.99	0.985 U	0.996 U	12.5	2.8
C1-FLUORENES	TTNUS148	ug/kg	1.47	2.22	1.21	0.992 U	2.66	1.27	1.11	3.07	2.75
C1-NAPHTHALENES	TTNUS149	ug/kg	1.62 J+	5.55 J+	1.34 J+	0.992 U	6.03 J+	1.13 J+	1.02 J+	4.82 J+	6.41 J+
C1-PHENANTHRENES/ANTHRACENES	TTNUS150	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	3.21	0.985 U	0.996 U	2.37	1.65
C2-CHRYSENES	TTNUS154	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
C2-DIBENZOTHIOPHENES	TTNUS155	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	5.11	1 U
C2-FLUORENES	TTNUS156	ug/kg	0.999 U	1.7	0.988 U	0.992 U	2.87	0.985 U	0.996 U	4.51	1.15
C2-NAPHTHALENES	TTNUS157	ug/kg	1.52	3.08	0.988 U	0.992 U	2.53	0.985 U	0.996 U	5.39	5.88
C2-PHENANTHRENES/ANTHRACENES	TTNUS158	ug/kg	0.999 U	1.54	0.988 U	0.992 U	3.59	0.985 U	0.996 U	3.03	1.06
C3-CHRYSENES	TTNUS159	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
C3-DIBENZOTHIOPHENES	TTNUS160	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	2.15	1 U
C3-FLUORENES	TTNUS161	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	2.28	0.985 U	0.996 U	3.77	1.06
C3-NAPHTHALENES	TTNUS162	ug/kg	2.51	2.81	0.988 U	0.992 U	1.91	0.985 U	0.996 U	6.09	4.9
C3-PHENANTHRENES/ANTHRACENES	TTNUS163	ug/kg	0.999 U	15.4	0.988 U	2.04	32	0.985 U	0.996 U	43.4	5.33
C4-CHRYSENES	TTNUS164	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
C4-NAPHTHALENES	TTNUS165	ug/kg	0.999 U	2.87	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	2.66
C4-PHENANTHRENES/ANTHRACENES	TTNUS166	ug/kg	0.999 U	1.12	0.988 U	0.992 U	3.23	0.985 U	0.996 U	4.43	1.51
CHRYSENE	218-01-9	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
DIBENZO(A,H)ANTHRACENE	53-70-3	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
DIBENZOTHIOPHENE	132-65-0	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1.02 J+
FLUORANTHENE	206-44-0	ug/kg	2.42 J+	3.32 J+	0.988 U	0.992 U	1.38 J+	0.985 U	0.996 U	3.84 J+	3 J+
FLUORENE	86-73-7	ug/kg	0.999 U	2.93 J+	0.988 U	0.992 U	2.74 J+	0.985 U	0.996 U	1 U	2.88 J+
INDENO(1,2,3-CD)PYRENE	193-39-5	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
NAPHTHALENE	91-20-3	ug/kg	8.25 J+	4.09 J+	2.52 J+	2.48 J+	4.95 J+	3.52 J+	3.07 J+	4.26 J+	3.84 J+
PERYLENE	198-55-0	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1 U	1 U
PHENANTHRENE	85-01-8	ug/kg	3.71 J+	4.68 J+	1.36 J+	0.992 U	4.43 J+	1.11 J+	0.996 U	2.99 J+	5.68 J+
PYRENE	129-00-0	ug/kg	1.08 J+	1.58 J+	0.988 U	0.992 U	0.994 U	0.985 U	0.996 U	1.55 J+	1 U

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Fish Fillet Data used in BHHRA for the Potomac River
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			Upper Potomac River								
CHEMICAL	**CAS #**	**Units**	**UPBB01 Brown bullhead 9/24/2013**	**UPCA01 Carp 9/24/2013**	**UPLB01 Largemouth bass 9/24/2013**	**UPNS01 N. snakehead 5/13/2013**	**UPSB01 Striped bass 5/9/2013**	**UPSF01 Sunfish 9/24/2013**	**UPWP01 White perch 5/9/2013**	**UPAE01 American eel 9/24/2013**	**UPCC01 Channel catfish 9/24/2013**
Polybrominated Diphenyl Ethers											
PBDE-1	7025-06-1	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-2	6876-00-2	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-3	101-55-3	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-7	171977-44-9	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-8/11	TTPBDE8.11	ug/kg	0.125 U	0.64	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-10	51930-04-2	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-12	189084-59-1	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-13	83694-71-7	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-15	2050-47-7	ug/kg	0.125 U	0.5	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-17	147217-75-2	ug/kg	0.125 U	0.21	0.124 U	0.124 U	1.47	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-25	147217-77-4	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.26	0.123 U	0.124 U	0.125 U	0.18
PBDE-28	41318-75-6	ug/kg	0.14	1.65	0.124 U	0.124 U	2.01	0.123 U	0.124 U	0.39	0.18
PBDE-30	155999-95-4	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-32	189084-60-4	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-33	147217-78-5	ug/kg	0.125 U	0.5	0.124 U	0.124 U	3.13	0.123 U	0.124 U	4.48	0.47
PBDE-35	147217-80-9	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-37	147217-81-0	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-47	5436-43-1	ug/kg	0.62	16.8	1.42	0.86	54.2	1.19	0.75	43.4	7.08
PBDE-49	243982-82-3	ug/kg	0.125 U	1.5	0.18	0.124 U	7.01	0.19	0.16	3.1	0.23
PBDE-66	189084-61-5	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.3	0.19
PBDE-71	189084-62-6	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-75	189084-63-7	ug/kg	0.125 U	0.21	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-77	93703-48-1	ug/kg	0.125 U	0.125 U	0.124 U	0.124 U	0.124 U	0.123 U	0.124 U	0.125 U	0.125 U
PBDE-85	182346-21-0	ug/kg	0.187 U	0.187 U	0.185 U	0.186 U	0.186 U	0.185 U	0.187 U	0.25	0.188 U
PBDE-99	60348-60-9	ug/kg	0.63	0.25	0.33	0.186 U	0.35	0.48	0.187 U	0.81	4.29
PBDE-100	189084-64-8	ug/kg	0.29	3.18	0.42	0.23	7.06	0.35	0.19	19.4	2.39
PBDE-116	189084-65-9	ug/kg	0.187 U	0.187 U	0.185 U	0.186 U	0.186 U	0.185 U	0.187 U	0.188 U	0.188 U
PBDE-118	446254-80-4	ug/kg	0.187 U	0.187 U	0.185 U	0.186 U	0.186 U	0.185 U	0.187 U	0.188 U	0.188 U
PBDE-119	189084-66-0	ug/kg	0.187 U	0.187 U	0.185 U	0.186 U	0.186 U	0.185 U	0.187 U	0.188 U	0.188 U
PBDE-126	366791-32-4	ug/kg	0.187 U	0.187 U	0.185 U	0.186 U	0.186 U	0.185 U	0.187 U	0.188 U	0.188 U
PBDE-138	182677-30-1	ug/kg	0.25 U	0.25 U	0.247 U	0.248 U	0.249 U	0.246 U	0.249 U	0.25 U	0.45
PBDE-153	68631-49-2	ug/kg	0.25 U	0.25 U	0.247 U	0.248 U	0.29	0.246 U	0.249 U	0.63	0.47
PBDE-154	207122-15-4	ug/kg	0.25 U	0.79	0.247 U	0.248 U	1.27	0.246 U	0.249 U	1.49	0.39
PBDE-155	35854-94-5	ug/kg	0.25 U	0.3	0.247 U	0.248 U	0.63	0.246 U	0.249 U	0.75	0.251 U
PBDE-166	189084-58-0	ug/kg	0.25 U	0.25 U	0.247 U	0.248 U	0.249 U	0.246 U	0.249 U	0.25 U	0.251 U
PBDE-181	189084-67-1	ug/kg	0.312 U	0.312 U	0.309 U	0.31 U	0.311 U	0.308 U	0.311 U	0.312 U	0.313 U
PBDE-183	207122-16-5	ug/kg	0.312 U	0.312 U	0.309 U	0.31 U	0.311 U	0.308 U	0.311 U	0.312 U	0.313 U
PBDE-190	189084-68-2	ug/kg	0.312 U	0.312 U	0.309 U	0.31 U	0.311 U	0.308 U	0.311 U	0.312 U	0.313 U
PBDE-209	1163-19-5	ug/kg	20 U	20 U	19.8 U	19.8 U	19.9 U	19.7 U	19.9 U	20 U	20.1 U
Total PBDEs	TotalPBDE	ug/kg	**2**	**27**	**2**	**1**	**78**	**2**	**1**	**75**	**16**
PCB Aroclors											
AROCLOR-1242	53469-21-9	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.984 U	0.996 U	1 U	1 U
AROCLOR-1248	12672-29-6	ug/kg	14.5	105	9.49	14.1	251	12.1	19.3	121	30
AROCLOR-1254	11097-69-1	ug/kg	0.999 U	52.5	9.49	7.06	503	4.05	0.996 U	485	60.1
AROCLOR-1260	11096-82-5	ug/kg	16.9	368	24.7	40.3	855	28.3	48.2	909	141
AROCLOR-1268	11100-14-4	ug/kg	0.999 U	0.998 U	0.988 U	0.992 U	0.994 U	0.984 U	0.996 U	1 U	1 U
TOTAL AROCLORS	TotalAroclor	**ug/kg**	**31**	**526**	**44**	**61**	**1609**	**44**	**68**	**1515**	**231**

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Potomac River								
CHEMICAL	CAS #	Units	UPBB01 Brown bullhead 9/24/2013	UPCA01 Carp 9/24/2013	UPLB01 Largemouth bass 9/24/2013	UPNS01 N. snakehead 5/13/2013	UPSB01 Striped bass 5/9/2013	UPSF01 Sunfish 9/24/2013	UPWP01 White perch 5/9/2013	UPAE01 American eel 9/24/2013	UPCC01 Channel catfish 9/24/2013
PCB Congeners											
PCB-1	2051-60-7	ug/kg	0.195	0.00998 U	2.23	0.089	18.4	0.153	0.22	14.2	0.153
PCB-7/9	TT_PCBC042	ug/kg	0.257	0.259	0.16	0.546	0.155	0.213	0.117	0.242	0.017
PCB-8/5	TT_PCBC045	ug/kg	0.132	0.777	0.122	0.262	0.224	0.023	0.08	0.288	0.184
PCB-15	2050-68-2	ug/kg	0.229	0.154	0.586	0.319	4.31	0.455	0.404	0.098	0.155
PCB-16/32	TT_PCBC014	ug/kg	0.103	0.8	0.183	0.476	0.267	0.242	0.348	0.09	0.16
PCB-18/17	TT_PCBC019	ug/kg	0.352	1.23	0.057	0.143	0.698	0.158	0.212	0.105	0.397
PCB-22/51	TT_PCBC025	ug/kg	0.123	0.00998 U	0.025	0.036	0.306	0.052	0.115	0.01 U	0.268
PCB-24/27	TT_PCBC026	ug/kg	0.071	0.303	0.153	0.139	0.151	0.071	0.149	0.01 U	0.143
PCB-25	55712-37-3	ug/kg	1.22	1.34	0.165	0.021	0.00994 U	0.137	0.00996 U	8.95	3.41
PCB-26	TT_PCBC027	ug/kg	0.143	0.238	0.629	0.423	0.00994 U	0.248	0.723	1.01	1.01
PCB-28	TT_PCBC028	ug/kg	0.231	4.69	0.576	0.513	1.35	0.286	1.59	3.72	1.47
PCB-29	TT_PCBC029	ug/kg	0.00999 U	0.027	0.281	0.014	0.338	0.034	0.089	0.038	0.262
PCB-30	TT_PCBC030	ug/kg	0.029	0.057	0.076	0.066	0.324	0.114	0.057	1.51	0.062
PCB-31	16606-02-3	ug/kg	0.094	0.00998 U	0.027	0.00992 U	6.29	0.00984 U	0.26	0.01 U	0.074
PCB-33/20	TT_PCBC031	ug/kg	0.049	0.00998 U	0.013	0.00992 U	3.85	0.016	0.233	0.01 U	0.121
PCB-39	38444-88-1	ug/kg	0.074	0.105	0.091	0.00992 U	0.238	0.231	0.00996 U	0.01 U	0.203
PCB-40	TT_PCBC032	ug/kg	0.096	0.00998 U	0.055	0.271	37.5	0.248	0.128	0.01 U	0.08
PCB-41/64	TT_PCBC033	ug/kg	0.056	0.00998 U	0.062	0.06	0.00994 U	0.139	0.106	0.01 U	0.01 U
PCB-42/59/37	TT_PCBC034	ug/kg	0.084	0.00998 U	0.053	0.14	0.00994 U	0.285	0.223	2.62	0.192
PCB-44	TT_PCBC035	ug/kg	0.365	4.1	0.274	0.561	5.77	0.146	0.997	3.24	2.01
PCB-45	TT_PCBC036	ug/kg	0.207	0.105	0.035	0.11	0.197	0.153	0.36	2.06	0.053
PCB-46	41464-47-5	ug/kg	0.17	0.097	0.265	0.34	0.664	0.223	0.101	0.488	0.037
PCB-47/75	TT_PCBC037	ug/kg	0.067	0.00998 U	0.092	0.096	31.5	0.163	0.18	0.01 U	0.01 U
PCB-48	70362-47-9	ug/kg	0.842	20.5	0.402	1.45	0.00994 U	1.35	0.605	34.9	9.26
PCB-49	TT_PCBC038	ug/kg	0.402	11.3	0.456	1	0.00994 U	0.637	1.85	3.5	2.96
PCB-52	35693-99-3	ug/kg	0.502	8.97	0.955	1.18	0.00994 U	0.969	1.26	14.7	2.83
PCB-53	TT_PCBC039	ug/kg	0.22	0.277	0.053	0.132	0.00994 U	0.046	0.237	0.879	0.078
PCB-63	74472-34-7	ug/kg	0.00999 U	0.00998 U	0.401	0.00992 U	0.00994 U	0.00984 U	0.17	0.01 U	0.01 U
PCB-60/56	TT_PCBC040	ug/kg	0.17	0.00998 U	0.089	0.249	0.00994 U	0.113	0.127	3.97	1.3
PCB-66	32598-10-0	ug/kg	1.24	2.78	0.032	0.282	25.9	0.203	2.55	1.3	1.67
PCB-67	73575-53-8	ug/kg	0.123	0.00998 U	0.186	0.284	0.00994 U	0.219	0.216	0.01 U	2.29
PCB-69	TT_PCBC041	ug/kg	0.103	0.097	0.00988 U	0.00992 U	0.00994 U	0.00984 U	0.00996 U	0.01 U	0.05
PCB-70	TT_PCBC043	ug/kg	0.076	0.00998 U	0.334	0.247	0.00994 U	0.081	0.085	2.1	0.01 U
PCB-72	41464-42-0	ug/kg	0.091	0.00998 U	0.097	0.643	5.12	0.517	0.134	0.893	0.016
PCB-74/61	TT_PCBC044	ug/kg	0.114	0.00998 U	0.039	0.286	0.00994 U	0.098	0.239	8.27	0.01 U
PCB-77	32598-13-3	ug/kg	0.00999 U	0.00998 U	0.00988 U	0.00992 U	1.05	0.00984 U	0.00996 U	0.01 U	0.01 U
PCB-81	70362-50-4	ug/kg	0.00999 U	0.00998 U	0.00988 U	0.00992 U	0.00994 U	0.00984 U	0.00996 U	0.01 U	0.01 U
PCB-82	52663-62-4	ug/kg	0.137	1.33	0.077	0.089	0.00994 U	0.029	0.357	2.74	0.646
PCB-83	TT_PCBC046	ug/kg	0.041	0.327	0.05	0.071	0.00994 U	0.017	0.177	0.01 U	0.152
PCB-84	52663-60-2	ug/kg	1.76	6.22	0.737	2.26	0.00994 U	1.34	1.15	29	2.5
PCB-85	TT_PCBC047	ug/kg	0.047	0.00998 U	0.059	0.086	0.00994 U	0.035	0.13	0.01 U	0.01 U
PCB-87/115	TT_PCBC048	ug/kg	0.563	5.78	0.541	0.399	0.00994 U	0.334	0.922	4.43	2.08
PCB-92	52663-61-3	ug/kg	0.066	0.00998 U	0.279	0.00992 U	0.00994 U	0.046	0.198	12.2	0.01 U
PCB-95/80	TT_PCBC049	ug/kg	0.00999 U	11.7	0.648	0.38	0.00994 U	0.601	0.00996 U	7.72	2.32
PCB-97	TT_PCBC050	ug/kg	0.00999 U	0.00998 U	0.012	0.073	0.00994 U	0.00984 U	0.048	0.01 U	0.01 U
PCB-99	TT_PCBC051	ug/kg	0.888	10.7	1.57	2.46	99.4	1.37	2.98	41.9	5.83
PCB-101/90	TT_PCBC001	ug/kg	0.875	31.3	2.03	0.934	153	2.07	2.78	42.5	8.86
PCB-105	32598-14-4	ug/kg	0.027	3.9	0.067	0.00992 U	30.8	0.00984 U	0.102	18.6	3.1
PCB-107	70424-68-9	ug/kg	0.00999 U	0.00998 U	0.112	0.628	0.00994 U	0.235	0.892	0.01 U	0.01 U
PCB-110	TT_PCBC002	ug/kg	1.41	18	1.22	1.88	16.4	0.857	2.32	36.5	5.37
PCB-114	74472-37-0	ug/kg	0.00999 U	0.00998 U	0.00988 U	0.00992 U	0.00994 U	0.00984 U	0.00996 U	0.01 U	0.01 U
PCB-118	31508-00-6	ug/kg	1.61	16.9	1.58	2.18	113	1.47	2.57	73.4	12.1
PCB-119	TT_PCBC003	ug/kg	0.07	0.00998 U	0.089	0.1	11.6	0.036	0.195	0.01 U	0.01 U

Table A-4
Fish Fillet Data used in BHHRA for the Potomac River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Upper Potomac River								
CHEMICAL	**CAS #**	**Units**	**UPBB01 Brown bullhead 9/24/2013**	**UPCA01 Carp 9/24/2013**	**UPLB01 Largemouth bass 9/24/2013**	**UPNS01 N. snakehead 5/13/2013**	**UPSB01 Striped bass 5/9/2013**	**UPSF01 Sunfish 9/24/2013**	**UPWP01 White perch 5/9/2013**	**UPAE01 American eel 9/24/2013**	**UPCC01 Channel catfish 9/24/2013**
PCB-126	57465-28-8	ug/kg	0.04	0.00998 U	0.03	0.08	0.5	0.03	0.02	0.34	0.14
PCB-128	TT_PCBC004	ug/kg	0.356	4.66	0.604	0.771	31.6	0.651	0.843	23.5	2.45
PCB-129	TT_PCBC005	ug/kg	0.035	0.055	0.063	0.04	0.544	0.00984 U	0.052	0.01 U	0.041
PCB-130	52663-66-8	ug/kg	0.013	0.00998 U	0.045	0.046	7.57	0.143	0.037	3.78	0.01 U
PCB-135	TT_PCBC006	ug/kg	0.107	0.00998 U	0.046	0.00992 U	0.00994 U	0.00984 U	0.00996 U	0.01 U	0.01 U
PCB-136	38411-22-2	ug/kg	0.00999 U	2.26	0.032	0.00992 U	0.00994 U	0.00984 U	0.00996 U	0.01 U	0.88
PCB-138/160	TT_PCBC007	ug/kg	2.49	47.6	4.49	6.19	215	3.98	6.01	217	23.7
PCB-141/179	TT_PCBC008	ug/kg	0.915	16.5	0.829	0.528	25.7	0.839	1.54	25.6	3.22
PCB-146	51908-16-8	ug/kg	0.085	0.00998 U	1.32	0.00992 U	0.00994 U	1.15	2.45	55.3	0.01 U
PCB-149/123	TT_PCBC009	ug/kg	0.804	29.9	1.51	2.15	0.00994 U	1.14	3	38.4	3.88
PCB-151	TT_PCBC010	ug/kg	0.675	14.5	0.059	1.68	0.00994 U	0.807	1.48	11.5	4.24
PCB-153/132	TT_PCBC011	ug/kg	1.29	67.2	5.86	8.96	286	4.5	10	340	50.9
PCB-156	TT_PCBC012	ug/kg	0.048	3.05	0.324	0.00992 U	19.9	0.00984 U	0.00996 U	9.79	1.41
PCB-157/173/201	TT_PCBC013	ug/kg	0.037	1.83	0.166	0.24	6.55	0.186	0.266	5.88	1.01
PCB-158	74472-42-7	ug/kg	0.402	0.00998 U	0.554	0.00992 U	21.8	0.391	0.058	23.7	0.01 U
PCB-166	TT_PCBC015	ug/kg	0.126	0.00998 U	0.083	0.00992 U	3.63	0.053	0.148	2.38	0.233
PCB-167	52663-72-6	ug/kg	0.027	0.00998 U	0.00988 U	0.00992 U	0.00994 U	0.00984 U	0.058	0.01 U	0.01 U
PCB-169	32774-16-6	ug/kg	0.02	0.01	0.01	0.00992 U	0.04	0.00984 U	0.00996 U	0.01 U	0.01 U
PCB-170/190	TT_PCBC016	ug/kg	0.74	17.9	1.37	1.4	40.2	1.24	1.36	48.4	5.19
PCB-171/202	TT_PCBC017	ug/kg	0.074	6.61	0.456	0.867	16.8	0.674	0.864	30.6	2.92
PCB-172	52663-74-8	ug/kg	0.105	2.86	0.00988 U	0.334	0.00994 U	0.241	0.369	0.01 U	0.754
PCB-174	38411-25-5	ug/kg	0.502	9.83	0.00988 U	0.684	16.4	0.492	0.686	0.01 U	1.7
PCB-175	40186-70-7	ug/kg	0.29	1	0.276	0.474	1.99	0.315	0.406	2.5	0.618
PCB-176/137	TT_PCBC018	ug/kg	0.077	1.89	0.122	0.00992 U	13.5	0.173	0.066	8.24	0.033
PCB-177	52663-70-4	ug/kg	0.411	9.64	0.335	0.818	15.6	0.545	0.431	19.7	1.01
PCB-178	52663-67-9	ug/kg	0.135	4.76	0.107	0.728	10.2	0.376	0.813	17.2	2.08
PCB-180	TT_PCBC020	ug/kg	1.9	38.7	0.00988 U	3.78	118	3.12	0.06	0.01 U	21.1
PCB-183	TT_PCBC021	ug/kg	0.46	11.3	0.88	1.16	29.3	0.857	1.16	37.7	4.66
PCB-185	TT_PCBC022	ug/kg	0.102	2.41	0.00988 U	0.216	0.00994 U	0.287	0.00996 U	0.01 U	0.731
PCB-187	52663-68-0	ug/kg	1.3	28	2.47	3.8	84	2.29	4.02	118	11.7
PCB-189	39635-31-9	ug/kg	0.00999 U	0.00998 U	0.033	0.01	1.89	0.047	0.014	1.16	0.01 U
PCB-191	74472-50-7	ug/kg	0.011	0.816	0.015	0.00992 U	0.00994 U	0.083	0.013	0.01 U	0.01 U
PCB-193	TT_PCBC023	ug/kg	0.129	2.82	0.019	0.364	0.00994 U	0.274	0.148	0.01 U	1.16
PCB-194	35694-08-7	ug/kg	0.279	7.42	0.489	0.568	13.2	0.48	0.61	16	1.54
PCB-195/208	TT_PCBC024	ug/kg	0.198	3.79	0.337	0.434	7.74	0.3	0.116	10.9	1.52
PCB-196	42740-50-1	ug/kg	0.499	10	0.977	0.981	22.6	0.739	0.293	30.1	3.87
PCB-197	TTNUS861	ug/kg	0.019	0.517	0.00988 U	0.105	0.00994 U	0.026	0.062	0.01 U	0.233
PCB-199	52663-75-9	ug/kg	0.515	8.2	0.785	0.926	16.4	0.68	0.034	26.5	2.3
PCB-200	52663-73-7	ug/kg	0.063	0.981	0.00988 U	0.00992 U	0.00994 U	0.068	0.00996 U	0.013	0.01 U
PCB-205	74472-53-0	ug/kg	0.025	0.69	0.00988 U	0.04	1.16	0.084	0.029	1.26	0.248
PCB-206	40186-72-9	ug/kg	0.177	1.94	0.018	0.428	5.91	0.236	0.534	6.96	0.869
PCB-207	52663-79-3	ug/kg	0.028	0.445	0.02	0.094	1.06	0.058	0.067	1.13	0.19
PCB-209	2051-24-3	ug/kg	0.23	1.04	0.51	0.559	4.74	0.266	0.17	3.52	1.12
Total PCBs	1336-36-3	**ug/kg**	**31**	**525**	**44**	**61**	**1608**	**44**	**67**	**1515**	**232**
PCB-TEQ	PCB-TEQ	**ug/kg**	**4.68E-03**	**1.97E-03**	**3.41E-03**	**8.14E-03**	**5.65E-02**	**3.09E-03**	**2.18E-03**	**3.84E-02**	**1.46E-02**

Source: Pinkney, A.E. 2017. Analysis of contaminant concentrations in fish tissue collected from the waters of the District of Columbia. Final Report. CBFO-C14-03. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, Annapolis, MD. 9/2014. Revised 11/2017.

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Units	Indian Creek P2-IC-008-GTA Largemouth bass 8/3/2016	P2-IC-009-GT1A Largemouth bass 8/3/2016	P2-IC-009-GT2A Largemouth bass 8/3/2016	P2-IC-010-GT1A Striped bass 8/12/2016	P2-IC-010-GT2A Striped bass 8/12/2016	P2-IC-010-GT3A Striped bass 8/12/2016
Dioxins and Furans								
1,2,3,4,6,7,8,9-OCDD	3268-87-9	ug/kg	0.00037 U	0.00047 U	0.0004 U	--	0.00078 U	0.00033 U
1,2,3,4,6,7,8,9-OCDF	39001-02-0	ug/kg	0.00022 U	0.00015 U	0.000068 U	--	0.00013 U	0.000052 U
1,2,3,4,6,7,8-HPCDD	35822-46-9	ug/kg	0.000036 U	0.000034 U	0.000031 U	--	0.00002 U	0.000018 U
1,2,3,4,6,7,8-HPCDF	67562-39-4	ug/kg	0.00004 U	0.000037 U	0.000032 U	--	0.000031 U	0.000024 U
1,2,3,4,7,8,9-HPCDF	55673-89-7	ug/kg	0.000049 U	0.000046 U	0.000041 U	--	0.000047 U	0.000037 U
1,2,3,4,7,8-HXCDD	39227-28-6	ug/kg	0.000031 U	0.000032 U	0.000024 U	--	0.000013 U	0.000018 U
1,2,3,4,7,8-HXCDF	70648-26-9	ug/kg	0.0001 U	0.000028 U	0.000026 U	--	0.00013 U	0.000068 U
1,2,3,6,7,8-HXCDD	57653-85-7	ug/kg	0.000031 U	0.000034 U	0.000022 U	--	0.000015 U	0.00002 U
1,2,3,6,7,8-HXCDF	57117-44-9	ug/kg	0.00023 J	0.00029 J	0.00035 J	--	0.00044 J	0.00012 J
1,2,3,7,8,9-HXCDD	19408-74-3	ug/kg	0.000029 U	0.000031 U	0.000022 U	--	0.000013 U	0.000018 U
1,2,3,7,8,9-HXCDF	72918-21-9	ug/kg	0.000036 U	0.000039 U	0.000033 U	--	0.000024 U	0.000019 U
1,2,3,7,8-PECDD	40321-76-4	ug/kg	0.000038 U	0.000035 U	0.0001 J	--	0.00012 J	0.000071 J
1,2,3,7,8-PECDF	57117-41-6	ug/kg	0.000028 U	0.000026 U	0.000025 U	--	0.000023 U	0.000019 U
2,3,4,6,7,8-HXCDF	60851-34-5	ug/kg	0.000028 U	0.000034 U	0.000027 U	--	0.000019 U	0.000015 U
2,3,4,7,8-PECDF	57117-31-4	ug/kg	0.000026 U	0.000022 U	0.000025 U	--	0.000023 U	0.000018 U
2,3,7,8-TCDD	1746-01-6	ug/kg	0.000018 U	0.000035 J	0.000022 U	--	0.00003 J	0.000012 U
2,3,7,8-TCDF	51207-31-9	ug/kg	0.00003 U	0.000044 J	0.000025 U	--	0.00036 J	0.00003 J
TCDD-TEQ (HH)	TCDD-TEQ	ug/kg	**2.30E-05**	**6.84E-05**	**1.35E-04**	**--**	**2.30E-04**	**8.60E-05**
Metals								
ALUMINUM	7429-90-5	mg/kg	0.64 J	0.75 J	0.94 J	--	--	--
ANTIMONY	7440-36-0	mg/kg	0.024 U	0.024 U	0.027 U	--	--	--
ARSENIC	7440-38-2	mg/kg	0.028 J	0.029 J	0.036 J	--	--	--
BARIUM	7440-39-3	mg/kg	0.061 U	0.026 U	0.081 U	--	--	--
BERYLLIUM	7440-41-7	mg/kg	0.0063 U	0.0063 U	0.0071 U	--	--	--
CADMIUM	7440-43-9	mg/kg	0.011 U	0.011 U	0.012 U	--	--	--
CALCIUM	7440-70-2	mg/kg	1200	360	1400	--	--	--
CHROMIUM	7440-47-3	mg/kg	2.6	0.72	1.5	--	--	--
COBALT	7440-48-4	mg/kg	0.018 U	0.014 U	0.023 U	--	--	--
COPPER	7440-50-8	mg/kg	0.28	0.2	0.24	--	--	--
IRON	7439-89-6	mg/kg	19	6	25	--	--	--
LEAD	7439-92-1	mg/kg	0.0076 J	0.021 J	0.01 J	--	--	--
MAGNESIUM	7439-95-4	mg/kg	300	260	290	--	--	--
MANGANESE	7439-96-5	mg/kg	0.44	0.23 J	0.51	--	--	--
MERCURY	7439-97-6	mg/kg	0.24 J-	0.2 J-	0.21 J-	--	--	--
NICKEL	7440-02-0	mg/kg	0.47	0.15	0.44	--	--	--
POTASSIUM	7440-09-7	mg/kg	3400	3300	3300	--	--	--
SELENIUM	7782-49-2	mg/kg	0.42	0.37 U	0.29 U	--	--	--
SILVER	7440-22-4	mg/kg	0.0069 U	0.0068 U	0.0078 U	--	--	--
SODIUM	7440-23-5	mg/kg	660	690	780	--	--	--
THALLIUM	7440-28-0	mg/kg	0.0028 J	0.0022 U	0.0025 U	--	--	--
VANADIUM	7440-62-2	mg/kg	0.059 U	0.058 U	0.067 U	--	--	--
ZINC	7440-66-6	mg/kg	8.1	5.5	7.3	--	--	--
Semivolatile Organic Compounds								
1,2,4-TRICHLOROBENZENE	120-82-1	ug/kg	--	--	--	--	--	--
1,2-DIPHENYLHYDRAZINE	122-66-7	ug/kg	--	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ug/kg	--	--	--	--	--	--
2,4,6-TRICHLOROPHENOL	88-06-2	ug/kg	--	--	--	--	--	--
2,4-DICHLOROPHENOL	120-83-2	ug/kg	--	--	--	--	--	--
2,4-DIMETHYLPHENOL	105-67-9	ug/kg	--	--	--	--	--	--
2,4-DINITROPHENOL	51-28-5	ug/kg	--	--	--	--	--	--
2,4-DINITROTOLUENE	121-14-2	ug/kg	--	--	--	--	--	--
2,6-DINITROTOLUENE	606-20-2	ug/kg	--	--	--	--	--	--
2-CHLORONAPHTHALENE	91-58-7	ug/kg	--	--	--	--	--	--
2-CHLOROPHENOL	95-57-8	ug/kg	--	--	--	--	--	--
2-NITROPHENOL	88-75-5	ug/kg	--	--	--	--	--	--
3,3'-DICHLOROBENZIDINE	91-94-1	ug/kg	--	--	--	--	--	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ug/kg	--	--	--	--	--	--
4-BROMOPHENYL PHENYL ETHER	101-55-3	ug/kg	--	--	--	--	--	--

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Indian Creek					
			P2-IC-008-GTA	P2-IC-009-GT1A	P2-IC-009-GT2A	P2-IC-010-GT1A	P2-IC-010-GT2A	P2-IC-010-GT3A
			Largemouth bass	Largemouth bass	Largemouth bass	Striped bass	Striped bass	Striped bass
CHEMICAL	CAS #	Units	8/3/2016	8/3/2016	8/3/2016	8/12/2016	8/12/2016	8/12/2016
4-CHLORO-3-METHYLPHENOL	59-50-7	ug/kg	--	--	--	--	--	--
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	ug/kg	--	--	--	--	--	--
4-NITROPHENOL	100-02-7	ug/kg	--	--	--	--	--	--
ACENAPHTHENE	83-32-9	ug/kg	--	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	ug/kg	--	--	--	--	--	--
ANTHRACENE	120-12-7	ug/kg	--	--	--	--	--	--
BENZIDINE	92-87-5	ug/kg	--	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	ug/kg	--	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	ug/kg	--	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	ug/kg	--	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	ug/kg	--	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	ug/kg	--	--	--	--	--	--
BENZOIC ACID	65-85-0	ug/kg	--	--	--	--	--	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ug/kg	--	--	--	--	--	--
BIS(2-CHLOROETHYL)ETHER	111-44-4	ug/kg	--	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ug/kg	--	--	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	ug/kg	--	--	--	--	--	--
CHRYSENE	218-01-9	ug/kg	--	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	ug/kg	--	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	ug/kg	--	--	--	--	--	--
DIMETHYL PHTHALATE	131-11-3	ug/kg	--	--	--	--	--	--
DI-N-BUTYL PHTHALATE	84-74-2	ug/kg	--	--	--	--	--	--
DI-N-OCTYL PHTHALATE	117-84-0	ug/kg	--	--	--	--	--	--
FLUORANTHENE	206-44-0	ug/kg	--	--	--	--	--	--
FLUORENE	86-73-7	ug/kg	--	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	ug/kg	--	--	--	--	--	--
HEXACHLOROBUTADIENE	87-68-3	ug/kg	--	--	--	--	--	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ug/kg	--	--	--	--	--	--
HEXACHLOROETHANE	67-72-1	ug/kg	--	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ug/kg	--	--	--	--	--	--
ISOPHORONE	78-59-1	ug/kg	--	--	--	--	--	--
NAPHTHALENE	91-20-3	ug/kg	--	--	--	--	--	--
NITROBENZENE	98-95-3	ug/kg	--	--	--	--	--	--
N-NITROSODIMETHYLAMINE	62-75-9	ug/kg	--	--	--	--	--	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ug/kg	--	--	--	--	--	--
N-NITROSODIPHENYLAMINE	86-30-6	ug/kg	--	--	--	--	--	--
PENTACHLOROPHENOL	87-86-5	ug/kg	--	--	--	--	--	--
PHENANTHRENE	85-01-8	ug/kg	--	--	--	--	--	--
PHENOL	108-95-2	ug/kg	--	--	--	--	--	--
PYRENE	129-00-0	ug/kg	--	--	--	--	--	--
Pesticides								
4,4'-DDD	72-54-8	ug/kg	0.042 U	0.4 J	0.21 J	--	0.52 J	0.15 U
4,4'-DDE	72-55-9	ug/kg	0.6	1.8	0.91	--	2.8	1.2 J
4,4'-DDT	50-29-3	ug/kg	0.042 U	0.042 U	0.042 U	--	0.13 U	0.15 U
ALDRIN	309-00-2	ug/kg	0.043 U	0.043 U	0.044 U	--	0.14 U	0.16 U
ALPHA-BHC	319-84-6	ug/kg	0.12 U	0.12 U	0.12 U	--	0.38 U	0.43 U
BETA-BHC	319-85-7	ug/kg	0.092 U	0.092 U	0.093 U	--	0.29 UJ	0.33 UJ
CHLORDANE (ALL)	CHLORDANE_ALL	ug/kg	10	19	12	--	25	13 J
DELTA-BHC	319-86-8	ug/kg	0.15 U	0.15 U	0.15 U	--	0.46 U	0.52 U
DIELDRIN	60-57-1	ug/kg	0.37 J	1.3	0.43 J	--	0.69 J	0.14 U
ENDOSULFAN I	959-98-8	ug/kg	0.026 U	0.026 U	0.026 U	--	0.082 U	0.094 U
ENDOSULFAN II	33213-65-9	ug/kg	0.13 U	0.13 U	0.13 U	--	0.39 U	0.45 U
ENDOSULFAN SULFATE	1031-07-8	ug/kg	0.052 U	0.052 U	0.053 U	--	0.16 U	0.19 U
ENDRIN	72-20-8	ug/kg	0.12 U	0.12 U	0.12 U	--	0.38 U	0.43 U
ENDRIN ALDEHYDE	7421-93-4	ug/kg	0.12 U	0.12 U	0.12 U	--	0.38 U	0.43 U
GAMMA-BHC (LINDANE)	58-89-9	ug/kg	0.084 U	0.085 U	0.085 U	--	0.27 U	0.3 U
HEPTACHLOR	76-44-8	ug/kg	0.035 U	0.036 U	0.036 U	--	0.11 U	0.13 U
HEPTACHLOR EPOXIDE	1024-57-3	ug/kg	0.12 J	0.34 J	0.05 U	--	0.15 U	0.18 U
TOXAPHENE	8001-35-2	ug/kg	13 U	14 U	14 U	--	42 U	48 U

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Indian Creek					
			P2-IC-008-GTA	P2-IC-009-GT1A	P2-IC-009-GT2A	P2-IC-010-GT1A	P2-IC-010-GT2A	P2-IC-010-GT3A
			Largemouth bass	Largemouth bass	Largemouth bass	Striped bass	Striped bass	Striped bass
CHEMICAL	CAS #	Units	8/3/2016	8/3/2016	8/3/2016	8/12/2016	8/12/2016	8/12/2016
Aroclors								
AROCLOR-1016	12674-11-2	ug/kg	0.67 U	0.44 U	0.55 U	--	--	--
AROCLOR-1221	11104-28-2	ug/kg	1.1 U	0.7 U	0.86 U	--	--	--
AROCLOR-1232	11141-16-5	ug/kg	0.37 U	0.24 U	0.3 U	--	--	--
AROCLOR-1242	53469-21-9	ug/kg	0.54 U	0.36 U	0.44 U	--	--	--
AROCLOR-1248	12672-29-6	ug/kg	0.34 U	0.23 U	0.28 U	--	--	--
AROCLOR-1254	11097-69-1	ug/kg	9.1	5.8	5.8	--	--	--
AROCLOR-1260	11096-82-5	ug/kg	12	6	6.3	--	--	--
Total Aroclors	TotalAroclor	ug/kg	**21.1**	**11.8**	**12.1**	**NA**	**NA**	**NA**
PCB Congeners								
PCB-1	2051-60-7	ug/kg	0.0028 U	0.00023 U	0.00016 U	0.0013 J	0.00024 U	0.0023 J
PCB-2	2051-61-8	ug/kg	0.0024 J	0.00026 U	0.00016 U	0.0003 U	0.00029 U	0.0035 J
PCB-3	2051-62-9	ug/kg	0.0003 U	0.00028 U	0.0008 J	0.00033 U	0.00034 U	0.0034 J
PCB-4	TTNUS524	ug/kg	0.024 J	0.012 J	0.008 J	0.0097 J	0.0093 J	0.006 J
PCB-5	16605-91-7	ug/kg	0.0015 J	0.0019 U	0.0013 U	0.0018 U	0.0021 U	0.0023 U
PCB-6	25569-80-6	ug/kg	0.015 J	0.004 J	0.0041 J	0.0025 J	0.0045 J	0.0042 J
PCB-7	33284-50-3	ug/kg	0.0021 J	0.0018 U	0.0014 J	0.0018 U	0.0021 U	0.0018 J
PCB-8	34883-43-7	ug/kg	0.035 J	0.012 U	0.011 U	0.011 J	0.014 J	0.011 J
PCB-9	34883-39-1	ug/kg	0.0054 U	0.0018 U	0.0013 U	0.0018 J	0.0021 U	0.0022 U
PCB-10	33146-45-1	ug/kg	0.0021 U	0.0019 U	0.0014 U	0.0019 U	0.0022 U	0.0024 U
PCB-11	2050-67-1	ug/kg	0.012 U	0.012 U	0.0096 U	0.0087 U	0.008 U	0.011 J
PCB-12/13	TTNUS800	ug/kg	0.0031 U	0.001 U	0.0012 U	0.0017 U	0.002 U	0.0022 U
PCB-14	34883-41-5	ug/kg	0.0015 U	0.0015 U	0.0011 U	0.0015 U	0.0017 U	0.0019 U
PCB-15	2050-68-2	ug/kg	0.0079 U	0.0037 U	0.0029 U	0.0019 U	0.0035 J	0.0019 J
PCB-16	38444-78-9	ug/kg	0.049	0.016 J	0.016 J	0.0097 J	0.015 J	0.012 J
PCB-17	37680-66-3	ug/kg	0.058	0.023	0.019 J	0.017 J	0.027	0.016 J
PCB-18/30	TTNUS616	ug/kg	0.14	0.043 J	0.039 J	0.034 J	0.053	0.034 J
PCB-19	38444-73-4	ug/kg	0.025	0.0095 J	0.0057 J	0.0012 U	0.0016 U	0.0078 J
PCB-20/28	TTNUS519	ug/kg	0.3	0.15	0.11	0.15	0.24	0.17
PCB-21/33	TTNUS810	ug/kg	0.06	0.021 J	0.019 J	0.024	0.04	0.025
PCB-22	38444-85-8	ug/kg	0.069	0.035	0.017 J	0.036	0.052	0.043
PCB-23	55720-44-0	ug/kg	0.00086 U	0.00067 U	0.00047 U	0.00067 U	0.00082 U	0.00083 U
PCB-24	55702-45-9	ug/kg	0.0043 J	0.0024 J	0.0011 J	0.00083 U	0.0011 U	0.00093 U
PCB-25	55712-37-3	ug/kg	0.014 J	0.008 J	0.0047 J	0.0065 J	0.01 J	0.0092 J
PCB-26/29	TTNUS811	ug/kg	0.031	0.016 J	0.012 J	0.02	0.03	0.022 J
PCB-27	38444-76-7	ug/kg	0.02 J	0.005 J	0.0033 J	0.0045 J	0.006 J	0.004 J
PCB-31	16606-02-3	ug/kg	0.15	0.074	0.043 J	0.062	0.1	0.071
PCB-32	38444-77-8	ug/kg	0.067	0.02 J	0.024	0.019 J	0.028	0.023
PCB-34	TTNUS277	ug/kg	0.00085 U	0.00066 U	0.00046 U	0.00089 J	0.00081 U	0.00081 U
PCB-35	37680-69-6	ug/kg	0.00087 U	0.00068 U	0.00047 U	0.00068 U	0.00083 U	0.00084 U
PCB-36	38444-87-0	ug/kg	0.00084 U	0.00066 U	0.00046 U	0.00066 U	0.0008 U	0.0027 J
PCB-37	38444-90-5	ug/kg	0.011 J	0.0055 J	0.0032 J	0.0048 J	0.0063 J	0.0064 J
PCB-38	53555-66-1	ug/kg	0.00089 U	0.00069 U	0.00048 U	0.00069 U	0.00085 U	0.00085 U
PCB-39	38444-88-1	ug/kg	0.00079 U	0.00062 U	0.00043 U	0.00062 U	0.00075 U	0.00076 U
PCB-41/40/71	TTNUS813	ug/kg	0.11 J	0.049	0.052	0.073	0.093	0.057
PCB-42	36559-22-5	ug/kg	0.084	0.048 J	0.031 J	0.072	0.1	0.063
PCB-43/73	TTNUSA51	ug/kg	0.011 J	0.0049 J	0.0062 J	0.0046 J	0.01 J	0.0077 J
PCB-44/47/65	TTNUS618	ug/kg	0.32	0.2	0.13	0.41	0.51	0.29
PCB-45/51	TTNUS814	ug/kg	0.052	0.024	0.018 J	0.03	0.036 J	0.025
PCB-46	41464-47-5	ug/kg	0.0076 J	0.0046 J	0.0057 J	0.0036 J	0.007 J	0.002 U
PCB-48	70362-47-9	ug/kg	0.053	0.023	0.017 J	0.031	0.05	0.028
PCB-49/69	TTNUS818	ug/kg	0.23	0.14	0.096	0.29	0.36	0.22
PCB-50/53	TTNUS815	ug/kg	0.037	0.013 J	0.012 J	0.018 J	0.031	0.013 J
PCB-52	35693-99-3	ug/kg	0.49	0.33	0.21	0.57	0.74	0.42
PCB-54	15968-05-5	ug/kg	0.0009 U	0.00093 U	0.00057 U	0.0011 U	0.0015 U	0.0015 U
PCB-55	74338-24-2	ug/kg	0.005 J	0.0035 J	0.0033 J	0.011 J	0.017 J	0.011 J
PCB-56	41464-43-1	ug/kg	0.054	0.044	0.024 J	0.079	0.1	0.064
PCB-57	70424-67-8	ug/kg	0.0021 J	0.00078 U	0.00049 U	0.0027 J	0.0022 J	0.0012 U
PCB-58	41464-49-7	ug/kg	0.0011 J	0.0021 J	0.00087 J	0.0016 J	0.0016 J	0.003 J
PCB-59/62/75	TTNUS816	ug/kg	0.039	0.02 J	0.012 J	0.032	0.047	0.029

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			Indian Creek					
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			Largemouth bass	Largemouth bass	Largemouth bass	Striped bass	Striped bass	Striped bass
CHEMICAL	CAS #	Units	8/3/2016	8/3/2016	8/3/2016	8/12/2016	8/12/2016	8/12/2016
PCB-60	33025-41-1	ug/kg	0.067	0.04	0.03	0.08	0.092	0.055 J
PCB-61/70/74/76	TTNUS817	ug/kg	0.35	0.29	0.18	0.58	0.7	0.39
PCB-63	74472-34-7	ug/kg	0.015 J	0.012 J	0.0062 J	0.023	0.025	0.017 J
PCB-64	52663-58-8	ug/kg	0.16	0.099	0.068	0.15	0.19	0.12
PCB-66	32598-10-0	ug/kg	0.26	0.2	0.13	0.4	0.47	0.26
PCB-67	73575-53-8	ug/kg	0.0046 J	0.0031 J	0.0028 J	0.0065 J	0.0093 J	0.0047 J
PCB-68	73575-52-7	ug/kg	0.0035 J	0.0053 J	0.00044 U	0.011 J	0.0087 J	0.0052 J
PCB-72	41464-42-0	ug/kg	0.0055 J	0.0045 J	0.0025 J	0.013 J	0.015 J	0.0082 J
PCB-77	32598-13-3	ug/kg	0.012 J	0.011 J	0.0056 U	0.024	0.025	0.015 J
PCB-78	70362-49-1	ug/kg	0.00084 U	0.0012 J	0.0005 U	0.00092 U	0.0014 J	0.0012 U
PCB-79	41464-48-6	ug/kg	0.0068 J	0.003 J	0.0021 J	0.0081 J	0.0072 J	0.0049 J
PCB-80	33284-52-5	ug/kg	0.00072 U	0.00069 U	0.00043 U	0.00079 U	0.001 U	0.0011 U
PCB-81	70362-50-4	ug/kg	0.00074 U	0.0021 J	0.0013 J	0.0029 J	0.0017 J	0.0011 U
PCB-82	52663-62-4	ug/kg	0.084	0.057	0.046	0.12	0.14	0.09
PCB-83/99	TTNUS863	ug/kg	0.63	0.58	0.4	1.6	1.7	1
PCB-84	52663-60-2	ug/kg	0.094	0.08	0.048	0.13	0.17	0.096
PCB-85/116/117	TTNUS799	ug/kg	0.2	0.17	0.12	0.35	0.4	0.24
PCB-86/87/97/109/119/125	TTNUS941	ug/kg	0.53	0.45	0.3 J	0.97	1.1	0.67
PCB-88/91	TTNUS819	ug/kg	0.12	0.092	0.06	0.24	0.27	0.15
PCB-89	73575-57-2	ug/kg	0.0041 J	0.0015 U	0.001 U	0.0025 U	0.0028 U	0.003 U
PCB-90/101/113	TTNUS619	ug/kg	1.2	0.97	0.7	2.2	2.7	1.5
PCB-92	52663-61-3	ug/kg	0.19	0.15	0.11	0.35	0.4	0.23
PCB-93/100	TTNUS864	ug/kg	0.0055 J	0.0014 J	0.0016 J	0.05 J	0.0081 J	0.025 J
PCB-94	73575-55-0	ug/kg	0.0015 U	0.0018 J	0.001 U	0.0025 U	0.0028 U	0.003 U
PCB-95	38379-99-6	ug/kg	0.57	0.45	0.28	0.82	1.1	0.53
PCB-96	73575-54-9	ug/kg	0.0011 U	0.0011 U	0.00078 U	0.0019 U	0.0021 U	0.0022 U
PCB-98/102	TTNUS865	ug/kg	0.018 J	0.011 J	0.003 U	0.021 J	0.015 J	0.016 J
PCB-103	TTNUS256	ug/kg	0.0064 J	0.0071 J	0.0047 J	0.034	0.039	0.014 J
PCB-104	TTNUS257	ug/kg	0.001 U	0.00099 U	0.0007 U	0.0017 U	0.0019 U	0.002 U
PCB-105	32598-14-4	ug/kg	0.36	0.3	0.22	0.58	0.68	0.38
PCB-106	70424-69-0	ug/kg	0.0013 U	0.0013 U	0.00091 U	0.0014 U	0.0016 U	0.0016 U
PCB-107	70424-68-9	ug/kg	0.081	0.061 J	0.049 J	0.18	0.2	0.11
PCB-108/124	TTNUS942	ug/kg	0.035 J	0.027 J	0.02 J	0.067	0.071	0.039
PCB-110/115	TTNUS797	ug/kg	1.2	0.9	0.59	1.8	2.3	1.3
PCB-111	39635-32-0	ug/kg	0.00096 U	0.0026 J	0.00065 U	0.0064 J	0.0052 J	0.0046 J
PCB-112	TTNUS259	ug/kg	0.0032 J	0.001 U	0.002 J	0.0076 J	0.0057 J	0.002 U
PCB-114	74472-37-0	ug/kg	0.023 J	0.015 J	0.016 J	0.033	0.038 J	0.024 J
PCB-118	31508-00-6	ug/kg	1.1	0.9	0.65	1.9	2.2	1.2
PCB-120	68194-12-7	ug/kg	0.0081 J	0.0078 J	0.0065 J	0.026	0.031	0.02 J
PCB-121	56558-18-0	ug/kg	0.00099 U	0.00097 U	0.00068 U	0.0016 U	0.0018 U	0.0019 U
PCB-122	76842-07-4	ug/kg	0.01 J	0.0046 J	0.0074 J	0.0096 J	0.012 J	0.015 J
PCB-123	65510-44-3	ug/kg	0.02 J	0.019 J	0.016 J	0.028 J	0.047	0.026
PCB-126	57465-28-8	ug/kg	0.0081 J	0.0031 U	0.0048 U	0.0072 J	0.0059 J	0.0026 J
PCB-127	39635-33-1	ug/kg	0.0028 J	0.0029 J	0.0017 J	0.0041 J	0.003 J	0.0023 J
PCB-128/166	TTNUS613	ug/kg	0.4	0.28	0.24	0.51	0.64	0.35
PCB-129/138/160/163	TTNUSA52	ug/kg	3.6	2.5	2	4.8	6	3.3
PCB-130	52663-66-8	ug/kg	0.13	0.11	0.085	0.2	0.25	0.14
PCB-131	61798-70-7	ug/kg	0.018 J	0.012 J	0.014 J	0.023 J	0.028 J	0.018 J
PCB-132	38380-05-1	ug/kg	0.36	0.23	0.17	0.49	0.63	0.34
PCB-133	35694-04-3	ug/kg	0.045 J	0.043	0.03	0.096	0.1 J	0.06
PCB-134/143	TTNUS801	ug/kg	0.057	0.043	0.031 J	0.093	0.13	0.056 J
PCB-135/151	TTNUS805	ug/kg	0.73	0.43	0.35	0.99	1.2	0.65
PCB-136	38411-22-2	ug/kg	0.084	0.059	0.028 J	0.21	0.24	0.11
PCB-137	35694-06-5	ug/kg	0.1	0.068 J	0.064	0.13	0.16	0.095
PCB-139/140	TTNUS803	ug/kg	0.036	0.028	0.022 J	0.056	0.072	0.045
PCB-141	52712-04-6	ug/kg	0.44	0.32	0.28	0.58	0.78	0.42
PCB-142	41411-61-4	ug/kg	0.0015 J	0.0024 U	0.0017 U	0.0036 U	0.0038 U	0.004 U
PCB-144	68194-14-9	ug/kg	0.093	0.065	0.045	0.13	0.15	0.088
PCB-145	74472-40-5	ug/kg	0.0016 U	0.0012 U	0.00086 U	0.0022 U	0.0024 U	0.0025 U
PCB-146	51908-16-8	ug/kg	0.62	0.44	0.33	1.1	1.3	0.64

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

			Indian Creek					
			P2-IC-008-GTA	P2-IC-009-GT1A	P2-IC-009-GT2A	P2-IC-010-GT1A	P2-IC-010-GT2A	P2-IC-010-GT3A
			Largemouth bass	Largemouth bass	Largemouth bass	Striped bass	Striped bass	Striped bass
CHEMICAL	CAS #	Units	8/3/2016	8/3/2016	8/3/2016	8/12/2016	8/12/2016	8/12/2016
PCB-147/149	TTNUS804	ug/kg	2.1	1.3	0.99	2.7	3.3	1.7
PCB-148	74472-41-6	ug/kg	0.0022 U	0.0029 J	0.0012 U	0.017 J	0.017 J	0.011 J
PCB-150	68194-08-1	ug/kg	0.0015 U	0.0012 U	0.00084 U	0.014 J	0.016 J	0.0081 J
PCB-152	68194-09-2	ug/kg	0.0015 U	0.0012 U	0.00086 U	0.0022 U	0.0024 U	0.0025 U
PCB-153/168	TTNUS615	ug/kg	3.7	2.7	2.1	5.6	7	3.9
PCB-154	TTNUS860	ug/kg	0.018 J	0.019 J	0.018 J	0.15	0.13 J	0.07
PCB-155	33979-03-2	ug/kg	0.0015 U	0.0011 U	0.00082 U	0.0081 J	0.0077 J	0.009 J
PCB-156/157	TTNUS523	ug/kg	0.24	0.18	0.14	0.32	0.43	0.24
PCB-158	74472-42-7	ug/kg	0.27	0.2	0.17	0.33	0.41	0.24
PCB-159	39635-35-3	ug/kg	0.018 J	0.0088 U	0.0095 U	0.012 J	0.027 J	0.013 J
PCB-161	74472-43-8	ug/kg	0.0019 U	0.0016 U	0.0012 U	0.0024 U	0.0025 U	0.0027 U
PCB-162	39635-34-2	ug/kg	0.0096 J	0.012 J	0.0079 J	0.016 J	0.027	0.017 J
PCB-164	74472-45-0	ug/kg	0.18	0.11 J	0.093	0.21	0.27	0.15
PCB-165	74472-46-1	ug/kg	0.0021 U	0.0018 U	0.0013 U	0.0063 J	0.0094 J	0.0059 J
PCB-167	52663-72-6	ug/kg	0.13	0.087	0.073	0.15	0.21	0.12
PCB-169	32774-16-6	ug/kg	0.0072 J	0.0048 J	0.006 J	0.0077 J	0.013 J	0.0043 J
PCB-170	35065-30-6	ug/kg	0.88	0.57	0.47	1	1.5	0.78
PCB-171/173	TTNUS806	ug/kg	0.25	0.17	0.13	0.3	0.44	0.23
PCB-172	52663-74-8	ug/kg	0.19	0.13	0.1	0.21	0.33	0.19
PCB-174	38411-25-5	ug/kg	0.54	0.35	0.27	0.56	0.96	0.43
PCB-175	40186-70-7	ug/kg	0.033	0.021 J	0.02 J	0.046	0.05 J	0.031 J
PCB-176	52663-65-7	ug/kg	0.037	0.032	0.019 J	0.074	0.095	0.05
PCB-177	52663-70-4	ug/kg	0.35	0.25	0.18	0.48	0.84	0.4
PCB-178	52663-67-9	ug/kg	0.19	0.13	0.1	0.29	0.41	0.22
PCB-179	52663-64-6	ug/kg	0.1	0.091	0.051	0.29	0.38	0.19
PCB-180/193	TTNUS617	ug/kg	2.5	1.6	1.3	2.7	4.4	2.3
PCB-181	74472-47-2	ug/kg	0.012 J	0.0042 J	0.0045 J	0.014 J	0.017 J	0.0042 J
PCB-182	60145-23-5	ug/kg	0.0091 J	0.003 J	0.0052 J	0.015 J	0.0028 U	0.012 J
PCB-183/185	TTNUS807	ug/kg	0.65	0.43	0.37	0.81	1.2	0.64
PCB-184	74472-48-3	ug/kg	0.0014 U	0.0012 U	0.00083 U	0.0046 J	0.0024 U	0.0023 U
PCB-186	74472-49-4	ug/kg	0.0013 U	0.0012 U	0.0008 U	0.0015 U	0.0023 U	0.0023 U
PCB-187	52663-68-0	ug/kg	2.5	1.2	1.1	2.2	3.3	1.8
PCB-188	TTNUS272	ug/kg	0.0027 J	0.0026 J	0.00071 U	0.021	0.018 J	0.017 J
PCB-189	39635-31-9	ug/kg	0.029	0.016 J	0.02 J	0.035	0.058	0.029 J
PCB-190	41411-64-7	ug/kg	0.2	0.13	0.11	0.25	0.4	0.22
PCB-191	74472-50-7	ug/kg	0.04 J	0.027	0.021 J	0.046 J	0.08	0.04 J
PCB-192	74472-51-8	ug/kg	0.0014 U	0.0012 U	0.00085 U	0.0016 U	0.0025 U	0.0024 U
PCB-194	35694-08-7	ug/kg	0.43	0.29	0.23	0.49	0.72	0.43
PCB-195	52663-78-2	ug/kg	0.19	0.12	0.095	0.21	0.3	0.17
PCB-196	42740-50-1	ug/kg	0.17 J	0.12	0.1	0.22	0.3	0.2
PCB-197	TTNUS861	ug/kg	0.014 J	0.0097 J	0.0066 J	0.024	0.024 J	0.022 J
PCB-198/201	TTNUSA53	ug/kg	0.54	0.35	0.3	0.62	0.85	0.6
PCB-199	52663-75-9	ug/kg	0.016 J	0.01 J	0.0056 J	0.024 J	0.036	0.022 J
PCB-200	52663-73-7	ug/kg	0.035	0.022 J	0.022 J	0.072	0.089	0.063
PCB-202	2136-99-4	ug/kg	0.07	0.055	0.038 J	0.17	0.2	0.14
PCB-203	52663-76-0	ug/kg	0.28	0.23	0.2	0.38	0.58	0.38
PCB-204	74472-52-9	ug/kg	0.00066 U	0.00068 U	0.00043 U	0.0011 U	0.0012 U	0.0014 U
PCB-205	74472-53-0	ug/kg	0.02 U	0.016 U	0.015 U	0.027	0.047	0.025
PCB-206	40186-72-9	ug/kg	0.16	0.14	0.14	0.25	0.3	0.31
PCB-207	52663-79-3	ug/kg	0.018 J	0.014 J	0.011 J	0.042	0.039 J	0.037
PCB-208	52663-77-1	ug/kg	0.041	0.041	0.026	0.12	0.12	0.14
PCB-209	2051-24-3	ug/kg	0.049	0.045 J	0.042	0.12	0.1	0.15
Total PCBs	1336-36-3	ug/kg	**34**	**23**	**18**	**46**	**60**	**33**
PCB-TEQ	PCB-TEQ	ug/kg	**1.08E-03**	**1.91E-04**	**2.14E-04**	**1.05E-03**	**1.09E-03**	**4.51E-04**

[1] Duplicate of P2-NWB-002-GT1A.

Source: TetraTech. 2018. Draft Remedial Investigation Report. Anacostia River Sediment Project. Washington D.C. Prepared for District of Columbia, Department of Energy and Environment. Prepared by TetraTech, Sterling, VA. March 30.

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Northeast Branch P2-NEB-007-GTA Largemouth bass 8/3/2016	P2-NEB-011-GTA Largemouth bass 8/3/2016	P2-NEB-012-GTA Largemouth bass 8/3/2016	P2-NWB-001-GT1A Largemouth bass 8/8/2016	P2-NWB-001-GT2A Largemouth bass 8/8/2016	P2-NWB-002-GT1A Largemouth bass 8/9/2016	P2-NWB-200-GTA [1] Largmouth Bass 8/9/2016	P2-NWB-002-GT2A Largemouth bass 8/9/2016
Dioxins and Furans									
1,2,3,4,6,7,8,9-OCDD	3268-87-9	0.00052 U	0.00033 U	0.0004 U	0.00072 U	0.00052 U	0.00021 U	0.00033 U	0.00022 U
1,2,3,4,6,7,8,9-OCDF	39001-02-0	0.001 U	0.00011 U	0.000075 U	0.000097 U	0.0001 U	0.000064 U	0.00011 U	0.000093 U
1,2,3,4,6,7,8-HPCDD	35822-46-9	0.00014 U	0.000068 U	0.00012 U	0.00013 U	0.000067 U	0.000055 U	0.000075 U	0.000042 U
1,2,3,4,6,7,8-HPCDF	67562-39-4	0.000073 U	0.000023 U	0.000034 U	0.000092 U	0.0001 U	0.00016 J	0.00012 U	0.000097 U
1,2,3,4,7,8,9-HPCDF	55673-89-7	0.000084 U	0.000029 U	0.000043 U	0.00011 U	0.00011 U	0.0001 U	0.00012 U	0.00011 U
1,2,3,4,7,8-HXCDD	39227-28-6	0.000045 U	0.000019 U	0.000031 U	0.000085 U	0.000049 U	0.000047 U	0.000082 U	0.000061 U
1,2,3,4,7,8-HXCDF	70648-26-9	0.00041 U	0.00016 U	0.000029 U	0.000037 U	0.000051 U	0.000029 U	0.000049 U	0.000091 J
1,2,3,6,7,8-HXCDD	57653-85-7	0.000042 U	0.000019 U	0.000033 U	0.000092 U	0.000052 U	0.000047 U	0.000096 U	0.000061 U
1,2,3,6,7,8-HXCDF	57117-44-9	0.00046 J	0.00016 J	0.00016 J	0.00011 J	0.00044 J	0.00012 J	0.000099 J	0.00018 J
1,2,3,7,8,9-HXCDD	19408-74-3	0.00004 U	0.000018 U	0.00003 U	0.000082 U	0.000047 U	0.000044 U	0.000083 U	0.000057 U
1,2,3,7,8,9-HXCDF	72918-21-9	0.000046 U	0.00003 U	0.000038 U	0.000045 U	0.000067 U	0.000039 U	0.000063 U	0.000046 U
1,2,3,7,8-PECDD	40321-76-4	0.000059 U	0.000026 U	0.000037 U	0.0001 U	0.00012 U	0.000092 U	0.00015 J	0.000079 U
1,2,3,7,8-PECDF	57117-41-6	0.000054 U	0.000017 U	0.000034 U	0.000047 U	0.000062 U	0.000048 U	0.000048 U	0.000054 U
2,3,4,6,7,8-HXCDF	60851-34-5	0.000038 U	0.000022 U	0.000029 U	0.00004 U	0.000054 U	0.000033 U	0.000051 U	0.000037 U
2,3,4,7,8-PECDF	57117-31-4	0.000049 U	0.000016 U	0.000031 U	0.000048 U	0.00013 J	0.000085 J	0.000048 U	0.00015 J
2,3,7,8-TCDD	1746-01-6	0.000038 U	0.000012 U	0.00001 U	0.00015 U	0.00012 U	0.00011 U	0.00011 U	0.000092 U
2,3,7,8-TCDF	51207-31-9	0.00015 J	0.000052 J	0.00002 U	0.00013 U	0.00012 U	0.000092 U	0.000091 U	0.000066 U
TCDD-TEQ (HH)	TCDD-TEQ	**6.10E-05**	**2.12E-05**	**1.60E-05**	**1.10E-05**	**8.30E-05**	**3.91E-05**	**1.60E-04**	**7.21E-05**
Metals									
ALUMINUM	7429-90-5	2.5 J	1.1 J	0.86 J	1.7 J	1 J	0.55 J	0.49 U	0.55 U
ANTIMONY	7440-36-0	0.037 U	0.027 U	0.025 U	0.027 U	0.027 U	0.027 U	0.024 U	0.028 U
ARSENIC	7440-38-2	0.045 J	0.066 J	0.045 J	0.091 J	0.073 J	0.078 J	0.07 J	0.058 J
BARIUM	7440-39-3	0.058 U	0.13 U	0.057 U	0.053 J	0.062 J	0.065 J	0.061 J	0.12 J
BERYLLIUM	7440-41-7	0.007 U	0.0069 U	0.0066 U	0.007 U	0.0071 U	0.0071 U	0.0064 U	0.0072 U
CADMIUM	7440-43-9	0.012 U	0.012 U	0.011 U	0.012 U	0.012 U	0.012 U	0.011 U	0.013 U
CALCIUM	7440-70-2	640	2800	870	750	850	910	760	2000
CHROMIUM	7440-47-3	12	1.8	5.6	3.4 J	2.5 J	0.65 J	0.8 J	1.3 J
COBALT	7440-48-4	0.046 U	0.015 U	0.047	0.02 U	0.017 U	0.008 U	0.0074 U	0.011 U
COPPER	7440-50-8	0.33	0.3	0.26	0.29	0.22	0.26	0.23	0.26
IRON	7439-89-6	82	13	31	26	19	7.4	8.8	13
LEAD	7439-92-1	0.026 J	0.0083 U	0.034 J	0.049 J	0.0086 U	0.011 J	0.0077 U	0.0088 U
MAGNESIUM	7439-95-4	280	380	260	340	300	360	300	310
MANGANESE	7439-96-5	0.98	0.65	0.51	0.36 U	0.48	0.3 U	0.24 U	0.39 U
MERCURY	7439-97-6	0.19 J-	0.26 J-	0.28 J-	0.31	0.19	0.38	0.34	0.27
NICKEL	7440-02-0	0.94	0.28	1.5	0.44	0.43	0.12	0.11	0.21
POTASSIUM	7440-09-7	3600	3900	3100	4200	3800	4500	3900	3700
SELENIUM	7782-49-2	0.26 U	0.3 U	0.3 U	0.3 J	0.32 J	0.39 J	0.27 J	0.3 J
SILVER	7440-22-4	0.0077 U	0.0075 U	0.0072 U	0.0077 U	0.0077 U	0.0077 U	0.0069 U	0.0079 U
SODIUM	7440-23-5	850	790	700	660	630	680	610	730
THALLIUM	7440-28-0	0.0024 U	0.0041 J	0.0029 J	0.0036 J	0.0026 J	0.0039 J	0.0032 J	0.0027 J
VANADIUM	7440-62-2	0.068 J	0.064 U	0.061 U	0.065 U	0.066 U	0.066 U	0.059 U	0.067 U
ZINC	7440-66-6	6.9	7.5	6.8	8.2	5.8	7.9	7.3	8
Semivolatile Organic Compounds									
1,2,4-TRICHLOROBENZENE	120-82-1	--	--	--	15 U	15 U	15 U	27 U	15 U
1,2-DIPHENYLHYDRAZINE	122-66-7	--	--	--	34 U	34 U	34 U	63 U	34 U
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	--	--	--	5.8 UJ	5.7 UJ	5.7 UJ	11 UJ	5.7 UJ
2,4,6-TRICHLOROPHENOL	88-06-2	--	--	--	40 U	40 U	39 U	74 U	40 U
2,4-DICHLOROPHENOL	120-83-2	--	--	--	5.4 U	5.3 U	5.3 U	9.9 U	5.3 U
2,4-DIMETHYLPHENOL	105-67-9	--	--	--	42 U	41 U	41 U	77 U	41 U
2,4-DINITROPHENOL	51-28-5	--	--	--	320 UJ	320 UJ	310 UJ	590 UJ	320 UJ
2,4-DINITROTOLUENE	121-14-2	--	--	--	22 U	21 U	21 U	40 U	21 U
2,6-DINITROTOLUENE	606-20-2	--	--	--	28 U	27 U	27 U	51 U	27 U
2-CHLORONAPHTHALENE	91-58-7	--	--	--	5.6 U	5.5 U	5.5 U	10 U	5.5 U
2-CHLOROPHENOL	95-57-8	--	--	--	22 U	22 U	22 U	40 U	22 U
2-NITROPHENOL	88-75-5	--	--	--	29 U	29 U	29 U	54 U	29 U
3,3'-DICHLOROBENZIDINE	91-94-1	--	--	--	28 U	28 U	28 U	52 U	28 U
4,6-DINITRO-2-METHYLPHENOL	534-52-1	--	--	--	110 U	110 U	110 U	200 U	110 U
4-BROMOPHENYL PHENYL ETHER	101-55-3	--	--	--	23 U	23 U	23 U	43 U	23 U

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northeast Branch							
		P2-NEB-007-GTA	P2-NEB-011-GTA	P2-NEB-012-GTA	P2-NWB-001-GT1A	P2-NWB-001-GT2A	P2-NWB-002-GT1A	P2-NWB-200-GTA [1]	P2-NWB-002-GT2A
		Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largmouth Bass	Largemouth bass
CHEMICAL	**CAS #**	8/3/2016	8/3/2016	8/3/2016	8/8/2016	8/8/2016	8/9/2016	8/9/2016	8/9/2016
4-CHLORO-3-METHYLPHENOL	59-50-7	--	--	--	25 U	24 U	24 U	45 U	24 U
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	--	--	--	30 U	29 U	29 U	55 U	29 U
4-NITROPHENOL	100-02-7	--	--	--	97 UJ	97 UJ	96 U	180 U	97 U
ACENAPHTHENE	83-32-9	--	--	--	5.1 U	5.1 U	5.1 U	9.5 U	5.1 U
ACENAPHTHYLENE	208-96-8	--	--	--	6.1 U	6.1 U	6 U	11 U	6.1 U
ANTHRACENE	120-12-7	--	--	--	5.2 U	5.2 U	5.2 U	9.7 U	5.2 U
BENZIDINE	92-87-5	--	--	--	1100 U	1100 U	1100 UJ	2100 UJ	1100 UJ
BENZO(A)ANTHRACENE	56-55-3	--	--	--	6.7 U	6.6 U	6.6 U	12 U	6.6 U
BENZO(A)PYRENE	50-32-8	--	--	--	5.3 U	5.3 U	5.3 U	9.9 U	5.3 U
BENZO(B)FLUORANTHENE	205-99-2	--	--	--	8.4 U	8.3 U	8.3 U	16 U	8.3 U
BENZO(G,H,I)PERYLENE	191-24-2	--	--	--	5.3 U	5.3 U	5.2 U	9.8 U	5.3 U
BENZO(K)FLUORANTHENE	207-08-9	--	--	--	11 U	11 U	11 U	20 U	11 U
BENZOIC ACID	65-85-0	--	--	--	790 J	610 J	670 J	1100 J	700 J
BIS(2-CHLOROETHOXY)METHANE	111-91-1	--	--	--	18 U	17 U	17 U	33 U	17 U
BIS(2-CHLOROETHYL)ETHER	111-44-4	--	--	--	7.2 U	7.1 U	7.1 U	13 U	7.1 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	--	--	--	43 U	43 U	43 U	80 U	43 U
BUTYL BENZYL PHTHALATE	85-68-7	--	--	--	36 UJ	36 UJ	36 U	68 U	36 U
CHRYSENE	218-01-9	--	--	--	6.4 U	6.3 U	6.3 U	12 U	6.3 U
DIBENZO(A,H)ANTHRACENE	53-70-3	--	--	--	5.9 U	5.9 U	5.9 U	11 U	5.9 U
DIETHYL PHTHALATE	84-66-2	--	--	--	29 U	29 U	29 U	54 U	29 U
DIMETHYL PHTHALATE	131-11-3	--	--	--	29 U	29 U	29 U	54 U	29 U
DI-N-BUTYL PHTHALATE	84-74-2	--	--	--	33 U	33 U	33 U	62 U	33 U
DI-N-OCTYL PHTHALATE	117-84-0	--	--	--	230 J	230 J	28 UJ	52 UJ	28 UJ
FLUORANTHENE	206-44-0	--	--	--	5.7 U	5.7 U	5.6 U	11 U	5.7 U
FLUORENE	86-73-7	--	--	--	7 U	7 U	6.9 U	13 U	7 U
HEXACHLOROBENZENE	118-74-1	--	--	--	5.7 U	5.6 U	5.6 U	11 U	5.6 U
HEXACHLOROBUTADIENE	87-68-3	--	--	--	6 U	5.9 U	5.9 U	11 U	5.9 U
HEXACHLOROCYCLOPENTADIENE	77-47-4	--	--	--	29 U	29 U	28 UJ	53 UJ	29 UJ
HEXACHLOROETHANE	67-72-1	--	--	--	19 U	19 U	19 U	36 U	19 U
INDENO(1,2,3-CD)PYRENE	193-39-5	--	--	--	5.5 U	5.5 U	5.4 U	10 U	5.5 U
ISOPHORONE	78-59-1	--	--	--	20 U	20 U	20 U	37 U	20 U
NAPHTHALENE	91-20-3	--	--	--	4.6 U	4.6 U	4.5 U	8.5 U	4.6 U
NITROBENZENE	98-95-3	--	--	--	22 U	22 U	22 U	41 U	22 U
N-NITROSODIMETHYLAMINE	62-75-9	--	--	--	23 U	23 U	23 U	42 U	23 U
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	--	--	--	6.3 U	6.2 U	6.2 U	12 U	6.2 U
N-NITROSODIPHENYLAMINE	86-30-6	--	--	--	25 U	25 U	24 U	46 U	25 U
PENTACHLOROPHENOL	87-86-5	--	--	--	24 UJ	24 UJ	24 U	44 U	24 U
PHENANTHRENE	85-01-8	--	--	--	8.5 U	8.4 U	8.4 U	16 U	14 J
PHENOL	108-95-2	--	--	--	13 U	9 U	6.2 U	52 J	13 J
PYRENE	129-00-0	--	--	--	5.4 U	5.4 U	5.3 U	10 U	5.4 U
Pesticides									
4,4'-DDD	72-54-8	0.042 U	0.31 J	0.11 J	0.085 U	0.084 U	0.085 U	--	0.085 U
4,4'-DDE	72-55-9	0.65	1.7	1	0.77 J	2.4	1.1	--	0.32 J
4,4'-DDT	50-29-3	0.042 U	0.042 U	0.042 U	0.085 U	0.084 U	0.085 U	--	0.085 U
ALDRIN	309-00-2	0.044 U	0.043 U	0.044 U	0.088 U	0.087 U	0.088 U	--	0.088 U
ALPHA-BHC	319-84-6	0.12 U	0.12 U	0.12 U	0.25 U	0.24 U	0.25 U	--	0.25 U
BETA-BHC	319-85-7	0.093 U	0.092 U	0.093 U	0.19 U	0.18 U	0.19 U	--	0.19 U
CHLORDANE (ALL)	CHLORDANE_ALL	8	18	9.5	21	62	29	--	7.1 J
DELTA-BHC	319-86-8	0.15 U	0.15 U	0.15 U	0.3 U	0.29 U	0.3 U	--	0.3 U
DIELDRIN	60-57-1	0.33 J	1.4	0.36 J	1.8	4.7	2.3	--	0.079 U
ENDOSULFAN I	959-98-8	0.026 U	0.026 U	0.026 U	0.053 U	0.052 U	0.053 U	--	0.053 U
ENDOSULFAN II	33213-65-9	0.13 U	0.13 U	0.13 U	0.26 U	0.25 U	0.26 U	--	0.26 U
ENDOSULFAN SULFATE	1031-07-8	0.053 U	0.052 U	0.053 U	0.11 U	0.1 U	0.11 U	--	0.11 U
ENDRIN	72-20-8	0.12 U	0.12 U	0.12 U	0.24 U	0.24 U	0.24 U	--	0.24 U
ENDRIN ALDEHYDE	7421-93-4	0.12 U	0.12 U	0.12 U	0.25 U	0.24 U	0.25 U	--	0.25 U
GAMMA-BHC (LINDANE)	58-89-9	0.085 U	0.085 U	0.085 U	0.17 U	0.17 U	0.17 U	--	0.17 U
HEPTACHLOR	76-44-8	0.036 U	0.036 U	0.036 U	0.072 U	0.071 U	0.072 U	--	0.072 U
HEPTACHLOR EPOXIDE	1024-57-3	0.05 U	0.41 J	0.05 U	1 J	4.8	2.4	--	0.1 U
TOXAPHENE	8001-35-2	14 U	14 U	14 U	27 U	27 U	27 U	--	27 U

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northeast Branch							
CHEMICAL	**CAS #**	**P2-NEB-007-GTA Largemouth bass 8/3/2016**	**P2-NEB-011-GTA Largemouth bass 8/3/2016**	**P2-NEB-012-GTA Largemouth bass 8/3/2016**	**P2-NWB-001-GT1A Largemouth bass 8/8/2016**	**P2-NWB-001-GT2A Largemouth bass 8/8/2016**	**P2-NWB-002-GT1A Largemouth bass 8/9/2016**	**P2-NWB-200-GTA[1] Largmouth Bass 8/9/2016**	**P2-NWB-002-GT2A Largemouth bass 8/9/2016**
Aroclors									
AROCLOR-1016	12674-11-2	0.72 U	0.48 U	0.38 U	3.8 U	3.8 U	3.8 U	--	3.8 U
AROCLOR-1221	11104-28-2	1.1 U	0.75 U	0.6 U	6 U	6 U	6 U	--	6 U
AROCLOR-1232	11141-16-5	0.39 U	0.26 U	0.21 U	2.1 U	2.1 U	2.1 U	--	2.1 U
AROCLOR-1242	53469-21-9	0.58 U	0.39 U	0.31 U	3 U	3 U	3.1 U	--	3.1 U
AROCLOR-1248	12672-29-6	0.37 U	0.24 U	0.2 U	1.9 U	1.9 U	2 U	--	2 U
AROCLOR-1254	11097-69-1	13	6.4	5.5	3 U	3 U	3.1 U	--	3.1 U
AROCLOR-1260	11096-82-5	13	7.2	6.4	2.8 U	6.8 J	5.7 J	--	2.9 U
Total Aroclors	TotalAroclor	**26**	**13.6**	**11.9**	**ND**	**6.8**	**5.7**	**NA**	**ND**
PCB Congeners									
PCB-1	2051-60-7	0.00024 U	0.0036 J	0.0014 U	0.00014 U	0.00085 J	0.0028 J	0.00013 U	0.00014 U
PCB-2	2051-61-8	0.00026 U	0.00028 U	0.00027 U	0.00057 J	0.0002 U	0.0061 J	0.00015 U	0.00017 U
PCB-3	2051-62-9	0.00029 U	0.00032 U	0.00029 U	0.00019 U	0.00022 U	0.0034 J	0.00018 U	0.0002 U
PCB-4	TTNUS524	0.0087 J	0.0074 J	0.0067 J	0.0057 U	0.008 J	0.0063 U	0.0039 U	0.002 U
PCB-5	16605-91-7	0.002 U	0.0023 U	0.0022 U	0.0012 U	0.00088 U	0.0019 U	0.0012 U	0.0013 U
PCB-6	25569-80-6	0.0037 J	0.0041 J	0.0022 J	0.0018 J	0.0032 J	0.0031 J	0.0015 J	0.0012 U
PCB-7	33284-50-3	0.0019 U	0.0022 U	0.0026 J	0.00071 U	0.0014 U	0.0012 U	0.0007 U	0.0012 U
PCB-8	34883-43-7	0.0086 U	0.0089 U	0.0058 U	0.0053 U	0.01 J	0.007 U	0.0048 U	0.0027 U
PCB-9	34883-39-1	0.0019 U	0.0031 U	0.0015 U	0.0012 U	0.0024 J	0.0018 U	0.0012 U	0.0012 U
PCB-10	33146-45-1	0.0021 U	0.0024 U	0.0016 U	0.0014 J	0.0012 U	0.0019 U	0.0012 U	0.0013 U
PCB-11	2050-67-1	0.012 U	0.012 U	0.0094 U	0.011 U	0.012 U	0.0086 U	0.007 U	0.0057 U
PCB-12/13	TTNUS800	0.0022 U	0.0022 U	0.0021 U	0.0011 U	0.0011 U	0.0018 U	0.0011 U	0.0012 U
PCB-14	34883-41-5	0.0017 U	0.0019 U	0.0018 U	0.00098 U	0.00095 U	0.0015 U	0.00097 U	0.001 U
PCB-15	2050-68-2	0.0031 U	0.0035 U	0.0018 U	0.0024 J	0.004 J	0.0038 J	0.0012 J	0.0017 J
PCB-16	38444-78-9	0.0097 J	0.007 J	0.0079 J	0.0078 J	0.012 J	0.01 J	0.0039 J	0.0024 J
PCB-17	37680-66-3	0.021 J	0.011 J	0.01 J	0.0092 J	0.016 J	0.01 J	0.006 J	0.0069 J
PCB-18/30	TTNUS616	0.032 J	0.03 J	0.028 J	0.023 J	0.043	0.029 J	0.019 J	0.015 J
PCB-19	38444-73-4	0.01 J	0.0068 J	0.0041 J	0.0055 J	0.0079 J	0.0064 J	0.0043 J	0.0026 J
PCB-20/28	TTNUS519	0.16	0.14	0.11	0.11	0.2	0.13	0.083	0.072
PCB-21/33	TTNUS810	0.02 J	0.018 J	0.013 J	0.012 J	0.023	0.015 J	0.0078 J	0.0099 J
PCB-22	38444-85-8	0.032 J	0.029	0.027	0.029	0.05	0.032	0.021 J	0.018 J
PCB-23	55720-44-0	0.00063 U	0.0007 U	0.00065 U	0.00029 U	0.00036 U	0.00048 U	0.00032 U	0.00034 U
PCB-24	55702-45-9	0.0024 J	0.00066 U	0.00061 U	0.0014 J	0.0019 J	0.0014 J	0.0014 J	0.00046 U
PCB-25	55712-37-3	0.0074 J	0.0055 J	0.0055 J	0.0052 J	0.0085 J	0.0056 J	0.0032 J	0.0027 J
PCB-26/29	TTNUS811	0.02 J	0.014 J	0.015 J	0.013 J	0.023	0.015 J	0.0085 J	0.0073 J
PCB-27	38444-76-7	0.0047 J	0.0034 J	0.0031 J	0.003 J	0.0043 J	0.0032 J	0.0025 J	0.0016 J
PCB-31	16606-02-3	0.08	0.06	0.052	0.055	0.087	0.065	0.038 J	0.032 J
PCB-32	38444-77-8	0.018 J	0.017 J	0.014 J	0.013 J	0.024	0.013 J	0.013 J	0.0087 J
PCB-34	TTNUS277	0.00062 U	0.00069 U	0.00064 U	0.00028 U	0.00036 U	0.00047 U	0.00031 U	0.00033 U
PCB-35	37680-69-6	0.00063 U	0.00071 U	0.00066 U	0.00029 U	0.00037 U	0.00048 U	0.00032 U	0.00034 U
PCB-36	38444-87-0	0.00061 U	0.00069 U	0.00063 U	0.00028 U	0.00035 U	0.00047 U	0.00031 U	0.00033 U
PCB-37	38444-90-5	0.0093 J	0.0086 J	0.0046 J	0.0062 J	0.01 J	0.0043 J	0.0034 J	0.004 J
PCB-38	53555-66-1	0.00065 U	0.00073 U	0.00067 U	0.0003 U	0.00037 U	0.00049 U	0.00032 U	0.00035 U
PCB-39	38444-88-1	0.00057 U	0.00065 U	0.00059 U	0.00026 U	0.00033 U	0.00044 U	0.00029 U	0.00031 U
PCB-41/40/71	TTNUS813	0.074	0.063 J	0.056	0.039	0.069	0.041	0.029	0.038
PCB-42	36559-22-5	0.073	0.053	0.05	0.03 J	0.06	0.037 J	0.026	0.031 J
PCB-43/73	TTNUSA51	0.0046 J	0.01 J	0.0043 J	0.0035 J	0.0048 J	0.0026 J	0.0022 J	0.0034 J
PCB-44/47/65	TTNUS618	0.43	0.31	0.27	0.16	0.27	0.18 J	0.11 J	0.14
PCB-45/51	TTNUS814	0.043	0.024 J	0.021 J	0.018 J	0.028	0.018 J	0.012 J	0.013 J
PCB-46	41464-47-5	0.0033 J	0.0039 J	0.0035 J	0.0028 J	0.0046 J	0.0039 J	0.0019 J	0.00098 U
PCB-48	70362-47-9	0.026 J	0.02 J	0.025	0.014 J	0.027	0.019 J	0.0095 J	0.014 J
PCB-49/69	TTNUS818	0.27	0.21	0.19	0.11	0.19	0.11	0.081	0.1
PCB-50/53	TTNUS815	0.032	0.017 J	0.013 J	0.01 J	0.018 J	0.0092 J	0.0086 J	0.0082 J
PCB-52	35693-99-3	0.62	0.48	0.46	0.3	0.51	0.33	0.2	0.27
PCB-54	15968-05-5	0.001 U	0.0012 U	0.00096 U	0.00072 U	0.00076 U	0.001 U	0.00063 U	0.00076 U
PCB-55	74338-24-2	0.0033 J	0.0059 J	0.0029 J	0.0029 J	0.0066 J	0.004 J	0.0028 J	0.0027 J
PCB-56	41464-43-1	0.064	0.06	0.045	0.044	0.071	0.046	0.031	0.034
PCB-57	70424-67-8	0.00089 U	0.001 U	0.00082 U	0.00048 U	0.001 J	0.00065 U	0.00046 U	0.00059 U
PCB-58	41464-49-7	0.0031 J	0.002 J	0.0086 J	0.002 J	0.00042 J	0.00065 U	0.00088 J	0.0012 J
PCB-59/62/75	TTNUS816	0.029 J	0.027	0.024 J	0.015 J	0.026	0.017 J	0.01 J	0.012 J

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3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Northeast Branch							
		P2-NEB-007-GTA Largemouth bass 8/3/2016	P2-NEB-011-GTA Largemouth bass 8/3/2016	P2-NEB-012-GTA Largemouth bass 8/3/2016	P2-NWB-001-GT1A Largemouth bass 8/8/2016	P2-NWB-001-GT2A Largemouth bass 8/8/2016	P2-NWB-002-GT1A Largemouth bass 8/9/2016	P2-NWB-200-GTA[1] Largmouth Bass 8/9/2016	P2-NWB-002-GT2A Largemouth bass 8/9/2016
PCB-60	33025-41-1	0.075	0.061	0.054	0.043	0.076	0.047	0.031	0.047
PCB-61/70/74/76	TTNUS817	0.49	0.42	0.37	0.29	0.48	0.32	0.2	0.23
PCB-63	74472-34-7	0.017 J	0.018 J	0.015 J	0.0076 J	0.014 J	0.0092 J	0.0069 J	0.0076 J
PCB-64	52663-58-8	0.16	0.13	0.11	0.079	0.14	0.094	0.059	0.074
PCB-66	32598-10-0	0.35	0.28	0.29	0.17	0.29	0.19	0.13	0.19
PCB-67	73575-53-8	0.0068 J	0.0051 J	0.003 J	0.0033 J	0.006 J	0.0025 J	0.0024 J	0.0021 J
PCB-68	73575-52-7	0.0065 J	0.0063 J	0.0033 J	0.0014 J	0.0024 J	0.0024 J	0.001 J	0.0018 J
PCB-72	41464-42-0	0.0081 J	0.0073 J	0.0071 J	0.0022 J	0.0039 J	0.0023 J	0.0025 J	0.0021 J
PCB-77	32598-13-3	0.015 J	0.0099 J	0.01 J	0.011 J	0.024	0.014 J	0.0079 J	0.0082 J
PCB-78	70362-49-1	0.00092 U	0.0011 U	0.00085 U	0.0005 U	0.00064 J	0.00067 U	0.00048 U	0.00061 U
PCB-79	41464-48-6	0.0081 J	0.006 J	0.0066 J	0.003 J	0.0041 J	0.0044 J	0.0018 J	0.003 J
PCB-80	33284-52-5	0.00078 U	0.00091 U	0.00073 U	0.00043 U	0.00046 U	0.00057 U	0.00041 U	0.00052 U
PCB-81	70362-50-4	0.003 J	0.00095 U	0.00077 U	0.0012 J	0.0029 J	0.00097 J	0.0015 J	0.0011 J
PCB-82	52663-62-4	0.11 J	0.082 J	0.1	0.063	0.1	0.07	0.047	0.058 J
PCB-83/99	TTNUS863	1.1	0.95	1	0.43	0.67	0.48 J	0.3 J	0.42
PCB-84	52663-60-2	0.17	0.12	0.12	0.11	0.16	0.1	0.065	0.095
PCB-85/116/117	TTNUS799	0.3	0.25	0.28	0.14	0.22	0.16 J	0.097 J	0.15
PCB-86/87/97/109/119/125	TTNUS941	0.82	0.7	0.72	0.42	0.65	0.47	0.29	0.43
PCB-88/91	TTNUS819	0.18	0.14	0.15	0.075	0.12	0.087	0.052	0.069
PCB-89	73575-57-2	0.0037 J	0.0019 U	0.0015 U	0.0011 U	0.0013 U	0.0016 U	0.0011 U	0.0011 U
PCB-90/101/113	TTNUS619	1.9	1.7	1.8	0.95	1.4	0.98	0.6	0.86
PCB-92	52663-61-3	0.34	0.29	0.3	0.14	0.2	0.14 J	0.086 J	0.12
PCB-93/100	TTNUS864	0.014 J	0.022 J	0.0089 J	0.0056 J	0.008 J	0.0063 J	0.0026 J	0.005 J
PCB-94	73575-55-0	0.002 U	0.0019 U	0.0015 U	0.0011 U	0.0013 U	0.0016 U	0.0011 U	0.0011 U
PCB-95	38379-99-6	1	0.77	0.76	0.47	0.69	0.47 J	0.28 J	0.41
PCB-96	73575-54-9	0.0015 U	0.0014 U	0.0011 U	0.00085 U	0.00097 U	0.0012 U	0.00084 U	0.00079 U
PCB-98/102	TTNUS865	0.02 J	0.013 J	0.018 J	0.0051 J	0.011 J	0.0057 J	0.0036 J	0.006 J
PCB-103	TTNUS256	0.02 J	0.016 J	0.018 J	0.001 U	0.006 J	0.0014 U	0.00099 U	0.00092 U
PCB-104	TTNUS257	0.0013 U	0.0013 U	0.00098 U	0.00076 U	0.00086 U	0.0011 U	0.00075 U	0.0007 U
PCB-105	32598-14-4	0.53	0.49	0.54	0.26	0.46	0.3	0.18	0.28
PCB-106	70424-69-0	0.0016 U	0.0017 U	0.0014 U	0.00063 U	0.00077 U	0.0013 J	0.00064 U	0.00066 U
PCB-107	70424-68-9	0.14	0.12	0.13	0.059	0.095	0.059 J	0.042	0.054
PCB-108/124	TTNUS942	0.046 J	0.051	0.059	0.029	0.048	0.037	0.019 J	0.026
PCB-110/115	TTNUS797	1.7	1.4	1.5	0.89	1.4	0.96	0.62	0.88
PCB-111	39635-32-0	0.0044 J	0.0012 U	0.0015 J	0.0019 J	0.00081 U	0.001 U	0.0007 U	0.0021 J
PCB-112	TTNUS259	0.0043 J	0.0013 U	0.001 U	0.0027 J	0.0045 J	0.0023 J	0.00076 U	0.0014 J
PCB-114	74472-37-0	0.036	0.033	0.039 J	0.017 J	0.029 J	0.016 J	0.013 J	0.019 J
PCB-118	31508-00-6	1.6	1.5	1.6	0.77	1.3	0.87	0.57	0.78
PCB-120	68194-12-7	0.015 J	0.0086 J	0.0088 J	0.003 J	0.0044 J	0.0038 J	0.0032 J	0.0028 J
PCB-121	56558-18-0	0.0035 J	0.0012 U	0.00095 U	0.00074 U	0.00084 U	0.001 U	0.00073 U	0.00068 U
PCB-122	76842-07-4	0.0084 J	0.008 J	0.015 J	0.0059 J	0.015 J	0.0063 J	0.003 J	0.0061 J
PCB-123	65510-44-3	0.027 J	0.03 J	0.023 J	0.017 J	0.024 J	0.016 J	0.012 J	0.018 J
PCB-126	57465-28-8	0.022 J	0.0036 U	0.0026 U	0.0048 J	0.006 J	0.0039 J	0.0026 J	0.0039 J
PCB-127	39635-33-1	0.003 J	0.0017 U	0.0041 J	0.0026 J	0.0028 J	0.002 J	0.0014 J	0.0022 J
PCB-128/166	TTNUS613	0.46	0.5	0.53	0.25	0.37	0.27 J	0.16 J	0.21
PCB-129/138/160/163	TTNUSA52	4.4	5.1	5.4	2.3	3.5	2.3	1.5	1.8
PCB-130	52663-66-8	0.18	0.2	0.21	0.1	0.16	0.099	0.061	0.081
PCB-131	61798-70-7	0.024	0.018 J	0.018 J	0.01 J	0.022	0.013 J	0.009 J	0.012 J
PCB-132	38380-05-1	0.5	0.42	0.47	0.36	0.51	0.31	0.2	0.26
PCB-133	35694-04-3	0.079	0.087	0.087	0.033	0.05	0.032	0.021 J	0.022 J
PCB-134/143	TTNUS801	0.09 J	0.09	0.086 J	0.059	0.085	0.053	0.036	0.046
PCB-135/151	TTNUS805	0.95	0.98	1	0.54	0.74	0.48	0.32	0.35
PCB-136	38411-22-2	0.17	0.13	0.12	0.1	0.14	0.077	0.044 J	0.065
PCB-137	35694-06-5	0.11	0.11	0.14	0.062	0.1	0.074	0.048	0.059
PCB-139/140	TTNUS803	0.047	0.042 J	0.053	0.02 J	0.031	0.024	0.018 J	0.015 J
PCB-141	52712-04-6	0.59	0.7	0.77	0.38	0.58	0.34	0.22	0.24
PCB-142	41411-61-4	0.0038 U	0.0029 U	0.0038 U	0.0017 U	0.0021 U	0.0022 U	0.0015 U	0.0018 U
PCB-144	68194-14-9	0.094 J	0.12	0.12	0.064	0.092	0.059	0.036	0.042
PCB-145	74472-40-5	0.0019 U	0.0015 U	0.0019 U	0.001 U	0.0013 U	0.0014 U	0.00096 U	0.0011 U
PCB-146	51908-16-8	0.78	0.85	0.98	0.36	0.55	0.38	0.24	0.26

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northeast Branch							
		P2-NEB-007-GTA	P2-NEB-011-GTA	P2-NEB-012-GTA	P2-NWB-001-GT1A	P2-NWB-001-GT2A	P2-NWB-002-GT1A	P2-NWB-200-GTA [1]	P2-NWB-002-GT2A
		Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largmouth Bass	Largemouth bass
CHEMICAL	**CAS #**	8/3/2016	8/3/2016	8/3/2016	8/8/2016	8/8/2016	8/9/2016	8/9/2016	8/9/2016
PCB-147/149	TTNUS804	2.4	2.5	2.8	1.4	2	1.3	0.89	0.98
PCB-148	74472-41-6	0.0078 J	0.01 J	0.0027 U	0.0014 U	0.0018 U	0.002 U	0.0013 U	0.0015 U
PCB-150	68194-08-1	0.0051 J	0.0042 J	0.0069 J	0.001 U	0.0012 U	0.0014 U	0.00093 U	0.0011 U
PCB-152	68194-09-2	0.0019 U	0.0015 U	0.0019 U	0.001 U	0.0013 U	0.0014 U	0.00095 U	0.0011 U
PCB-153/168	TTNUS615	4.8	5.5	6	2.3	3.5	2.3	1.4	1.5
PCB-154	TTNUS860	0.054 J	0.068	0.052	0.012 J	0.0085 J	0.012 J	0.0041 J	0.0099 J
PCB-155	33979-03-2	0.0034 J	0.0014 U	0.0018 U	0.00097 U	0.0012 U	0.0014 U	0.00091 U	0.001 U
PCB-156/157	TTNUS523	0.31	0.31	0.35	0.18	0.28	0.19	0.12	0.14
PCB-158	74472-42-7	0.32	0.37	0.4	0.18	0.28	0.18 J	0.11 J	0.14
PCB-159	39635-35-3	0.02 J	0.02 J	0.021 J	0.0011 U	0.019 J	0.013 J	0.0064 J	0.0097 J
PCB-161	74472-43-8	0.0025 U	0.0019 U	0.0025 U	0.0011 U	0.0014 U	0.0015 U	0.001 U	0.0012 U
PCB-162	39635-34-2	0.015 J	0.015 J	0.018 J	0.0011 U	0.012 J	0.0072 J	0.0053 J	0.0074 J
PCB-164	74472-45-0	0.21	0.24	0.25	0.12	0.18	0.12	0.074	0.088
PCB-165	74472-46-1	0.0034 J	0.0034 J	0.0027 U	0.0012 U	0.0015 U	0.0016 U	0.0011 U	0.0014 J
PCB-167	52663-72-6	0.14	0.17	0.18	0.00079 U	0.13	0.092	0.058	0.062
PCB-169	32774-16-6	0.0085 J	0.0098 J	0.011 J	0.0037 J	0.0042 J	0.004 J	0.0024 J	0.0036 J
PCB-170	35065-30-6	0.98	1.3	1.3	0.56	0.9	0.56	0.36	0.36
PCB-171/173	TTNUS806	0.26	0.33	0.36	0.16	0.24	0.15 J	0.096 J	0.097
PCB-172	52663-74-8	0.19	0.26	0.26	0.13	0.2	0.14 J	0.088 J	0.074
PCB-174	38411-25-5	0.67	0.73	0.8	0.49	0.7	0.46	0.3	0.28
PCB-175	40186-70-7	0.039	0.046	0.049	0.022	0.037	0.022 J	0.013 J	0.011 J
PCB-176	52663-65-7	0.059	0.052	0.054 J	0.049	0.068	0.043	0.023	0.024
PCB-177	52663-70-4	0.53	0.58	0.6	0.32	0.49	0.33	0.2	0.2
PCB-178	52663-67-9	0.26	0.3	0.3	0.14	0.2	0.14 J	0.09 J	0.089
PCB-179	52663-64-6	0.21	0.18	0.18	0.15	0.22	0.13	0.085	0.084
PCB-180/193	TTNUS617	2.6	3.2	3.5	1.6	2.6	1.7	1.1	0.96
PCB-181	74472-47-2	0.0069 J	0.0092 J	0.012 J	0.0048 J	0.01 J	0.0066 J	0.0044 J	0.0012 U
PCB-182	60145-23-5	0.0042 J	0.014 J	0.011 J	0.0043 J	0.0045 J	0.0042 J	0.004 J	0.0026 J
PCB-183/185	TTNUS807	0.74	0.88	0.98	0.42	0.68	0.42	0.27	0.26
PCB-184	74472-48-3	0.0015 U	0.0014 U	0.0015 U	0.00087 U	0.0012 U	0.0027 J	0.00089 U	0.0011 J
PCB-186	74472-49-4	0.0014 U	0.0013 U	0.0014 U	0.00085 U	0.0012 U	0.0012 U	0.00086 U	0.00096 U
PCB-187	52663-68-0	2	2.6	2.7	1.2	1.9	1.5	0.95	0.85
PCB-188	TTNUS272	0.0074 J	0.0045 J	0.0056 J	0.00075 U	0.0011 U	0.0011 U	0.0008 U	0.00085 U
PCB-189	39635-31-9	0.033	0.042	0.046	0.017 J	0.031	0.023 J	0.013 J	0.011 J
PCB-190	41411-64-7	0.22	0.28 J	0.35	0.14	0.18	0.13 J	0.079 J	0.078
PCB-191	74472-50-7	0.05	0.058	0.046 J	0.029	0.043	0.026	0.018 J	0.018 J
PCB-192	74472-51-8	0.0015 U	0.0014 U	0.0015 U	0.0009 U	0.0013 U	0.0013 U	0.00091 U	0.001 U
PCB-194	35694-08-7	0.42	0.56	0.6	0.3	0.47	0.34	0.21	0.2
PCB-195	52663-78-2	0.21	0.25	0.27	0.11	0.18	0.12	0.076	0.074
PCB-196	42740-50-1	0.17 J	0.24	0.24	0.11	0.19	0.13 J	0.082 J	0.088
PCB-197	TTNUS861	0.017 J	0.017 J	0.021 J	0.0078 J	0.012 J	0.0084 J	0.0048 J	0.0054 J
PCB-198/201	TTNUSA53	0.54	0.66	0.7	0.36	0.57	0.46	0.29	0.29
PCB-199	52663-75-9	0.023	0.021 J	0.022 J	0.017 J	0.031	0.018 J	0.012 J	0.015 J
PCB-200	52663-73-7	0.048	0.055	0.05	0.025	0.036	0.023 J	0.017 J	0.017 J
PCB-202	2136-99-4	0.097	0.1	0.1	0.061	0.09	0.068	0.043	0.046
PCB-203	52663-76-0	0.32	0.39	0.46	0.22	0.33	0.26	0.16	0.16
PCB-204	74472-52-9	0.00086 U	0.00077 U	0.00076 U	0.00053 U	0.00079 U	0.00079 U	0.00056 U	0.00052 U
PCB-205	74472-53-0	0.028	0.032	0.038	0.016 J	0.021 J	0.019 J	0.011 J	0.0089 J
PCB-206	40186-72-9	0.14 J	0.17	0.18	0.15	0.21	0.17	0.12	0.14
PCB-207	52663-79-3	0.02 J	0.017 J	0.022 J	0.012 J	0.02 J	0.014 J	0.0069 J	0.014 J
PCB-208	52663-77-1	0.056	0.05	0.048	0.048	0.059	0.052	0.03 J	0.046
PCB-209	2051-24-3	0.05	0.043 J	0.055	0.046	0.049 J	0.049	0.032	0.052
Total PCBs	1336-36-3	**41**	**43**	**46**	**22**	**35**	**23**	**15**	**17**
PCB-TEQ	PCB-TEQ	**2.54E-03**	**3.72E-04**	**4.14E-04**	**6.30E-04**	**7.97E-04**	**5.57E-04**	**3.62E-04**	**5.38E-04**

[1] Duplicate of P2-NWB-002-GT1A.

Source: TetraTech. 2018. Draft Remedial Investigation Report. Anacostia Riv
Sediment Project. Washington D.C. Prepared for District of Columbia, Departm
Energy and Environment. Prepared by TetraTech, Sterling, VA. March 30.

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch							
CHEMICAL	**CAS #**	**P2-NWB-002-GT3A Largemouth bass 8/9/2016**	**P2-NWB-003-GTA Northern snakehead 8/16/2016**	**P2-NWB-004-GT1A Largemouth bass 8/12/2016**	**P2-NWB-004-GT2A Largemouth bass 8/12/2016**	**P2-NWB-013-GT1A Largemouth bass 8/10/2016**	**P2-NWB-013-GT2A Largemouth bass 8/10/2016**	**P2-NWB-013-GT3A Largemouth bass 8/10/2016**	**P2-NWB-014-GTA Smallmouth bass 8/4/2016**
Dioxins and Furans									
1,2,3,4,6,7,8,9-OCDD	3268-87-9	0.00031 U	0.001 U	0.00034 U	0.0004 U	0.00034 U	0.0007 U	0.00039 U	0.0005 U
1,2,3,4,6,7,8,9-OCDF	39001-02-0	0.000092 U	0.00002 U	0.000081 U	0.00012 U	0.000015 U	0.00052 U	0.000092 U	0.00021 U
1,2,3,4,6,7,8-HPCDD	35822-46-9	0.000062 U	0.00015 J	0.000019 U	0.000065 U	0.000087 J	0.00014 J	0.000022 U	0.000049 U
1,2,3,4,6,7,8-HPCDF	67562-39-4	0.000092 J	0.000047 U	0.000041 U	0.000022 U	0.000029 U	0.00015 U	0.000033 U	0.000035 U
1,2,3,4,7,8,9-HPCDF	55673-89-7	0.00011 U	0.000043 U	0.000062 U	0.000032 U	0.000043 U	0.000034 U	0.000049 U	0.000048 U
1,2,3,4,7,8-HXCDD	39227-28-6	0.00008 U	0.00002 U	0.000016 U	0.000015 U	0.000021 U	0.00002 U	0.00002 U	0.000025 U
1,2,3,4,7,8-HXCDF	70648-26-9	0.000033 U	0.00016 J	0.00012 U	0.000094 U	0.00014 J	0.00016 J	0.00015 J	0.00013 U
1,2,3,6,7,8-HXCDD	57653-85-7	0.00008 U	0.000061 J	0.000017 U	0.000015 U	0.000021 U	0.000021 U	0.000021 U	0.000026 U
1,2,3,6,7,8-HXCDF	57117-44-9	0.000036 U	0.001 J	0.00017 J	0.00017 J	0.00052 J	0.00047 J	0.00027 J	0.00022 J
1,2,3,7,8,9-HXCDD	19408-74-3	0.000074 U	0.000019 U	0.000016 U	0.000014 U	0.000019 U	0.000019 U	0.000019 U	0.000024 U
1,2,3,7,8,9-HXCDF	72918-21-9	0.000041 U	0.000026 U	0.000019 U	0.000016 U	0.000024 U	0.000025 U	0.000024 U	0.000026 U
1,2,3,7,8-PECDD	40321-76-4	0.000092 J	0.00023 U	0.000029 U	0.000027 U	0.000025 U	0.000024 U	0.00013 U	0.000029 U
1,2,3,7,8-PECDF	57117-41-6	0.000052 U	0.000024 U	0.000015 U	0.000013 U	0.000022 U	0.000022 U	0.00002 U	0.00003 U
2,3,4,6,7,8-HXCDF	60851-34-5	0.000035 U	0.000021 U	0.000015 U	0.000013 U	0.000018 U	0.000021 U	0.00002 U	0.000023 U
2,3,4,7,8-PECDF	57117-31-4	0.00005 U	0.00014 U	0.000014 U	0.000047 U	0.00002 U	0.000019 U	0.000072 U	0.000026 U
2,3,7,8-TCDD	1746-01-6	0.000075 U	0.000015 U	0.000024 J	0.000048 J	0.000028 J	0.000033 J	0.000012 U	0.000025 U
2,3,7,8-TCDF	51207-31-9	0.000098 U	0.000023 U	0.000083 J	0.000089 J	0.00022 J	0.00019 J	0.000093 J	0.000031 U
TCDD-TEQ (HH)	TCDD-TEQ	**9.29E-05**	**1.24E-04**	**4.93E-05**	**7.39E-05**	**1.17E-04**	**1.16E-04**	**5.13E-05**	**2.20E-05**
Metals									
ALUMINUM	7429-90-5	0.58 U	0.49 U	0.55 U	0.58 U	0.5 U	0.52 U	--	0.54 U
ANTIMONY	7440-36-0	0.029 U	0.025 U	0.028 U	0.029 U	0.033 U	0.026 U	--	0.058 U
ARSENIC	7440-38-2	0.068 J	0.027 J	0.074 J	0.059 J	0.073 J	0.041 J	--	0.1
BARIUM	7440-39-3	0.052 J	0.14 J	0.079 J	0.11 J	0.12 J	0.085 J	--	0.11 J
BERYLLIUM	7440-41-7	0.0075 U	0.0064 U	0.0072 U	0.0075 U	0.0065 U	0.0067 U	--	0.007 U
CADMIUM	7440-43-9	0.013 U	0.011 U	0.013 U	0.013 U	0.011 U	0.012 U	--	0.012 U
CALCIUM	7440-70-2	860	1200 J	950 J	1800 J	900 J	1300 J	--	870
CHROMIUM	7440-47-3	1.2 J	0.62	2.1	1.6	0.88	0.8	--	1.4
COBALT	7440-48-4	0.011 U	0.012 J	0.015 J	0.0066 J	0.013 J	0.0062 J	--	0.024 J
COPPER	7440-50-8	0.27	0.32	0.29	0.32	0.32	0.33	--	0.32
IRON	7439-89-6	11	9	15	14	7.9	8.1	--	10
LEAD	7439-92-1	0.012 J	0.0078 U	0.0088 U	0.0091 U	0.0078 U	0.0081 U	--	0.0085 U
MAGNESIUM	7439-95-4	320	290	320	330	300	330	--	330
MANGANESE	7439-96-5	0.27 U	0.39 J	0.34 J	0.35 J	0.28 J	0.39 J	--	0.3 U
MERCURY	7439-97-6	0.32	0.34 J	0.2 J	0.18 J	0.076 U	0.16 J	--	0.5 J-
NICKEL	7440-02-0	0.33	0.12	0.29	0.086 J	0.14	0.16	--	0.4
POTASSIUM	7440-09-7	3900	3800	4100	4100	3900	4300	--	4200
SELENIUM	7782-49-2	0.32 J	0.33 J	0.24 J	0.24 J	0.17 J	0.14 J	--	0.31 J
SILVER	7440-22-4	0.0082 U	0.007 U	0.0079 U	0.0082 U	0.0071 U	0.0073 U	--	0.0077 U
SODIUM	7440-23-5	690	600	630	620	520	530	--	610
THALLIUM	7440-28-0	0.0026 U	0.0041 J	0.0029 J	0.0033 J	0.0043 J	0.0024 J	--	0.006 J
VANADIUM	7440-62-2	0.07 U	0.06 U	0.067 U	0.07 U	0.064 J	0.063 U	--	0.065 U
ZINC	7440-66-6	6.9	10	8.9	8.4	12	7.7	--	9.7
Semivolatile Organic Compounds									
1,2,4-TRICHLOROBENZENE	120-82-1	15 U	15 U	--	--	--	--	--	15 U
1,2-DIPHENYLHYDRAZINE	122-66-7	34 U	34 U	--	--	--	--	--	34 U
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	5.8 UJ	5.7 UJ	--	--	--	--	--	5.7 U
2,4,6-TRICHLOROPHENOL	88-06-2	40 U	40 U	--	--	--	--	--	39 U
2,4-DICHLOROPHENOL	120-83-2	5.4 U	5.3 U	--	--	--	--	--	5.3 U
2,4-DIMETHYLPHENOL	105-67-9	42 U	41 U	--	--	--	--	--	41 U
2,4-DINITROPHENOL	51-28-5	320 UJ	320 U	--	--	--	--	--	310 U
2,4-DINITROTOLUENE	121-14-2	22 U	21 U	--	--	--	--	--	21 U
2,6-DINITROTOLUENE	606-20-2	28 U	27 U	--	--	--	--	--	27 U
2-CHLORONAPHTHALENE	91-58-7	5.6 U	5.5 U	--	--	--	--	--	5.5 U
2-CHLOROPHENOL	95-57-8	22 U	22 U	--	--	--	--	--	22 U
2-NITROPHENOL	88-75-5	29 U	29 U	--	--	--	--	--	29 U
3,3'-DICHLOROBENZIDINE	91-94-1	28 U	28 UR	--	--	--	--	--	28 U
4,6-DINITRO-2-METHYLPHENOL	534-52-1	110 U	110 U	--	--	--	--	--	110 U
4-BROMOPHENYL PHENYL ETHER	101-55-3	23 U	23 U	--	--	--	--	--	23 U

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Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch							
		P2-NWB-002-GT3A	P2-NWB-003-GTA	P2-NWB-004-GT1A	P2-NWB-004-GT2A	P2-NWB-013-GT1A	P2-NWB-013-GT2A	P2-NWB-013-GT3A	P2-NWB-014-GTA
		Largemouth bass	Northern snakehead	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Smallmouth bass
CHEMICAL	CAS #	8/9/2016	8/16/2016	8/12/2016	8/12/2016	8/10/2016	8/10/2016	8/10/2016	8/4/2016
4-CHLORO-3-METHYLPHENOL	59-50-7	25 U	24 U	--	--	--	--	--	24 U
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	30 U	29 U	--	--	--	--	--	29 U
4-NITROPHENOL	100-02-7	97 U	97 U	--	--	--	--	--	96 UJ
ACENAPHTHENE	83-32-9	5.1 U	5.1 U	--	--	--	--	--	5.1 U
ACENAPHTHYLENE	208-96-8	6.1 U	6.1 U	--	--	--	--	--	6 U
ANTHRACENE	120-12-7	5.2 U	5.2 U	--	--	--	--	--	5.2 U
BENZIDINE	92-87-5	1100 UJ	1100 UR	--	--	--	--	--	1100 U
BENZO(A)ANTHRACENE	56-55-3	6.7 U	6.6 U	--	--	--	--	--	6.6 U
BENZO(A)PYRENE	50-32-8	5.3 U	5.3 U	--	--	--	--	--	5.3 U
BENZO(B)FLUORANTHENE	205-99-2	8.4 U	8.3 U	--	--	--	--	--	8.3 U
BENZO(G,H,I)PERYLENE	191-24-2	5.3 U	5.3 U	--	--	--	--	--	5.2 U
BENZO(K)FLUORANTHENE	207-08-9	11 U	11 U	--	--	--	--	--	11 U
BENZOIC ACID	65-85-0	670 J	640 J	--	--	--	--	--	650 J
BIS(2-CHLOROETHOXY)METHANE	111-91-1	18 U	17 U	--	--	--	--	--	17 U
BIS(2-CHLOROETHYL)ETHER	111-44-4	7.2 U	7.1 U	--	--	--	--	--	7.1 U
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	43 U	43 U	--	--	--	--	--	43 U
BUTYL BENZYL PHTHALATE	85-68-7	36 U	36 U	--	--	--	--	--	36 U
CHRYSENE	218-01-9	6.4 U	6.3 U	--	--	--	--	--	6.3 U
DIBENZO(A,H)ANTHRACENE	53-70-3	5.9 U	5.9 U	--	--	--	--	--	5.9 U
DIETHYL PHTHALATE	84-66-2	29 U	29 U	--	--	--	--	--	46 J
DIMETHYL PHTHALATE	131-11-3	29 U	29 U	--	--	--	--	--	29 U
DI-N-BUTYL PHTHALATE	84-74-2	33 U	33 U	--	--	--	--	--	33 U
DI-N-OCTYL PHTHALATE	117-84-0	28 UJ	28 UJ	--	--	--	--	--	270 J
FLUORANTHENE	206-44-0	5.7 U	5.7 U	--	--	--	--	--	5.6 U
FLUORENE	86-73-7	7 U	7 U	--	--	--	--	--	6.9 U
HEXACHLOROBENZENE	118-74-1	5.7 U	5.6 U	--	--	--	--	--	5.6 U
HEXACHLOROBUTADIENE	87-68-3	6 U	5.9 U	--	--	--	--	--	5.9 U
HEXACHLOROCYCLOPENTADIENE	77-47-4	29 UJ	29 U	--	--	--	--	--	28 U
HEXACHLOROETHANE	67-72-1	19 U	19 U	--	--	--	--	--	19 U
INDENO(1,2,3-CD)PYRENE	193-39-5	5.5 U	5.5 U	--	--	--	--	--	5.4 U
ISOPHORONE	78-59-1	20 U	20 U	--	--	--	--	--	20 U
NAPHTHALENE	91-20-3	4.6 U	4.6 U	--	--	--	--	--	4.5 U
NITROBENZENE	98-95-3	22 U	22 U	--	--	--	--	--	22 U
N-NITROSODIMETHYLAMINE	62-75-9	23 U	23 UJ	--	--	--	--	--	23 U
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	6.3 U	6.2 U	--	--	--	--	--	6.2 U
N-NITROSODIPHENYLAMINE	86-30-6	25 U	25 U	--	--	--	--	--	24 U
PENTACHLOROPHENOL	87-86-5	24 U	24 U	--	--	--	--	--	24 U
PHENANTHRENE	85-01-8	8.5 U	8.4 U	--	--	--	--	--	8.4 U
PHENOL	108-95-2	6.3 U	6.3 U	--	--	--	--	--	6.2 U
PYRENE	129-00-0	5.4 U	5.4 U	--	--	--	--	--	5.3 U
Pesticides									
4,4'-DDD	72-54-8	0.084 U	0.6 J	--	0.085 U	0.084 U	0.084 U	0.18 U	0.043 U
4,4'-DDE	72-55-9	0.28 J	1.9	--	1.1	1.5	1.1	1.2 J	0.37 J
4,4'-DDT	50-29-3	0.084 U	0.084 UJ	--	0.085 U	0.084 U	0.084 U	0.18 U	0.043 U
ALDRIN	309-00-2	0.087 U	0.087 U	--	0.088 U	0.087 U	0.087 U	0.19 U	0.044 U
ALPHA-BHC	319-84-6	0.24 U	0.24 U	--	0.25 U	0.24 U	0.24 U	0.53 U	0.12 U
BETA-BHC	319-85-7	0.18 U	0.18 U	--	0.19 UJ	0.19 UJ	0.19 UJ	0.4 UJ	0.094 U
CHLORDANE (ALL)	CHLORDANE_ALL	6.3 J	22	--	27	39 J-	26	31	8.9
DELTA-BHC	319-86-8	0.29 U	0.29 U	--	0.3 U	0.3 U	0.3 U	0.64 U	0.15 U
DIELDRIN	60-57-1	0.078 U	2.9	--	1.6	3.4	2	1.4 J	0.44 J
ENDOSULFAN I	959-98-8	0.052 U	0.052 U	--	0.053 U	0.053 U	0.053 U	0.11 U	0.027 U
ENDOSULFAN II	33213-65-9	0.25 U	0.25 U	--	0.26 U	0.25 U	0.25 U	0.55 U	0.13 U
ENDOSULFAN SULFATE	1031-07-8	0.1 U	0.1 U	--	0.11 U	0.11 U	0.11 U	0.23 U	0.053 U
ENDRIN	72-20-8	0.24 U	0.24 U	--	0.24 U	0.24 U	0.24 U	0.52 U	0.12 U
ENDRIN ALDEHYDE	7421-93-4	0.24 U	0.24 U	--	0.25 U	0.24 U	0.24 U	0.53 U	0.12 U
GAMMA-BHC (LINDANE)	58-89-9	0.17 U	0.17 U	--	0.17 U	0.17 U	0.17 U	0.37 U	0.086 U
HEPTACHLOR	76-44-8	0.071 U	0.071 U	--	0.072 U	0.072 U	0.072 U	0.15 U	0.036 U
HEPTACHLOR EPOXIDE	1024-57-3	0.099 U	1.3 J	--	0.86 J	3.5	2.3	1.3 J	0.32 J
TOXAPHENE	8001-35-2	27 U	27 U	--	27 U	27 U	27 U	59 U	14 U

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

CHEMICAL	CAS #	Northwest Branch P2-NWB-002-GT3A Largemouth bass 8/9/2016	P2-NWB-003-GTA Northern snakehead 8/16/2016	P2-NWB-004-GT1A Largemouth bass 8/12/2016	P2-NWB-004-GT2A Largemouth bass 8/12/2016	P2-NWB-013-GT1A Largemouth bass 8/10/2016	P2-NWB-013-GT2A Largemouth bass 8/10/2016	P2-NWB-013-GT3A Largemouth bass 8/10/2016	P2-NWB-014-GTA Smallmouth bass 8/4/2016
Aroclors									
AROCLOR-1016	12674-11-2	3.8 U	3.8 U	--	--	--	--	--	0.38 U
AROCLOR-1221	11104-28-2	6 U	6 U	--	--	--	--	--	0.6 U
AROCLOR-1232	11141-16-5	2.1 U	2.1 U	--	--	--	--	--	0.21 U
AROCLOR-1242	53469-21-9	3 U	3.1 U	--	--	--	--	--	0.31 U
AROCLOR-1248	12672-29-6	1.9 U	1.9 U	--	--	--	--	--	0.19 U
AROCLOR-1254	11097-69-1	3 U	3.1 U	--	--	--	--	--	4.8
AROCLOR-1260	11096-82-5	2.8 U	25	--	--	--	--	--	3
Total Aroclors	TotalAroclor	**ND**	**25**	**NA**	**NA**	**NA**	**NA**	**NA**	**7.8**
PCB Congeners									
PCB-1	2051-60-7	0.00024 U	0.00051 UJ	0.00019 U	0.0003 U	0.00026 U	0.0038 J	0.00028 U	0.00023 U
PCB-2	2051-61-8	0.00026 U	0.00061 UJ	0.00022 U	0.00036 U	0.0003 U	0.0057 J	0.00032 U	0.00026 U
PCB-3	2051-62-9	0.00027 U	0.00074 UJ	0.00088 U	0.0015 U	0.0005 J	0.003 J	0.00038 U	0.00031 U
PCB-4	TTNUS524	0.0042 U	0.0052 J	0.0038 J	0.0039 J	0.0065 J	0.0049 J	0.0042 J	0.0031 U
PCB-5	16605-91-7	0.0015 U	0.0061 UJ	0.0017 U	0.0021 U	0.0016 U	0.0015 U	0.0018 U	0.0025 U
PCB-6	25569-80-6	0.001 J	0.0058 UJ	0.0027 J	0.0019 U	0.0024 J	0.0031 J	0.0017 U	0.0023 U
PCB-7	33284-50-3	0.0014 U	0.0059 UJ	0.0016 U	0.002 U	0.0015 U	0.0014 U	0.0018 U	0.0024 U
PCB-8	34883-43-7	0.0043 U	0.0056 UJ	0.0067 J	0.0051 J	0.0087 J	0.0076 U	0.0074 U	0.007 U
PCB-9	34883-39-1	0.0015 U	0.006 UJ	0.0017 U	0.0014 J	0.0014 J	0.0026 J	0.0018 U	0.0024 U
PCB-10	33146-45-1	0.0016 U	0.0064 UJ	0.0018 U	0.0022 U	0.0016 U	0.002 J	0.0016 J	0.0026 U
PCB-11	2050-67-1	0.0049 U	0.0093 U	0.0091 U	0.0075 U	0.0089 U	0.011 J	0.007 U	0.011 U
PCB-12/13	TTNUS800	0.0014 U	0.0036 J	0.0016 U	0.0025 J	0.0015 U	0.0014 U	0.0017 U	0.0023 U
PCB-14	34883-41-5	0.0012 U	0.005 UJ	0.0014 U	0.0017 U	0.0013 U	0.0012 U	0.0015 U	0.002 U
PCB-15	2050-68-2	0.00085 J	0.0067 UJ	0.0014 J	0.0037 J	0.0031 U	0.0062 U	0.0034 U	0.0043 U
PCB-16	38444-78-9	0.0034 J	0.0031 UJ	0.0079 J	0.0039 J	0.011 J	0.0092 J	0.0094 J	0.007 J
PCB-17	37680-66-3	0.0074 J	0.0026 UJ	0.011 J	0.01 J	0.016 J	0.018 J	0.01 J	0.01 J
PCB-18/30	TTNUS616	0.015 J	0.0023 UJ	0.027 J	0.022 J	0.046 J	0.046 J	0.026 J	0.016 J
PCB-19	38444-73-4	0.00082 U	0.0032 UJ	0.001 U	0.0012 U	0.0081 J	0.0093 J	0.0072 J	0.00094 U
PCB-20/28	TTNUS519	0.06	0.76 J	0.1	0.12	0.25	0.23	0.14	0.073
PCB-21/33	TTNUS810	0.0079 J	0.0054 J	0.012 J	0.014 J	0.018 J	0.019 J	0.014 J	0.0077 J
PCB-22	38444-85-8	0.015 J	0.026 J	0.024 J	0.031	0.07	0.061	0.038	0.018 J
PCB-23	55720-44-0	0.00043 U	0.0016 UJ	0.00056 U	0.00066 U	0.00057 U	0.00067 U	0.00063 U	0.00074 U
PCB-24	55702-45-9	0.00056 U	0.0022 UJ	0.00071 U	0.0024 J	0.0018 J	0.0011 J	0.00075 U	0.00065 U
PCB-25	55712-37-3	0.0028 J	0.0054 J	0.0058 J	0.0044 J	0.012 J	0.011 J	0.0074 J	0.0028 J
PCB-26/29	TTNUS811	0.0075 J	0.015 J	0.011 J	0.015 J	0.027	0.028	0.015 J	0.0089 J
PCB-27	38444-76-7	0.00049 U	0.0019 UJ	0.0017 J	0.0018 J	0.0061 J	0.0086 J	0.004 J	0.0012 J
PCB-31	16606-02-3	0.032 J	0.016 J	0.05	0.055	0.12	0.11	0.063	0.033 J
PCB-32	38444-77-8	0.0052 U	0.0019 UJ	0.011 J	0.011 J	0.022 J	0.029	0.019 J	0.011 J
PCB-34	TTNUS277	0.00043 U	0.0016 UJ	0.00055 U	0.00065 U	0.00056 U	0.0013 J	0.00062 U	0.00072 U
PCB-35	37680-69-6	0.00044 U	0.0016 UJ	0.00057 U	0.00067 U	0.00058 U	0.00068 U	0.00064 U	0.00074 U
PCB-36	38444-87-0	0.00042 U	0.0016 UJ	0.00055 U	0.00065 U	0.00056 U	0.00065 U	0.00062 U	0.00072 U
PCB-37	38444-90-5	0.0041 J	0.0016 UJ	0.0058 J	0.0045 J	0.014 J	0.01 J	0.0082 J	0.0036 U
PCB-38	53555-66-1	0.00045 U	0.0017 UJ	0.00058 U	0.00068 U	0.0011 J	0.00069 U	0.00065 U	0.00076 U
PCB-39	38444-88-1	0.0004 U	0.0015 UJ	0.00052 U	0.00061 U	0.00052 U	0.00061 U	0.00058 U	0.00067 U
PCB-41/40/71	TTNUS813	0.028	0.0039 UJ	0.036	0.039 J	0.063	0.063	0.042	0.025
PCB-42	36559-22-5	0.021 J	0.028 J	0.029 J	0.035	0.065	0.061	0.038	0.023 J
PCB-43/73	TTNUSA51	0.0034 J	0.0037 UJ	0.0056 J	0.0054 J	0.0046 J	0.006 J	0.0052 J	0.001 U
PCB-44/47/65	TTNUS618	0.1	0.55 J	0.13	0.17	0.28	0.29	0.16	0.076 J
PCB-45/51	TTNUS814	0.0098 J	0.0041 UJ	0.013 J	0.018 J	0.027	0.028	0.013 J	0.0081 J
PCB-46	41464-47-5	0.0021 J	0.0048 UJ	0.0025 J	0.0024 J	0.0055 J	0.0034 J	0.0015 U	0.003 J
PCB-48	70362-47-9	0.0088 J	0.0039 UJ	0.016 J	0.016 J	0.026	0.022 J	0.018 J	0.0065 J
PCB-49/69	TTNUS818	0.072	0.041 J	0.092	0.12	0.19	0.19	0.11	0.061
PCB-50/53	TTNUS815	0.0078 J	0.0038 UJ	0.0085 J	0.009 J	0.013 J	0.015 J	0.011 J	0.0038 J
PCB-52	35693-99-3	0.2	0.63 J	0.25	0.29	0.49	0.52	0.3	0.15
PCB-54	15968-05-5	0.00088 U	0.0037 UJ	0.0012 U	0.0014 U	0.0011 U	0.0012 U	0.0012 U	0.00091 U
PCB-55	74338-24-2	0.0031 J	0.0099 J	0.0052 J	0.009 J	0.0087 J	0.0094 J	0.0031 J	0.0036 J
PCB-56	41464-43-1	0.028	0.015 J	0.041	0.047	0.078	0.076 J	0.042	0.024 J
PCB-57	70424-67-8	0.00066 U	0.0029 UJ	0.0009 U	0.001 U	0.00084 U	0.0024 J	0.00091 U	0.00079 U
PCB-58	41464-49-7	0.00095 J	0.0029 UJ	0.0023 J	0.003 J	0.0019 J	0.0011 J	0.0026 J	0.00079 U
PCB-59/62/75	TTNUS816	0.0086 J	0.051 J	0.015 J	0.019 J	0.03	0.026	0.014 J	0.0098 J

Table A-5
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Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch							
CHEMICAL	**CAS #**	**P2-NWB-002-GT3A** Largemouth bass 8/9/2016	**P2-NWB-003-GTA** Northern snakehead 8/16/2016	**P2-NWB-004-GT1A** Largemouth bass 8/12/2016	**P2-NWB-004-GT2A** Largemouth bass 8/12/2016	**P2-NWB-013-GT1A** Largemouth bass 8/10/2016	**P2-NWB-013-GT2A** Largemouth bass 8/10/2016	**P2-NWB-013-GT3A** Largemouth bass 8/10/2016	**P2-NWB-014-GTA** Smallmouth bass 8/4/2016
PCB-60	33025-41-1	0.033	0.22 J	0.045	0.044 J	0.075	0.077	0.044 J	0.031
PCB-61/70/74/76	TTNUS817	0.19	0.67 J	0.24	0.28	0.47	0.51	0.27	0.15
PCB-63	74472-34-7	0.005 J	0.045 J	0.0073 J	0.0093 J	0.012 J	0.011 J	0.0067 J	0.0051 J
PCB-64	52663-58-8	0.052	0.13 J	0.08	0.089	0.14	0.14	0.076	0.041
PCB-66	32598-10-0	0.12	0.97 J	0.15	0.2	0.28	0.29	0.18	0.099
PCB-67	73575-53-8	0.00059 U	0.0026 UJ	0.0029 J	0.0032 J	0.0051 J	0.0071 J	0.0035 J	0.00071 U
PCB-68	73575-52-7	0.0006 U	0.012 J	0.00081 U	0.0019 J	0.0028 J	0.0027 J	0.0013 J	0.00072 U
PCB-72	41464-42-0	0.0025 J	0.0066 J	0.0028 J	0.0023 J	0.0035 J	0.0046 J	0.00088 U	0.0016 J
PCB-77	32598-13-3	0.0078 J	0.0084 J	0.011 J	0.011 J	0.022 J	0.024	0.012 J	0.007 J
PCB-78	70362-49-1	0.00068 U	0.003 UJ	0.00093 U	0.0011 U	0.00087 U	0.00075 J	0.00094 U	0.00082 U
PCB-79	41464-48-6	0.0031 J	0.0051 J	0.0032 J	0.0033 J	0.006 J	0.0041 J	0.0036 J	0.0022 J
PCB-80	33284-52-5	0.00058 U	0.0026 UJ	0.00079 U	0.00091 U	0.00074 U	0.0008 U	0.0008 U	0.0007 U
PCB-81	70362-50-4	0.00061 U	0.0026 UJ	0.00082 U	0.00093 U	0.0028 J	0.0022 J	0.0029 J	0.00073 U
PCB-82	52663-62-4	0.049	0.031 J	0.062	0.089	0.11	0.13	0.077	0.033 J
PCB-83/99	TTNUS863	0.31	1.1 J	0.39	0.48	0.72	0.78	0.48	0.25
PCB-84	52663-60-2	0.061	0.023 J	0.074 J	0.11	0.17	0.18	0.089 J	0.057
PCB-85/116/117	TTNUS799	0.1	0.34 J	0.13	0.17	0.24	0.26	0.16	0.082
PCB-86/87/97/109/119/125	TTNUS941	0.3	0.33 J	0.38	0.45	0.74	0.79	0.46	0.24
PCB-88/91	TTNUS819	0.058	0.05 J	0.057 J	0.084	0.12	0.13	0.079	0.033 J
PCB-89	73575-57-2	0.0015 U	0.0063 UJ	0.002 U	0.0022 U	0.0018 U	0.0022 U	0.0019 U	0.0015 U
PCB-90/101/113	TTNUS619	0.65	1.2 J	0.73	0.89	1.3	1.4	0.88	0.44
PCB-92	52663-61-3	0.084 J	0.34 J	0.11	0.11 J	0.2	0.21	0.14	0.064
PCB-93/100	TTNUS864	0.0052 J	0.0056 UJ	0.0042 J	0.0083 J	0.002 J	0.007 J	0.0016 U	0.0014 U
PCB-94	73575-55-0	0.0015 U	0.0063 UJ	0.002 U	0.0022 U	0.0018 U	0.0027 J	0.0019 U	0.0015 U
PCB-95	38379-99-6	0.31	0.3 J	0.37	0.42	0.63	0.66	0.4	0.21
PCB-96	73575-54-9	0.0011 U	0.0047 UJ	0.0015 U	0.0016 U	0.0014 U	0.0016 U	0.0014 U	0.0012 U
PCB-98/102	TTNUS865	0.0025 J	0.0054 UJ	0.0041 J	0.0077 J	0.0034 J	0.0096 J	0.011 J	0.0013 U
PCB-103	TTNUS256	0.0022 J	0.0055 UJ	0.0018 U	0.0038 J	0.0016 U	0.004 J	0.0016 U	0.0014 U
PCB-104	TTNUS257	0.00097 U	0.0042 UJ	0.0014 U	0.0014 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
PCB-105	32598-14-4	0.2	0.69 J	0.26	0.31	0.45	0.52	0.32	0.16
PCB-106	70424-69-0	0.00088 U	0.0034 UJ	0.0012 U	0.0013 U	0.001 U	0.0032 J	0.001 U	0.0014 U
PCB-107	70424-68-9	0.038	0.15 J	0.059	0.074	0.1	0.11	0.069	0.034 J
PCB-108/124	TTNUS942	0.021 J	0.016 J	0.028	0.034	0.047	0.055	0.033	0.017 J
PCB-110/115	TTNUS797	0.61	1.3 J	0.75	0.93	1.5	1.5	0.96	0.45
PCB-111	39635-32-0	0.00091 U	0.0061 J	0.0013 U	0.0013 U	0.0026 J	0.0014 U	0.0012 U	0.00097 U
PCB-112	TTNUS259	0.00099 U	0.0071 J	0.0014 U	0.0015 U	0.0048 J	0.0018 J	0.0025 J	0.0011 U
PCB-114	74472-37-0	0.012 J	0.051 J	0.019 J	0.023	0.032	0.033	0.021 J	0.012 J
PCB-118	31508-00-6	0.56	1.9 J	0.73	0.91	1.3	1.6	0.98	0.45
PCB-120	68194-12-7	0.0036 J	0.0041 UJ	0.0027 J	0.0027 J	0.0071 J	0.0085 J	0.0039 J	0.00099 U
PCB-121	56558-18-0	0.00094 U	0.0041 UJ	0.0013 U	0.0014 U	0.0012 U	0.0014 U	0.0012 U	0.001 U
PCB-122	76842-07-4	0.0041 J	0.015 J	0.0031 J	0.0096 J	0.014 J	0.021 J	0.0076 J	0.0037 J
PCB-123	65510-44-3	0.014 J	0.036 J	0.016 J	0.022 J	0.026 J	0.031 J	0.027	0.012 J
PCB-126	57465-28-8	0.0017 J	0.0027 J	0.0034 J	0.0072 J	0.0048 J	0.0055 J	0.0035 J	0.0019 U
PCB-127	39635-33-1	0.00087 U	0.0042 J	0.0012 U	0.0013 U	0.0037 J	0.0031 J	0.001 U	0.0014 U
PCB-128/166	TTNUS613	0.18	0.48 J	0.18	0.23	0.31	0.36	0.24	0.12
PCB-129/138/160/163	TTNUSA52	1.6	4.1 J	1.5	1.9	2.5	2.8	1.9	0.92
PCB-130	52663-66-8	0.062	0.17 J	0.077	0.097	0.12	0.14	0.081 J	0.05
PCB-131	61798-70-7	0.0099 J	0.013 J	0.011 J	0.012 J	0.016 J	0.019 J	0.012 J	0.0041 J
PCB-132	38380-05-1	0.22	0.28 J	0.19	0.25	0.37	0.38	0.24	0.12
PCB-133	35694-04-3	0.021 J	0.077 J	0.024 J	0.032	0.036	0.043	0.027 J	0.0084 J
PCB-134/143	TTNUS801	0.043	0.063 J	0.039	0.048	0.071	0.074	0.048	0.019 J
PCB-135/151	TTNUS805	0.44	0.66 J	0.26	0.32	0.42	0.4	0.31	0.17
PCB-136	38411-22-2	0.061	0.014 J	0.047	0.058	0.087	0.08	0.051 J	0.027 J
PCB-137	35694-06-5	0.046	0.15 J	0.057	0.073	0.093 J	0.11	0.071	0.037 J
PCB-139/140	TTNUS803	0.013 J	0.059 J	0.021 J	0.028	0.034	0.035	0.023 J	0.01 J
PCB-141	52712-04-6	0.26	0.5 J	0.2	0.25	0.32	0.35	0.25	0.11
PCB-142	41411-61-4	0.0021 U	0.0082 UJ	0.0028 U	0.0029 U	0.0026 U	0.0027 U	0.0026 U	0.0026 U
PCB-144	68194-14-9	0.049	0.031 J	0.037	0.046	0.058	0.054	0.036	0.023 J
PCB-145	74472-40-5	0.0013 U	0.0053 UJ	0.0017 U	0.0018 U	0.0015 U	0.0016 U	0.0015 U	0.0013 U
PCB-146	51908-16-8	0.26	0.74 J	0.23	0.29	0.4	0.42	0.3	0.15

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch							
		P2-NWB-002-GT3A	P2-NWB-003-GTA	P2-NWB-004-GT1A	P2-NWB-004-GT2A	P2-NWB-013-GT1A	P2-NWB-013-GT2A	P2-NWB-013-GT3A	P2-NWB-014-GTA
		Largemouth bass	Northern snakehead	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Largemouth bass	Smallmouth bass
CHEMICAL	**CAS #**	8/9/2016	8/16/2016	8/12/2016	8/12/2016	8/10/2016	8/10/2016	8/10/2016	8/4/2016
PCB-147/149	TTNUS804	1.1	1.5 J	0.72	0.88	1.2	1.3	0.91	0.47
PCB-148	74472-41-6	0.0018 U	0.0074 UJ	0.0024 U	0.0025 U	0.0022 U	0.0022 U	0.0021 U	0.0018 U
PCB-150	68194-08-1	0.0013 U	0.0052 UJ	0.0017 U	0.0018 U	0.0018 J	0.0016 U	0.0015 U	0.0013 U
PCB-152	68194-09-2	0.0013 U	0.0053 UJ	0.0017 U	0.0018 U	0.0015 U	0.0016 U	0.0015 U	0.0013 U
PCB-153/168	TTNUS615	1.5	4.2 J	1.4	1.7	2.3	2.6	1.8	0.88
PCB-154	TTNUS860	0.0073 J	0.026 J	0.0076 J	0.0075 J	0.014 J	0.0094 J	0.0086 J	0.0046 J
PCB-155	33979-03-2	0.0012 U	0.005 UJ	0.0016 U	0.0017 U	0.0015 U	0.0015 U	0.0015 U	0.0012 U
PCB-156/157	TTNUS523	0.11	0.35 J	0.13	0.16	0.23	0.27	0.17	0.089
PCB-158	74472-42-7	0.12	0.35 J	0.13	0.16	0.2	0.23	0.15	0.082
PCB-159	39635-35-3	0.0081 J	0.0049 J	0.0073 J	0.007 J	0.01 J	0.0099 J	0.0046 J	0.0029 J
PCB-161	74472-43-8	0.0014 U	0.0054 UJ	0.0019 U	0.0019 U	0.0017 U	0.0018 U	0.0018 U	0.0017 U
PCB-162	39635-34-2	0.0053 J	0.02 J	0.0057 J	0.01 J	0.01 J	0.011 J	0.0068 J	0.0037 J
PCB-164	74472-45-0	0.091	0.19 J	0.072	0.097	0.12	0.14	0.09	0.051
PCB-165	74472-46-1	0.0015 U	0.006 UJ	0.002 U	0.0021 U	0.0019 U	0.002 U	0.0019 U	0.0019 U
PCB-167	52663-72-6	0.05	0.14 J	0.065	0.085	0.11	0.12	0.077	0.042
PCB-169	32774-16-6	0.0043 J	0.015 J	0.0014 U	0.0015 U	0.0024 J	0.0043 J	0.0029 J	0.0013 U
PCB-170	35065-30-6	0.42	1.1 J	0.28	0.36	0.42	0.47	0.34	0.19
PCB-171/173	TTNUS806	0.12	0.32 J	0.079	0.093	0.11	0.12	0.089	0.053
PCB-172	52663-74-8	0.084	0.27 J	0.064	0.082	0.097	0.1	0.078	0.039 J
PCB-174	38411-25-5	0.35	0.58 J	0.2	0.25	0.32	0.33	0.24	0.14
PCB-175	40186-70-7	0.015 J	0.039 J	0.0086 J	0.014 J	0.016 J	0.02 J	0.012 J	0.0065 J
PCB-176	52663-65-7	0.034	0.026 J	0.02 J	0.024	0.029	0.03	0.02 J	0.011 J
PCB-177	52663-70-4	0.23	0.47 J	0.15	0.19	0.24	0.25	0.18	0.095
PCB-178	52663-67-9	0.11	0.31 J	0.068	0.09	0.1	0.12	0.088	0.05
PCB-179	52663-64-6	0.11	0.18 J	0.062	0.08	0.11	0.11	0.071	0.039
PCB-180/193	TTNUS617	1.2	3.2 J	0.77	0.95	1.1	1.3	0.91	0.53
PCB-181	74472-47-2	0.0033 J	0.02 J	0.0017 U	0.0019 U	0.0018 U	0.0048 J	0.0017 U	0.0014 U
PCB-182	60145-23-5	0.0024 J	0.0063 UJ	0.0049 J	0.0056 J	0.0017 U	0.004 J	0.0017 U	0.004 J
PCB-183/185	TTNUS807	0.32	0.88 J	0.21	0.26	0.3	0.33	0.24	0.14
PCB-184	74472-48-3	0.0012 U	0.0054 UJ	0.0014 U	0.0015 U	0.0015 U	0.0015 U	0.0014 U	0.0012 U
PCB-186	74472-49-4	0.0012 U	0.0052 UJ	0.0013 U	0.0015 U	0.0014 U	0.0015 U	0.0014 U	0.0011 U
PCB-187	52663-68-0	1.4	2.6 J	0.58	0.72	0.91	1	0.79	0.48
PCB-188	TTNUS272	0.0011 U	0.0047 UJ	0.0012 U	0.0014 U	0.0013 U	0.0013 U	0.0012 U	0.001 U
PCB-189	39635-31-9	0.016 J	0.047 J	0.012 J	0.015 J	0.016 J	0.018 J	0.012 J	0.0053 U
PCB-190	41411-64-7	0.092	0.28 J	0.08	0.089	0.095	0.11	0.086	0.042
PCB-191	74472-50-7	0.021 J	0.059 J	0.014 J	0.014 J	0.021 J	0.018 J	0.022 J	0.0061 J
PCB-192	74472-51-8	0.0013 U	0.0055 UJ	0.0014 U	0.0016 U	0.0015 U	0.0016 U	0.0015 U	0.0012 U
PCB-194	35694-08-7	0.23	0.9 J	0.17	0.2	0.22	0.27	0.19	0.15
PCB-195	52663-78-2	0.087	0.32 J	0.053 J	0.065	0.078	0.086	0.072	0.037 J
PCB-196	42740-50-1	0.098	0.41 J	0.066	0.087	0.098	0.1	0.078	0.049
PCB-197	TTNUS861	0.0062 J	0.034 J	0.00091 U	0.00089 U	0.0061 J	0.0052 J	0.0051 J	0.0007 U
PCB-198/201	TTNUSA53	0.33	1.1 J	0.23	0.27	0.35	0.41	0.31	0.22
PCB-199	52663-75-9	0.015 J	0.027 J	0.01 J	0.013 J	0.015 J	0.016 J	0.015 J	0.0057 J
PCB-200	52663-73-7	0.018 J	0.098 J	0.015 J	0.016 J	0.019 J	0.021 J	0.017 J	0.011 J
PCB-202	2136-99-4	0.043	0.18 J	0.038 J	0.046	0.065	0.077	0.059	0.036
PCB-203	52663-76-0	0.17	0.56 J	0.14	0.17	0.19	0.22	0.17	0.11
PCB-204	74472-52-9	0.00072 U	0.0032 UJ	0.00095 U	0.00093 U	0.00083 U	0.00092 U	0.00084 U	0.00072 U
PCB-205	74472-53-0	0.011 J	0.034 J	0.0073 J	0.013 J	0.0087 J	0.011 J	0.0081 J	0.006 U
PCB-206	40186-72-9	0.12	0.52 J	0.11	0.14	0.16	0.21	0.17	0.11
PCB-207	52663-79-3	0.011 J	0.061 J	0.011 J	0.013 J	0.012 J	0.017 J	0.016 J	0.012 J
PCB-208	52663-77-1	0.034	0.16 J	0.041	0.042	0.051	0.061	0.052	0.032
PCB-209	2051-24-3	0.042	0.21 J	0.034	0.033 J	0.045 J	0.047 J	0.04	0.035
Total PCBs	1336-36-3	**16**	**41**	**15**	**18**	**25**	**27**	**18**	**9**
PCB-TEQ	PCB-TEQ	**3.29E-04**	**8.17E-04**	**3.78E-04**	**7.67E-04**	**6.20E-04**	**7.60E-04**	**4.87E-04**	**2.37E-05**

[1] Duplicate of P2-NWB-002-GT1A.

Source: TetraTech. 2018. Draft Remedial Investigation Report. Anacostia Riv
Sediment Project. Washington D.C. Prepared for District of Columbia, Departm
Energy and Environment. Prepared by TetraTech, Sterling, VA. March 30.

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch					Paint Branch		
		P2-NWB-015-GTA	P2-NWB-016-GTA	P2-NWB-017-GTA	P2-NWB-018-GT1A	P2-NWB-018-GT2A	P2-PB-005-GT1A	P2-PB-005-GT2A	P2-PB-006-GTA
		Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Largemouth bass	Largemouth bass	Largemouth bass
CHEMICAL	CAS #	8/5/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/15/2016	8/15/2016	8/3/2016
Dioxins and Furans									
1,2,3,4,6,7,8,9-OCDD	3268-87-9	0.00081 U	0.00063 U	0.00036 U	0.00043 U	0.00035 U	0.00036 U	0.00056 U	0.00043 U
1,2,3,4,6,7,8,9-OCDF	39001-02-0	0.000098 U	0.0002 U	0.0000057 U	0.000014 U	0.0000062 U	0.000015 U	0.00014 U	0.00016 U
1,2,3,4,6,7,8-HPCDD	35822-46-9	0.000086 U	0.000051 U	0.000031 U	0.0001 U	0.000053 U	0.000022 U	0.000091 U	0.00011 U
1,2,3,4,6,7,8-HPCDF	67562-39-4	0.000086 U	0.000065 U	0.000035 U	0.000042 U	0.000027 U	0.000026 U	0.000027 U	0.000033 U
1,2,3,4,7,8,9-HPCDF	55673-89-7	0.000095 U	0.000087 U	0.000043 U	0.000054 U	0.000042 U	0.000036 U	0.000029 U	0.000041 U
1,2,3,4,7,8-HXCDD	39227-28-6	0.00006 U	0.000035 U	0.000019 U	0.000022 U	0.000017 U	0.000021 U	0.000024 U	0.00002 U
1,2,3,4,7,8-HXCDF	70648-26-9	0.000051 J	0.00015 U	0.000081 U	0.000088 U	0.000064 U	0.00017 U	0.00023 U	0.0001 U
1,2,3,6,7,8-HXCDD	57653-85-7	0.000061 U	0.000034 U	0.00006 J	0.00004 J	0.000019 U	0.000022 U	0.000026 U	0.00002 U
1,2,3,6,7,8-HXCDF	57117-44-9	0.000072 J	0.00041 J	0.00025 J	0.00024 J	0.00018 J	0.00061 J	0.00015 J	0.00032 J
1,2,3,7,8,9-HXCDD	19408-74-3	0.000056 U	0.000033 U	0.000018 U	0.000021 U	0.000017 U	0.00002 U	0.000024 U	0.000019 U
1,2,3,7,8,9-HXCDF	72918-21-9	0.000046 U	0.000049 U	0.000023 U	0.000039 U	0.00003 U	0.000027 U	0.000018 U	0.000022 U
1,2,3,7,8-PECDD	40321-76-4	0.000074 U	0.00023 J	0.00004 J	0.000099 J	0.000023 U	0.000089 J	0.0001 J	0.00011 J
1,2,3,7,8-PECDF	57117-41-6	0.000044 U	0.000051 U	0.000025 U	0.000044 U	0.000029 U	0.000025 U	0.000018 U	0.000023 U
2,3,4,6,7,8-HXCDF	60851-34-5	0.000039 U	0.000043 U	0.000021 U	0.000032 U	0.000025 U	0.000023 U	0.000016 U	0.000018 U
2,3,4,7,8-PECDF	57117-31-4	0.000042 U	0.000056 U	0.000025 U	0.000039 U	0.000083 J	0.000024 U	0.000081 U	0.000089 U
2,3,7,8-TCDD	1746-01-6	0.00013 U	0.000051 U	0.000045 J	0.000021 U	0.000013 U	0.00002 U	0.000012 U	0.000019 J
2,3,7,8-TCDF	51207-31-9	0.000097 U	0.00018 J	0.000074 J	0.00019 J	0.000021 U	0.000086 J	0.00021 J	0.00017 J
TCDD-TEQ (HH)	TCDD-TEQ	**1.23E-05**	**2.89E-04**	**1.23E-04**	**1.46E-04**	**4.29E-05**	**1.59E-04**	**1.36E-04**	**1.78E-04**
Metals									
ALUMINUM	7429-90-5	0.7 J	0.88 J	0.82 J	1.2 J	--	0.51 U	0.7 J	0.58 J
ANTIMONY	7440-36-0	0.024 U	0.03 U	0.027 U	0.027 U	--	0.035 U	0.027 U	0.046 U
ARSENIC	7440-38-2	0.11	0.14	0.088 J	0.13	--	0.028 J	0.027 J	0.034 J
BARIUM	7440-39-3	0.053 J	0.05 J	0.043 J	0.12 J	--	0.1 J	0.084 J	0.11 U
BERYLLIUM	7440-41-7	0.0061 U	0.0074 U	0.0071 U	0.0071 U	--	0.0066 U	0.0071 U	0.0068 U
CADMIUM	7440-43-9	0.011 U	0.013 U	0.012 U	0.012 U	--	0.012 U	0.012 U	0.012 U
CALCIUM	7440-70-2	630	450	680	1700	--	890 J	1000 J	1100
CHROMIUM	7440-47-3	1.7 J	1.6	1.1	1.9	--	1.3	1.6	2.3
COBALT	7440-48-4	0.011 U	0.012 J	0.0082 J	0.01 J	--	0.02 J	0.011 J	0.029 U
COPPER	7440-50-8	0.23	0.29	0.26	0.27	--	0.26	0.28	0.28
IRON	7439-89-6	14	13	9.5	16	--	10	12	16
LEAD	7439-92-1	0.0075 U	0.031 J	0.0086 U	0.0087 U	--	0.0081 U	0.0086 U	0.015 J
MAGNESIUM	7439-95-4	290	340	300	360	--	310	300	280
MANGANESE	7439-96-5	0.27 U	0.3 J	0.32 J	0.55	--	0.33 J	0.28 J	0.45
MERCURY	7439-97-6	0.17	0.16 J-	0.21 J-	0.2 J-	--	0.42 J	0.33 J	0.39 J-
NICKEL	7440-02-0	0.24	0.3	0.18	0.22	--	0.23	0.28	0.54
POTASSIUM	7440-09-7	3700	4300	3700	4100	--	3900	3800	3300
SELENIUM	7782-49-2	0.2 J	0.35 J	0.34 J	0.23 J	--	0.29 J	0.23 J	0.22 U
SILVER	7440-22-4	0.0067 U	0.0081 U	0.0077 U	0.0078 U	--	0.0073 U	0.0077 U	0.0074 U
SODIUM	7440-23-5	770	650	570	670	--	590	570	680
THALLIUM	7440-28-0	0.0021 U	0.0041 J	0.003 J	0.003 J	--	0.0062 J	0.0053 J	0.0047 J
VANADIUM	7440-62-2	0.057 U	0.069 U	0.066 U	0.067 U	--	0.062 U	0.066 U	0.067 J
ZINC	7440-66-6	6.5	8.2	7.8	9.1	--	7.8	7.4	6.4
Semivolatile Organic Compounds									
1,2,4-TRICHLOROBENZENE	120-82-1	--	15 U	15 U	--	--	--	--	--
1,2-DIPHENYLHYDRAZINE	122-66-7	--	34 U	34 U	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	--	5.8 U	5.8 U	--	--	--	--	--
2,4,6-TRICHLOROPHENOL	88-06-2	--	40 U	40 U	--	--	--	--	--
2,4-DICHLOROPHENOL	120-83-2	--	5.4 U	5.4 U	--	--	--	--	--
2,4-DIMETHYLPHENOL	105-67-9	--	42 U	42 U	--	--	--	--	--
2,4-DINITROPHENOL	51-28-5	--	320 U	320 U	--	--	--	--	--
2,4-DINITROTOLUENE	121-14-2	--	22 U	22 U	--	--	--	--	--
2,6-DINITROTOLUENE	606-20-2	--	28 U	28 U	--	--	--	--	--
2-CHLORONAPHTHALENE	91-58-7	--	5.6 U	5.6 U	--	--	--	--	--
2-CHLOROPHENOL	95-57-8	--	22 U	22 U	--	--	--	--	--
2-NITROPHENOL	88-75-5	--	29 U	29 U	--	--	--	--	--
3,3'-DICHLOROBENZIDINE	91-94-1	--	28 U	28 U	--	--	--	--	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	--	110 U	110 U	--	--	--	--	--
4-BROMOPHENYL PHENYL ETHER	101-55-3	--	23 U	23 U	--	--	--	--	--

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Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch					Paint Branch		
		P2-NWB-015-GTA	P2-NWB-016-GTA	P2-NWB-017-GTA	P2-NWB-018-GT1A	P2-NWB-018-GT2A	P2-PB-005-GT1A	P2-PB-005-GT2A	P2-PB-006-GTA
		Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Largemouth bass	Largemouth bass	Largemouth bass
CHEMICAL	**CAS #**	8/5/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/15/2016	8/15/2016	8/3/2016
4-CHLORO-3-METHYLPHENOL	59-50-7	--	25 U	25 U	--	--	--	--	--
4-CHLOROPHENYL PHENYL ETHER	7005-72-3	--	30 U	30 U	--	--	--	--	--
4-NITROPHENOL	100-02-7	--	97 UJ	97 UJ	--	--	--	--	--
ACENAPHTHENE	83-32-9	--	5.1 U	5.1 U	--	--	--	--	--
ACENAPHTHYLENE	208-96-8	--	6.1 U	6.1 U	--	--	--	--	--
ANTHRACENE	120-12-7	--	5.2 U	5.2 U	--	--	--	--	--
BENZIDINE	92-87-5	--	1100 U	1100 U	--	--	--	--	--
BENZO(A)ANTHRACENE	56-55-3	--	6.7 U	6.7 U	--	--	--	--	--
BENZO(A)PYRENE	50-32-8	--	5.3 U	5.3 U	--	--	--	--	--
BENZO(B)FLUORANTHENE	205-99-2	--	8.4 U	8.4 U	--	--	--	--	--
BENZO(G,H,I)PERYLENE	191-24-2	--	5.3 U	5.3 U	--	--	--	--	--
BENZO(K)FLUORANTHENE	207-08-9	--	11 U	11 U	--	--	--	--	--
BENZOIC ACID	65-85-0	--	650 J	620 J	--	--	--	--	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	--	18 U	18 U	--	--	--	--	--
BIS(2-CHLOROETHYL)ETHER	111-44-4	--	7.2 U	7.2 U	--	--	--	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	--	43 U	43 U	--	--	--	--	--
BUTYL BENZYL PHTHALATE	85-68-7	--	36 U	36 U	--	--	--	--	--
CHRYSENE	218-01-9	--	6.4 U	6.4 U	--	--	--	--	--
DIBENZO(A,H)ANTHRACENE	53-70-3	--	5.9 U	5.9 U	--	--	--	--	--
DIETHYL PHTHALATE	84-66-2	--	29 U	29 U	--	--	--	--	--
DIMETHYL PHTHALATE	131-11-3	--	29 U	29 U	--	--	--	--	--
DI-N-BUTYL PHTHALATE	84-74-2	--	33 U	33 U	--	--	--	--	--
DI-N-OCTYL PHTHALATE	117-84-0	--	28 UJ	230 J	--	--	--	--	--
FLUORANTHENE	206-44-0	--	5.7 U	5.7 U	--	--	--	--	--
FLUORENE	86-73-7	--	7 U	7 U	--	--	--	--	--
HEXACHLOROBENZENE	118-74-1	--	5.7 U	5.7 U	--	--	--	--	--
HEXACHLOROBUTADIENE	87-68-3	--	6 U	6 U	--	--	--	--	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	--	29 U	29 U	--	--	--	--	--
HEXACHLOROETHANE	67-72-1	--	19 U	19 U	--	--	--	--	--
INDENO(1,2,3-CD)PYRENE	193-39-5	--	5.5 U	5.5 U	--	--	--	--	--
ISOPHORONE	78-59-1	--	20 U	20 U	--	--	--	--	--
NAPHTHALENE	91-20-3	--	4.6 U	4.6 U	--	--	--	--	--
NITROBENZENE	98-95-3	--	22 U	22 U	--	--	--	--	--
N-NITROSODIMETHYLAMINE	62-75-9	--	23 U	23 U	--	--	--	--	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	--	6.3 U	6.3 U	--	--	--	--	--
N-NITROSODIPHENYLAMINE	86-30-6	--	25 U	25 U	--	--	--	--	--
PENTACHLOROPHENOL	87-86-5	--	24 U	24 U	--	--	--	--	--
PHENANTHRENE	85-01-8	--	8.5 U	8.5 U	--	--	--	--	--
PHENOL	108-95-2	--	6.3 U	15 U	--	--	--	--	--
PYRENE	129-00-0	--	5.4 U	5.4 U	--	--	--	--	--
Pesticides									
4,4'-DDD	72-54-8	0.17 U	0.042 U	0.043 U	0.043 U	--	0.084 U	0.084 UJ	0.42 J
4,4'-DDE	72-55-9	0.84 J	1.3	0.96	1.4	--	1	1.6	1.9
4,4'-DDT	50-29-3	0.17 U	0.042 U	0.043 U	0.19 J	--	0.084 U	0.084 UJ	0.042 U
ALDRIN	309-00-2	0.18 U	0.044 U	0.044 U	0.044 U	--	0.087 U	0.087 U	0.043 U
ALPHA-BHC	319-84-6	0.49 U	0.12 U	0.12 U	0.12 U	--	0.24 U	0.24 U	0.12 U
BETA-BHC	319-85-7	0.37 U	0.093 U	0.094 U	0.094 U	--	0.19 UJ	0.19 U	0.092 U
CHLORDANE (ALL)	CHLORDANE_ALL	19	37	22	37	--	17	35	0.47 U
DELTA-BHC	319-86-8	0.59 U	0.15 U	0.15 U	0.15 UJ	--	0.3 U	0.3 U	0.15 U
DIELDRIN	60-57-1	0.2 J	2.7	1.6	3.7	--	0.8 J	3	2.4
ENDOSULFAN I	959-98-8	0.11 U	0.026 U	0.027 U	0.027 U	--	0.053 U	0.053 U	0.026 U
ENDOSULFAN II	33213-65-9	0.51 U	0.13 U	0.13 U	0.13 U	--	0.25 U	0.25 U	0.13 U
ENDOSULFAN SULFATE	1031-07-8	0.21 U	0.053 U	0.053 U	0.053 U	--	0.11 U	0.11 U	0.052 U
ENDRIN	72-20-8	0.49 U	0.12 U	0.12 U	0.12 U	--	0.24 U	0.24 U	0.12 U
ENDRIN ALDEHYDE	7421-93-4	0.49 U	0.12 U	0.12 U	0.12 U	--	0.24 U	0.24 U	0.12 U
GAMMA-BHC (LINDANE)	58-89-9	0.34 U	0.085 U	0.086 U	0.086 U	--	0.17 U	0.17 U	0.085 U
HEPTACHLOR	76-44-8	0.14 U	0.036 U	0.036 U	0.036 U	--	0.072 U	0.072 U	0.036 U
HEPTACHLOR EPOXIDE	1024-57-3	0.2 U	3.4	1.8	3.9	--	0.15 J	2.5	1.3
TOXAPHENE	8001-35-2	55 U	14 U	14 U	14 U	--	27 U	27 U	14 U

Table A-5
Fish Fillet Data used in BHHRA for the Upstream Non-Tidal Anacostia River
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch					Paint Branch		
		P2-NWB-015-GTA	P2-NWB-016-GTA	P2-NWB-017-GTA	P2-NWB-018-GT1A	P2-NWB-018-GT2A	P2-PB-005-GT1A	P2-PB-005-GT2A	P2-PB-006-GTA
		Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Largemouth bass	Largemouth bass	Largemouth bass
CHEMICAL	CAS #	8/5/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/15/2016	8/15/2016	8/3/2016
Aroclors									
AROCLOR-1016	12674-11-2	--	0.38 U	0.38 U	3.8 U	--	3.8 U	3.8 U	0.38 U
AROCLOR-1221	11104-28-2	--	0.6 U	0.6 U	6 U	--	6 U	6 U	0.6 U
AROCLOR-1232	11141-16-5	--	0.21 U	0.21 U	2.1 U	--	2.1 U	2.1 U	0.21 U
AROCLOR-1242	53469-21-9	--	0.3 U	0.31 U	3 U	--	3.1 U	3 U	0.31 U
AROCLOR-1248	12672-29-6	--	0.19 U	0.2 U	1.9 U	--	1.9 U	1.9 U	0.2 U
AROCLOR-1254	11097-69-1	--	9.9	5.9	3 U	--	3.1 U	3 U	19
AROCLOR-1260	11096-82-5	--	6.8	7	2.8 U	--	8.1 J	5.5 J	16
Total Aroclors	TotalAroclor	**NA**	**16.7**	**12.9**	**ND**	**NA**	**8.1**	**5.5**	**35**
PCB Congeners									
PCB-1	2051-60-7	0.00021 U	0.00041 U	0.00029 U	0.00035 U	0.00064 U	0.00025 U	0.0003 U	0.00024 U
PCB-2	2051-61-8	0.00023 U	0.00047 U	0.00035 U	0.0004 U	0.0056 J	0.0003 U	0.00035 U	0.00026 U
PCB-3	2051-62-9	0.00025 U	0.00055 U	0.00042 U	0.00045 U	0.00077 U	0.00036 U	0.00043 U	0.00029 U
PCB-4	TTNUS524	0.0037 U	0.014 U	0.01 U	0.0093 U	0.0065 U	0.0034 J	0.0078 J	0.0054 J
PCB-5	16605-91-7	0.0011 U	0.0042 U	0.0037 U	0.003 U	0.0051 U	0.0018 U	0.0027 U	0.0017 U
PCB-6	25569-80-6	0.0014 J	0.0052 J	0.0035 U	0.0029 U	0.0048 U	0.0019 J	0.0025 J	0.0027 J
PCB-7	33284-50-3	0.0017 U	0.0036 J	0.0036 U	0.0029 U	0.0049 U	0.0017 U	0.0026 U	0.0017 U
PCB-8	34883-43-7	0.005 U	0.014 J	0.0069 U	0.0088 U	0.0089 U	0.0034 J	0.0058 J	0.0056 U
PCB-9	34883-39-1	0.0017 U	0.0077 J	0.0036 U	0.0029 U	0.0049 U	0.0017 U	0.0026 U	0.0017 U
PCB-10	33146-45-1	0.0018 U	0.0043 U	0.0038 U	0.0032 U	0.0053 U	0.00086 J	0.0028 U	0.0018 U
PCB-11	2050-67-1	0.0081 U	0.012 U	0.012 U	0.011 U	0.01 U	0.0075 U	0.012 J	0.013 U
PCB-12/13	TTNUS800	0.0017 U	0.0039 U	0.005 U	0.0029 U	0.0048 U	0.0017 U	0.0025 U	0.0017 U
PCB-14	34883-41-5	0.0014 U	0.0034 U	0.003 U	0.0025 U	0.0042 U	0.0014 U	0.0022 U	0.0012 U
PCB-15	2050-68-2	0.0017 U	0.0098 U	0.0068 U	0.0059 U	0.005 U	0.0013 J	0.0027 U	0.0029 U
PCB-16	38444-78-9	0.0055 J	0.014 J	0.0014 U	0.011 J	0.006 J	0.003 J	0.01 J	0.0088 J
PCB-17	37680-66-3	0.0041 J	0.021 J	0.0091 J	0.0092 J	0.0016 U	0.0045 J	0.012 J	0.013 J
PCB-18/30	TTNUS616	0.015 J	0.041 J	0.029 J	0.035 J	0.021 J	0.011 J	0.035 J	0.025 J
PCB-19	38444-73-4	0.00094 U	0.014 J	0.0044 J	0.0075 J	0.0019 U	0.0011 U	0.0019 U	0.0046 J
PCB-20/28	TTNUS519	0.089	0.28	0.12	0.16	0.11	0.076	0.16	0.12
PCB-21/33	TTNUS810	0.007 J	0.025	0.01 J	0.016 J	0.014 J	0.0067 J	0.017 J	0.017 J
PCB-22	38444-85-8	0.022 J	0.075	0.032	0.045	0.034 J	0.019 J	0.04	0.026
PCB-23	55720-44-0	0.00039 U	0.0007 U	0.00067 U	0.00058 U	0.00087 U	0.00064 U	0.00085 U	0.00068 U
PCB-24	55702-45-9	0.00064 U	0.00097 U	0.001 U	0.00083 U	0.0013 U	0.00076 U	0.0013 U	0.0013 U
PCB-25	55712-37-3	0.0035 J	0.011 J	0.0074 J	0.0072 J	0.0029 J	0.0037 J	0.0036 J	0.0052 J
PCB-26/29	TTNUS811	0.0074 J	0.035	0.014 J	0.016 J	0.017 J	0.011 J	0.018 J	0.018 J
PCB-27	38444-76-7	0.00055 U	0.0095 J	0.00086 U	0.0063 J	0.0041 J	0.00065 U	0.0025 J	0.0034 J
PCB-31	16606-02-3	0.04 J	0.13	0.062	0.081	0.054 J	0.043 J	0.076	0.053
PCB-32	38444-77-8	0.007 J	0.033	0.017 J	0.021 J	0.013 J	0.0065 J	0.01 J	0.014 J
PCB-34	TTNUS277	0.00038 U	0.00068 U	0.00066 U	0.00057 U	0.00086 U	0.00063 U	0.00084 U	0.00067 U
PCB-35	37680-69-6	0.00039 U	0.0007 U	0.00068 U	0.00059 U	0.00089 U	0.00065 U	0.00086 U	0.00069 U
PCB-36	38444-87-0	0.00038 U	0.00068 U	0.00066 U	0.00057 U	0.00086 U	0.00062 U	0.00083 U	0.00066 U
PCB-37	38444-90-5	0.0049 J	0.014 J	0.0071 J	0.0081 J	0.0052 J	0.0042 J	0.011 J	0.0082 J
PCB-38	53555-66-1	0.0004 U	0.00072 U	0.00069 U	0.0006 U	0.0009 U	0.00066 U	0.00088 U	0.0007 U
PCB-39	38444-88-1	0.00035 U	0.00064 U	0.00062 U	0.00053 U	0.0008 U	0.00059 U	0.00078 U	0.00062 U
PCB-41/40/71	TTNUS813	0.027	0.079	0.049 J	0.051	0.038	0.028	0.044	0.066
PCB-42	36559-22-5	0.026	0.082	0.04 J	0.044 J	0.033 J	0.031	0.039	0.056
PCB-43/73	TTNUSA51	0.003 J	0.0095 J	0.0049 J	0.0026 J	0.0015 U	0.0041 J	0.004 J	0.0051 J
PCB-44/47/65	TTNUS618	0.16	0.36	0.18	0.2	0.18	0.15	0.18	0.27
PCB-45/51	TTNUS814	0.012 J	0.039	0.016 J	0.02 J	0.014 J	0.0093 J	0.016 J	0.027
PCB-46	41464-47-5	0.0018 J	0.0093 J	0.0059 J	0.0033 J	0.002 U	0.0016 U	0.004 J	0.0028 J
PCB-48	70362-47-9	0.011 J	0.038	0.015 J	0.014 J	0.014 J	0.013 J	0.02 J	0.019 J
PCB-49/69	TTNUS818	0.1	0.25	0.13	0.14	0.11	0.13	0.14	0.21
PCB-50/53	TTNUS815	0.0047 J	0.02 J	0.011 J	0.011 J	0.009 J	0.0096 J	0.012 J	0.023 J
PCB-52	35693-99-3	0.28	0.62	0.31	0.37	0.3	0.32	0.35	0.57
PCB-54	15968-05-5	0.0008 U	0.0015 U	0.0011 U	0.0014 U	0.0017 U	0.0012 U	0.0019 U	0.0016 U
PCB-55	74338-24-2	0.00061 U	0.016 J	0.0055 J	0.0084 J	0.0018 J	0.0081 J	0.0097 J	0.0027 J
PCB-56	41464-43-1	0.036	0.091	0.052	0.058	0.051	0.041	0.061	0.067
PCB-57	70424-67-8	0.00058 U	0.0011 U	0.0008 U	0.00091 U	0.0012 U	0.00095 U	0.0013 U	0.0018 J
PCB-58	41464-49-7	0.00059 J	0.0017 J	0.0016 J	0.00042 J	0.0012 U	0.00095 U	0.0013 U	0.0019 J
PCB-59/62/75	TTNUS816	0.014 J	0.036	0.014 J	0.018 J	0.014 J	0.015 J	0.018 J	0.02 J

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		Northwest Branch					Paint Branch		
		P2-NWB-015-GTA	P2-NWB-016-GTA	P2-NWB-017-GTA	P2-NWB-018-GT1A	P2-NWB-018-GT2A	P2-PB-005-GT1A	P2-PB-005-GT2A	P2-PB-006-GTA
		Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Smallmouth bass	Largemouth bass	Largemouth bass	Largemouth bass
CHEMICAL	CAS #	8/5/2016	8/4/2016	8/4/2016	8/4/2016	8/4/2016	8/15/2016	8/15/2016	8/3/2016
PCB-60	33025-41-1	0.04 J	0.1	0.062	0.056	0.055	0.036	0.066	0.061
PCB-61/70/74/76	TTNUS817	0.25	0.6	0.33	0.34	0.28	0.29	0.39	0.42
PCB-63	74472-34-7	0.0086 J	0.018 J	0.0086 J	0.0092 J	0.011 J	0.011 J	0.012 J	0.014 J
PCB-64	52663-58-8	0.075	0.18	0.092	0.095	0.087	0.072	0.1	0.12
PCB-66	32598-10-0	0.18	0.38	0.22	0.21	0.21	0.16	0.22	0.31
PCB-67	73575-53-8	0.0036 J	0.007 J	0.0041 J	0.004 J	0.0011 U	0.0024 J	0.0048 J	0.0059 J
PCB-68	73575-52-7	0.0021 J	0.003 J	0.002 J	0.0024 J	0.0011 U	0.00087 U	0.0027 J	0.004 J
PCB-72	41464-42-0	0.0029 J	0.0041 J	0.0028 J	0.0032 J	0.0012 U	0.0034 J	0.0035 J	0.011 J
PCB-77	32598-13-3	0.014 J	0.026	0.014 J	0.016 J	0.012 J	0.015 J	0.017 J	0.017 J
PCB-78	70362-49-1	0.0006 U	0.0022 J	0.00083 U	0.00094 U	0.0018 J	0.00099 U	0.0013 U	0.00072 J
PCB-79	41464-48-6	0.0034 J	0.009 J	0.0048 J	0.0038 J	0.0037 J	0.0029 J	0.0046 J	0.0074 J
PCB-80	33284-52-5	0.00051 U	0.00096 U	0.00071 U	0.00081 U	0.0011 U	0.00085 U	0.0011 U	0.00073 U
PCB-81	70362-50-4	0.00046 J	0.0033 J	0.00072 U	0.0026 J	0.0011 U	0.00087 U	0.0011 U	0.0036 J
PCB-82	52663-62-4	0.074	0.12	0.053 J	0.084	0.091	0.071	0.06	0.12
PCB-83/99	TTNUS863	0.5	0.87	0.55	0.49	0.51	0.63	0.57	1.1
PCB-84	52663-60-2	0.1	0.2	0.12	0.12	0.094 J	0.086	0.079	0.17
PCB-85/116/117	TTNUS799	0.15	0.28	0.18	0.16	0.17	0.18	0.19	0.33
PCB-86/87/97/109/119/125	TTNUS941	0.47	0.83	0.54	0.49	0.47	0.47	0.43	0.92
PCB-88/91	TTNUS819	0.085	0.13	0.084 J	0.081	0.087	0.096	0.076	0.18
PCB-89	73575-57-2	0.0014 U	0.0027 U	0.002 U	0.002 U	0.0029 U	0.002 U	0.003 U	0.002 U
PCB-90/101/113	TTNUS619	0.89	1.5	1	0.87	0.91	1.2	1.1	2.2
PCB-92	52663-61-3	0.12 J	0.25	0.14	0.15	0.14	0.21	0.13 J	0.35 J
PCB-93/100	TTNUS864	0.0022 J	0.0071 J	0.0017 U	0.0033 J	0.0073 J	0.0025 J	0.011 J	0.016 J
PCB-94	73575-55-0	0.0014 U	0.0027 U	0.002 U	0.002 U	0.0029 U	0.002 U	0.003 U	0.002 U
PCB-95	38379-99-6	0.4	0.76	0.46	0.46	0.42	0.57	0.46	1
PCB-96	73575-54-9	0.001 U	0.002 U	0.0015 U	0.0015 U	0.0022 U	0.0015 U	0.0022 U	0.0015 U
PCB-98/102	TTNUS865	0.0048 J	0.0099 J	0.0058 J	0.0066 J	0.0036 J	0.0068 J	0.0089 J	0.017 J
PCB-103	TTNUS256	0.004 J	0.0023 U	0.0017 U	0.0018 U	0.0026 U	0.0097 J	0.0085 J	0.024
PCB-104	TTNUS257	0.0009 U	0.0018 U	0.0013 U	0.0014 U	0.0019 U	0.0013 U	0.002 U	0.0013 U
PCB-105	32598-14-4	0.29	0.51	0.36	0.31	0.3	0.34	0.3	0.62
PCB-106	70424-69-0	0.0017 J	0.0016 U	0.0012 U	0.0023 J	0.0016 U	0.0013 U	0.0014 U	0.0022 J
PCB-107	70424-68-9	0.065	0.11	0.08	0.072	0.071 J	0.083	0.065 J	0.15
PCB-108/124	TTNUS942	0.03	0.053 J	0.041	0.039	0.038	0.045	0.04	0.062 J
PCB-110/115	TTNUS797	0.91	1.6	1	0.96	0.95	1.1	0.93	2
PCB-111	39635-32-0	0.00085 U	0.0036 J	0.0012 U	0.0013 U	0.0018 U	0.0013 U	0.0019 U	0.0036 J
PCB-112	TTNUS259	0.00092 U	0.0018 U	0.0013 U	0.0014 U	0.002 U	0.0014 U	0.002 U	0.0051 J
PCB-114	74472-37-0	0.018 J	0.033	0.026 J	0.021 J	0.019 J	0.02 J	0.019 J	0.042
PCB-118	31508-00-6	0.89	1.5	1	0.9	0.86	1.1	0.9	1.8
PCB-120	68194-12-7	0.004 J	0.0056 J	0.0044 J	0.0043 J	0.0019 U	0.012 J	0.0085 J	0.017 J
PCB-121	56558-18-0	0.00088 U	0.0017 U	0.0013 U	0.0013 U	0.0019 U	0.0013 U	0.0019 U	0.0013 U
PCB-122	76842-07-4	0.0087 J	0.011 J	0.011 J	0.0081 J	0.0067 J	0.0077 J	0.016 J	0.026
PCB-123	65510-44-3	0.017 J	0.036	0.022 J	0.021 J	0.017 J	0.025 J	0.019 J	0.023 J
PCB-126	57465-28-8	0.0029 J	0.01 J	0.0049 U	0.0016 U	0.005 U	0.0037 J	0.0044 J	0.0088 J
PCB-127	39635-33-1	0.00075 U	0.0015 U	0.0022 J	0.0012 U	0.0016 U	0.0013 U	0.0033 J	0.004 J
PCB-128/166	TTNUS613	0.23	0.36	0.25	0.22	0.21 J	0.32	0.28	0.56
PCB-129/138/160/163	TTNUSA52	1.8	2.9	1.9	1.8	1.7	3.4	3.1	6.2
PCB-130	52663-66-8	0.098	0.16	0.11	0.093	0.087	0.15	0.12	0.26
PCB-131	61798-70-7	0.016 J	0.022 J	0.015 J	0.015 J	0.0074 J	0.015 J	0.012 J	0.034
PCB-132	38380-05-1	0.27	0.44	0.27	0.26	0.24	0.37	0.28	0.69
PCB-133	35694-04-3	0.026 J	0.042	0.031	0.028	0.03 J	0.058	0.057	0.11
PCB-134/143	TTNUS801	0.048	0.087	0.049	0.054	0.042 J	0.072	0.056 J	0.13
PCB-135/151	TTNUS805	0.27	0.52	0.3	0.29	0.28	0.66	0.54	1.4
PCB-136	38411-22-2	0.058	0.11	0.066	0.062	0.052 J	0.1	0.074	0.19
PCB-137	35694-06-5	0.074	0.14	0.09	0.073 J	0.074	0.083	0.076	0.13
PCB-139/140	TTNUS803	0.026	0.044	0.025	0.024 J	0.018 J	0.029 J	0.027	0.044 J
PCB-141	52712-04-6	0.22	0.39	0.25	0.24	0.2 J	0.5	0.42	0.93
PCB-142	41411-61-4	0.0021 U	0.0035 U	0.0028 U	0.0029 U	0.0034 U	0.0032 U	0.0042 U	0.0034 U
PCB-144	68194-14-9	0.039	0.07	0.039	0.036	0.036 J	0.08	0.059 J	0.15
PCB-145	74472-40-5	0.0014 U	0.002 U	0.0018 U	0.0018 U	0.0022 U	0.0019 U	0.003 U	0.0018 U
PCB-146	51908-16-8	0.28	0.48	0.29	0.27	0.26	0.62	0.55	1.1

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3400 Benning Rd, N.E., Washington DC 20019

		Northwest Branch					Paint Branch		
		P2-NWB-015-GTA	**P2-NWB-016-GTA**	**P2-NWB-017-GTA**	**P2-NWB-018-GT1A**	**P2-NWB-018-GT2A**	**P2-PB-005-GT1A**	**P2-PB-005-GT2A**	**P2-PB-006-GTA**
		Smallmouth bass	**Smallmouth bass**	**Smallmouth bass**	**Smallmouth bass**	**Smallmouth bass**	**Largemouth bass**	**Largemouth bass**	**Largemouth bass**
CHEMICAL	**CAS #**	**8/5/2016**	**8/4/2016**	**8/4/2016**	**8/4/2016**	**8/4/2016**	**8/15/2016**	**8/15/2016**	**8/3/2016**
PCB-147/149	TTNUS804	0.92	1.6	1	0.89	0.85	1.9	1.5	3.5
PCB-148	74472-41-6	0.0019 U	0.0029 U	0.0025 U	0.0025 U	0.0031 U	0.0071 J	0.0042 U	0.0046 J
PCB-150	68194-08-1	0.0013 U	0.002 U	0.0017 U	0.0018 U	0.0022 U	0.0019 U	0.0029 U	0.0031 J
PCB-152	68194-09-2	0.0014 U	0.002 U	0.0018 U	0.0018 U	0.0022 U	0.0019 U	0.003 U	0.0017 U
PCB-153/168	TTNUS615	1.6	2.7	1.7	1.6	1.6	4	3.7	6.9
PCB-154	TTNUS860	0.015 J	0.012 J	0.006 J	0.0073 J	0.0075 J	0.028 J	0.019 J	0.033 J
PCB-155	33979-03-2	0.0013 U	0.0019 U	0.0017 U	0.0017 U	0.0021 U	0.0018 U	0.0029 U	0.0017 U
PCB-156/157	TTNUS523	0.16	0.27	0.18	0.16	0.15	0.23	0.22	0.4
PCB-158	74472-42-7	0.15	0.24	0.16	0.15	0.14	0.23	0.2	0.43
PCB-159	39635-35-3	0.0064 J	0.015 J	0.0082 J	0.007 J	0.0077 J	0.014 J	0.017 J	0.041
PCB-161	74472-43-8	0.0014 U	0.0023 U	0.0019 U	0.0019 U	0.0023 U	0.0021 U	0.0028 U	0.0023 U
PCB-162	39635-34-2	0.0081 J	0.012 J	0.0093 J	0.008 J	0.0076 J	0.012 J	0.013 J	0.018 J
PCB-164	74472-45-0	0.084	0.15	0.096	0.087 J	0.094	0.17	0.14	0.31
PCB-165	74472-46-1	0.0015 U	0.0025 U	0.0021 U	0.0028 J	0.0025 U	0.0023 U	0.003 U	0.0053 J
PCB-167	52663-72-6	0.082	0.12	0.082	0.075	0.081	0.13	0.12	0.2
PCB-169	32774-16-6	0.0042 J	0.014 J	0.009 J	0.0082 J	0.0017 U	0.0049 J	0.0076 J	0.0094 J
PCB-170	35065-30-6	0.3	0.53	0.3	0.31	0.28	0.85	0.71	1.5
PCB-171/173	TTNUS806	0.087	0.14	0.085	0.087	0.062 J	0.22	0.18	0.41
PCB-172	52663-74-8	0.076	0.12	0.069	0.072	0.069	0.2	0.16	0.29
PCB-174	38411-25-5	0.23	0.4	0.22 J	0.24	0.21	0.64	0.48	1.1
PCB-175	40186-70-7	0.011 J	0.019 J	0.012 J	0.0093 J	0.015 J	0.027	0.019 J	0.051
PCB-176	52663-65-7	0.024	0.039	0.021 J	0.015 J	0.02 J	0.043 J	0.029 J	0.084
PCB-177	52663-70-4	0.18	0.31	0.18	0.18	0.15	0.49	0.41	0.84
PCB-178	52663-67-9	0.074 J	0.14	0.084	0.081	0.062 J	0.22	0.2	0.36
PCB-179	52663-64-6	0.076	0.13	0.079	0.074 J	0.064	0.16	0.13	0.3
PCB-180/193	TTNUS617	0.86	1.4	0.84	0.81	0.76	2.5	2.1	3.8
PCB-181	74472-47-2	0.0043 J	0.007 J	0.006 J	0.0017 U	0.0021 U	0.011 J	0.0097 J	0.017 J
PCB-182	60145-23-5	0.0027 J	0.0022 U	0.0038 J	0.0034 J	0.0065 J	0.013 J	0.0036 J	0.01 J
PCB-183/185	TTNUS807	0.22	0.36	0.22	0.23	0.21	0.6	0.47	1
PCB-184	74472-48-3	0.001 U	0.0018 U	0.0014 U	0.0014 U	0.0017 U	0.0019 U	0.0019 U	0.00096 J
PCB-186	74472-49-4	0.001 U	0.0018 U	0.0013 U	0.0014 U	0.0016 U	0.0019 U	0.0019 U	0.0014 U
PCB-187	52663-68-0	0.7	1.3	0.74	0.68	0.58	1.8	1.6	2.9
PCB-188	TTNUS272	0.00092 U	0.0016 U	0.0012 U	0.0013 U	0.0015 U	0.0017 U	0.0018 U	0.002 J
PCB-189	39635-31-9	0.012 J	0.026 J	0.0092 U	0.0091 U	0.0081 U	0.034	0.03	0.052
PCB-190	41411-64-7	0.069	0.12	0.074	0.07	0.07	0.24	0.21	0.37
PCB-191	74472-50-7	0.013 J	0.022 J	0.014 J	0.012 J	0.0096 J	0.037 J	0.034 J	0.066
PCB-192	74472-51-8	0.0011 U	0.0019 U	0.0014 U	0.0015 U	0.0017 U	0.002 U	0.002 U	0.0015 U
PCB-194	35694-08-7	0.17	0.29	0.15	0.21	0.17	0.4	0.35	0.6
PCB-195	52663-78-2	0.052 J	0.098	0.06	0.062	0.063	0.18	0.15	0.28
PCB-196	42740-50-1	0.068	0.12	0.074 J	0.073	0.07	0.16	0.12	0.24
PCB-197	TTNUS861	0.0055 J	0.0056 J	0.0047 J	0.0031 J	0.0042 J	0.012 J	0.0075 J	0.015 J
PCB-198/201	TTNUSA53	0.27	0.44	0.23 J	0.24	0.23	0.49	0.46	0.7
PCB-199	52663-75-9	0.012 J	0.017 J	0.0096 J	0.011 J	0.0099 J	0.021 J	0.015 J	0.036
PCB-200	52663-73-7	0.015 J	0.025 J	0.017 J	0.015 J	0.015 J	0.029	0.022	0.049
PCB-202	2136-99-4	0.044	0.078	0.043	0.042	0.038 J	0.078	0.07	0.11
PCB-203	52663-76-0	0.15	0.26	0.15	0.15	0.14	0.3	0.27	0.43
PCB-204	74472-52-9	0.00068 U	0.0011 U	0.00078 U	0.00059 U	0.001 U	0.00088 U	0.0013 U	0.00075 U
PCB-205	74472-53-0	0.0059 J	0.015 J	0.0069 U	0.0095 U	0.0095 U	0.03	0.023	0.03 J
PCB-206	40186-72-9	0.13	0.2	0.12	0.14	0.14	0.12	0.15	0.14
PCB-207	52663-79-3	0.0093 J	0.024	0.0095 J	0.012 J	0.012 J	0.0099 J	0.013 J	0.016 J
PCB-208	52663-77-1	0.047	0.069	0.037	0.037	0.048	0.032	0.041	0.039
PCB-209	2051-24-3	0.033	0.054	0.03 J	0.033 J	0.038 J	0.036	0.048	0.031
Total PCBs	1336-36-3	**17**	**30**	**18**	**18**	**17**	**31**	**28**	**53**
PCB-TEQ	PCB-TEQ	**4.62E-04**	**1.50E-03**	**3.22E-04**	**2.93E-04**	**4.40E-05**	**5.75E-04**	**7.18E-04**	**1.26E-03**

[1] Duplicate of P2-NWB-002-GT1A.

Source: TetraTech. 2018. Draft Remedial Investigation Report. Anacostia Riv
Sediment Project. Washington D.C. Prepared for District of Columbia, Departm
Energy and Environment. Prepared by TetraTech, Sterling, VA. March 30.

Attachment B

Screening Level Evaluation of the Vapor Intrusion Pathway

Attachment B
Screening Level Evaluation of the Vapor Intrusion Pathway

A screening level evaluation of the potential for vapors in the subsurface to migrate to indoor air (the vapor intrusion pathway) is provided below. The evaluation was conducted for all areas of the Site, regardless of the presence of buildings, in order to provide a conservative evaluation of potential current and future risk.

Extensive soil sampling was conducted at the Site, including analysis of volatile organic compounds (VOCs) on over 200 samples. VOCs were detected infrequently (in about 10% of the samples). Vapor intrusion screening levels for soil are not available from the United States Environmental Protection Agency (USEPA) or the District of Columbia Department of Energy and Environment (DOEE) because soil is not considered an appropriate medium for evaluation of vapor intrusion. Therefore, the vapor intrusion pathway was evaluated based on groundwater data.

As discussed in the of the main text of this Remedial Investigation Report, the Patapsco Formation underlying the Site is divided by a semi-confining layer into an upper water-bearing zone (UWZ) and a lower water-bearing zone (LWZ). The water table aquifer (UWZ) generally ranges from 9 to 16 feet (ft) below ground surface (bgs), but reaches as deep as 26 ft bgs in the vicinity of the topographic high in the south-central portion of the Site. The piezometric surface of the LWZ aquifer at the Site generally averages 0 to 2 ft deeper than the UWZ water table. Groundwater samples were collected from monitoring wells and direct-push borings from both the UWZ and LWZ. Depending on the analyte, up to 117 samples are available from the UWZ and up to 66 samples are available from the LWZ; all available samples were analyzed for VOCs. This vapor intrusion evaluation is based on the shallower UWZ.

VISL Screen

USEPA's Vapor Intrusion Screening Level (VISL)[1] calculator was used to derive groundwater screening levels for the vapor intrusion pathway. VISLs are applicable to chemicals that are volatile (defined by the VISL calculator as those chemicals with a Henry's Law constant greater than 10^{-5} atm-m^3/mole and a vapor pressure greater than one millimeter of mercury) and for which inhalation toxicity data are available. As indicated in Table B-1, 30 of the organic chemicals detected in groundwater meet these criteria. VISLs were derived using the VISL calculator's default exposure assumptions for an industrial scenario (8 hours per day, 250 days per year for 25 years). A target cancer risk level of $1x10^{-6}$ and a target hazard quotient of 0.1 were used. The VISL calculator uses a default groundwater-to-indoor air attenuation factor of 0.001, which is recommended by USEPA as a reasonably conservative generic attenuation factor (USEPA, 2015a). The resulting groundwater VISLs are therefore conservative. An exceedance of a VISL does not necessarily

[1] https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator. Accessed February 2019.

indicate an unacceptable risk from the vapor intrusion pathway, but rather that further evaluation is warranted.

Maximum detected VOC concentrations in UWZ groundwater were compared to the VISLs in Table B-2. The following chemicals were found to have maximum detected concentrations greater than VISLs:

Chemical	Upper Water-Bearing Zone
Chloroform	X
Tetrachloroethylene (PCE)	X
Trichloroethene (TCE)	X
Vinyl Chloride	X
Diesel Range Organics (C10-C20) (DRO)	X

Each of these chemicals is evaluated below to select Chemicals of Potential Concern (COPCs) for further evaluation in this screening level vapor intrusion evaluation.

Chloroform

Chloroform was detected sporadically in Site wells, with only one exceedance of the VISL (3.55 micrograms per liter [µg/L]) in the UWZ; detection limits are below the VISL. The exceedance occurred in well DP60, along the northern property boundary, at a depth of 15 to 20 feet bgs (15 µg/L). There are no permanent buildings in this area, making the vapor intrusion pathway incomplete under the current scenario. Given the depth to groundwater, considerable attenuation is expected to occur in the vadose zone. The tight soils in this vicinity further reduce soil permeability and limit vapor migration. However, chloroform was conservatively selected as a COPC for the potential future vapor intrusion scenario.

TCE, PCE, and Vinyl Chloride

Areas where TCE, PCE, and vinyl chloride exceeded VISLs are co-located and are limited to two general areas: one along the southern boundary and another on the downgradient perimeter in the southwest area of the Site. There are no permanent buildings in these areas, making the vapor intrusion pathway incomplete under the current scenario.

Wells with exceedances of TCE and PCE along the southern boundary adjacent to Benning Road include DPA3, DPA4, DPA5, DPB3, DPB5, DPB6, DPB7, DPB9, DPB10 (PCE only), DPC4, DPC5, DPC7, SUSDP09, and MW-09A. Vinyl chloride also exceeded its VISL in MW-09A. Detected concentrations of TCE in these wells ranged from less than 1 µg/L to 41 µg/L (MW-09A); the VISL for TCE is 2.2 µg/L. Detected concentrations of PCE in these wells ranged from less than 1 µg/L to 470 µg/L (DPB7); the VISL for PCE is 24.2 µg/L. Vinyl chloride was not detected in the majority of these wells at a reporting limit of 1 µg/L, which is lower than the VISL of 2.45 µg/L. One detected concentration in MW-09A exceeded the VISL at a concentration of 5.3 µg/L.

Wells in the UWZ with exceedances of TCE and PCE at the downgradient perimeter adjacent to Anacostia Avenue include SUSDP09, TA19C1, and TA19C2. Detected concentrations of TCE in these wells ranged from less than 1 µg/L to 5.9 µg/L (TA19C2) and detected concentrations of PCE ranged from less than 1 µg/L to 30 µg/L (TA19C1). As mentioned, the VISL is 2.2 µg/L for TCE and 24.2 µg/L for PCE.

TCE also exceeded the VISL in MW-05, located between the two general areas identified above. However, the concentration of 2.3 µg/L is only marginally greater than the VISL of 2.2 µg/L.

Given the depth to groundwater in these areas, considerable attenuation is expected to occur in the vadose zone. The tight soils in this vicinity further reduce soil permeability and limit vapor migration. However, TCE, PCE, and vinyl chloride were conservatively selected as COPCs for the potential future vapor intrusion scenario.

DRO

DRO was detected in fewer than 10 groundwater samples at concentrations ranging from 270 µg/L to 540 µg/L. The VISL for DRO was derived using very conservative assumptions, including the use of a provisional screening toxicity value and volatility parameters based on n-nonane. The resulting VISL is less than 1 part per billion.

Both the forensic saturated hydrocarbon and DRO/oil range organics (ORO) chromatographic data indicate the highest concentrations of total petroleum hydrocarbon (TPH) on Site are likely from dielectric fluids, such as refined mineral oils used in transformers. Both the literature about dielectric fluids and previous analysis conducted by AECOM for Pepco indicate these severely hydrotreated naphthenic oils have extremely low aromatic content and consist primarily of aliphatic hydrocarbons in the C20-C40 range. Gasoline range organics (GRO) were not detected in the UWZ, and detections of benzene, toluene, ethylbenzene, and xylenes were below VISLs.

A key difference between vapor intrusion of chlorinated VOCs and petroleum hydrocarbons is biodegradation (ITRC, 2014; USEPA, 2015b). Biodegradation can reduce concentrations in the vadose zone thus reducing the potential for vapor intrusion by petroleum hydrocarbons. The Interstate Technology & Regulatory Council (ITRC) and USEPA vapor intrusion guidance documents established minimum vertical separation distances between a building foundation and the petroleum source of 5 feet (ITRC) and 6 feet (USEPA) for dissolved phase constituents and 18 feet (ITRC) and 15 feet (USEPA) for light non-aqueous phase liquid (LNAPL). Where the Site-specific vertical separation distance meets or exceeds the applicable minimum distance, petroleum hydrocarbons are expected to biodegrade to levels below those that would pose a health concern, and no further evaluation of the vapor intrusion pathway is considered necessary (ITRC, 2014; USEPA, 2015b). As the depth to groundwater is deeper than the separation distances, the vapor intrusion pathway is considered incomplete. Therefore, DRO was not included as a COPC for further evaluation in the vapor intrusion evaluation.

Further Evaluation of COPCs

The COPCs selected above were further evaluated to estimate the potential carcinogenic risk and noncarcinogenic hazard for an indoor commercial/industrial worker assuming a building is constructed in the future. USEPA's VISL calculator was used to derive the potential risk/hazard estimates based on maximum detected concentrations in each of the areas discussed above (see Table B-3). Potential risks and hazards were compared to USEPA target levels, as described below.

USEPA has established target risk levels under the National Contingency Plan (NCP) (USEPA, 1990). Target risk levels refer to levels of cancer risk or hazard indices that are deemed acceptable by the USEPA or other regulatory agencies. These are levels below which the potential for adverse effects to humans are assumed to be negligible or inconsequential. The NCP establishes a target cancer risk range of 10^{-6} to 10^{-4} and a target hazard index (HI) of less than or equal to 1 (USEPA, 1990). The USEPA subsequently clarified that, "Where the cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, and the non-carcinogenic hazard quotient is less than 1, action generally is not warranted, unless there are adverse environmental impacts" (USEPA, 1991). Potential chemicals of concern (COCs) are identified in this Baseline Human Health Risk Assessment, per DOEE request, as those COPCs with individual cancer risks greater than 1×10^{-6} or an HI greater than 1 on a target endpoint basis. The results are presented in the tables below.

COPC	Potential Cancer Risk			
	Southern Boundary [(a)]	Northern Boundary (DP60)	Downgradient Perimeter (TA19C1, TA19C2)	MW-05A
Chloroform	4E-07	4E-06	ND	2E-07
Tetrachloroethylene	7E-06	7E-09	5E-07	2E-07
Trichloroethylene	6E-06	ND	8E-07	3E-07
Vinyl Chloride	2E-06	ND	ND	ND
Total	**2E-05**	**4E-06**	**1E-06**	**8E-07**

Notes:
ND = Not detected.
Blue highlighting indicates that the cumulative potential risk is within USEPA's target risk range of 10^{-6} to 10^{-4}.
[(a)] Wells with exceedances: DPA3, DPA4, DPA5, DPB10, DPB3, DPB5, DPB6, DPB7, DPB9, DPC4, DPC5, DPC7, MW-09A, and SUSDP09.

COPC	Potential Noncancer Hazard Index (HI)			
	Southern Boundary [(a)]	Northern Boundary (DP60)	Downgradient Perimeter (TA19C1, TA19C2)	MW-05A
Chloroform	0.0005	0.005	ND	0.0003
Tetrachloroethylene	2	0.002	0.1	0.06
Trichloroethylene	2	ND	0.3	0.1
Vinyl Chloride	0.01	ND	ND	ND
Total	**4**	**0.007**	**0.4**	**0.2**

Notes:
ND = Not detected.
Yellow highlighting indicates that the target endpoint HI exceeds 1.
[(a)] Wells with exceedances: DPA3, DPA4, DPA5, DPB10, DPB3, DPB5, DPB6, DPB7, DPB9, DPC4, DPC5, DPC7, MW-09A, and SUSDP09.

The cumulative potential risk along the southern boundary, the northern boundary, and the downgradient perimeter is within the USEPA risk range of 10^{-6} to 10^{-4} (USEPA, 1991). The cumulative potential risk in MW-05A is below the risk range. These results indicate that the vapor intrusion pathway does not pose an inhalation risk in excess of USEPA target levels. The total noncancer HI along the southern boundary exceeds 1; the remaining areas have an HI below 1. COPCs with potential risks greater than 1×10^{-6} are indicated above in blue, and those with HI greater than 1 are indicated above in yellow.

Conclusions

Per the NCP, actions at Superfund sites are generally not warranted unless the total cumulative risk exceeds 10^{-4} or the HI exceeds 1 on a target endpoint basis. Based on the conservative screening level vapor intrusion evaluation and assuming a building is constructed in the future, potential cancer risks are within the risk range. Exceedances of a target endpoint HI of 1 occurred along the southern property boundary. At the request of DOEE, COPCs with potential risks above 10^{-6} were identified as potential COCs regardless of whether cumulative risk exceeded 10^{-4}. The table below presents the potential COCs with potential risks greater than 10^{-6} or a target endpoint HI of 1; the hazard value representing the highest target endpoint HI is presented.

COPC	Risk/HI	Potential COCs for the Future Vapor Intrusion Pathway [(a)]	
		Southern Boundary	Northern Boundary (DP-60)
Chloroform	Risk	--	4E-06
Tetrachloroethylene	Risk	7E-06	--
	HI	2	--
Trichloroethylene	Risk	6E-06	--
	HI	2	--
Vinyl Chloride	Risk	2E-06	--

Notes:
-- Indicates that the Excess Lifetime Cancer Risk is less than or equal to 10^{-6} or the HI is less than or equal to 1.
Blue highlighting indicates that risk exceeds 10^{-6} but is less than or equal to 10^{-4}.
Yellow highlighting indicates that risk exceeds 10^{-4} or the target endpoint HI exceeds 1.
[(a)] Future outdoor industrial worker.

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USEPA. 2015a. Office of Solid Waste and Emergency Response (OSWER) Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air. OSWER Publication 9200.2-154. June 2015.

USEPA. 2015b. Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites. EPA 510-R-15-001. June 2015.

Table B-1
Evaluation of Chemicals Detected in Upper Water Bearing Zone to Include in Vapor Intrusion Evaluation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Cas Number	Detected Organic Chemical	Criteria for Evaluation: Does the chemical meet the definition for volatility? (a)	Does the chemical have inhalation toxicity data?	Source of Chemical Information	Evaluate for Vapor Intrusion? (b)	Target Groundwater Concentration (c) (ug/L)
Dioxins and Furans						
DFTEQ-HH	TCDD TEQ HH	Yes	Yes	VISL	Yes	1.58E-04
PCBs						
TOT-PCB-ARO-C	Total PCBs (Aroclors)	Yes	Yes	VISL (Aroclor 1254)	Yes	1.85E+00
Pesticides						
72-54-8	4,4'-DDD	No	Yes	VISL	No	NA
50-29-3	4,4'-DDT	No	Yes	VISL	No	NA
319-85-7	beta-BHC	No	Yes	VISL	No	NA
5103-71-9	cis-Chlordane	Yes	Yes	VISL (chlordane)	Yes	6.17E+01
319-86-8	delta-BHC	No	No	HSDB	No	NA
60-57-1	Dieldrin	No	Yes	VISL	No	NA
58-89-9	gamma-BHC (Lindane)	No	Yes	VISL	No	NA
1024-57-3	Heptachlor Epoxide	Yes	Yes	VISL	Yes	5.49E+00
5103-74-2	trans-Chlordane	Yes	Yes	VISL (chlordane)	Yes	6.17E+01
Petroleum Compounds						
C10C20	Diesel Range Organics (C10-C20)	Yes	Yes	VISL (aliphatic medium)	Yes	3.15E-01
C20C36	Oil Range Organics (C20-C36)	Yes	No	VISL (aliphatic high)	No	NA
SVOCs						
92-52-4	1,1'-Biphenyl	Yes	Yes	VISL	Yes	1.39E+01
91-57-6	2-Methylnaphthalene	Yes	No	VISL	No	NA
106-44-5	4-Methylphenol	No	Yes	VISL	No	NA
83-32-9	Acenaphthene	Yes	No	VISL	No	NA
208-96-8	Acenaphthylene	Yes	No	RAIS	No	NA
120-12-7	Anthracene	Yes	No	VISL	No	NA
100-52-7	Benzaldehyde	Yes	No	VISL	No	NA
56-55-3	Benzo(a)anthracene	Yes	Yes	VISL	Yes	4.17E+02
50-32-8	Benzo(a)pyrene	No	Yes	VISL	No	NA
205-99-2	Benzo(b)fluoranthene	No	Yes	VISL	No	NA
191-24-2	Benzo(g,h,i)perylene	No	No	RAIS	No	NA
207-08-9	Benzo(k)fluoranthene	No	Yes	VISL	No	NA
117-81-7	bis-(2-Ethylhexyl)phthalate	No	Yes	VISL	No	NA
85-68-7	Butylbenzylphthalate	No	No	VISL	No	NA
105-60-2	Caprolactam	No	Yes	VISL	No	NA
86-74-8	Carbazole	No	No	RAIS	No	NA
218-01-9	Chrysene	No	Yes	VISL	No	NA
53-70-3	Dibenzo(a,h)anthracene	No	Yes	VISL	No	NA
132-64-9	Dibenzofuran	No	No	VISL	No	NA
84-66-2	Diethylphthalate	No	No	VISL	No	NA
131-11-3	Dimethylphthalate	No	No	HSDB	No	NA
84-74-2	Di-n-butylphthalate	No	No	VISL	No	NA
117-84-0	Di-n-octylphthalate	No	No	VISL	No	NA
206-44-0	Fluoranthene	No	No	VISL	No	NA
86-73-7	Fluorene	Yes	No	VISL	No	NA
193-39-5	Indeno(1,2,3-cd)pyrene	No	Yes	VISL	No	NA
91-20-3	Naphthalene	Yes	Yes	VISL	Yes	2.01E+01
85-01-8	Phenanthrene	Yes	No	RAIS	No	NA
108-95-2	Phenol	No	Yes	VISL	No	NA
129-00-0	Pyrene	Yes	No	VISL	No	NA
VOCs						
75-35-4	1,1-Dichloroethene	Yes	Yes	VISL	Yes	8.21E+01
78-93-3	2-Butanone	Yes	Yes	VISL	Yes	9.41E+05
591-78-6	2-Hexanone	Yes	Yes	VISL	Yes	3.45E+03
108-10-1	4-Methyl-2-pentanone	Yes	Yes	VISL	Yes	2.33E+05
67-64-1	Acetone	Yes	Yes	VISL	Yes	9.45E+06
71-43-2	Benzene	Yes	Yes	VISL	Yes	6.93E+00
75-27-4	Bromodichloromethane	Yes	Yes	VISL	Yes	3.82E+00
75-65-0	Butyl alcohol, tert-	Yes	Yes	VISL (isopropanol)	Yes	2.65E+05
75-15-0	Carbon Disulfide	Yes	Yes	VISL	Yes	5.21E+02
67-66-3	Chloroform	Yes	Yes	VISL	Yes	3.55E+00
156-59-2	cis-1,2-Dichloroethylene	Yes	No	VISL (trans-12DCE)	No	NA
108-20-3	Diisopropyl ether	Yes	Yes	VISL	Yes	2.93E+03
XYLMP	m, p-Xylene	Yes	Yes	VISL (total xylenes)	Yes	1.62E+02
1634-04-4	Methyl tert-Butyl Ether (MTBE)	Yes	Yes	VISL	Yes	1.97E+03
75-09-2	Methylene Chloride	Yes	Yes	VISL	Yes	1.98E+03

Table B-1
Evaluation of Chemicals Detected in Upper Water Bearing Zone to Include in Vapor Intrusion Evaluation
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Cas Number	Detected Organic Chemical	Criteria for Evaluation				Target Groundwater Concentration (c) (ug/L)
		Does the chemical meet the definition for volatility? (a)	Does the chemical have inhalation toxicity data?	Source of Chemical Information	Evaluate for Vapor Intrusion? (b)	
95-47-6	o-Xylene	Yes	Yes	VISL	Yes	2.07E+02
994-05-8	Tertiary-Amyl Methyl Ether	Yes	Yes	VISL (MTBE)	Yes	1.97E+03
127-18-4	Tetrachloroethylene	Yes	Yes	VISL	Yes	2.42E+01
108-88-3	Toluene	Yes	Yes	VISL	Yes	8.07E+03
156-60-5	trans-1,2-Dichloroethene	Yes	No	VISL	No	NA
79-01-6	Trichloroethene	Yes	Yes	VISL	Yes	2.18E+00
75-01-4	Vinyl Chloride	Yes	Yes	VISL	Yes	2.45E+00
1330-20-7	Xylenes (total)	Yes	Yes	VISL	Yes	1.62E+02

Notes:
CAS - Chemical Abstracts Service.
COPC - Chemical of Potential Concern.
HSDB - Hazardous Substances Databank. https://toxnet.nlm.nih.gov/cgi-bin/sis/search2. Accessed February 2019.
NA - Not Applicable.
PCB - Polychlorinated biphenyl.
RAIS - Risk Assessment Information System. https://rais.ornl.gov/cgi-bin/tools/TOX_search?select=chem_spef. Accessed February 2019.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - Dioxin Toxic Equivalence.
TPH - Total Petroleum Hydrocarbons.
VISL - Vapor Intrusion Screening Level Calculator.
VOC - Volatile Organic Compound.

(a) - Chemical meets the definition of volatility if the Henry's law constant is greater than 1E-05 atm-m^3/mol or if the vapor pressure is greater than 1 millimeter mercury (mm Hg).
(b) - Chemical is evaluated for the vapor intrusion pathway if it meets the definiton of volatility and if it has inhalation toxicity data.
(c) - Calculated using VISL Calculator with default commercial/industrial parameters. Based on a cancer risk level of 1E-6 and an hazard quotient of 0.1. https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator. Accessed February 2019.

Table B-2
Occurrence, Distribution and Selection of Chemicals of Potential Concern in Groundwater for the Volatilization to Indoor Air Pathway for Pepco Site Groundwater
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Cas Number	Chemical	Minimum (1) Concentration	Maximum (1) Concentration	Average Detected Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits (2)	Concentration Used for Screening (3)	Screening Toxicity Value (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (6)
Pepco Site Upper Water Bearing Zone	**Dioxins and Furans**												
	DFTEQ-HH	TCDD TEQ	1.28E-09	1.41E-05	1.74E-06	ug/l	MW12A	11 / 14	0.000000981 - 0.00000263	1.41E-05	1.58E-04	N	BSL
	PCBs												
	TOT-PCB-ARO-C	Total PCBs (Aroclors)	7.70E-03	1.50E-01	5.10E-02	ug/l	SUSDP05 (14 - 19 ft)	4 / 55	0.0094 - 0.01	1.50E-01	1.85E+00	N	BSL
	Pesticides												
	5103-71-9	cis-Chlordane	9.60E-04 J	9.60E-04 J	9.60E-04	ug/l	SUSDP09 (25 - 30 ft)	1 / 27	0.0012 - 0.0013	9.60E-04	6.17E+01	N	BSL
	1024-57-3	Heptachlor Epoxide	8.10E-04 J	1.70E-02 J	5.70E-03	ug/l	MW06A	4 / 27	0.0012 - 0.0013	1.70E-02	5.49E+00	N	BSL
	5103-74-2	trans-Chlordane	1.20E-03	2.10E-03 J	1.60E-03	ug/l	MW13A	5 / 27	0.0012 - 0.0013	2.10E-03	6.17E+01	N	BSL
	Petroleum Hydrocarbons												
	C10C20	Diesel Range Organics (C10-C20)	3.20E+02 J	5.40E+02	4.30E+02	ug/l	DP46 (15 - 20 ft)	6 / 41	480 - 520	5.40E+02	3.15E-01	**Y**	**ASL**
	SVOCs												
	92-52-4	1,1'-Biphenyl	2.70E-01 J	2.70E-01 J	2.70E-01	ug/l	MW02A	1 / 21	0.93 - 1.1	2.70E-01	1.39E+01	N	BSL
	56-55-3	Benzo(a)anthracene	4.70E-02 J	3.40E+00	8.60E-01	ug/l	MW07A	9 / 58	0.18 - 0.23	3.40E+00	4.17E+02	N	BSL
	91-20-3	Naphthalene	4.40E-02 J	1.30E+01 J	1.60E+00	ug/l	MW12A	9 / 58	0.18 - 0.23	1.30E+01	2.01E+01	N	BSL
	VOCs												
	75-35-4	1,1-Dichloroethene	7.20E-01 J	7.20E-01 J	7.20E-01	ug/l	MW09A	1 / 114	1 - 1	7.20E-01	8.21E+01	N	BSL
	78-93-3	2-Butanone	7.40E-01 J	2.10E+01	7.50E+00	ug/l	MW09A	6 / 91	5 - 5	2.10E+01	9.41E+05	N	BSL
	591-78-6	2-Hexanone	4.70E-01 J	4.70E-01 J	4.70E-01	ug/l	MW09A	1 / 91	5 - 5	4.70E-01	3.45E+03	N	BSL
	108-10-1	4-Methyl-2-pentanone	6.40E-01 J	6.40E-01 J	6.40E-01	ug/l	MW09A	1 / 91	5 - 5	6.40E-01	2.33E+05	N	BSL
	67-64-1	Acetone	2.70E+00 J	7.30E+01	8.10E+00	ug/l	DP58 (15 - 20 ft)	33 / 91	5 - 5	7.30E+01	9.45E+06	N	BSL
	71-43-2	Benzene	2.10E-01 J	2.70E-01 J	2.50E-01	ug/l	MW09A	3 / 91	1 - 1	2.70E-01	6.93E+00	N	BSL
	75-27-4	Bromodichloromethane	3.60E-01 J	2.60E+00	1.50E+00	ug/l	DP60 (15 - 20 ft)	2 / 91	1 - 1	2.60E+00	3.82E+00	N	BSL
	75-65-0	Butyl alcohol, tert-	1.10E+02 J-	1.10E+02 J-	1.10E+02	ug/l	DP58 (15 - 20 ft)	1 / 34	40 - 800	1.10E+02	2.65E+05	N	BSL
	75-15-0	Carbon Disulfide	4.60E-01 J	1.50E+00	8.90E-01	ug/l	DP58 (15 - 20 ft)	9 / 91	1 - 1	1.50E+00	5.21E+02	N	BSL
	67-66-3	Chloroform	2.20E-01 J	1.50E+01	1.80E+00	ug/l	DP60 (15 - 20 ft)	18 / 91	1 - 1	1.50E+01	3.55E+00	**Y**	**ASL**
	108-20-3	Diisopropyl ether	2.90E-01 J	6.30E-01 J	4.20E-01	ug/l	TA19C1 (15 - 20 ft)	3 / 34	1 - 20	6.30E-01	2.93E+03	N	BSL
	XYLMP	m, p-Xylene	2.70E-01 J	5.60E-01 J	4.40E-01	ug/l	SUSDP06 (14.5 - 19.5 ft)	4 / 91	1 - 2	5.60E-01	1.62E+02	N	BSL
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	2.10E-01 J	4.80E+01	4.70E+00	ug/l	DP45 (15 - 20 ft)	51 / 91	1 - 1	4.80E+01	1.97E+03	N	BSL
	75-09-2	Methylene Chloride	2.00E-01 J	4.90E-01 J	3.10E-01	ug/l	SUSDP02 (12 - 17 ft)	5 / 91	1 - 1	4.90E-01	1.98E+03	N	BSL
	95-47-6	o-Xylene	1.10E-01 J	2.40E-01 J	1.60E-01	ug/l	SUSDP06 (14.5 - 19.5 ft)	4 / 91	1 - 1	2.40E-01	2.07E+02	N	BSL
	994-05-8	Tertiary-Amyl Methyl Ether	2.00E-01 J	1.30E+00 J	5.50E-01	ug/l	DP57 (15 - 20 ft)	4 / 34	1 - 20	1.30E+00	1.97E+03	N	BSL
	127-18-4	Tetrachloroethylene	1.80E-01 J	4.70E+02	5.80E+01	ug/l	DPB7	54 / 114	1 - 1	4.70E+02	2.42E+01	**Y**	**ASL**
	108-88-3	Toluene	1.50E-01 J	2.10E+00	4.30E-01	ug/l	SUSDP06 (14.5 - 19.5 ft)	33 / 91	1 - 1	2.10E+00	8.07E+03	N	BSL
	79-01-6	Trichloroethene	1.70E-01 J	4.10E+01	9.10E+00	ug/l	MW09A	28 / 114	1 - 1	4.10E+01	2.18E+00	**Y**	**ASL**
	75-01-4	Vinyl Chloride	5.30E+00	5.30E+00	5.30E+00	ug/l	MW09A	1 / 114	1 - 1	5.30E+00	2.45E+00	**Y**	**ASL**
	1330-20-7	Xylenes (total)	1.10E-01	8.00E-01	4.00E-01	ug/l	SUSDP06 (14.5 - 19.5 ft)	6 / 91	1 - 2	8.00E-01	1.62E+02	N	BSL

Notes:

(1) Minimum/maximum detected concentration and associated data flags.
J = The chemical was positively identified; however, the associated numerical value is an estimated concentration only.
(2) Lab Reporting Detection Limits (RDLs) are shown where the frequency of detection is less than 100%.
(3) Maximum detected concentration used for screening.
(4) Screening levels are equal to the USEPA Vapor Intrusion Screening Level based on a target risk level of $1x10^{-6}$ for carcinogens and a target hazard quotient of 0.1 for noncarcinogens. Calculated February 2019 via calculator.
See Table F-1 for screening levels and surrogates used.
(6) Rationale Codes:
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL).

Definitions:

CAS - Chemical Abstracts Service
COPC - Chemical of Potential Concern
PCB - Polychlorinated biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD TEQ - Dioxin Toxic Equivalence
TPH - Total Petroleum Hydrocarbons.
VOC - Volatile Organic Compound.

Table B-3
Commercial Vapor Intrusion Risk
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Variable	Commercial Air Default Value	Value
AF_{gw} (Attenuation Factor Groundwater) unitless	0.001	0.001
AT_w (averaging time - composite worker)	365	365
ED_w (exposure duration - composite worker) yr	25	25
EF_w (exposure frequency - composite worker) day/yr	250	250
ET_w (exposure time - composite worker) hr	8	8
LT (lifetime) yr	70	70

Table B-3
Commercial Vapor Intrusion Risk
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Southern Boundary (Wells with exceedances: DPA3, DPA4, DPA5, DPB10, DPB3, DPB5, DPB6, DPB7, DPB9, DPC4, DPC5, DPC7, MW09A, SUSDP09)

Chemical	CAS Number	Area Maximum Groundwater Concentration C_{gw} (µg/L)	Site Indoor Air Concentration $C_{i,a}$ (µg/m^3)	Chronic Daily Intake (Cancer) (ug/m3)	Chronic Daily Intake (noncancer) (mg/m3)	VI Carcinogenic Risk CR	VI Hazard HQ	IUR (ug/m^3)$^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Critical Endpoint	Temperature ( ) for Groundwater Vapor Concentration	Henry's Law Constant Used in Calcs (unitless)
Chloroform	67-66-3	1.3	0.2	1.59E-02	4.45E-05	3.66E-07	0.0005	2.30E-05	IRIS	9.77E-02	ATSDR	Hepatic effects	25	0.15
Tetrachloroethylene	127-18-4	470	340	2.77E+01	7.77E-02	7.21E-06	1.94	2.60E-07	IRIS	4.00E-02	IRIS	Neurological, Ocular	25	0.724
Trichloroethylene	79-01-6	41	17	1.35E+00	3.77E-03	5.52E-06	1.89	4.10E-06	IRIS	2.00E-03	IRIS	Thyroid, Vascular	25	0.403
Vinyl Chloride	75-01-4	5.3	6	4.93E-01	1.38E-03	2.17E-06	0.01	4.40E-06	IRIS	1.00E-01	IRIS	Liver	25	1.14
**Sum*						*1.53E-05*	*3.84*							

Target Endpoint HQ
Liver/Hepatic: 0.01
Neurological, Ocular: 1.94
Thyroid, Vascular: 1.89
Maximum: 1.94

DP60 (Northern Boundary)

Chemical	CAS Number	Area Maximum Groundwater Concentration C_{gw} (µg/L)	Site Indoor Air Concentration $C_{i,a}$ (µg/m^3)	Chronic Daily Intake (Cancer) (ug/m3)	Chronic Daily Intake (noncancer) (mg/m3)	VI Carcinogenic Risk CR	VI Hazard HQ	IUR (ug/m^3)$^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Critical Endpoint	Temperature ( ) for Groundwater Vapor Concentration	Henry's Law Constant Used in Calcs (unitless)
Chloroform	67-66-3	15	2.3	1.83E-01	5.14E-04	4.22E-06	0.005	2.30E-05	IRIS	9.77E-02	ATSDR	Hepatic effects	25	0.15
Tetrachloroethylene	127-18-4	0.44	0	2.60E-02	7.27E-05	6.75E-09	0.002	2.60E-07	IRIS	4.00E-02	IRIS	Neurological, Ocular	25	0.724
Trichloroethylene	79-01-6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Thyroid, Vascular	ND	ND
Vinyl Chloride	75-01-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Liver	ND	ND
*Sum						4.23E-06	0.007							

Target Endpoint HQ
Liver/Hepatic: 0.005
Neurological, Ocular: 0.002
Thyroid, Vascular: ND
Maximum: 0.005

Table B-3
Commercial Vapor Intrusion Risk
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Downgradient Perimeter (Wells with exceedances: TA19C1, TA19C2)

Chemical	CAS Number	Area Maximum Groundwater Concentration C_{gw} (µg/L)	Site Indoor Air Concentration $C_{i,a}$ (µg/m^3)	Chronic Daily Intake (Cancer) (ug/m3)	Chronic Daily Intake (noncancer) (mg/m3)	VI Carcinogenic Risk CR	VI Hazard HQ	IUR (ug/m^3)$^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Critical Endpoint	Temperature ( ) for Groundwater Vapor Concentration	Henry's Law Constant Used in Calcs (unitless)
Chloroform	67-66-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Hepatic effects	ND	ND
Tetrachloroethylene	127-18-4	30	22	1.77E+00	4.96E-03	4.60E-07	0.12	2.60E-07	I	4.00E-02	IRIS	Neurological, Ocular	25	0.724
Trichloroethylene	79-01-6	5.9	2	1.94E-01	5.43E-04	7.95E-07	0.27	4.10E-06	I	2.00E-03	IRIS	Thyroid, Vascular	25	0.403
Vinyl Chloride	75-01-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Liver	ND	ND
*Sum						1.26E-06	0.40							

Target Endpoint HQ	
Liver/Hepatic:	ND
Neurological, Ocular:	0.12
Thyroid, Vascular:	0.27
Maximum:	0.27

MW05A

Chemical	CAS Number	Area Maximum Groundwater Concentration C_{gw} (µg/L)	Site Indoor Air Concentration $C_{i,a}$ (µg/m^3)	Chronic Daily Intake (Cancer) (ug/m3)	Chronic Daily Intake (noncancer) (mg/m3)	VI Carcinogenic Risk CR	VI Hazard HQ	IUR (ug/m^3)$^{-1}$	IUR Ref	Chronic RfC (mg/m^3)	RfC Ref	Critical Endpoint	Temperature ( ) for Groundwater Vapor Concentration	Henry's Law Constant Used in Calcs (unitless)
Chloroform	67-66-3	0.77	0.1	9.42E-03	2.64E-05	2.17E-07	0.0003	2.30E-05	I	9.77E-02	ATSDR	Hepatic effects	25	0.15
Tetrachloroethylene	127-18-4	15	11	8.86E-01	2.48E-03	2.30E-07	0.06	2.60E-07	I	4.00E-02	IRIS	Neurological, Ocular	25	0.724
Trichloroethylene	79-01-6	2.3	1	7.56E-02	2.12E-04	3.10E-07	0.11	4.10E-06	I	2.00E-03	IRIS	Thyroid, Vascular	25	0.403
Vinyl Chloride	75-01-4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Liver	ND	ND
*Sum						7.57E-07	0.1681							

Target Endpoint HQ	
Liver/Hepatic:	0.0003
Neurological, Ocular:	0.06
Thyroid, Vascular:	0.11
Maximum:	0.11

Attachment C

Discussion of Key Exposure Parameters Used in the BHHRA

Attachment C
Discussion of Key Exposure Parameters Used in the BHHRA

1 Introduction

This Baseline Human Health Risk Assessment (BHHRA) evaluated the following receptors:

Landside

- Current/Future Construction Worker (adult). Potential direct contact (ingestion and dermal) with surface and subsurface soil and potential inhalation of soil-derived fugitive dust during utility or other construction work requiring excavation. In addition, the construction worker may be exposed to volatiles in the air of an excavation trench due to volatilization from groundwater infiltrating the trench.
- Future Outdoor Industrial Worker (adult). Potential direct contact (ingestion and dermal) with surface soil and potential inhalation of surface soil-derived fugitive dust, in the event of a change in the existing soil cover on Site in the future.
- Future Indoor Industrial Worker (adult). A screening level evaluation of the potential vapor intrusion from groundwater to indoor air pathway is included in Attachment B. Default exposure parameters were used (exposure of 250 days per year for 25 years).
- Future Recreational Visitors (older child/teen). Potential direct contact (ingestion and dermal) with surface soil, and potential inhalation of surface soil-derived fugitive dust in the western portion of the Site next to Anacostia Avenue, if the area were to become publically accessible in the future (see Figure 3-1 of the main text of this BHHRA).

Waterside

- Current/Future Recreational Anglers (adult, older child/teen, young child). Potential direct contact with fringe surface sediment and surface water while fishing, and ingestion of fish from the Anacostia River. The BHHRA also included an evaluation of a high-end consuming angler for ingestion of fish only.
- Current/Future Swimmers (adult, older child/teen, young child). Potential direct contact with fringe surface sediment and surface water while swimming in the Anacostia River.

- Current/Future Waders (adult, older child/teen, young child). Potential direct contact with fringe surface sediment and surface water while wading in the Anacostia River.
- Shoreline Workers (adult). Potential direct contact with fringe surface sediment and surface water while performing maintenance, landscaping, or other activities along the shoreline of the Anacostia River.

Tables 5-2, 5-3, 5-4, 5-5, and 5-6 of the main text of this BHHRA present the exposure parameter values used to quantitatively estimate potential risks from exposures to soil, excavation trench air, fringe surface sediment, surface water, and fish tissue, respectively. Default exposure factors were used in the screening level vapor intrusion evaluation (8 hours per day, 250 days per year, 25 years). A description of each Landside receptor evaluated in the BHHRA is provided in Section 5.3 of the main text of this BHHRA. Key exposure parameters are discussed below for both the reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios, including:

- Fish Consumption Exposure Parameters
- Soil and Fringe Surface Sediment Ingestion Rates
- Surface Water Ingestion Rates
- Body Surface Areas Exposed
- Soil and Fringe Surface Sediment Adherence Factors
- Exposure Frequency
- Exposure Duration
- Body Weight

2 Fish Consumption Exposure Parameters

A number of parameters were used to calculate the potential risk from consumption of fish, including consumption rate, species, body parts consumed, fraction ingested from the Site, preparation and cooking methods, and years of fishing at the Site. In selecting appropriate fish consumption exposure parameters, U.S. Environmental Protection Agency (USEPA) guidance (USEPA, 1989a,b, 1998, 2000, 2011) discusses the importance of considering site-specific factors, including water quality, public access, abundance of desirable species, and proximity of other desirable water bodies, as well as characteristics of the angling population.

The Anacostia River is a tidal river with habitat suitable for a variety of freshwater and estuarine species, including American eel, brown bullhead, channel catfish, largemouth and smallmouth bass, carp, and sunfish. Angling from shore and boat has been observed, as discussed below. A water body-specific fish consumption advisory is in effect for the Anacostia and Potomac Rivers recommending against consumption of some species (catfish, carp, and American eel) and limited consumption of other species (e.g., largemouth bass and sunfish) (DOEE, 2016). However, some people may not be aware of the advisory, or may choose to catch and eat river fish despite the advisory.

To aid in the development of appropriate fish consumption exposure parameters for the BHHRA, available local and regional angler studies were consulted. Fish consumption rates and fraction of diet/fraction ingested are discussed below.

2.1 Fish Consumption Rate

Available angler surveys were reviewed to identify data that could serve as a source of consumption rates for the Anacostia River. Four regional studies were identified, and are summarized below.

- Survey of Chesapeake Bay Occupational and Recreational Fishers (Harris et al., 2009)
- Chesapeake Bay Angler Survey (Gibson and McClafferty, 2005)
- Anacostia River Angler Survey (OpinionWorks, 2012)
- Subsistence Fishing on the Potomac and Anacostia Rivers (NPS, 2016)

Chesapeake Bay Occupational and Recreational Fishers Survey

Researchers from the University of Toronto and Virginia Commonwealth University, with support from the Virginia Department of Health, conducted a survey of occupational and recreational anglers that fish in Chesapeake Bay (Harris et al., 2009). The participants (n=99) were recruited from an existing cohort of an epidemiological study examining exposure to a seafood toxin (*Pfiesteria*), and included occupational anglers as well as recreational anglers with occupations not related to fishing. The majority (80%) were male, 85% had at least a high school education, and 98% were white (2% were black). In 2001, participants were administered an in-person questionnaire that focused on current fish consumption, species consumed, past fish consumption, and perceptions of risk. Fish consumption included all sources of fish meals, including store-bought, self-caught, restaurant, etc. Information on fish meal frequency was solicited two ways: 1) on the basis of average fish consumption on a weekly, monthly, or annual basis, and 2) on a species-specific basis. Using the two methods, the median number of annual fish meals was estimated to be 52 based on “average” reported fish meal frequency, and 65 based on summing species-specific reported fish meal frequencies. Species most frequently consumed included flounder, tuna (including canned tuna), striped bass, sea trout, and croaker. Approximately 70% of the fish consumed was self-caught (with about half of that from Virginia waters), and the average fish meal size was approximately 9 ounces (median of 8 ounces). The authors found a statistically significant relationship between consumption and occupation, with higher consumption by occupational anglers and other water-related occupations versus non-water-related occupations. The authors suggest that the consumption estimates based on summation of different fish types are likely upwardly biased by approximately 30%.

The 2001 Chesapeake Bay occupational and recreational fishers survey is of limited usefulness to the Pepco Anacostia River risk assessment for several reasons: fish consumption represents all sources of fish, not just self-caught, the predominantly White study population differs from Anacostia River anglers (largely non-White), and marine fish that would not typically be present represent a large portion of the diet (e.g., flounder and sea trout).

Chesapeake Bay Angler Survey

In 2004, researchers from Virginia Polytechnic Institute and State University, under contract to the Chesapeake Bay Program, conducted on-site angler interviews in three regions of concern: 1) Baltimore, Maryland area, 2) Washington, DC area, and 3) Tidewater, Virginia area (Gibson and McClafferty, 2005). The purpose of the study was to characterize anglers' demographic characteristics and consumption behaviors, as well as their knowledge of consumption advisories. The interviews were conducted over 8 weeks in June–August at nine predetermined fishing sites in each study area. Of the nine intercept sites in the Washington, DC study area, seven were located on the Potomac River, one on the Anacostia River (Anacostia Park South[1]), and one on the bay south of the confluence of the two rivers. The individual site sampling frequencies were weighted to sample the sites where anglers were expected more frequently, based on consultations with fishery managers and visual observations of survey staff (Gibson and McClafferty, 2005). Interview teams visited assigned sites for 8-hour shifts (morning shift of 6 am to 2 pm and afternoon shift of 12 noon to 8 pm).

A total of 247 interviews were conducted in the DC area. The study attempted to interview each angler only once, although the authors report that 9% of the 247 intercepts were with anglers that had been interviewed earlier in the summer. Most anglers (91%) were male, and the average age was 45. Most (84%) had obtained at least a high school education. Half of the anglers were African-American, 33% were White, 10% were Hispanic, and 6% were Asian. About 40% reported annual household incomes above $80,000, about 30% reported annual household incomes of $40,000 to $80,000, and 30% reported less than $40,000. About 9% reported annual household incomes of less than $20,000.

[1] Gibson's 2005 Master's thesis: *Fish Consumption Advisories in Tributaries to the Chesapeake Bay: Improving the Communication of Risk to Washington, DC Anglers*, provided additional information on the 2004 survey. In the thesis, the Anacostia South Park survey site was depicted on a map on the east side of the river adjacent to the Pennsylvania Ave. Bridge (Sousa Bridge). This location is approximately 1.8 miles downriver from the Pepco Site. Anacostia South Park (site 9) was visited six times during the 8-week survey period. Two of the visits were conducted on weekend days, while the other four were on weekdays. Five of the six visits took place during the afternoon shift, and one visit took place during the morning shift. A total of 13% (about 30 interviews) of all DC area interviews were conducted at the Anacostia South Park site, ranking fourth out of the nine DC area sites.

About 37% reported eating some of their catch, and 63% reported practicing catch and release only. Of those who reported consuming their catch, 75% reported avoiding certain species. About half of anglers who reported not consuming their catch said they sometimes gave away their catch. When consuming anglers were asked to name up to four species consumed and consumption frequency, catfish (listed as a “do not eat” species) was the most popular species, followed by stripers and largemouth bass. For the other two “do not eat” listed species (carp and eel), only three anglers reported consuming carp, and none reported consuming eel.

Most anglers reported fishing and eating their catch in the warmer months (April–September). During these warmer months, 53% of consuming anglers reported a consumption rate of 1 to 3 times per month, and 20% reported a consumption rate of 1 to 2 times per week. On average throughout the year, anglers ate their catch less than once per month (44%) or between one and three times per month (29%). Only 2% reported eating self-caught fish more than twice a week throughout the year. Asian and Hispanic anglers were more likely to consume their fish than anglers of other ethnicities, and were also more likely to provide their catch to other family members. The majority (about 60%) reported removing the skin and trimming the fat, and most (78%) reported eating 8 ounces or less for a typical meal. Of the 247 DC area anglers interviewed, only 6 reported eating crabs. When asked about reasons for fishing, over 90% of the anglers reported being outdoors or relaxing as very important. About 20% reported getting fresh fish for a family meal as a very important reason. About 56% of the interviewed anglers reported awareness of the consumption advisories.

The 2004 Chesapeake Bay Angler Survey includes consumption and behavior data for anglers on the Potomac River and Anacostia River that may be useful for the risk assessment. The survey questions asked about consumption and sharing habits related to “self-caught” fish from the Washington, DC area, although not necessarily specific to the Anacostia River. Population statistics were not generated, and sampling weights were not provided. Thus, there is uncertainty as to the representativeness of the interview data to the larger population of Anacostia River anglers and consuming anglers. In addition, the survey was administered over an 8-week period of high fishing activity, and anglers were asked to recall year-round practices. There is uncertainty in using one-time recall data to estimate long-term consumption rates (USEPA, 2011). Recall survey methods tend to bias consumption rates high, especially for more avid anglers and with longer recall periods (USEPA, 1998; Connelly and Brown, 1995; Fisher et al., 1991). “Recall bias” may be further amplified when the respondent is interviewed at the height of the fishing season, and responses extrapolated to cold weather months when fishing activity is much lower. This bias will lead to overestimating annual consumption rates (USEPA, 2011).

Anacostia River Angler Survey

OpinionWorks, under contract to the Anacostia Riverkeeper and with multi-agency support, conducted a study to assess the characteristics, practices, and attitudes of Anacostia River anglers (OpinionWorks, 2012). On-site interviews were conducted on various days of the week and hours of the day from early morning to evening, over 5 weeks in August and September 2011 at 10 fishing sites between Bladensburg, Maryland and the mouth of the Anacostia River near Hains Point in the District of Columbia. Interviews were administered predominantly in English (85%), with the remainder in Spanish (14%) and Vietnamese (1%). Information was gathered on fishing practices, fish consumption and sharing, and awareness of health risks. Of the 111 anglers interviewed, 67% were African American, 18% were Hispanic, 8% were Asian, and 6% were White. About 62% had a high school education, and 25% never completed high school. About 63% of the interviewed anglers reported fishing at least once a week during the warm weather months, and 18% reported fishing daily during warm weather months. When shown a photo sheet of fish species in the river, catfish was reported as caught most often (65% of anglers), followed by brown bullhead (33% of anglers) and sunfish (20% of anglers). About 75% of anglers reported eating or sharing some or all of their catch, and about 25% practice catch and release only. About one third (35%) reported eating or sharing their catch once per week, and 7% reported eating fish every day. Nearly half (46%) reported sharing self-caught fish outside of their family. The goal of this study was to understand fishing, consumption, and sharing practices of anglers; however, the study was not designed and did not collect the data necessary to calculate long-term fish consumption rates and was therefore not used in developing fish consumption rates for this BHHRA.

National Park Service (NPS) Survey of Potomac and Anacostia River Anglers

The Interim report *Subsistence Fishing on the Potomac and Anacostia Rivers* (NPS, 2016) summarizes a survey of anglers who fish from NPS-managed land in the DC area. The study was initiated in 2014 with identification of popular fishing spots along 47 miles of riverfront along the Potomac and Anacostia Rivers, followed by in-field angler interviews in late spring through fall of 2015. The purpose of the study was to determine the extent of non-recreational fishing, and the social, cultural, and community context of fishing in the two rivers. By design, the study targeted anglers who appeared to be harvesting for consumption and/or sharing. The sampling design is based on an availability sample versus a random sample, which limits extrapolation of study findings to the broader population of anglers fishing in the study area (NPS, 2016). The authors state that four basic questions underlie the study: Why are people fishing on the rivers and eating their catch; what motivates them to do this and what does it mean to them? Who are the anglers and fisher women doing the fishing and what are they catching? How and what kind of sharing is going on? And what is the extent of food insecurity among people who are fishing?

As stated in the NPS report:

> By using anthropological methodology and techniques, this study aims to provide a deeper understanding of the cultural communities represented by anglers, and their relation to the land and river resources. The resulting ethnographic resource study will provide (l) an ethnohistorical overview of fishing on the Potomac and Anacostia Rivers, (2) ethnographic data about contemporary anglers, and (3) an understanding about the cultural relevance of park resources to people and groups....

As such, the study focuses on the social, economic, and cultural reasons for fishing in the national park, and was not designed to collect the data necessary to estimate fish consumption rates for use in a risk assessment. Documentation of fish harvests, and plans for consumption and sharing captured through diaries or repeated intercepts with anglers, are more reliable methods of collecting data for deriving reliable estimates of long-term fish consumption rates. The initial study results are based on 35 angler interviews, the majority of which (31 of 35) were with anglers fishing on the Potomac River; only 4 of the interviewed anglers were fishing on the Anacostia River.[2] The documentation of the NPS study is limited, and the survey was designed with quantification of angler fishing and harvest as an objective. Further, the study represents the responses of a small sample size; a total of 35 anglers were interviewed, of which only 4 were intercepted on the Anacostia River. Therefore, this study was not used in developing fish consumption rates for this BHHRA.

<u>Selected Fish Consumption Rates</u>

The Chesapeake Bay angler survey was selected as the most appropriate study for use in deriving fish consumption rates for the Benning Road BHHRA. This study was selected because it followed general survey design methods, recorded 247 interviews over an 8-week period, included the Anacostia River, identified species preferences, and presented consumption frequency ranges. While the Chesapeake Bay angler survey was not conducted with the intention of collecting data for use in a BHHRA, the available data are sufficient to develop consumption estimates for DC area anglers. Since the survey was conducted during the warm weather period when fishing activity tends to be highest, angler responses regarding fishing and consuming frequency are likely to be biased upward (recall bias). As previously noted, this bias tends to result in overestimating annual consumption rates (USEPA, 2011). The angler surveys by OpinionWorks (2012) and NPS (2016) provide generally qualitative information on anglers, motivations for fishing, and general consuming and sharing practices; this information has also been considered in the development of the fish consumption exposure parameters.

For the RME scenario, a fish consumption rate of 20 grams/day was used for the adult angler. This rate equates to approximately 32 half-pound meals per year of self-caught fish, and was derived based on

[2] The authors report that a second phase of interviews is planned, with a final sample size goal of 100 interviews (NPS, 2016).

angler responses on frequency of eating their catch. The rate assumes one-half pound of self-caught fish meal per week during the six warmer months of the year (April through September) and one meal per month during the six cooler months of the year (October through March). For the CTE scenario, a fish consumption rate that is half of the RME rate (10 grams/day) was used for the adult angler. The assumption that a typical fish meal consists of a half-pound of fish is conservative, as nearly 80% of anglers reported consuming 8 ounces or less (Gibson and McClafferty, 2005).

Consumption rates for the older child/teen and young child were based on the assumption that intakes are approximately two-thirds and one-third, respectively, that of the adult. This assumption is based on the ratios of mean child-to-adult fish ingestion rates for fish consumption (USEPA, 2011). The derivation of the recreational angler consumption rates is presented in **Table C-1**. The RME and CTE fish consumption rates used in the BHHRA are shown below in units of grams per day and fish meals per year, assuming typical meal sizes of 8 ounces (227 grams) for the adult, 6 ounces (170 grams) for the older child, and 4 ounces (113 grams) for the young child.

	Fish Consumption Rates Recreational Angler			
	RME		CTE	
Angler Age Group[a]	**g/day**	**meals/year**	**g/day**	**meals/year**
Adult	20	32	10	16
Older child/teen	13	28	7	15
Young child	7	23	3	10

[a] Age groups: adult = 19+ yrs; older child/teen = 7 to <19 yrs; young child = 1 to <7 yrs.

Based on the survey results presented in Gibson and McClafferty (2005), some anglers supplement a sizeable fraction of their diet with river fish. The BHHRA includes an analysis of a high-end consuming angler who fishes year-round and consumes two fish meals per week of Anacostia River fish, as indicated below.

	Fish Consumption Rates High-end Consuming Angler	
	RME	
Angler Age Group[a]	**g/day**	**meals/year**
Adult	65	104
Older child/teen	43	69
Young child	21	33

[a] Age groups: adult = 19+ yrs; older child/teen = 7 to <19 yrs; young child = 1 to <7 yrs.

Because there is a current fish consumption advisory, it is possible that fish consumption rates would increase in the future if the advisory is lifted. Additional improvements in the river could also lead to increased fish consumption in the future. Section 7.3.2 of the main text of this BHHRA discusses uncertainties in fish consumption rates and potential future changes in the advisory or river conditions.

2.2 Fraction Ingested

The Risk Assessment Guidance for Superfund (RAGS) Part A includes the term “fraction ingested” (FI), which is defined as the “fraction ingested from contaminated source (unitless)” (USEPA, 1989a). Anglers fish at multiple locations and likely obtain catch from several locations throughout the Anacostia River and the broader DC area, including the Potomac River and upper Chesapeake Bay. The use of a FI of less than 1 translates to assuming that a portion of the angler’s self-caught fish diet comes from locations other than the Anacostia River in the vicinity of the Site. The size of the Pepco Waterside Investigation Area (approximately one-half mile of shoreline) relative to the length of the Anacostia River (approximately 8.4 miles from Bladensburg to the confluence with the Potomac River) is less than 6 percent. In addition, fish move throughout the river, with home ranges for some species of up to several miles (e.g., catfish, carp, striped bass). For the RME scenario, it was assumed that half of the fish consumed by the angler comes from the Anacostia River in the vicinity of the Site (FI = 0.5). For the CTE scenario, a FI of 0.25 was used to account for anglers who catch and eat fish from throughout the greater DC area. An FI was not applied to the high-end consuming angler scenario.

3 Soil and Fringe Sediment Ingestion Rates

While a number of studies on incidental ingestion of soil as a result of hand-to-mouth behaviors have been conducted, as summarized in USEPA guidance (2011), similar data for sediment are lacking. Incidental ingestion of sediment is generally expected to be limited since submerged sediments tend to be washed off of the exposed skin (USEPA, 2004). Since empirical, site-specific measurements of sediment ingestion are not feasible, the development of appropriate incidental sediment ingestion rates for the BHHRA entailed the use of soil ingestion rates published in USEPA guidance (USEPA, 2011, 2014).

The USEPA’s default upper-bound residential soil ingestion rates are 200 mg/day for young children (1 to <7 years of age) and 100 mg/day for adults (USEPA, 2014). These soil ingestion rates are intended to capture exposure to outdoor soil and household dust of outdoor soil origin (USEPA, 2011). The rate for the young child is based on two soil ingestion studies (Özkaynak et al., 2010; Stanek and Calabrese, 1995). The rate for the adult is based on the 1991 version of the standard default exposure factors, because USEPA (2011) does not provide upper-bound values. USEPA has adopted the upper 95th percentile soil ingestion rate from Stanek et al. (1997) as the default construction worker ingestion rate of 330 mg/day (USEPA, 2002).

Because of uncertainty in the fraction of total daily intake that is composed of fringe surface sediment versus soil, and Site versus non-Site, and also to provide a conservative, upper-bound estimate, the default values for incidental soil ingestion (USEPA, 2002, 2014) were used as the basis of the soil and fringe surface sediment ingestion rates for the BHHRA. The rates were adjusted for recreational receptors to account for the fraction of the total daily intake derived from river fringe surface sediment or Site soil relative to the fraction derived from the backyard, household dust, and other non-Site sources. It was conservatively assumed that on the days when the recreational receptor visits the River or Site, approximately 50% of the total daily intake would be derived from river fringe surface sediment or Site soil, and 50% would be from backyards, household dust, and other non-Site-related locations. The same relative source apportionment was applied to the CTE rates, which are assumed to be 50% of RME rates. For non-recreational receptors, it was assumed that 100% of the daily intake rate comes from river fringe surface sediment or Site soil. The selected fringe surface sediment and soil incidental ingestion rates for Waterside and Landside receptors are summarized below.

Waterside Receptors	USEPA Default Total Daily Soil Intake Rate		Assumed River Fringe Surface Sediment Ingestion Rate	
	RME	CTE	RME	CTE
	mg/day	mg/day	mg/day	mg/day
Angler, Swimmer, Wader (adult)	100	50	50[a]	25[a]
Angler, Swimmer, Wader (older child/teen)	100	50	50[a]	25[a]
Angler, Swimmer, Wader (young child)	200	100	100[a]	50[a]
Shoreline Worker (adult)	100	50	100	50

Notes:
[a] It is assumed that 50% of the receptor's total daily intake rate is associated with backyard soils, household dust, and other off-Site sources, which are not included in the BHHRA, and that 50% is river fringe surface sediment.

Landside Receptors	USEPA Default Total Daily Soil Intake Rate		Assumed On-Site Soil Ingestion Rate	
	RME	CTE	RME	CTE
	mg/day	mg/day	mg/day	mg/day
Construction Worker (adult)	330	330	330	330
Outdoor Industrial Worker (adult)	100	50	100	50
Recreational Visitor (older child/teen)	100	50	50[a]	25[a]

Notes:
[a] It is assumed that 50% of the receptor's total daily intake rate is associated with backyard soils, household dust, and other off-Site sources, which are not included in the BHHRA, and that 50% is Site soil.

4 Surface Water Ingestion Rate

While a number of studies on drinking water ingestion rates have been conducted, as summarized in USEPA guidance (2011), similar data for incidental surface water ingestion are generally lacking, especially for activities such as wading or boating. However, USEPA (2011) provides incidental water ingestion rates during swimming. The ingestion rates are based on a pilot study in which 53 participants (12 adults and 41 children) swam for 45 minutes in a community outdoor swimming pool treated with chloroisocyanate. Cyanuric acid in the urine of each participant was used as an indicator of pool water ingestion exposure (see the table below). The upper percentile rates are based on the 97th percentile for children and the maximum value for adults. While the use of these values from a small-scale pilot study may not be appropriate, the upper-bound values reported in USEPA (2011) were used for the RME scenario, and the mean values were used for the CTE scenario. As the CTE scenario is meant to represent average conditions, the mean values are more appropriate than the upper-bound, which reflect greater than 95th percentiles.

Age	Mean (mL/hour)	Upper Percentile (mL/hour)
Children	49	120
Adults	21	71

Estimates of incidental water ingestion that occurs during water recreational activities other than swimming are not provided in USEPA guidance. However, a study of incidental water ingestion during limited-contact recreation was identified in the peer reviewed literature (Dorevitch et al., 2011). Self-reported estimates of incidental water ingestion were obtained from approximately 2,700 people (6 years of age or older) who were canoeing, kayaking, and fishing in Chicago area surface waters. A second study evaluated 662 people in swimming pools involved in full contact (i.e., swimming) and limited contact recreational activities, such as canoeing, kayaking (including capsizing), simulated fishing, and wading/splashing. The surface water study was an observational design study with no time limit on the duration of the activity. The swimming pool study was a controlled exposure design of 60 minutes and a subsequent urine analysis 24 hours later to measure levels of cyanuric acid (a tracer of swimming pool water). Of the surface water participants, less than 2% reported swallowing a teaspoon or more, and less than 0.5% reported swallowing a mouthful or more (Dorevitch et al., 2011).

The authors report the mean and upper confidence limit for incidental surface water ingestion rates of 3 to 4 mL per event and 10 to 15 mL per event, respectively, for limited-contact recreational exposures to surface water (e.g., canoeing, kayaking, fishing) (Dorevitch et al., 2011). The midpoint of the upper confidence limit rate of 13 mL per event and the mean rate of 4 mL per event was used for the RME and CTE incidental surface water ingestion rates, respectively, for the non-swimming exposure scenarios (angler, wader, worker) and all age groups.

5 Body Surface Area Exposed

Recreational visitors, as well as industrial workers and construction workers, may come into contact with soil while on-Site. Recreational receptors may come into contact with fringe surface sediment and surface water while wading in shallow areas of the River to play or fish, or occasionally swimming in the River. The shoreline worker receptor may contact fringe surface sediment and surface water while performing maintenance or other work-related activities along the shoreline. For the evaluation of potential risk from direct contact with fringe surface sediment during swimming, wading, and angling, it is assumed that some fringe surface sediment remains adhered to the skin surface after the event.

Tables C-2 through **C-6** present the calculation of the exposed body surface areas. The same exposed skin surface areas were used in the RME and CTE scenarios.

<u>Worker Receptors</u>

For the adult outdoor industrial worker, construction worker, and shoreline worker, the head, hands, and forearms are assumed to remain in contact with soil (industrial worker, construction worker) or fringe surface sediment and surface water (shoreline worker). USEPA derived a default value of 3,527 cm^2 using the average of males and females for this body surface area (USEPA, 2014). The default value is used in this BHHRA.

<u>Recreational Visitor</u>

The older child/teen recreational visitor may come into contact with surface soil on-Site. It is assumed that the head, hands, forearms, and lower legs are potentially exposed. Based on these body parts, a mean surface area of 3,950 cm^2 was calculated in **Table C-2** for males and females age 7 to <19.

<u>Swimmer Receptor</u>

For the swimmer receptor, the entire body surface area is assumed to be exposed to surface water. The body surface areas for the swimmer, calculated using the average of males and females, are as follows (USEPA, 2011, 2014):

- Adult swimmer = 20,900 cm^2
- Older child/teen swimmer = 14,825 cm^2
- Young child swimmer = 7,500 cm^2

Table C-3 presents the calculation of the total body surface area for the young child and older child/teen swimmer. The total body surface area for the adult swimmer was taken from USEPA (2014).

For the swimmer's exposure to fringe surface sediment, not all of the body surface area is assumed to remain in contact with fringe surface sediment. Sediment from deeper water is expected to wash off of the body upon exiting the water (USEPA, 2004). For the adult and older child/teen swimmer, the lower legs and feet are assumed to remain in contact with fringe surface sediment. For the young child swimmer, more of the body surface is assumed to remain in contact with fringe surface sediment, including the hands, forearms, lower legs, and feet.

Thus, using the average of males and females and weighted averages by year for each child body part, the body surface areas exposed to fringe surface sediment are as follows for the swimmer (USEPA, 2011):

- Adult swimmer = 3,800 cm^2 (**Table C-4**)
- Older child/teen swimmer = 2,710 cm^2 (**Table C-5**)
- Young child swimmer = 2,057 cm^2 (**Table C-6**)

Wader and Angler Receptors

For the water and angler receptor's exposure to fringe surface sediment and surface water, the same body surface areas exposed to sediment for the swimmer are used.

6 Soil and Sediment Adherence Factors

To account for differences in adherence for different parts of the body, an area-weighted adherence factor is calculated using body part-specific adherence levels. For each receptor, the skin surface area of each exposed body part is multiplied by its body part-specific adherence factor to yield a total mass adhered to that body part. The total masses are then summed for all exposed body parts, and then divided by the total body surface area exposed to derive the area-weighted adherence factor.[3]

Soil

USEPA (2014) provides a default soil adherence factors for outdoor workers of 0.12 mg/m^2. USEPA (2002) provides a default soil adherence factor for construction workers of 0.3 mg/m^2. These defaults are used in this BHHRA. For the older child/teen recreational visitor to the Landside area, a soil adherence factor of 0.01 mg/m^2 was calculated based on soil loading rates for soccer players (see **Table C-2**).

[3] An implicit assumption in the dermal dose model is that exposure (and absorption of contaminants by the skin) occurs for each event in which soil/sediment contacts the exposed body surface area without regard to the duration of the exposure event. This is a conservative assumption, as desorption of contaminants from soil/sediment is a slow diffusive process driven by the magnitude of the concentration gradient between internal regions where contaminants are sequestered and the surface where a low concentration is maintained (Shor et al., 2004). Further, not all of the soil contaminant may be absorbed for various reasons, including matrix effects, volatilization, skin loading, washing, or abrasion of soil from skin, etc. (Spalt et al., 2009).

Fringe Surface Sediment

USEPA (2004,) recommends sediment adherence data for children from several studies, including children playing indoors, at daycare, in dry soil, in wet soil, in mud, on tidal flats, during gardening, and while playing soccer. The activity and conditions that most closely align with receptor activities at the River is children playing in wet soil. Therefore, the fringe surface sediment adherence factors for the older child/teen and young child were based on the geometric mean surface area weighted soil adherence data for children playing in wet soil (USEPA, 2004, Exhibit C-2). The fringe surface sediment adherence factor is 0.25 mg/m^2 for the older child/teen (see **Table C-5**) and 0.28 mg/m^2 for the young child (see **Table C-6**).

USEPA (2011) provides sediment adherence data for adults from several studies, including one of adults gathering reeds on tidal flats (‘reed gatherer’). Therefore, the fringe surface sediment adherence factors for adults were based on data for the reed gatherer (USEPA, 2011, Table 7-20). The calculated fringe surface sediment adherence factor for recreational adults and the shoreline worker is 0.3 mg/m^2 (See **Table C-4**).

7 Exposure Frequency and Exposure Time

Exposure frequency is the number of days per year that a receptor engages in a particular activity that could result in exposure. Exposure time is the duration of the event that brings the receptor into contact with the environmental medium.

Landside Exposure Pathways

An exposure frequency of 40 days per year is assumed for the construction worker, assuming 5 days per week for a period of 2 months (8 weeks) under the RME scenario. Under the CTE scenario, an exposure frequency of 20 days per year is assumed, assuming 5 days per week for one month (4 weeks).

The USEPA (2014) default for an outdoor worker of 225 days per year is used for the industrial worker under the RME scenario. Under the CTE scenario, an exposure frequency of 219 days per year is assumed based on the central tendency estimate for industrial workers in USEPA (2004).

The older child/teen recreational visitor is assumed to visit the site one day per week for May, September, and October, and two days per week for the summer, June through August (for a total of 39 days per year) under the RME scenario, and one day every other week from May to October (13 days per year) under the CTE scenario.

Waterside Exposure Pathways

Exposure frequencies and exposure times for recreational scenarios involving direct contact with fringe surface sediment and surface water were based on site-specific factors, including:

- Nature of the activity (e.g., swimming vs. wading)
- Characteristics of the area, including access and nearby land use
- Climate factors such as temperature and precipitation (e.g., sediment contact is curtailed during cold weather months when the sediment is frozen or snow covered)

Exposure to fringe surface sediment and surface water is expected to occur predominantly in the warmer months of the year, when people are more likely to visit the River and more of the skin surface area is exposed. It is assumed that swimming occurs during the three summer months (June, July, and August), when monthly average water temperatures are comfortable for swimming, typically above 70 degrees Fahrenheit (USGS, 2015). However, given the absence of designated swimming locations on the Anacostia, as well as aesthetic and safety considerations, swimming is expected to be an infrequent event now and in the future. It is assumed that wading may occur during the months of May, June, July, August, and September, when monthly average water temperatures are above 60 to 65 degrees Fahrenheit (USGS, 2015). While some anglers may fish year-round, most fishing takes place during the months of April through September (Gibson and McClafferty, 2005). It is assumed that the shoreline worker may contact shoreline fringe surface sediment and surface water once a week when the ground is not frozen or snow covered, or when such activity is not precluded by inclement weather.

Based on consideration of climate, characteristics of the Study Area, and the nature of the activity, the fringe surface sediment and surface water exposure frequencies for each receptor scenario are summarized below. The exposure frequency is assumed to be once or twice a week during the months of the year when the activity is assumed to take place. For the swimmer and wader receptors, exposure frequencies for the older child/teen are higher than for the young child and adult, as older children are more likely to engage in activities that may bring them into direct contact with river fringe surface sediment and surface water.

Receptor Population	Age Group[a]	Fringe Surface Sediment Exposure Frequency (days/year)		Surface Water Exposure Frequency (days/year)	
		RME	CTE	RME	CTE
Angler	Adult	26	13	26	13
	Older child/teen	26	13	26	13
	Young child	26	13	26	13
Swimmer	Adult	13	6	13	6
	Older child/teen	26	13	26	13
	Young child	13	6	13	6
Wader	Adult	35	17	35	17
	Older child/teen	43	22	43	22
	Young child	35	17	35	17
Worker	Adult	50	25	50	25

[a] Age groups: adult = 19+ yrs; older child/teen = 7 to <19 yrs; young child = 1 to <7 yrs.

The surface water and sediment exposure frequencies presented above were developed taking into consideration the existing parks, walking trails, boat docks, and fishing activity within the Waterside Investigation Area, as well as potential improvements in these resources. However, it is possible that River use could increase at a rate higher than assumed. Section 7.3 of the main text of this BHHRA discusses uncertainties associated with the assumed exposure frequencies.

The surface water exposure times for each receptor scenario were also selected taking into consideration the characteristics of the Study Area and the nature of the activity. As previously noted, exposure time is not used in the calculation of intake from fringe surface sediment dermal contact. The surface water exposure times are summarized in the table below.

Receptor Population	Age Group[a]	Surface Water Exposure Time (hour/day)	
		RME	CTE
Angler	Adult	1	0.5
	Older child/teen	1	0.5
	Young child	1	0.5
Swimmer	Adult	0.5	0.25
	Older child/teen	0.5	0.25
	Young child	0.5	0.25
Wader	Adult	1	0.5
	Older child/teen	1	0.5
	Young child	1	0.5
Worker	Adult	2	1

[a] Age groups: adult = 19+ yrs; older child/teen = 7 to <19 yrs; young child = 1 to <7 yrs.

8 Exposure Duration

Exposure duration is the estimate of the total time of exposure (in years) that a receptor engages in a particular activity that could result in exposure.

The older child/teen recreational visitor, angler, wader, and swimmer receptors are assumed to be potentially exposed at the Site for 12 years (from age 7 to <19 years) under the RME scenario. Under the CTE scenario, these receptors are assumed to be potentially exposed at the Site for half of that time, 6 years.

The outdoor industrial worker and the shoreline worker are assumed to be exposed at the Site for 25 years under the RME scenario (USEPA, 2014). Under the CTE scenario, workers are assumed to be potentially exposed at the Site for 6.6 years, which is the median tenure for workers at the same job (USEPA, 2011).

Construction activities are assumed to occur over a 1-year period under both the RME and CTE scenarios.

Anglers, swimmers, and waders are assumed to be nearby residents, and as such, residential exposure durations are used to evaluate adults and young children. To estimate residential exposure duration, both the total occupancy period for individuals in the target population and the likelihood that at the end of each occupancy period the individual moves out of the area must be known. Estimating exposure duration (i.e., residence time) is complicated by a number of factors, including data availability and the statistical treatment of the data. Few studies are available with which to estimate population mobility within a targeted area, and the use of county data requires a detailed analysis that accounts for age at onset, mortality, and county-to-county mobility.

In USEPA’s 2014 recommended default exposure factors, USEPA identifies 26 years as the upper bound default for residential exposure duration (USEPA, 2014). Therefore, under the RME scenario, a 26-year exposure duration was selected for the recreational receptors (6 years during childhood and 20 years during adulthood), assuming that these individuals live within the vicinity of the Site. Under the CTE scenario, an exposure duration of 12 years (2 years during childhood and 10 during adulthood) was selected based on the mean residential occupancy period (USEPA, 2011).

9 Body Weight

In accordance with USEPA (1989a), the value for body weight is the average body weight over the exposure period. There are extensive data on human body weight, much of which has been compiled in the Exposure Factors Handbook (EFH) (USEPA, 2011). The EFH provides recommended body weights for adults and children, which are based on data derived from the National Health and Nutrition Examination Survey (NHANES) for the years 1999 through 2006. The NHANES study is a nationally representative sample of the U.S. population, with participants selected using a probability-based sampling design, and has been continuously conducted since 1999. Since the 2011 update to EFH, more recent anthropometric reference data for U.S. children and adults collected under NHANES for the years 2007 through 2010 have been published by the National Center for Health Statistics (Fryar et al., 2012).[4] Not only are these data more recent, they are provided for each year of a child’s age from birth to 19 years, unlike the body weight data in EFH, which are weighted averages for multi-year age groups (e.g., 3 to <6 yrs, 6 to <11 yrs). The use of single-year body weight data rather than averages for multiple years of age allows for calculation of age group-specific body weights on a more refined basis. Therefore, the NHANES 2007–2010 body weight data (Fryar et al., 2012) were used to estimate body weight for the young child and older child. Consistent with the approach in EFH, the average of the body weights for males and females for each year of age was used to calculate the average receptor body weight over the exposure period.

[4] The NHANES 2007–2010 sample included participants of all ages. Those aged 60 and over, Hispanics, Blacks, and those with low incomes were oversampled to improve the precision of the statistical estimates for these groups (Fryar et al., 2012).

National values are typically used, unless a specific population that differs from the nation as a whole is targeted. Since the receptor population in the vicinity of the Anacostia River is not expected to differ from the rest of the United States, national average body weight values were used.

Body weights for children and teenagers were calculated as shown in **Table C-7.** The selected body weight for the young child receptor is 17 kilograms (kg) for both the RME and CTE scenarios, and the selected body weight for the older child/teen receptor is 53 kg for both the RME and CTE scenarios. The selected body weight for adult receptors under both the RME and CTE scenarios is 80 kg, which is the national average for male and female adults (USEPA, 2011, 2014).

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Table C-1
Calculation of Fish Consumption Rates for Recreational Angler Receptor (a)
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Reasonable Maximum Exposure (RME)

Time period	**Apr-Sept**	
number months	6	
weeks/month	4.3	
total weeks	26	
meals/week	1.0	
total meals (Apr-Sept)	*26*	
Time period	**Oct-Mar**	
number months	6	
meals/month	1.0	
total meals (Oct-Mar)	*6*	
Total year-round meals	***32***	
Meal size (grams)	***227***	(b)
Grams/day (annualized)	***20***	(c)

RME Adult Angler (g/day)	20	
RME Older Child/Teen Angler (g/day)	13	(e)
RME Young Child (g/day)	7	(e)

Central Tendency Exposure (CTE)

Time period	**Apr-Sept**	
number months	6	
weeks/month	4.3	
total weeks	26	
meals/week	0.5	
total meals (Apr-Sept)	*13*	
Time period	**Oct-Mar**	
number months	6	
meals/month	0.5	
total meals (Oct-Mar)	*3*	
Total year-round meals	***16***	
Meal size (grams)	***227***	(b)
Grams/day (annualized)	***10***	(d)

CTE Adult Angler (g/day)	10	
CTE Older Child/Teen Angler (g/day)	7	(e)
CTE Young Child (g/day)	3	(e)

Notes:
(a) Rates are based on responses of Washington DC area anglers that participated in 2004 Chesapeake Bay Angler Survey (Gibson & McClafferty, 2005). During warmer weather months (Apr-Sept), 53% of consuming anglers reported eating their catch 1 to 3 times/month, and 20% reported eating their catch 1-2 times/week. On average throughout the year, anglers ate their catch less than once per month (44%) or between one and three times per month (29%). Additional support obtained from Anacostia River Angler Survey (OpinionWorks, 2012).
(b) Meal size assumed to be 8 ounces (227 grams). Most anglers (78%) reported eating 8 ounces or less at a meal. In addition, an 8-ounce serving size is used to set fish consumption advisories.
(c) RME adult rate assumes one meal/week during 6 warmer months of the year (Apr-Sept) and 1 meal/month during 6 cooler months of the year (Oct-Mar) for a total of 32 meals/year (expressed in grams/day averaged over 365 days/year). RME rate equates to catching ~53 pounds of whole fish per year assuming ~30% is edible (USEPA, 1989).
(d) CTE adult rate assumes one meal every other week during 6 warmer months of the year (Apr-Sept) and 1 meal every other month during 6 cooler months of the year (Oct-Mar) for a total of 16 meals/year (expressed in grams/day averaged over 365 days). CTE rate equates to catching ~27 pounds of whole fish per year assuming ~30% is edible (USEPA, 1989).
(e) Consumption rates for older child and young child are assumed to be two thirds and one third of adult rate, respectively (USEPA, 2011). Rates are rounded to integers.

Table C-2
Calculation of Body Surface Area Exposed to Soil and Adherence Factor for Older Child/Teen Recreational Visitor
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Older Child/Teenager (7 to <19 years, from 7th birthday to the day before 19th birthday)									
Mean Surface Area by Body Part, m² (EFH, Table 7-2, USEPA, 2011)									
Age	legs	lower legs (a)		head	hands	arms	forearms	
7<8 (data 6<11)	0.311	0.124	(b)	0.066	0.051	0.151	0.059	(e)
8<9 (data 6<11)	0.311	0.124	(b)	0.066	0.051	0.151	0.059	(e)
9<10 (data 6<11)	0.311	0.124	(b)	0.066	0.051	0.151	0.059	(e)
10<11 (data 6<11)	0.311	0.124	(b)	0.066	0.051	0.151	0.059	(e)
11<12 (data 11<16)	0.483	0.193	(c)	0.073	0.072	0.227	0.086	(e)
12<13 (data 11<16)	0.483	0.193	(c)	0.073	0.072	0.227	0.086	(e)
13<14 (data 11<16)	0.483	0.193	(c)	0.073	0.072	0.227	0.086	(e)
14<15 (data 11<16)	0.483	0.193	(c)	0.073	0.072	0.227	0.086	(e)
15<16 (data 11<16)	0.483	0.193	(c)	0.073	0.072	0.227	0.086	(e)
16<17 (data 16<21)	0.543	0.212	(d)	0.075	0.083	0.269	0.102	(g)
17<18 (data 16<21)	0.543	0.212	(d)	0.075	0.083	0.269	0.102	(g)
18<19 (data 16<21)	0.543	0.212	(d)	0.075	0.083	0.269	0.102	(g)
Average (cm²)	**4,407**	**1,749**		**712**	**678**	**2,122**	**811**	
Head, hands,forearms, and lower legs	**3,950**	**Older Child/Teen**						

Body Part	Older Child/Teenager (7 to <19 years) Body Surface Area (see above) (cm²)	Soil Loading Rate Soccer Players No. 1 (h) (mg/cm²)	Total Soil Mass (mg)
Head	712	0.012	9
Hands	678	0.108	73
Forearms	811	0.011	9
Lower Legs	1,749	0.031	54
Total	3,950	–	54
Area-Weighted Adherence Factor (mg/cm²) = Soil mass/Surface area =			**0.01**

Notes:
EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).
(a) Lower leg surface area = leg surface area x average of the ratios of the lower leg to the leg (EFH Table 7-8), average of male and female, consistent with methods used in USEPA, 2014.
(b) Ratios of the lower leg to the leg for the 6, 8 and 10 year-olds (0.4) (Table 7-8).
(c) Ratio of the lower leg to the leg for the 12 and 14 year-olds (0.4) (Table 7-8).
(d) Ratios of the lower leg to the leg for the 16 and 18 year-olds (0.39) (Table 7-8).
(e) Surface area for the arm x average of the ratios of the forearm to the arm for 6, 8 and 10 year-olds (0.39) (EFH Table 7-8).
(f) Surface area for the arm x average of the ratios of the forearm to the arm for 12 and 14 year-olds (0.38) (EFH Table 7-8).
(g) Surface area for the arm x average of the ratios of the forearm to the arm for 16 and 18 year-olds (0.38) (EFH Table 7-8).
(h) Data from USEPA (2004; Exhibit C-2, 2011; Table 7-4). Geometric mean of soccer kids number 1 (ages 13 and 14; soccer players number 2 and 3 are adults).

Table C-3
Calculation of Body Surface Area Exposed to Surface Water while Swimming for Young Child and Older Child/Teen Swimmers
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Young Child (1 to <7 years, from 1st birthday to the day before 7th birthday)	
Age	**Mean Surface Area (m^2) (EFH, Table 7-9)**
1<2	0.53
2<3	0.61
3<4 (data 3<6)	0.76
4<5 (data 3<6)	0.76
5<6 (data 3<6)	0.76
6<7 (data 6<11)	1.08
Average (cm^2)	**7,500**

Older Child/Teenager (7 to <19 years, from 7th birthday to the day before 19th birthday)	
Age	**Mean Surface Area (m^2) (EFH, Table 7-9)**
7<8 (data 6<11)	1.08
8<9 (data 6<11)	1.08
9<10 (data 6<11)	1.08
10<11 (data 6<11)	1.08
11<12 (data 11<16)	1.59
12<13 (data 11<16)	1.59
13<14 (data 11<16)	1.59
14<15 (data 11<16)	1.59
15<16 (data 11<16)	1.59
16<17 (data 16<21)	1.84
17<18 (data 16<21)	1.84
18<19 (data 16<21)	1.84
Average (cm^2)	**14,825**

Notes:
EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).
Source:
USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

Table C-4
Calculation of Body Surface Area Exposed to Fringe Surface Sediment and Adherence Factor for Adult Waterside Receptors
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Body Part	Mean Body Surface Area for Adult EFH Tables 7-12 and 7-13 (USEPA 2011) Male m^2	Female m^2		Average of Males and Females cm^2
Head	0.136	0.114		1,250
Upper extremities				
Arms	0.314	0.237		2,755
Upper arms	0.172	0.13035	(a)	1,512
Forearms	0.148	0.11139	(a)	1,297
Hands	0.107	0.089		980
Lower extremities				
Legs	0.682	0.598		6,400
Lower legs	0.268	0.233		2,505
Feet	0.137	0.122		1,295
	Adult Body Surface Area Exposed to Fringe Surface Sediment (cm^2)			
	swimmer, wader, angler	**lower legs, feet**	**=**	**3,800**
	worker	**hands, forearms, head**	**=**	**3,527**

Body Part	Adult (>18 yrs) swimmer, wader, angler — Body Surface Area Exposed to Sediment (cm^2)	Soil Loading Rate Reed Gatherer (b) (mg/cm^2)	Total Soil Mass (mg)
Lower Legs	2,505	0.16	401
Feet	1,295	0.63	816
Total	3,800	–	1,217
Area-Weighted Adherence Factor (mg/cm^2) = Soil mass/Surface area =			**0.3**

Body Part	Adult (>18 yrs) worker — Body Surface Area Exposed to Sediment and Bank Soil (cm^2)	Soil Loading Rate Reed Gatherer (b) (mg/cm^2)		Total Soil Mass (mg)
Head	1,250	0.197	(c)	246
Hands	980	0.66		647
Forearms	1,297	0.036		47
Total	3,527	–		893
Area-Weighted Adherence Factor (mg/cm^2) = Soil mass/Surface area =				**0.3**

Notes:
EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).
(a) In accordance with USEPA 2014 OSWER Directive on Recommended Default Exposure Factors (USEPA, 2014), the female forearms and upper arms surface areas were calculated as follows:
Female arms [0.237] x (Male forearm/Male arms) [0.47]
Female arms [0.237] x (Male upper arms/Male arms) [0.55]
(b) - Data from USEPA (2011) Table 7-20. Geometric mean of values for reed gatherers.
(c) - Adherence factor for face based on gardeners due to lack of face adherence data for reed gatherers.

Sources:
USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120.

Table C-5
Calculation of Body Surface Area Exposed to Fringe Surface Sediment and Adherence Factor
for Older Child/Teen Waterside Receptors
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Older Child/Teenager (7 to <19 years, from 7th birthday to the day before 19th birthday)				
Mean Surface Area by Body Part, m^2 (EFH, Table 7-2, USEPA, 2011)				
Age	legs	lower legs (a)		feet
7<8 (data 6<11)	0.311	0.124	(b)	0.073
8<9 (data 6<11)	0.311	0.124	(b)	0.073
9<10 (data 6<11)	0.311	0.124	(b)	0.073
10<11 (data 6<11)	0.311	0.124	(b)	0.073
11<12 (data 11<16)	0.483	0.193	(c)	0.105
12<13 (data 11<16)	0.483	0.193	(c)	0.105
13<14 (data 11<16)	0.483	0.193	(c)	0.105
14<15 (data 11<16)	0.483	0.193	(c)	0.105
15<16 (data 11<16)	0.483	0.193	(c)	0.105
16<17 (data 16<21)	0.543	0.212	(d)	0.112
17<18 (data 16<21)	0.543	0.212	(d)	0.112
18<19 (data 16<21)	0.543	0.212	(d)	0.112
Average (cm^2)	**4,407**	**1,749**		**961**
Lower legs and feet (cm^2)	**2,710**	**Older Child/Teen**		

Body Part	**Older Child/Teenager (7 to <19 years)** **Body Surface Area (see above) (cm^2)**	**Soil Loading Rate (e) (mg/cm^2)**		**Total Soil Mass (mg)**
Lower Legs	1,749	0.026		45
Feet	961	0.656	(f)	630
Total	2,710	–		676
Area-Weighted Adherence Factor (mg/cm^2) = Soil mass/Surface area =				**0.25**

Notes:
EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).
(a) Lower leg surface area = leg surface area x average of the ratios of the lower leg to the leg (EFH Table 7-8), average of male and female, consistent with methods used in USEPA, 2014.
(b) Ratios of the lower leg to the leg for the 6, 8 and 10 year-olds (0.4) (Table 7-8).
(c) Ratio of the lower leg to the leg for the 12 and 14 year-olds (0.4) (Table 7-8).
(d) Ratios of the lower leg to the leg for the 16 and 18 year-olds (0.39) (Table 7-8).
(e) Data from USEPA (2004, Exhibit C-2). Geometric mean value, children playing in wet soil.
(f) Data for feet are not available. Therefore, hand data are used as a proxy.

Sources:
USEPA, 2004. Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment Final. EPA/540/R/99/005.
USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.
USEPA, 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120.

Table C-6
Calculation of Body Surface Area Exposed to Fringe Surface Sediment and Adherence Factor for Young Child Waterside Receptors
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Young Child (1 to <7 years, from 1st birthday to the day before 7th birthday)								
Mean Surface Area by Body Part, m^2 (EFH, Table 7-2)								
Age	hands	arms	forearms		legs	lower legs		feet
1<2	0.030	0.069	0.028	(b)	0.122	0.051	(e)	0.033
2<3	0.028	0.088	0.035	(b)	0.154	0.065	(e)	0.038
3<4 (data 3<6)	0.037	0.106	0.042	(c)	0.195	0.078	(f)	0.049
4<5 (data 3<6)	0.037	0.106	0.042	(c)	0.195	0.078	(f)	0.049
5<6 (data 3<6)	0.037	0.106	0.042	(c)	0.195	0.078	(g)	0.049
6<7 (data 6<11)	0.051	0.151	0.059	(d)	0.311	0.124	(g)	0.073
Average (cm^2)	**367**	**1,043**	**415**		**1,953**	**791**		**485**
hands, forearms, lower legs, feet (cm^2) =	**2,057**	**Young Child**						

Body Part	**Young Child (Age 1 to <7 Years)** **Body Surface Area (see above) (cm^2)**	**Soil Loading Rate (h) (mg/cm^2)**		**Total Soil Mass (mg)**
Hands	367	0.656		241
Forearms	415	0.015		6
Lower Legs	791	0.026		21
Feet	485	0.656	(i)	318
Total	2,057	–		585
Area-Weighted Adherence Factor (mg/cm^2) = Soil mass/Surface area =				**0.28**

Notes:

EFH - 2011 Edition of the Exposure Factors Handbook (USEPA, 2011).

(a) Lower leg surface area = leg surface area x average of the ratios of the lower leg to the leg
Forearm surface area = arm surface area x ratio of the forearm to the arm
(EFH Table 7-8), average of male and female, consistent with methods used in USEPA, 2014.

(b) Ratio of the forearm to the arm for the 2-year old, average of male and female (0.4) (EFH Table 7-8).

(c) Ratio of the forearm to the arm for the 4-year old, average of male and female (0.4) (EFH Table 7-8).

(d) Ratio of the forearm to the arm for 6, 8 and 10 year-olds (0.39) (EFH Table 7-8).

(e) Ratio of the lower leg to the leg for the 2-year old, average of male and female (0.42) (EFH Table 7-8).

(f) Ratio of the lower leg to the leg for the 4-year old, average of male and female (0.4) (EFH Table 7-8).

(g) Ratio of the lower leg to the leg for the 6, 8 and 10 year-olds (0.4) (EFH Table 7-8).

(h) Data from USEPA (2004, Exhibit C-2). Geometric mean value, children playing in wet soil.

(i) Data for feet are not available. Therefore, hand data are used as a proxy.

Sources:

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

USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

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

Table C-7
Calculation of Body Weights for Young Child and Older Child/Teen Receptors
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Age	Body Weight (kilograms)
1<2 yr	11.1
2<3 yr	13.7
3<4 yr	16
4<5 yr	18.1
5<6 yr	21.2
6<7 yr	24
Average Young Child, age 1 to <7 years	**17**

Age	Body Weight (kilograms)
7<8	26.8
8<9	31.6
9<10	36.1
10<11	40.6
11<12	47.1
12<13	51.9
13<14	58
14<15	62.8
15<16	66.7
16<17	68.8
17<18	70.6
18<19	73.4
Average Older Child/Teen (7 to <19 years)	**53**

Source:
Fryar, C.D., Q. Gu, and C.L. Ogden. 2012. Anthropometric reference data for children and adults: United States, 2007-2010. National Center for Health Statistics. Vital Health Stat 11(252).

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Attachment D

Derivation of Cooking Loss Factors

Attachment D
Derivation of Cooking Loss Factors

Loss of hydrophobic chemicals of potential concern (COPCs) upon cooking is a recognized phenomenon and can have a significant effect on the calculated COPC exposure dose from tissue consumption by humans. Numerous published studies have evaluated contaminant loss from fish tissue as a result of cooking, many of which have been summarized in scientific literature reviews (Sherer and Price, 1993; Wilson et al., 1998; Zabik and Zabik, 1999), as well as agency guidance on assessing contaminants in fish consumption advisories (USEPA, 2000).

The goals of the evaluation are as follows:

- Perform an updated literature review to include more recent studies on cooking loss in fish, focusing on lipophilic organic chemicals
- Evaluate relevant data on a consistent basis that accounts for changes in tissue mass as a result of cooking processes; this is most commonly done by considering the mass of COPC in the edible tissue before and after cooking
- Identify studies with sufficient data for quantitative analysis to determine the range and midpoint on a chemical- and cooking method-specific basis
- Evaluate the importance of other specific factors influencing the extent of cooking losses, such as species, skin-on versus skin-off preparation, lipid content, and cooking duration and temperature
- Identify cooking loss factors for use in the baseline human health risk assessment (BHHRA) for the Pepco Benning Road Facility for both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios

A total of 34 relevant studies were identified, as summarized in **Table D-1**. Of the 34 relevant studies identified, 29 address polychlorinated biphenyls (PCBs) as mixtures or Aroclors, two address coplanar or so-called “dioxin-like” PCB congeners, 13 address one or more dichlorodiphenyltrichloroethane and its derivatives (DDx), and nine address one or more dioxin and furan congeners. The studies address a variety of fish species, including striped bass, carp, trout, bass, catfish, perch, flounder, salmon, walleye, and bluefish. A variety of cooking methods are represented, including baking/roasting, broiling, grilling, boiling, poaching, pan frying, deep frying, microwaving, and smoking. Four of the 34 studies are review articles; where possible, the original studies and data were used in this evaluation. The full list of studies reviewed is presented in the references. A number of other studies related to cooking loss in other foodstuffs, such as beef, and other contaminants, such as inorganics, were also identified. However, because this analysis focuses on lipophilic organic compounds and fish, they are not included.

The pool of studies was narrowed to 17 that used a relevant and appropriate experimental method and presented changes in raw and cooked fish tissue COPC levels on a mass basis or provided sufficient data for calculating mass loss of COPCs (see **Table D-2**). Comparison of concentrations in raw and cooked fish alone neglects the change in tissue mass that occurs, which is often significant. Therefore, this evaluation addresses the change in COPC levels on a consistent, mass basis. The percentage of COPC mass lost during cooking was calculated as follows:

$$\frac{\text{COPC mass in uncooked fillet} - \text{COPC mass in cooked fillet}}{\text{COPC mass in uncooked fillet}} \times 100$$

For studies that did not report loss on this basis, but provided the necessary data (e.g., pre- and post-cooking tissue concentrations and weights, or weight loss factor), it was possible to calculate loss on a mass basis from the data provided.

The mass-based method of quantifying cooking loss is consistent with numerous studies, including those of Zabik and colleagues (1979, 1995a,b,c, 1996), Stachiw et al. (1988), Sherer and Price (1993), Moya et al. (1998), Wilson et al. (1998), and Wang and Harrad (2000). It is also the approach used in the PCB cooking loss analysis for the Hudson River HHRA. For one study (Smith et al. 1973), it was necessary to calculate mass loss differently due to the type of data provided. For Smith et al. (1973), mass loss was calculated following the method described in Sherer and Price (1993), as follows:

$$\frac{\text{Mass of COPC in drippings}}{\text{COPC mass in cooked fillet} + \text{COPC mass in drippings}} \times 100$$

The mass of COPC in drippings and cooked fillet was calculated as:

$$M_{COPC} = C_{COPC} \times F \times M_r$$

Where:

M_{COPC} = Mass of COPC in fillet or drippings in µg
C_{COPC} = Concentration of COPC in µg/g fat in fillet or drippings
F = Percentage of fat in fillet or drippings
M_r = Mass of fillet or drippings in g

Studies that reported results solely on a toxicity equivalence (TEQ) basis were not included because actual changes in mass are obscured by weighting of individual congener results on the basis of toxicity.

For each study, **Table D-2** presents the reported or calculated percent mass loss values for three key COPCs (PCBs, DDx compounds, and dioxins and furans) by each of seven cooking methods with available data: 1) deep fry, 2) pan fry, 3) bake/roast, 4) broil/grill, 5) boil/poach, 6) microwave, and 7) smoke. The bake and roast cooking methods were considered sufficiently similar to be grouped for the purposes of this analysis, as were broil and grill (including charbroil), and boil and poach. The cooking methods with the most data points are broil/grill, bake/roast, pan fry, and deep fry. When all cooking methods are combined, the number of data points identified for each of the three COPCs is as follows: PCBs n = 79, dioxins and furans n = 12, and DDx n = 70. **Table D-3** presents mass loss results by cooking method for the three COPCs, as well as summary statistics and percentiles.

Analysis of Outliers and Extreme Values

An analysis was performed on the three combined cooking method data sets to determine if any individual data points may be statistical outliers or extreme values. Outliers and extreme values were defined using the Interquartile Range (IQR), which is equal to the difference between the 75th and 25th percentiles of the dataset. The IQR approach to the determination of outliers and extreme values has been referred to in the U.S. Environmental Protection Agency's (USEPA's) *Data Quality Assessment: Statistical Methods for Practitioners* (2006). Outliers and extreme values were defined as follows:

- Outliers: Those values that were less than (25^{th} percentile – 1.5 x IQR) or greater than (75^{th} percentile + 1.5 x IQR)
- Extreme values: Those values that were less than (25^{th} percentile – 3 x IQR) or greater than (75^{th} percentile + 3 x IQR)

The results of the outlier and extreme value evaluation are also presented in **Table D-3**. For each COPC dataset, those values determined to be outliers are highlighted yellow and those values determined to be extreme values are highlighted red. One value of 100% loss of dioxin following smoking (Zabik and Zabik 1995c) was identified as an extreme value. Two negative values for PCBs and five high end values for DDx compounds were identified as outliers. **Figure D-1** presents box and whisker plots with the outliers and extreme value identified by yellow and red dots, respectively.

Summary statistics and percentiles were calculated with and without the extreme values and outliers. As shown in **Table D-4**, midpoint values change only slightly when the extreme value and outliers are removed. **Figure D-2** presents the range and median cooking loss value by cooking method for each of the three COPCs (all values are included in **Figure D-2** with the exception of the extreme value of 100% loss of dioxin for smoking).

General observations include the following:

- Even when expressed on a consistent mass-loss basis, results are variable, with percent loss values ranging as high as 70 to 80% and as low as zero for the same COPC and cooking method
- For the study that reported an increase in mass after baking and broiling (Moya et al., 1998), the observations generally coincide with low initial COPC concentrations, and are likely an artifact of measurement error rather than a true net gain in COPC mass
- Median losses are generally in the range of 20 to 50% for typical cooking methods (i.e., pan frying, baking, broiling, deep frying), and consistent differences in mass loss between cooking methods are not apparent

- Based on the observation that the cooking loss results for each of the three categories of COPCs all fall into the same wide range, the case could be made for combining all studies into a single category of lipophilic organochlorinated compounds and assigning one cooking loss factor to the entire set of compounds
- Two studies examined the cooking loss of polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) and coplanar PCB congeners in the same samples of fish under the same experimental protocols (Hori et al., 2005; Schecter et al., 1998). In each of these studies, the cooking losses of the PCDDs, PCDFs, and coplanar PCBs were nearly the same. Hence, the data indicate that these congeners comprise a group of compounds that should be assigned the same cooking loss factor.
- In keeping with USEPA's approach of differentiating cooking losses between COPC classes, a similar approach was taken here, and median and mean cooking loss values were computed for the three COPC classes
- Combining results for each COPC across all cooking methods and all data, the median (and mean) losses are: 30% (32%) for total PCBs; 50% (53%) for dioxins, furans, and coplanar PCBs; and 32% (34%) for DDx
- When statistical outliers and extreme values are removed, the median (and mean) losses change minimally: 30% (33%) for total PCBs; 48% (48%) for dioxins, furans, and coplanar PCBs; and 31% (31%) for DDx

There are a number of potential causes for the variability observed in the data, including differences in the specifics of the cooking methods (e.g., time, temperature), differences in fillet processing (e.g., trimming and thickness, part of body) and fillet geometry, variability in COPC concentrations between fish used within the same study, low initial COPC concentrations for some studies (e.g., less than 10-fold margin between concentration and the limit of detection [LOD]), and differences in extraction methods for raw and cooked tissue.

Another observation based on a review of the available data is that initial COPC concentration in the fish tissue does not appear to be a controlling factor when losses are reported on a mass basis. A relationship between skin removal or retention and cooking loss is not consistently apparent, although some studies did find greater loss with skin removal (Bayen et al., 2005; Salama et al., 1998; Zabik et al., 1979). Some studies suggest that higher internal temperatures and longer cooking times result in higher losses (Stachiw et al., 1998; Zabik et al., 1982). Lastly, while some data support a correlation between lipid loss and COPC loss during cooking (e.g., Bayen et al., 2005), analysis by others suggests that a loss of lipid is not consistently correlated with COPC loss (Wilson et al., 1998; Moya et al., 1998; Poston et al., 1995). In the analysis of PCB cooking loss studies conducted for the Hudson River HHRA, similar observations were reported (TAMS/Gradient 2000).

Combining data from various studies does involve several implicit assumptions:

- Behavior and analytical results for the different COPCs are sufficiently similar that data aggregation is legitimate (which is consistent with USEPA's approach)
- Two studies (Hori et al., 2005 and Schecter et al., 1998) provide evidence that cooking loss for dioxin-like PCB congeners may be more similar to that of PCDD/PCDF congeners than non-dioxin-like PCB congeners (see PCB values identified with an asterisk in **Table D-3**)
- Details of the preparation and cooking methods, such as the internal temperature, cooking time, tissue size, and geometry, are not critical
- Differences between fish species and lipid contents are not significant

While these assumptions introduce uncertainty, the available data are too limited for segregation and analysis of each these variables.

Summary

An updated review of the scientific literature identified 17 studies with relevant and appropriate data for quantifying the change in COPC mass in fish tissue as a result of cooking by several methods (deep fry, pan fry, bake/roast, broil/grill, boil/poach, microwave, and smoke). The studies address a variety of fish species, including striped bass, carp, trout, bass, catfish, perch, flounder, salmon, walleye, and bluefish. For the three COPCs included in the analysis (PCBs, dioxins and furans, and DDx compounds), a total of 79 data points were identified for PCB compounds (Aroclor and congener data), 70 data points were identified for DDx compounds, and 12 data points were identified for dioxin and furan compounds (PCDDs and PCDFs).

For each COPC, mass loss was demonstrated regardless of the cooking method used.[1] The amount of COPC mass loss was variable within and between studies, which is likely due to a variety of factors, such as cooking time, temperature, tissue preparation (skinning and trimming), fillet geometry, lipid content, initial chemical concentration, analytical methodology, and extraction efficiency, which are not consistently controlled for across the various studies. Despite the variability, the data are sufficiently consistent and robust to support inclusion of a quantitative cooking loss factor in the assessment of exposure dosage from consumption of fish. Because of the variability in the data, the median may be the most appropriate statistic for quantifying cooking loss, because it is the least affected by outliers and extreme values. As noted below, the essential approach used in the data reduction and selection is very similar to that used by USEPA in their derivation of cooking loss factors.

Based on analysis of the available data, estimates of cooking loss for each COPC are as follows:

- **For total PCB mixtures**, cooking loss ranged from no loss to 74% loss across the 14 studies with relevant data. Median losses by cooking method ranged from 25% (bake/roast) to 39% (smoke), with a median of 30% when all PCB data are combined regardless of cooking method.

[1] One study (Moya et al., 1998) did not show consistent PCB mass loss following baking and broiling of flounder; however, these results may be an artifact of highly variable initial PCB concentrations. Some studies have also speculated that negative values may be an artifact of incomplete COPC extraction from the raw tissue (Zabik et al., 1982; Sherer and Price, 1993).

- **For dioxins, furans, and coplanar PCBs**, cooking loss ranged from 28% to 63% across the four studies with relevant data. Median losses by cooking method ranged from 29% (boil/poach) to 57% (bake/roast), with a median of 48% when all dioxin and furan data (except the extreme value of 100%) are combined regardless of cooking method. Combining all dioxin, furan, and dioxin-like PCB congener data also results in a median of 48%.

- **For DDx,** cooking loss ranged from 3% to 80% across the 10 studies with relevant data. Median losses by cooking method ranged from 22% (boil/poach) to 45% (smoke), with a median of 32% when all DDx data are combined regardless of cooking method.

This analysis is consistent with how this issue has been evaluated in the past, both by USEPA and others (Bayen et al., 2005; Moya et al., 1998; Salama et al., 1998; Wilson et al., 1998; Sherer and Price, 1993; and Zabik and colleagues [1979, 1995a,b, 1996]). Additionally, the analysis reflects an updated data set, including several studies published since the USEPA's analysis for the Hudson River HHRA and the agency's fish consumption advisory guidance (USEPA, 2000).

Based on this updated analysis, the following cooking loss factors are supported for use in the BHHRA:

COPC	Cooking Loss Factor	
	10^{th} Percentile RME	Median CTE
Total PCBs	0.13	0.30
Dioxins, furans, and coplanar PCBs	0.29	0.48
DDx	0.10	0.32

The summary statistics for the full datasets were used because of the similarity of the statistics with and without outliers and extreme values. The exception to this is that the value of 100% for dioxins and furans was removed. For dioxin-like PCB congeners, available data support the use of the same cooking loss factor as that used for dioxins and furans. This consistency also makes sense when risks are assessed on the basis of a dioxin TEQ approach. While several of the pesticides included in the BHHRA (e.g., chlordane and it's isomers, dieldrin and hexachlorobenzene) were not specifically included in this analysis, it is expected that median cooking loss factors for other pesticides are in the same range as DDx (30% to 35%) based on studies where pesticides other than DDx have been evaluated (e.g., Zabik et al., 1995a,b, 1996).

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Table D-1
Overview of Cooking Loss Studies
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Study	Chemical(s) evaluated	Species	Source of fish	Cooking method(s)	Was study method appropriate?	Do authors report loss on mass basis?	Was a quantitative estimate of mass loss possible?	Was study used in mass loss calculations?
Armbruster et al. 1987	PCBs	Striped bass	Long Island Sound	Bake, broil, pan-fry, poach, microwave, boil	Yes	No, concentrations before and after cooking reported on dry weight basis	No, data needed to convert results to mass basis not provided	No, but authors report a statistically significant reduction in concentration for 6 cooking methods combined
Armbruster et al. 1989	PCBs	Bluefish	Atlantic Ocean near Long Island Sound	Bake, broil, fry, poach	No, concentration change includes trimming and cooking	No, concentrations before and after trimming/cooking reported on dry weight basis	No, data needed to convert results to mass basis not provided	No, cannot distinguish loss due to cooking alone, but authors report an overall mean reduction of 67%
Bayen et al. 2005	PCBs, DDT	Salmon	Norway	Bake, microwave, boil, pan-fry	Yes	Yes	NA	Yes
Cichy et al. 1979	PCBs	Lake trout	Hancock, MI	Irradiate and broil	No, gamma irradiation used as well as broiling	Yes, percent mass loss due to irradiation and broiling	NA	No, cooking method not relevant to typical cooking practices
Ciereszko and Witczak 2003	PCBs	Carp	Poland	Boil, stew, pan-fry, deep-fry, microwave	Yes	No	No, fillet mass not provided (only % dry weight and lipid)	No
Domingo 2011	PCBs, PCDDs, PCDFs, PAH, HCB, PBDE,	*Review and summary of other published studies.*						No
Hori et al. 2005	PCDDs, PCDFs, and coplanar PCBs	Mackerel	Japan	Grill, boil, tsumire (chopped & boiled fish balls)	Yes	No; authors report “most isomers showed obvious downward trends”	Yes	Yes
Karl and Ruoff 2008	TCDD-TEQ and PCB-TEQ	Mackerel and Halibut	Bay of Biscay (mackerel) and Greenland (halibut)	Hot smoke	Yes	No	Yes	No, results presented on TEQ basis only; actual changes in concentrations obscured by weighting of results on basis of toxicity
Marmon et al. 2009	PCDDs, PCDFs, and PCBs	Herring	Baltic Sea	pH-shift processing	No	No	Possibly; mass balance data provided	No, method not relevant to typical cooking practice
Moses et al. 2009	Pesticides, PCBs, PBDEs	Sheefish	Northwest Alaska	Bake, dry, smoke	Yes	No	No, fillet weight data not provided	No
Moya et al. 1998	PCBs	Winter flounder	New Bedford Harbor, MA	Deep-fry, pan-fry, broil	Yes	Yes	NA	Yes, same data as Poston et al. 1995, which is the original study
Perello et al. 2010	PCDDs, PCDFs, PCBs, and PCDEs	Sardine, hake, tuna	Markets in Catalonia, Spain	Pan-fry, grill, boil, roast	No, raw and cooked data appear to be from different groups of fish; also, initial concentrations were close to or at LOD	No	Yes	No, calculating difference between concentrations in cooked fillet from one fish and raw fillet from another fish may not yield accurate estimate of loss, because initial concentrations may not have been similar; also, it is difficult to measure change due to cooking with very low initial tissue concentrations
Poston et al. 1995	PCBs	Winter flounder	New Bedford Harbor, MA	Deep-fry, pan-fry, broil	Yes	Yes	NA	Yes, same study as Moya et al. 1998
Puffer and Gossett 1983	PCBs, DDT, Benzo(a)pyrene	White croaker	Santa Monica Bay and Orange County, CA	Pan-fry	Yes	No	Yes, weight loss factor provided	Yes
Reinert et al. 1972	DDT, DDE	Yellow perch, bloaters	Lake Michigan	Pan-fry, bake, broil, smoke	Yes	No	Yes	Yes
Salama et al. 1998	PCBs	Bluefish	Massachusetts waters	Smoke, charbroil, microwave, pan-fry, bake	Yes	Yes	NA	Yes

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Schecter et al. 1998	PCDDs, PCDFs, and coplanar PCBs	Catfish	Market in Binghamton, NY	Broil	Author (A. Schecter) reports that raw and cooked samples were all cut from the same fish samples, so concentrations are assumed to be similar	No	Yes, mean weight of catfish samples (n=4) before and after cooking provided	Yes, although some uncertainty associated with question of internal controls (use of same fish for uncooked and cooked comparison) and use of mean sample weights
Sherer and Price 1993	PCBs	*Review and summary of other published studies.*						No
Skea et al. 1979	Mirex, Aroclor 1254, DDT	Smallmouth bass, brown trout	Lake Ontario	Smoke, bake, broil, deep-fry	Yes	Yes	NA	Yes
Smith et al. 1973	Aroclor 1248 and 1254, DDT	Chinook, coho salmon	Manistee River, Michigan	Bake, poach, bake in bag	Yes	No	Yes, fillet weight and % fat in raw and cooked samples provided	Yes
Stachiw et al. 1988	2,3,7,8-TCDD	Carp	Saginaw Bay	Roast, charbroil	Study used "restructured carp fillet" (surimi), which involved mechanical deboning & processing of fillets	Yes	NA	Yes
Trotter et al. 1989	PCBs, pesticides	Bluefish	Massachusetts waters	Bake	Yes	No	Yes	Yes
Wang and Harrad 2000	PCBs	Salmon, trout	Not specified	Pan-fry	Yes	Yes, results corrected for mass loss	NA	Yes
Wilson et al. 1998	PCBs and DDT	*Review and summary of other published studies.*						No
Witczak 2009	PCBs	Herring, salmon, carp, trout, flounder, cod, loach	Market in Szczecin, Poland	Pan-fry	Yes	No	No, fillet weights not provided	No
Witczak and Ciereszko 2006	PCBs	Mackerel	Norwegian Sea	Smoke	No, sawdust used in smoker contained PCBs	No	No, fillet weights not provided	No, cross contamination from PCBs in sawdust is likely
Witczak and Ciereszko 2008	PCBs	Herring	Norwegian Sea	Smoke	No, sawdust used in smoker contained PCBs	No	No, fillet weights not provided	No, cross contamination from PCBs in sawdust is likely
Zabik et al. 1979	PCBs, DDT, dieldrin	Lake trout	Lake Superior	Broil, roast, microwave	Yes	Yes	NA	Yes
Zabik et al. 1982	PCBs, DDT	Carp	Saginaw Bay	Poach, roast, deep-fry, charbroil, microwave	No, the authors acknowledge issues with extraction from raw fillets	Yes	NA	No, cooking loss estimates from raw fillets in which extraction issues are noted will not provide accurate estimates
Zabik and Zabik 1995	Dioxin	Carp, salmon, trout, walley, white bass	Great Lakes	Bake, charbroil, deep fry, pan fry, salt boil, smoke	Yes	Yes	NA	Yes
Zabik et al. 1995a	PCBs, pesticides	Walleye, white bass	Lake Erie, Huron, Michigan	Bake, charbroil, deep fry, pan fry	Yes	Yes	NA	Yes
Zabik et al. 1995b	PCBs, pesticides	Carp, salmon	Lake Erie, Huron, Michigan	Bake, charbroil, deep fry, pan fry	Yes	Yes	NA	Yes
Zabik et al. 1996	PCBs, pesticides, PAH	Lake trout,siscowet	Lakes Huron, Michigan, Ontario, Superior	Bake, charbroil, salt boil, smoke	Yes	Yes	NA	Yes
Zabik and Zabik 1999	PCBs, PBBs, dioxin	*Review and summary of other published studies.*						No

Notes:
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
DDx - dichlorodiphenyltrichloroethane and its derivatives
NA - Not applicable.
PCB - polychlorinated biphenyls
PCDD - polychlorinated dibenzo-p-dioxins
PCDF - polychlorinated dibenzofurans
TCDD - tetrachlorodibenzo-p-dioxin

Sources are provided on the following pages.

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Study	Chemical(s) evaluated	Species	Source of fish	Cooking method(s)	Was study method appropriate?	Do authors report loss on mass basis?	Was a quantitative estimate of mass loss possible?	Was study used in mass loss calculations?

Sources:

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Table D-1
Overview of Cooking Loss Studies
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Study	Chemical(s) evaluated	Species	Source of fish	Cooking method(s)	Was study method appropriate?	Do authors report loss on mass basis?	Was a quantitative estimate of mass loss possible?	Was study used in mass loss calculations?

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Table D-1
Summary of Studies Used for Mass Loss Calculations
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Study	Chemical(s) evaluated	Species	Percent Mass Loss						
			Deep Fry	Pan Fry	Bake/Roast	Broil/Grill	Boil/Poach	Microwave	Smoke
Bayen et al. 2005	PCBs, DDT	Salmon	--	PCB 36% (sk-on) 44% (sk-off) DDT 31% (sk-on) 41% (sk-off)	PCB 28% (sk-on) 36% (sk-off) DDT 19% (sk-on) 28% (sk-off)	--	PCB 28% (sk-on) 38% (sk-off) DDT 25% (sk-on) 37% (sk-off)	PCB 23% (sk-on) 30% (sk-off) DDT 21% (sk-on) 29% (sk-off)	
Hori et al. 2005	PCDDs, PCDFs, and coplanar PCBs	Mackerel	--	--	--	PCDD/F 46% PCB 43%	PCDD/F 29% PCB 28%	--	
Moya et al. 1998; Poston et al. 1995	PCBs	Winter flounder	PCB 47%	PCB -17%	--	PCB -15%	--	--	
Puffer and Gossett 1983	PCBs, DDT, Benzo(a)pyrene	White croaker		PCB 29% [i] 65% [j] DDT 39% [i] 74% [j]					
Reinert et al. 1972	DDT	Bloaters (B) Yellow perch (P)	DDT 75%/80% (B) [b] 4% (P)		DDT 6% (P)	DDT 74% (B) 4% (P)			DDT 40% (B)
Salama et al. 1998	PCBs	Bluefish		PCB 27%	PCB 39%	PCB 37% (sk-on) 47% (sk-off)		PCB 60%	PCB 65%
Schecter et al. 1998	PCDDs, PCDFs, and coplanar PCBs	Catfish				PCDD/F 51% PCB 52%			
Skea et al. 1979	Mirex, Aroclor 1254, DDT	Smallmouth bass, Brown trout	PCB 74% DDE 75%		PCB 16% DDE 16%	PCB 0% DDE 20%			PCB 27% DDE 27%
Smith et al. 1973	PCBs, DDx	Chinook, Coho salmon			PCB 24%[a] (Chinook) 29% (Coho) DDx[b] 10% (Chinook) 8% (Coho)				
Stachiw et al. 1988	TCDD	Carp (Surimi)			TCDD 63% (covered) 57% (uncov.)	TCDD 62%			
Trotter et al. 1989	PCBs, pesticides	Bluefish			PCB 24% DDE 33%				

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Summary of Studies Used for Mass Loss Calculations
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Study	Chemical(s) evaluated	Species	Percent Mass Loss						
			Deep Fry	Pan Fry	Bake/Roast	Broil/Grill	Boil/Poach	Microwave	Smoke
Wang and Harrad 2000	PCBs	Salmon (S), Trout (T)		PCB 31% (S, sk on) 30% (S, sk off) 25% (T, sk on) 26% (T, sk off)					
Zabik et al. 1979	PCBs, DDT, Dieldrin	Lake trout			PCB 34% 40% (sk on) 50% (sk off) DDT 30% 47% (sk on) 57% (sk off)	PCB 53% DDT 39%		PCB 26% DDT 55%	
Zabik and Zabik 1995	Dioxin	Carp, Salmon, Trout, White bass, Walleye	PCDD/F 47%	PCDD/F 46%	PCDD/F 54%	PCDD/F 48%	PCDD/F 28%		PCDD/F 100%
Zabik et al. 1995a	PCBs, DDx	Walleye (W), White bass (B)	PCB (W) 15%[e] DDT (W) 3%[e]	PCB (B) 18%[c] 44%[d] DDT (B) 32%[c] 38%[d]	PCB (W) 13%[c] 20%[d] 23%[e] DDT (W) 33%[c] 26%[d] 22%[e]	PCB (W) 20%[c] 29%[d] 27%[e] DDT (W) 25%[c] 17%[d] 33%[e]			
Zabik et al. 1995b	PCBs, DDx	Carp (C) Salmon (S)	PCB (C) 16% (sk-on)[c] 32% (sk-off)[c] 67% (sk-on)[d] 32% (sk-off)[d] DDx[b] (C) 29% (sk-on)[c] 40% (sk-off)[c] 38% (sk-on)[d] 45% (sk-off)[d]	PCB (C) 22% (sk-on)[c] 19% (sk-off)[c] 42% (sk-on)[d] 37% (sk-off)[d] DDx[b] (C) 45% (sk-on)[c] 29% (sk-off)[c] 43% (sk-on)[d] 34% (sk-off)[d]	PCB (S) 49% (sk-on)[d] 45% (sk-off)[d] 25% (sk-on)[e] 29% (sk-off)[e] DDx[b] (S) 38% (sk-on)[d] 29% (sk-off)[d] 16% (sk-on)[e] 27% (sk-off)[e]	PCB (S) 40% (sk-on)[d] 62% (sk-off)[d] 61% (sk-on)[df] 52% (sk-off)[df] 44% (sk-on)[e] 33% (sk-off)[e] 37% (sk-on)[ef] 44% (sk-off)[ef] DDx[b] (S) 39% (sk-on)[d] 58% (sk-off[d] 57% (sk-on)[df] 56% (sk-off)[df] 45% (sk-on)[e] 24% (sk-off)[e] 41% (sk-on)[ef] 40% (sk-off)[ef]			
Zabik et al. 1996	PCBs, DDx	Lake Trout (T) Siscowets (St)			PCB (T) 18%[d] 10%[e] 11%[g] 18%[h] DDx[b] (T/St) 14%[d] 10%[e] 36%[g] 26%[h]	PCB (T) 15%[d] 7%[e] 12%[g] 32%[h] DDx[b] (T) 20%[d] 14%[e] 36%[g] 32%	PCB (T/St) 10%[e] 19%[h] DDx[b] (T/St) 4%[e] 19%[h]		PCB (T/St) 41%[e] 37%[h] DDx[b] (T/St) 56%[e] 50%[h]

Table D-1
Summary of Studies Used for Mass Loss Calculations
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Study	Chemical(s) evaluated	Species	Percent Mass Loss						
			Deep Fry	Pan Fry	Bake/Roast	Broil/Grill	Boil/Poach	Microwave	Smoke

Notes:
(a) First value for frying in lard, second value for frying in corn oil.
(b) DDx mass loss was calculated by taking the average of mass loss values reported for DDD, DDE, and DDT (which are averages of replicates).
(c) Lake Erie
(d) Lake Huron
(e) Lake Michigan
(f) Charred and scored
(g) Lake Ontario
(h) Lake Superior
(i) Orange County
(j) Santa Monica

Acronyms:
DDD - dichlorodiphenyldichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
DDx - dichlorodiphenyltrichloroethane and its derivatives
PCB - polychlorinated biphenyls
PCDD - polychlorinated dibenzo-p-dioxins
PCDF - polychlorinated dibenzofurans
TCDD - tetrachlorodibenzo-p-dioxin

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Skea, J.C., Simonin, H.A., Harris, E.J., Jackling, S., Spagnoli, J.J., Symula, J. and Colquhoun, J.R. 1979. “Reducing Levels of Mirex, Aroclor 1254 and DDE by Trimming and Cooking Lake Ontario Brown Trout (Salmo Trutta Linnaeus) and Smallmouth Bass (Micropterus Dolomieui Lacepede)”. J. Great Lakes Res., Internat. Assoc. Great Lakes Res.5(2):153-159.

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Zabik, Mary E., Zabik, Matthew J., Booren, Al M., Nettles, Miriam, Song, Jeong-Hee, Welch, Robert and Humphrey, Harold. 1995b. “Pesticides and Total Polychlorinated Biphenyls in Chinook Salmon and Carp Harvested from the Great Lakes: Effects of Skin-on and Skin-off Processing and Selected Cooking Methods”. Journal of Agricultural and Food Chemistry 43:993-1001.

Zabik, Mary E., Booren, Al, Zabik, Matthew J. Welch, Robert and Humphrey, Harold. 1996. “Pesticide Residues, PCBs and PAHs in Baked, Charbroiled, Salt Boiled and Smoked Great Lakes Lake Trout”. Food Chemistry 55:231-239.

Table D-3
Cooking Loss Data and Summary Statistics for PCBs, DDx and Dioxins/Furans
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

PCBs
0.15
0.16
0.32
0.67
0.32
0.74
0.477
0.65
0.29
0.27
0.18
0.44
0.22
0.19
0.42
0.37
0.36
0.44
0.31
0.3
0.25
0.26
-0.17
0.24
0.34
0.4
0.5
0.39
0.23
0.2
0.13
0.49
0.45
0.25
0.29
0.18
0.1
0.11
0.18
0.28
0.36
0.16
0.29
0.14
0.37
0.47
0.53
0.2
0.29
0.27
0.4
0.62
0.44
0.33
0.15
0.07
0.12
0.32
0.61
0.52
0.37
0.44
0
-0.15
0.43*
0.52*
0.1
0.19
0.28
0.38
0.28*
0.6
0.26
0.23
0.3
0.65
0.41
0.37
0.27

DDx Compounds
0.03
0.8
0.75
0.04
0.75
0.29
0.4
0.38
0.45
0.74
0.39
0.32
0.38
0.31
0.41
0.45
0.29
0.43
0.34
0.3
0.47
0.57
0.33
0.26
0.22
0.1
0.1
0.19
0.28
0.06
0.16
0.38
0.29
0.16
0.27
0.14
0.1
0.36
0.26
0.33
0.25
0.17
0.33
0.39
0.74
0.04
0.2
0.39
0.58
0.45
0.24
0.2
0.14
0.36
0.32
0.57
0.56
0.41
0.4
0.25
0.37
0.04
0.19
0.55
0.21
0.29
0.4
0.27
0.56
0.5

Dioxin Compounds
0.47
0.46
0.54
0.63
0.57
0.48
0.51
0.46
0.62
0.28
0.29
1

Outlier
Extreme Value

Cooking Method Key
Deep Fry
Pan Fry
Bake/Roast
Broil/Grill
Boil/Poach
Microwave
Smoke

Table D-3
Cooking Loss Data and Summary Statistics for PCBs, DDx and Dioxins/Furans
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Statistic	PCBs	DDx Compounds	Dioxin Compounds
Median	0.3	0.32	0.5
Mean	0.32	0.34	0.53
Std. Dev.	0.17	0.18	0.18
Count	79	70	12
Minimum	-0.17	0.03	0.28
10th Percentile	0.13	0.1	0.31
25th Percentile	0.2	0.21	0.46
50th Percentile	0.3	0.32	0.5
75th Percentile	0.42	0.41	0.58
90th Percentile	0.53	0.57	0.63
Maximum	0.74	0.8	1
IQR (75th - 25th)	**21.56**	**19.74**	**11.58**
1.5 * IQR	32.34	29.61	17.36
75th + 1.5*IQR	74.69	70.6	75.31
25th - 1.5*IQR	-11.56	-8.37	29.01
3 * IQR	64.69	59.23	34.73
75th + 3*IQR	107.04	100.21	92.68
25th - 3*IQR	-43.9	-37.99	11.64

Notes:

Dioxin-like PCB denoted with an asterisk (*).

DDx = dichlorodiphenyltrichloroethane and its derivatives

PCB = polychlorinated biphenyls

Table D-4
Cooking Loss Statistics with and without Extreme Values and Outliers
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

	PCBs		DDx Compounds		Dioxins and Furans	
	All Data	w/o Outliers [(a)]	All Data	w/o Outliers [(b)]	All Data	w/o Extreme Value [(c)]
Median	30	30	32	31	50	48
Mean	32	33	34	31	53	48
Count	79	77	70	65	12	11
Minimum	-17	0	3	3	28	28
10th Percentile	13	15	10	10	31	29
25th Percentile	21	23	21	20	46	46
50th Percentile	30	30	32	30	51	48
75th Percentile	42	43	41	40	59	55
90th Percentile	53	54	57	49	63	62
Maximum	74	74	80	58	100	63

Notes:

(a) - No extreme values were identified in the PCB data set; two negative values were identified as outliers.

(b) - No extreme values were identified in the DDx data set; five high-end values were identified as outliers.

(c) - One extreme value (100% loss) was identified in the dioxins and furans data set; no outliers were identified.

Figure D-1: Identification of Outliers and Extreme Values

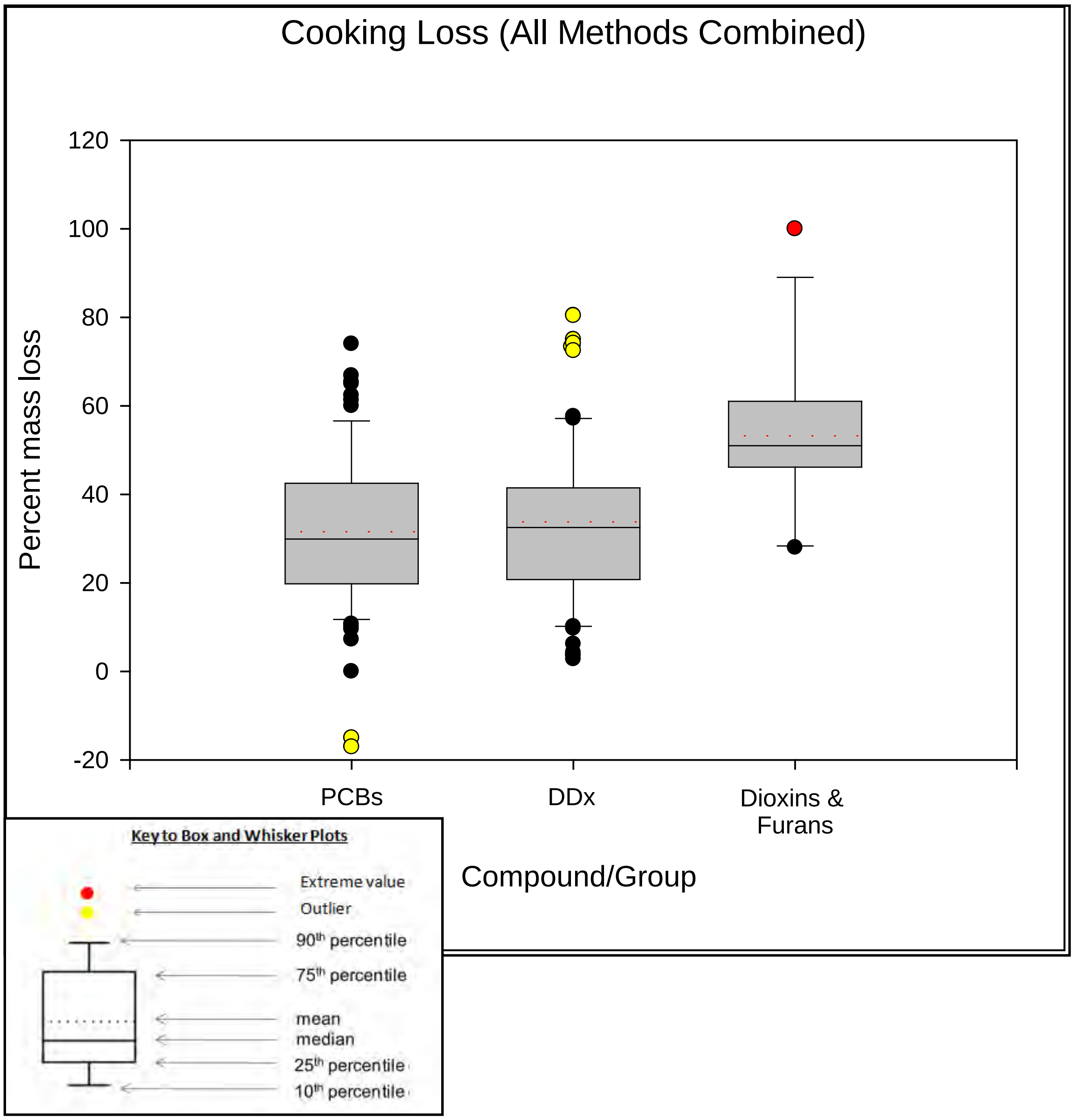

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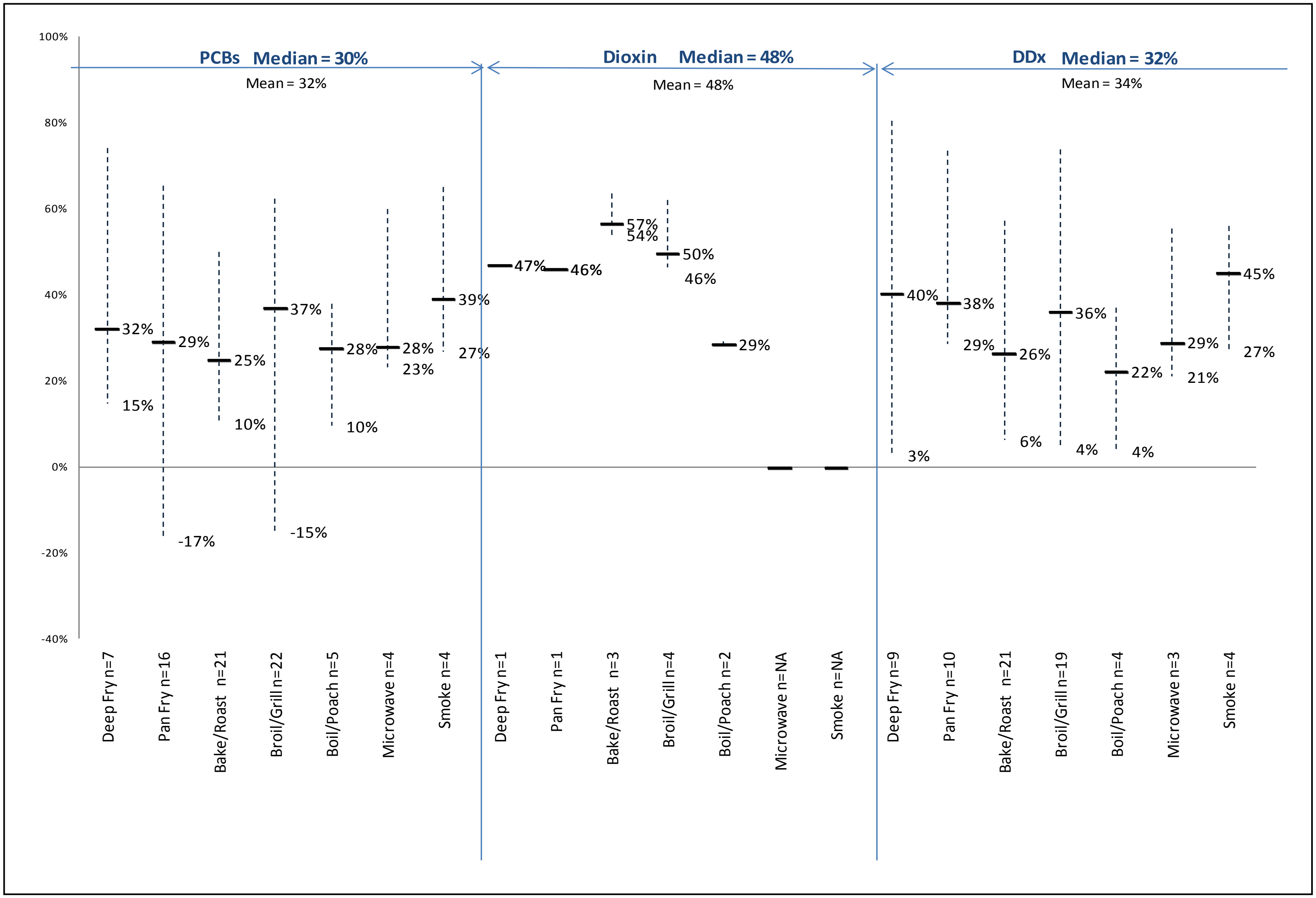
Figure D-2: Summary of Mass Loss by COPC and Cooking Method



* Excluding extreme value of 100% dioxin loss (smoke).

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Attachment E

Exposure Point Concentration Calculations (ProUCL Input and Output)

ProUCL Input Files

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft			0.077	1	0.099	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	2.6	1	0.12	1	0.18	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	1.8	1	0.16	1	0.16	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft			0.19	1	0.18	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft			0.0081	0	0.0081	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft			0.0075	0	0.0075	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft			0.0075	0	0.0075	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft			0.047	1	0.044	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft			0.28	1	0.2	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft			0.028	1	0.03	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft			0.14	1	0.13	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft	0.93	1				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft	1.9	1				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft			0.29	1	0.29	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft			0.016	1	0.013	1

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft	0.13	1	0.04	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	0.098	1	0.091	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	0.17	1	0.071	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft	0.26	1	0.07	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft	0.0081	0	0.0081	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft	0.0075	0	0.0075	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft	0.0075	0	0.0075	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft	0.058	1	0.02	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft	0.26	1	0.12	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft	0.033	1	0.015	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft	0.17	1	0.066	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft	0.39	1	0.13	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft	0.02	1	0.0085	1

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Chrysene	D_Chrysene	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft	0.092	1			0.03	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	0.13	1	92	1	0.023	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	0.19	1	130	1	0.03	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft	0.2	1			0.046	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft	0.0081	0			0.0081	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft	0.0075	0			0.0075	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft	0.0075	0			0.0075	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft	0.062	1			0.011	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft	0.25	1			0.029	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft	0.03	1			0.0058	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft	0.15	1			0.025	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft			4	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft			7.9	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft	0.31	1			0.076	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft	0.026	1			0.0059	1

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	13	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	92	0
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft	20	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft	19	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft	19	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft	18	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft	18	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft	20	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft	19	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft	18	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft	19	0
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft		

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft	0.085	1		
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	0.082	1	200	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	0.097	1	36	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft	0.15	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft	0.0081	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft	0.0075	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft	0.0075	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft	0.033	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft	0.1	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft	0.017	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft	0.074	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft			370	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft			230	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft	0.25	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft	0.011	1		

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft	0.11	0		
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	0.039	0	12	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	0.018	1	8.7	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft	0.0064	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft	0.0081	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft	0.0075	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft	0.0075	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft	0.0075	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft	0.018	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft	0.0016	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft	0.0023	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft			3.4	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft			4.2	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft	0.013	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft	0.0099	1		

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft	0.054	1		
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	0.0096	0	0.00000251	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	0.021	1	0.00000127	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft	0.092	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft	0.001	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft	0.0047	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft	0.0047	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft	0.00089	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft	0.00083	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft	0.0009	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft	0.001	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft	0.0045	0	0.000000213	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft	0.0045	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft	0.0049	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft	0.00095	0	0.000000558	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft	0.0045	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft	0.0048	0		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft	0.086	1		
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft	0.0027	1		

Matrix	horizon	Units	Pepco/Pepco(OpenLot)	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Surface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP01	2/4/2013	0.33 - 1 ft	0.11	0	58	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	2/4/2013	0.33 - 0.83 ft	0.11	0	16	1
SO	Surface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	0 - 1 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/17/2013	4.5 - 5.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	5/20/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	DP36	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/25/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SB2	1/26/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	9.5 - 10.5 ft	0.037	1	8.6	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP01	5/20/2013	14 - 15 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/14/2013	4.5 - 5.5 ft	0.053	1	12	1
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	5/20/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	6/13/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Pepco (Open Lot)	SUSDP02	1/25/2017	2 - 5 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft	3.1	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft	3.1	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft	2.1	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft	2.4	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft	24	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft	6.8	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft	3.4	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft	27	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	6.3	1	0.092	1	0.1	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	7.7	1	0.7	1	0.68	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft			0.56	1	0.45	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	7.3	1	0.52	1	0.55	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft			0.26	1	0.24	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft			0.11	1	0.092	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft			1.1	1	1.2	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft			1.2	1	1.2	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft			0.31	1	0.31	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	11	1	0.098	1	0.1	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft			0.02	1	0.015	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	3	1	0.98	1	0.82	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	12	1	0.41	1	0.45	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft			0.18	1	0.15	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft	190	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	3.6	1	0.27	1	0.28	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft			0.12	1	0.16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	12	1	0.44	1	0.5	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft			0.48	1	0.46	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft	14	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft	6.3	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft	11	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft	9.5	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft	11	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft	3.2	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft	8.6	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft	57	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft	2	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft	22	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft	43	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft	11	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft	19	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft	54	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft	2.4	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft	5.2	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft	71	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft	8.1	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft	16	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft	11	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft	7.4	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft	4	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft	23	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft	8.9	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft	8.2	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft	38	1				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft	6.2	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	9.5	1	0.34	1	0.33	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	14	1	0.28	1	0.33	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft			0.12	1	0.15	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft			0.0072	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft			0.088	1	0.061	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	37	1	0.34	1	0.39	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	71	1	0.58	1	1.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft			0.079	1	0.15	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	4.7	1	3.4	1	2.6	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft			0.0055	1	0.0071	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft			0.029	1	0.03	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft			0.68	1	0.51	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft			0.29	1	0.23	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft			0.62	1	0.5	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft			0.17	1	0.14	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft			0.13	1	0.09	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft			0.054	1	0.04	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft			0.071	1	0.047	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft			0.15	1	0.11	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft			0.33	1	0.31	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft			0.43	1	0.36	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft	1.8	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft			39	1	34	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft			0.013	1	0.0064	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft			0.54	1	0.56	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft			0.14	1	0.13	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft			2.3	1	2.4	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft			0.63	1	0.59	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft			1.2	1	1.1	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	2	1	0.0014	1	0.0082	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft			0.0078	0	0.0078	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft			0.0072	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft			0.0076	0	0.0076	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft			0.0073	0	0.0073	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	2.2	1	0.021	1	0.022	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	2.3	1	0.19	1	0.21	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	2.3	1	0.016	0	0.016	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	2.1	1	0.71	1	0.64	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	3.4	1	0.15	1	0.17	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	3.9	1	0.08	1	0.099	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft			0.74	1	0.55	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft			0.41	1	0.26	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft			3.4	1	2.5	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft			0.91	1	1.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft	2.8	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft	1.5	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft			0.7	0	0.7	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft			0.12	1	0.24	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft	2.9	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft	0.48	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	2.8	1	1.1	1	0.99	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	2.1	1	0.57	1	0.53	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	0.74	1	0.0072	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft			0.89	1	0.68	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft			1.1	1	0.72	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft			0.78	1	0.58	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft			0.019	1	0.012	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft	5.6	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft	4.8	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft	3.2	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft	13	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft	3.6	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft	12	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft	3.2	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft	8.2	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft	3.4	1				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft	4.5	1				

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	0.12	1	0.036	1	0.19	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	0.71	1	0.37	1	0.79	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft	0.58	1	0.2	1	0.53	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	0.63	1	0.36	1	0.7	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft	0.34	1	0.14	1	0.32	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft	0.11	1	0.049	1	0.1	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft	1.4	1	0.42	1	1.2	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft	1.4	1	0.54	1	1.3	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft	0.42	1	0.14	1	0.31	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	0.22	1	0.046	1	0.25	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft	0.024	1	0.0091	1	0.018	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	0.92	1	0.34	1	0.92	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	0.44	1	0.22	1	0.4	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft	0.21	1	0.066	1	0.22	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	0.31	1	0.11	1	0.34	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft	0.16	1	0.038	1	0.2	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	0.65	1	0.2	1	0.5	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft	0.64	1	0.22	1	0.53	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	0.39	1	0.15	1	0.37	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	0.32	1	0.12	1	0.29	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft	0.16	1	0.058	1	0.15	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft	0.0072	0	0.0072	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft	0.11	1	0.035	1	0.22	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	0.38	1	0.16	1	0.38	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	0.64	1	0.21	1	0.62	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft	0.15	0	0.15	0	0.16	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	1.8	1	0.85	1	3.3	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft	0.0068	1	0.0019	1	0.0063	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft	0.031	1	0.012	1	0.037	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft	0.64	1	0.27	1	0.64	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft	0.3	1	0.11	1	0.38	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft	0.63	1	0.21	1	0.65	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft	0.19	1	0.047	1	0.29	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft	0.21	1	0.049	1	0.57	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft	0.085	1	0.016	1	0.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft	0.12	1	0.022	1	0.37	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft	0.2	1	0.047	1	0.31	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft	0.43	1	0.11	1	0.38	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft	0.45	1	0.18	1	0.54	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft	45	1	16	1	45	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft	0.0088	1	0.0059	1	0.013	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft	0.84	1	0.25	1	0.76	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft	0.16	1	0.065	1	0.16	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft	2.9	1	1.1	1	2.6	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft	0.75	1	0.28	1	0.77	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft	1.5	1	0.43	1	1.4	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	0.0017	1	0.0082	0	0.0023	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft	0.0078	0	0.0078	0	0.0078	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft	0.0072	0	0.0072	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft	0.0076	0	0.0076	0	0.0076	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft	0.0073	0	0.0073	0	0.0073	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	0.022	1	0.012	1	0.023	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	0.19	1	0.079	1	0.19	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	0.016	0	0.016	0	0.016	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	0.66	1	0.31	1	0.74	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	0.17	1	0.058	1	0.17	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	0.091	1	0.037	1	0.086	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft	0.66	1	0.26	1	0.72	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft	0.36	1	0.098	1	0.34	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft	2.3	1	0.66	1	3.1	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft	1	1	0.23	1	0.92	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft	0.7	0	0.7	0	0.7	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft	0.24	0	0.24	0	0.17	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	0.89	1	0.47	1	1.1	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	0.54	1	0.2	1	0.58	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	0.0072	0	0.0072	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft	0.88	1	0.26	1	0.83	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft	0.92	1	0.38	1	1.1	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft	0.75	1	0.28	1	0.72	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft	0.017	1	0.0069	1	0.018	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft	5.9	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft	4.1	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft	3.8	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft	4.3	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft	18	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft	5.9	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft	9.1	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft	30	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	3.2	1	0.04	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	7.2	1	0.11	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft			0.11	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	4.6	1	0.11	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft			0.052	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft			0.023	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft			0.31	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft			0.28	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft			0.078	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	5.9	1	0.042	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft			0.0075	0
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	8.2	1	0.16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	23	1	0.086	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft			0.16	0
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft	67	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	4.4	1	0.049	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft			0.07	0
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	15	1	0.095	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft			0.13	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft	12	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft	4.9	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft	13	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft	8	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft	5.4	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft	5.3	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft	23	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft	41	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft	3.2	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft	11	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft	120	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft	14	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft	15	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft	3.5	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft	6.4	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft	8.2	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft	5.2	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft	11	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft	35	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft	10	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft	4.7	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft	6.9	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft	3.1	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft	3.5	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft	6.5	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft	240	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft	18	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	6.9	1	0.062	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	9	1	0.072	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft			0.044	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft			0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft			0.026	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	5.4	1	0.073	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	11	1	0.45	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft			0.15	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	7.7	1	0.25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft			0.0071	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft			0.0062	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft			0.14	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft			0.064	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft			0.13	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft			0.033	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft			0.05	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft			0.018	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft			0.029	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft			0.042	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft			0.079	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft			0.09	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft	2.6	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft			7.4	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft			0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft			0.14	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft			0.034	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft			0.62	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft			0.16	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft			0.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	7.8	1	0.0082	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft			0.0078	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft			0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft			0.0076	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft			0.0073	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	6.6	1	0.0029	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	6.5	1	0.04	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	4.7	1	0.016	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	3.5	1	0.095	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	2.5	1	0.034	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	8.3	1	0.017	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft			0.13	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft			0.066	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft			0.36	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft			0.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft	3.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft	3.9	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft			0.7	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft			0.24	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft	6.5	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft	1.1	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	6.7	1	0.18	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	5.5	1	0.099	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	1.1	1	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft			0.16	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft			0.16	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft			0.14	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft			0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft	2.3	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft	3	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft	2	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft	9.2	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft	5	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft	29	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft	4.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft	8.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft	2	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft	9.1	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	15	1	0.068	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	66	1	0.44	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft			0.38	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	180	1	0.33	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft			0.16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft			0.072	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft			0.96	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft			1.1	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft			0.25	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	95	0	0.098	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft			0.012	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	97	0	0.56	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	110	0	0.29	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft			0.11	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	88	0	0.14	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft			0.095	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft	280	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft	280	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	90	0	0.31	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft			0.37	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft	67	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft	36	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft	550	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	68	1	0.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	14	1	0.23	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft	20	0	0.11	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft	18	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft	43	1	0.048	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	71	1	0.25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	45	1	0.58	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft	4700	1	0.15	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft	3000	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft	19	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft	19	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft	18	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	66	1	0.82	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft	18	0	0.0071	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft	18	0	0.018	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft			0.4	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft			0.18	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft			0.34	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft			0.096	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft			0.069	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft			0.029	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft			0.038	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft			0.085	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft			0.23	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft			0.25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft	19	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft	18	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft	18	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft			21	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft			0.0036	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft			0.43	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft			0.11	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft			1.9	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft			0.45	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft			0.7	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	20	0	0.0082	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft	19	0	0.0078	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft	18	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft			0.0076	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft			0.0073	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	20	0	0.014	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	36	1	0.11	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	20	0	0.016	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	100	0	0.35	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	190	1	0.12	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	21	0	0.06	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft			0.39	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft			0.17	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft			0.98	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft			0.73	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft	20	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft	21	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft	36	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft			0.7	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft			0.24	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft	3900	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft	260	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft	73	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft	210	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft	900	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft	19	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft	22	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft	18	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	200	0	0.63	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	160	1	0.34	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	18	0	0.0072	0
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft			0.46	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft			0.46	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft			0.39	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft			0.0099	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft	99	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft	6900	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft	440	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft	140	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft	50	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft	530	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft	11000	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft	5700	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft	1600	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft	15	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft	260	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft	89	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft	110	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft	3600	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft	18	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft	21	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft	21	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft	240	1			31	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft	130	1			16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft	200	1			23	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft	120	1			24	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft	1000	1			300	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft	130	1			87	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft	320	1			52	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft	440	1			700	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	62	1	0.037	1	7.2	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	260	1	0.084	1	72	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft			0.045	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	150	1	0.042	1	16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft			0.44	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft			0.0069	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft			0.064	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft			0.065	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft			0.018	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	49	1	0.042	1	28	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft			0.0075	0		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	270	1	0.074	1	97	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	690	1	0.052	1	610	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft			0.16	0		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft	6600	1			460	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	280	1	0.042	1	33	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft			0.068	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	190	1	0.026	1	230	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft			0.059	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft	280	1			120	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft	130	1			18	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft	160	1			18	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft	130	1			19	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft	50	1			50	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft	200	1			15	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft	330	1			790	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft	1400	1			1300	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft	110	1			25	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft	160	1			100	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft	310	1			6800	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft	110	1			490	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft	240	1			130	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft	10	1			8.5	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft	210	1			26	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft	320	1			70	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft	33	1			9.5	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft	240	1			240	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft	690	1			1000	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft	170	1			150	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft	150	1			16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft	86	1			8.1	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft	49	1			12	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft	47	1			19	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft	200	1			43	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft	200	1			8000	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft						
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft	400	1			300	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	150	1	0.087	1	18	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	580	1	0.068	1	59	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft			0.043	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft			0.0072	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft			0.1	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	110	1	0.061	1	9.6	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	810	1	0.1	1	120	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft			0.31	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	230	1	0.18	1	12	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft			0.0071	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft			0.0083	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft			0.034	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft			0.12	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft			0.07	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft			0.096	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft			0.072	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft			0.021	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft			0.098	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft			0.11	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft			0.093	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft			0.15	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft	71	1			2.8	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft			0.13	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft			0.0072	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft			0.066	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft			0.0037	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft			0.19	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft			0.012	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft			0.11	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	190	1	0.0082	0	5.8	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft			0.0078	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft			0.0072	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft			0.0076	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft			0.0073	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	120	1	0.0026	1	4.8	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	240	1	0.038	0	7.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	360	1	0.016	0	3.7	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	160	1	0.054	1	14	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	61	1	0.023	1	9.6	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	230	1	0.0094	1	7.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft			0.053	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft			0.043	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft			0.04	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft			0.1	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft	54	1			7.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft	76	1			3.7	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft			0.17	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft			0.24	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft	150	1			7.5	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft	94	1			0.78	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	230	1	0.089	1	68	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	220	1	0.28	1	19	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	34	1	0.0072	0	3	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft			0.048	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft			0.08	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft			0.18	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft			0.002	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft	100	1			5	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft	94	1			4.7	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft	55	1			3.4	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft	160	1			62	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft	89	1			8.5	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft	490	1			380	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft	71	1			6	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft	56	1			130	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft	52	1			4.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft	180	1			140	1

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft	0.0051	0		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft	0.94	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft	0.042	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft	0.047	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft	0.0093	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft	0.012	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft	0.17	1	0.0000501	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft	0.18	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft	0.072	1	0.00000259	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft	0.043	1	0.00000291	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft	1.6	1	0.0000352	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft	0.1	1	0.00000838	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft	0.24	1	0.00000384	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft	3.9	1	0.0000421	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft			0.00000233	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft			0.00000269	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft	0.28	1	0.00000461	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft	0.28	1	0.00000367	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft	0.42	1	0.0000116	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft	0.69	1	0.00000745	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft	0.81	1	0.0000116	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft	0.46	1	0.00000353	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft	0.34	1	0.00000471	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	0.0099	0		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	0.064	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft	0.2	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	5.7	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft	0.29	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft	0.04	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft	0.0085	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft	0.31	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	1.9	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft	0.0061	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	0.15	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	0.84	1	0.0000364	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft	2.8	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft	2.2	1	0.0000287	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft	0.32	1	0.00000332	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft			0.00000219	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft			0.00000601	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	0.61	1	0.0000587	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft	6.2	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft	5.8	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft	4.6	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft	0.19	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft	0.55	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft	0.73	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft	0.11	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	0.7	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft	0.77	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft	2.4	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft	4.4	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft	8.6	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft	0.13	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft	0.3	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft	0.32	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft	1.6	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft	1.3	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft	7.6	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft	0.23	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft	0.066	1		
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft	2.9	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft	2.5	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft	0.48	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft	2.8	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft	0.54	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	0.35	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	0.18	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft	0.014	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft	0.0045	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft	0.023	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	0.21	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	0.064	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft	1.3	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft	0.00091	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft	0.0046	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft	0.0045	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	0.00099	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft	0.0045	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft	0.0044	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft	0.31	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft	4.8	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft	0.00088	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft	0.044	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft	1.1	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft	0.15	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft	0.066	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft	0.036	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft	0.017	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft	6.9	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft	0.39	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft	0.03	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft	0.033	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft	0.52	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft	1.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft	0.28	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft	0.15	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft	0.0033	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft	0.019	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft	0.19	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft	0.068	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft	0.064	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	0.013	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft	0.0049	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft	0.012	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft	0.0048	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft	0.0044	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	0.0012	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	0.0048	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	0.005	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	0.41	1	0.00000119	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	0.14	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	0.0052	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft	0.97	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft	0.1	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft	0.14	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft	0.0051	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft	0.6	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft			0.00000345	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft	0.0019	1	0.000000601	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft	0.0052	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft	0.0035	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft	11	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft	1.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft	0.001	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft	10	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft	7.6	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft	9.1	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft	14	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft	5.5	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft	0.37	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft	2	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft	1.3	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft	0.0055	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft	0.64	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft	0.024	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft	5.7	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft	1.5	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft	0.15	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft	0.019	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft	0.096	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft	2.7	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft	0.65	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft	0.044	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft	0.053	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft	0.071	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft	0.94	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft	0.76	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft	1.2	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft	0.0041	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft	0.0053	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft	0.013	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	0.16	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	0.19	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	0.0044	0		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft	0.31	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft	0.38	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft	0.28	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft	0.0085	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft	0.27	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft	0.081	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft	1.9	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft	0.19	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft	0.099	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft	0.034	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft	7	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft	6.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft	0.66	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft	0.4	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft	0.082	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft	0.035	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft	0.14	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft	1.6	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft	0.0035	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft	0.033	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft	0.0061	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft	0.0038	1		
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1D	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS05-1F	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061C	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061D	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061E	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS061G	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1A	1/24/2017	0 - 1 ft	0.12	0	44	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	1/24/2017	0 - 1 ft	0.11	0	35	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1B	2/3/2017	0 - 1 ft	0.057	1	64	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1C	1/24/2017	0 - 1 ft	0.12	0	23	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	1/24/2017	0 - 1 ft	0.12	1	900	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1D	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1F	1/24/2017	0 - 1 ft	0.11	0	260	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1G	1/24/2017	0 - 1 ft	0.17	1	190	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	1/24/2017	0 - 1 ft	0.13	1	1300	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-1H	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2A	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2B	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2F	3/22/2017	0 - 1 ft			23	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2H	3/22/2017	0 - 1 ft			59	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2I	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2J	3/22/2017	0 - 1 ft			1900	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2N	3/22/2017	0 - 1 ft			1400	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2O	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUS08-2P	3/22/2017	0 - 1 ft			56	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP03	2/4/2013	0.5 - 1 ft	0.12	0	9.9	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	2/4/2013	0 - 1 ft	0.13	1	140	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	2/4/2013	0 - 1 ft	0.11	0	75	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	2/5/2013	0 - 1 ft	0.14	1	20	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP07	2/5/2013	0 - 1 ft	0.12	0	45	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	2/5/2013	0 - 1 ft	0.13	0	1700	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	1/24/2017	0 - 1 ft	0.13	1	1500	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	3/22/2017	0 - 1 ft			52	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3I	8/2/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP08-3K	8/3/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	2/5/2013	0 - 1 ft	0.11	0	78	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP13	2/5/2013	0 - 1 ft	0.17	1	35	1
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	0 - 1 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3Q	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A1	1/24/2017	0 - 1 ft	0.33	1	290	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A3	1/24/2017	0 - 1 ft	0.089	1	180	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A7	1/24/2017	0 - 1 ft	0.15	1	32	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1A9	1/24/2017	0 - 1 ft	0.14	1	53	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C1	1/24/2017	0 - 1 ft	0.29	1	470	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C3	1/24/2017	0 - 1 ft	0.11	0	41	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	1/24/2017	0 - 1 ft	0.18	1	7000	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	1/24/2017	0 - 1 ft	0.22	1	3800	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C5	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C7	1/24/2017	0 - 1 ft	0.033	1	16	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1C9	1/24/2017	0 - 1 ft	0.17	1	200	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	1/24/2017	0 - 1 ft	0.26	1	42000	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E1	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	0 - 1 ft	0.13	1	3800	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1-E11	1/30/2018	0 - 1 ft	0.23	1	180	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E3	1/24/2017	0 - 1 ft	0.22	1	57	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E4	1/24/2017	0 - 1 ft	0.12	0	100	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E5	1/24/2017	0 - 1 ft	0.12	0	190	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E7	1/24/2017	0 - 1 ft	0.46	1	20	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	1/24/2017	0 - 1 ft	0.089	1	1100	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1E9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	1/24/2017	0 - 1 ft	0.12	1	3800	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F4	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1F5	1/24/2017	0 - 1 ft	0.15	1	610	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G1	1/24/2017	0 - 1 ft	0.1	0	68	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	0 - 1 ft	0.12	0	37	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G3	1/24/2017	0 - 1 ft	0.13	1	98	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G5	1/24/2017	0 - 1 ft	0.071	1	330	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G7	1/24/2017	0 - 1 ft	0.069	1	190	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	1/24/2017	0 - 1 ft	0.14	1	37000	1
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1G9	6/29/2018	0 - 1 ft				
SO	Surface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	0 - 1 ft	0.12	0	450	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9G	3/1/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9H	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	CT16SO9I	8/4/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP27	3/26/2013	6.5 - 7.5 ft	0.14	1	110	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/20/2013	2.5 - 3.5 ft	0.13	1	120	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP40	5/28/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/21/2013	4.5 - 5.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	14.5 - 15.5 ft	0.61	1	25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	DP42	5/29/2013	9.5 - 10.5 ft	1.6	1	49	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SB3	3/13/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SBS0303N-North	2/15/2017	3 - 3.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/14/2013	4.5 - 5.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP03	5/21/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/15/2013	2.5 - 3.5 ft	0.12	1	25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	5/20/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/25/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04	1/27/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1A	8/1/2017	4 - 5 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1C	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1E	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-1G	8/1/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP04-2I	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/15/2013	4.5 - 5.5 ft	0.039	1	11	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	5/21/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05	1/24/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1C	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1E	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-1G	7/31/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP05-2M	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/15/2013	4.5 - 5.5 ft	0.081	1	18	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	5/22/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP06	3/13/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/15/2013	4.5 - 5.5 ft	0.11	1	18	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	9.5 - 10.5 ft	0.098	1	20	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP07	5/22/2013	14.5 - 15.5 ft	0.066	1	17	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/15/2013	2.5 - 3.5 ft	0.057	1	25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	9.5 - 10.5 ft	0.094	1	36	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	5/23/2013	14.5 - 15.5 ft	0.15	1	25	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08	1/24/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-1E	8/2/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP08-2G	8/3/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/14/2013	4.5 - 5.5 ft	0.11	1	21	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	9.5 - 10.5 ft	0.066	1	14	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	5/28/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11	1/25/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	2/22/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1A	3/28/2018	6 - 7 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1B	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-1H	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2A	3/16/2018	5 - 6 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2D	4/5/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP11-2N	4/6/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/20/2013	4.5 - 5.5 ft	0.1	1	16	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP13	5/29/2013	9.5 - 10.5 ft	0.033	1	2.9	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/22/2013	2.5 - 3.5 ft	0.098	1	130	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	9.5 - 10.5 ft	0.12	1	23	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	5/24/2013	14.5 - 15.5 ft	0.052	1	8.2	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDP41	1/24/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1C	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1E	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-1G	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2E	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2I	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-2M	2/22/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3R	5/31/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-3S	3/15/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	SUSDPCT16-4W	4/6/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	1 - 2 ft	0.11	0	670	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	2 - 3 ft	0.074	1	630	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E0	8/1/2017	3 - 4 ft	0.057	1	420	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E1	7/31/2017	1 - 2 ft	0.2	1	200	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E10	8/8/2017	1 - 2 ft	0.13	1	21	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1E9	8/3/2017	1 - 2 ft	0.22	1	560	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G10	8/4/2017	1 - 2 ft	0.11	1	17	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	1 - 2 ft	0.11	1	1400	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1G9	8/4/2017	2 - 3 ft	0.044	1	540	1
SO	Subsurface	mg/kg	Warehouse and Laydown Area	TA1H9	8/4/2017	1 - 2 ft	0.12	1	530	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/28/2013	3.5 - 4.5 ft	1.6	1	0.24	1	0.24	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/29/2013	13.5 - 14.5 ft	1.9	1	0.0076	0	0.0076	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	5/15/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	1 - 2 ft			0.65	1	0.69	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	2 - 5 ft			0.14	1	0.13	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4E	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	4.5 - 5.5 ft			1.3	1	1.1	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	9.5 - 10.5 ft	1.1	1	0.048	1	0.046	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	14.5 - 15.5 ft			0.045	1	0.041	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	1 - 2 ft			0.06	1	0.045	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	2 - 5 ft			100	1	100	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	5 - 10 ft			1.4	1	1.3	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	10 - 15 ft			3.4	1	3	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	14.5 - 15.5 ft			0.66	1	0.57	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	1 - 2 ft			200	1	160	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	2 - 3 ft			3.6	1	3.2	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	3 - 4 ft			1.1	1	0.94	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	4 - 5 ft			1	1	0.83	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	10 - 11 ft			4.7	1	3.8	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	11 - 12 ft			0.072	1	0.068	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	12 - 13 ft			0.0059	1	0.0052	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	13 - 14 ft			0.0086	0	0.0086	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	14 - 15 ft			0.0087	0	0.0087	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	1 - 2 ft			0.064	1	0.06	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	2 - 3 ft			0.79	1	0.75	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	3 - 4 ft			5.4	1	4.7	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	4 - 5 ft			17	1	15	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	5 - 6 ft			0.52	1	0.45	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	10 - 11 ft			0.43	1	0.45	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	11 - 12 ft			0.11	1	0.12	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	1 - 2 ft			0.15	1	0.14	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	2 - 3 ft			0.021	1	0.02	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	3 - 4 ft			0.0084	0	0.0084	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	4 - 5 ft			0.0036	1	0.0088	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	10 - 11 ft			0.0044	1	0.0032	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	11 - 12 ft			0.0079	0	0.0079	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	12 - 13 ft			0.0082	0	0.0082	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	13 - 14 ft			0.0081	0	0.0081	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	14 - 15 ft			0.008	0	0.008	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	1 - 2 ft			54	1	45	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	2 - 3 ft			1.2	1	0.96	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	3 - 4 ft			0.0077	0	0.0077	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	4 - 5 ft			0.0085	0	0.0085	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	10 - 11 ft			0.0091	0	0.0091	0

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	11 - 12 ft			0.009	0	0.009	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	12 - 13 ft			0.0089	0	0.0089	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	13 - 14 ft			0.0083	0	0.0083	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	14 - 15 ft			0.008	0	0.008	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	1 - 2 ft			0.086	1	0.21	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	1 - 2 ft			0.53	1	0.47	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	2 - 3 ft			0.085	1	0.15	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	3/28/2018	10 - 11 ft			0.25	1	0.23	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	5/17/2013	3.5 - 4.5 ft	0.39	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	9.5 - 10.5 ft	2.9	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	1 - 2 ft			1.1	1	0.95	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	2 - 5 ft			7	1	6.5	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	5 - 10 ft			0.35	1	0.35	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	10 - 15 ft			0.43	1	0.44	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	1 - 2 ft			15	1	13	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	2 - 3 ft			0.67	1	0.63	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	3 - 4 ft			0.049	1	0.047	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	4 - 5 ft			0.073	1	0.076	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	1 - 2 ft			11	1	9.7	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	2 - 3 ft			0.2	1	0.2	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	3 - 4 ft			0.13	1	0.11	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	4 - 5 ft			0.017	1	0.021	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	1 - 2 ft			0.11	1	0.096	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	2 - 3 ft			0.023	1	0.023	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	3 - 4 ft			0.061	1	0.05	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	4 - 5 ft			0.13	1	0.12	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	1 - 2 ft			530	1	420	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	2 - 3 ft			2.1	1	2.1	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	1 - 2 ft			1.1	1	1.1	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	1 - 2 ft			5.2	1	4.3	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	2 - 3 ft			0.026	1	0.024	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	1 - 2 ft			0.77	1	0.75	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	2 - 3 ft			0.26	1	0.28	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	1 - 2 ft			0.0087	1	0.0093	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	5/21/2013	2.5 - 3.5 ft	6.8	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	2.5 - 3.5 ft			1.2	1	1.2	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	3.5 - 5 ft			0.017	1	0.018	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	1 - 2 ft			0.13	1	0.14	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	2 - 3 ft			0.38	1	0.48	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/15/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	1 - 2 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1A	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1B	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1C	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1D	1/25/2017	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1E	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1F	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1G	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	2/3/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2A	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2B	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2D	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2E	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2F	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2L	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2M	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2N	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2O	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2P	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1B	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1D	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1F	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1H	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1A	1/27/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1B	1/27/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1C	1/25/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1E	1/25/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1F	1/25/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1G	1/25/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	2/5/2013	0.5 - 1 ft	13	1	0.3	1	0.33	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	0 - 1 ft			0.28	1	0.28	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	2/6/2013	0 - 1 ft	14	1	1.7	1	1.8	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	0 - 1 ft			0.11	1	0.089	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	0 - 1 ft			2	1	1.9	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	0 - 1 ft			0.98	1	0.81	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	0 - 1 ft			0.46	1	0.39	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	0 - 1 ft			1	1	0.82	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	0 - 1 ft			0.13	1	0.13	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	0 - 1 ft			0.26	1	0.22	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	0 - 1 ft			0.34	1	0.38	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	0 - 1 ft			2	1	1.9	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	0 - 1 ft			2.2	1	2	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	0 - 1 ft			0.14	1	0.13	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	0 - 1 ft			2.5	1	2.5	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	0 - 1 ft			0.18	1	0.17	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	0 - 1 ft			0.14	0	0.14	0
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	1.5 - 2.5 ft			0.85	1	0.84	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	1/25/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	1/27/2017	1.5 - 2.5 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	1/26/2017	0 - 1 ft	7.1	1	0.062	1	0.03	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/28/2013	3.5 - 4.5 ft	0.24	1	0.13	1	0.23	1	4.4	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/29/2013	13.5 - 14.5 ft	0.0076	0	0.0076	0	0.0076	0	4.5	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	5/15/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	1 - 2 ft	0.95	1	0.37	1	0.74	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	2 - 5 ft	0.16	1	0.061	1	0.13	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	4 - 5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4E	2/1/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	4.5 - 5.5 ft	1.3	1	0.56	1	1.4	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	9.5 - 10.5 ft	0.046	1	0.019	1	0.05	1	2.9	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	14.5 - 15.5 ft	0.039	1	0.026	1	0.05	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	1 - 2 ft	0.084	1	0.021	1	0.098	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	2 - 5 ft	120	1	52	1	97	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	5 - 10 ft	1.6	1	0.61	1	1.3	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	10 - 15 ft	3.5	1	1.2	1	3.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	14.5 - 15.5 ft	0.59	1	0.23	1	0.66	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	1 - 2 ft	190	1	71	1	180	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	2 - 3 ft	4.4	1	0.97	1	3.4	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	3 - 4 ft	1.3	1	0.36	1	1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	4 - 5 ft	1.1	1	0.38	1	0.92	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	10 - 11 ft	4.8	1	1.9	1	4.8	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	11 - 12 ft	0.086	1	0.031	1	0.074	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	12 - 13 ft	0.0073	1	0.0085	0	0.0054	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	13 - 14 ft	0.0086	0	0.0086	0	0.0086	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	14 - 15 ft	0.0087	0	0.0087	0	0.0087	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	1 - 2 ft	0.081	1	0.02	1	0.077	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	2 - 3 ft	0.92	1	0.33	1	0.84	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	3 - 4 ft	5.8	1	2.1	1	5.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	4 - 5 ft	19	1	6.2	1	17	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	5 - 6 ft	0.61	1	0.23	1	0.51	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	10 - 11 ft	0.61	1	0.19	1	0.53	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	11 - 12 ft	0.17	1	0.04	1	0.13	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	1 - 2 ft	0.26	1	0.07	1	0.19	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	2 - 3 ft	0.031	1	0.012	1	0.024	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	3 - 4 ft	0.0084	0	0.0084	0	0.0034	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	4 - 5 ft	0.0088	0	0.0088	0	0.0042	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	10 - 11 ft	0.0077	0	0.003	1	0.0033	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	11 - 12 ft	0.0079	0	0.0079	0	0.0079	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	12 - 13 ft	0.0082	0	0.0082	0	0.0082	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	13 - 14 ft	0.0081	0	0.0081	0	0.0081	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	14 - 15 ft	0.008	0	0.008	0	0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	1 - 2 ft	51	1	24	1	51	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	2 - 3 ft	1.1	1	0.46	1	1.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	3 - 4 ft	0.0077	0	0.0077	0	0.0077	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	4 - 5 ft	0.0085	0	0.0085	0	0.0085	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	10 - 11 ft	0.0091	0	0.0091	0	0.0091	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	11 - 12 ft	0.009	0	0.009	0	0.009	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	12 - 13 ft	0.0089	0	0.0089	0	0.0089	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	13 - 14 ft	0.0083	0	0.0083	0	0.0083	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	14 - 15 ft	0.008	0	0.008	0	0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	1 - 2 ft	0.39	1	0.1	1	0.13	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	1 - 2 ft	0.39	1	0.47	1	0.55	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	2 - 3 ft	0.13	1	0.039	1	0.12	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	3/28/2018	10 - 11 ft	0.24	1	0.12	1	0.23	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	5/17/2013	3.5 - 4.5 ft							4.1	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	9.5 - 10.5 ft							4.8	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	1 - 2 ft	1.4	1	0.44	1	1.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	2 - 5 ft	7.8	1	2.9	1	6.4	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	5 - 10 ft	0.42	1	0.17	1	0.36	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	10 - 15 ft	0.53	1	0.2	1	0.44	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	1 - 2 ft	14	1	6.1	1	14	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	2 - 3 ft	0.73	1	0.3	1	0.69	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	3 - 4 ft	0.053	1	0.031	1	0.053	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	4 - 5 ft	0.089	1	0.04	1	0.078	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	1 - 2 ft	14	1	4.2	1	10	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	2 - 3 ft	0.23	1	0.082	1	0.2	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	3 - 4 ft	0.14	1	0.04	1	0.12	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	4 - 5 ft	0.021	1	0.009	1	0.017	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	1 - 2 ft	0.14	1	0.052	1	0.15	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	2 - 3 ft	0.033	1	0.013	1	0.033	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	3 - 4 ft	0.078	1	0.031	1	0.086	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	4 - 5 ft	0.18	1	0.073	1	0.19	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	1 - 2 ft	510	1	200	1	450	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	2 - 3 ft	2.7	1	1.1	1	2	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	1 - 2 ft	1.9	1	0.59	1	1.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	1 - 2 ft	6.5	1	1.8	1	4.7	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	2 - 3 ft	0.039	1	0.01	1	0.027	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	1 - 2 ft	1.4	1	0.39	1	0.89	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	2 - 3 ft	0.48	1	0.13	1	0.3	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	1 - 2 ft	0.012	1	0.0058	1	0.0089	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	5/21/2013	2.5 - 3.5 ft							3.3	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	2.5 - 3.5 ft	1.8	1	0.58	1	1.4	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	3.5 - 5 ft	0.027	1	0.0094	1	0.019	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	1 - 2 ft	0.35	1	0.3	0	0.28	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	2 - 3 ft	0.45	1	0.13	1	0.35	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/15/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	1 - 2 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1A	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1B	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1C	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1D	1/25/2017	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1E	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1F	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1G	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	2/3/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2A	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2B	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2D	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2E	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2F	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2L	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2M	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2N	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2O	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2P	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1B	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1D	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1F	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1H	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1A	1/27/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1B	1/27/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1C	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1E	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1F	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1G	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	2/5/2013	0.5 - 1 ft	0.37	1	0.17	1	0.37	1	9.6	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	0 - 1 ft	0.38	1	0.18	1	0.4	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	2/6/2013	0 - 1 ft	2.4	1	0.77	1	2	1	4.4	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	0 - 1 ft	0.16	1	0.051	1	0.13	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	0 - 1 ft	2.3	1	0.72	1	1.9	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	0 - 1 ft	1	1	0.49	1	0.95	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	0 - 1 ft	0.66	1	0.23	1	0.56	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	0 - 1 ft	1.4	1	0.35	1	1.1	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	0 - 1 ft	0.19	1	0.071	1	0.13	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	0 - 1 ft	0.53	1	0.18	1	0.43	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	0 - 1 ft	0.46	1	0.3	1	0.41	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	0 - 1 ft	2.9	1	0.83	1	1.9	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	0 - 1 ft	2.8	1	0.48	1	2.1	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	0 - 1 ft	0.18	1	0.1	1	0.14	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	0 - 1 ft	5	1	1.3	1	2.5	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	0 - 1 ft	0.3	1	0.11	1	0.21	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	0 - 1 ft	0.14	0	0.14	0	0.14	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	1.5 - 2.5 ft	1	1	0.36	1	0.88	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	1/27/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	1/26/2017	0 - 1 ft	0.072	1	0.027	1	0.086	1	17	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/28/2013	3.5 - 4.5 ft	0.055	1	19	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/29/2013	13.5 - 14.5 ft	0.0076	0	19	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	5/15/2013	4.5 - 5.5 ft			19	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	14.5 - 15.5 ft			20	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	9.5 - 10.5 ft			19	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	1 - 2 ft	0.18	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	2 - 5 ft	0.023	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4E	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	4.5 - 5.5 ft	0.2	1	370	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	9.5 - 10.5 ft	0.01	1	75	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	14.5 - 15.5 ft	0.044	0	22	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	1 - 2 ft	0.012	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	2 - 5 ft	16	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	5 - 10 ft	0.32	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	10 - 15 ft	0.5	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	14.5 - 15.5 ft	0.12	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	1 - 2 ft	1.7	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	2 - 3 ft	0.86	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	3 - 4 ft	0.25	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	4 - 5 ft	0.23	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	10 - 11 ft	0.99	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	11 - 12 ft	0.018	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	12 - 13 ft	0.0085	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	13 - 14 ft	0.0086	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	14 - 15 ft	0.0087	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	1 - 2 ft	0.017	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	2 - 3 ft	0.16	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	3 - 4 ft	1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	4 - 5 ft	3.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	5 - 6 ft	0.029	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	10 - 11 ft	0.11	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	11 - 12 ft	0.027	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	1 - 2 ft	0.047	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	2 - 3 ft	0.0061	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	3 - 4 ft	0.0084	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	4 - 5 ft	0.0088	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	10 - 11 ft	0.0077	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	11 - 12 ft	0.0079	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	12 - 13 ft	0.0082	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	13 - 14 ft	0.0081	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	14 - 15 ft	0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	1 - 2 ft	9.8	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	2 - 3 ft	0.24	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	3 - 4 ft	0.0077	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	4 - 5 ft	0.0085	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	10 - 11 ft	0.0091	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	11 - 12 ft	0.009	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	12 - 13 ft	0.0089	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	13 - 14 ft	0.0083	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	14 - 15 ft	0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	1 - 2 ft	0.058	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	1 - 2 ft	0.097	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	2 - 3 ft	0.21	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	3/28/2018	10 - 11 ft	0.036	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	5/17/2013	3.5 - 4.5 ft			20	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	14.5 - 15.5 ft			150	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	9.5 - 10.5 ft			20	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	1 - 2 ft	0.16	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	2 - 5 ft	1.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	5 - 10 ft	0.059	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	10 - 15 ft	0.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	1 - 2 ft	2.3	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	2 - 3 ft	0.15	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	3 - 4 ft	0.012	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	4 - 5 ft	0.018	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	1 - 2 ft	1.2	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	2 - 3 ft	0.044	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	3 - 4 ft	0.021	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	4 - 5 ft	0.0053	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	1 - 2 ft	0.02	1	360	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	2 - 3 ft	0.0082	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	3 - 4 ft	0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	4 - 5 ft	0.025	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	1 - 2 ft	62	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	2 - 3 ft	0.5	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	1 - 2 ft	0.39	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	1 - 2 ft	0.84	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	2 - 3 ft	0.0083	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	1 - 2 ft	0.18	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	2 - 3 ft	0.08	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	1 - 2 ft	0.0076	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	5/21/2013	2.5 - 3.5 ft			67	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	14.5 - 15.5 ft			21	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	9.5 - 10.5 ft			18	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	2.5 - 3.5 ft	0.2	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	3.5 - 5 ft	0.0046	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	1 - 2 ft	0.3	0	7900	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	2 - 3 ft	0.053	1	98	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	2 - 3 ft			20	0
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/15/2017	1 - 2 ft			700	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	1 - 2 ft			470	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1A	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1B	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1C	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1D	1/25/2017	0 - 1 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1E	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1F	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1G	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	2/3/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2A	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2B	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2D	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2E	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2F	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2L	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2M	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2N	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2O	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2P	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1B	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1D	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1F	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1H	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1A	1/27/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1B	1/27/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1C	1/25/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1E	1/25/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1F	1/25/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1G	1/25/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	2/5/2013	0.5 - 1 ft	0.065	1	98	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	0 - 1 ft	0.077	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	2/6/2013	0 - 1 ft	0.42	1	79	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	0 - 1 ft	0.02	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	0 - 1 ft	0.72	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	0 - 1 ft	0.07	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	0 - 1 ft	0.11	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	0 - 1 ft	0.25	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	0 - 1 ft	0.036	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	0 - 1 ft	0.063	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	0 - 1 ft	0.07	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	0 - 1 ft	0.35	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	0 - 1 ft	0.28	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	0 - 1 ft	0.025	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	0 - 1 ft	0.51	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	0 - 1 ft	0.053	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	0 - 1 ft	0.14	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	1.5 - 2.5 ft	0.16	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	1/25/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	1/27/2017	1.5 - 2.5 ft				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	1/26/2017	0 - 1 ft	0.011	1	2900	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	0 - 1 ft			3400	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	0 - 1 ft			20	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/28/2013	3.5 - 4.5 ft	0.15	1	80	1	0.1	1	5.6	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/29/2013	13.5 - 14.5 ft	0.0076	0	43	1	0.0076	0	2.5	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	5/15/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	1 - 2 ft	0.48	1			0.038	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	2 - 5 ft	0.092	1			0.0058	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	4 - 5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4E	2/1/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	4.5 - 5.5 ft	0.7	1			0.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	9.5 - 10.5 ft	0.033	1	24	1	0.0067	1	4.2	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	14.5 - 15.5 ft	0.029	1			0.0038	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	1 - 2 ft	0.032	1			0.026	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	2 - 5 ft	59	1			1.6	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	5 - 10 ft	1	1			0.35	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	10 - 15 ft	1.7	1			0.069	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	14.5 - 15.5 ft	0.37	1			0.024	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	1 - 2 ft	110	1			30	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	2 - 3 ft	2.4	1			0.43	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	3 - 4 ft	0.77	1			0.099	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	4 - 5 ft	0.69	1			0.038	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	10 - 11 ft	2.9	1			0.22	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	11 - 12 ft	0.052	1			0.013	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	12 - 13 ft	0.0034	1			0.0085	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	13 - 14 ft	0.0086	0			0.0086	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	14 - 15 ft	0.0087	0			0.0087	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	1 - 2 ft	0.041	1			0.01	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	2 - 3 ft	0.51	1			0.04	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	3 - 4 ft	3.2	1			0.31	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	4 - 5 ft	10	1			1.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	5 - 6 ft	0.35	1			0.084	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	10 - 11 ft	0.41	1			0.26	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	11 - 12 ft	0.1	1			0.022	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	1 - 2 ft	0.13	1			0.078	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	2 - 3 ft	0.018	1			0.0039	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	3 - 4 ft	0.0084	0			0.0084	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	4 - 5 ft	0.0088	0			0.0088	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	10 - 11 ft	0.0077	0			0.0077	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	11 - 12 ft	0.0079	0			0.0079	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	12 - 13 ft	0.0082	0			0.0082	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	13 - 14 ft	0.0081	0			0.0081	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	14 - 15 ft	0.008	0			0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	1 - 2 ft	33	1			3.8	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	2 - 3 ft	0.78	1			0.06	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	3 - 4 ft	0.0077	0			0.0077	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	4 - 5 ft	0.0085	0			0.0085	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	10 - 11 ft	0.0091	0			0.0091	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	11 - 12 ft	0.009	0			0.009	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	12 - 13 ft	0.0089	0			0.0089	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	13 - 14 ft	0.0083	0			0.0083	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	14 - 15 ft	0.008	0			0.008	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	1 - 2 ft	0.18	1			0.041	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	1 - 2 ft	0.3	1			0.1	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	2 - 3 ft	0.17	1			0.079	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	3/28/2018	10 - 11 ft	0.12	1			0.013	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	5/17/2013	3.5 - 4.5 ft			53	1			13	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	9.5 - 10.5 ft			140	1			15	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	1 - 2 ft	0.63	1			0.15	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	2 - 5 ft	3.6	1			0.83	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	5 - 10 ft	0.24	1			0.063	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	10 - 15 ft	0.32	1			0.03	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	1 - 2 ft	9.1	1			0.46	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	2 - 3 ft	0.52	1			0.0084	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	3 - 4 ft	0.041	1			0.0081	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	4 - 5 ft	0.063	1			0.0078	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	1 - 2 ft	5.5	1			0.41	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	2 - 3 ft	0.15	1			0.0091	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	3 - 4 ft	0.082	1			0.0039	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	4 - 5 ft	0.016	1			0.0082	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	1 - 2 ft	0.067	1			0.048	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	2 - 3 ft	0.014	1			0.014	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	3 - 4 ft	0.035	1			0.045	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	4 - 5 ft	0.08	1			0.058	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	1 - 2 ft	260	1			130	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	2 - 3 ft	1.5	1			0.32	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	1 - 2 ft	1.1	1			0.092	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	1 - 2 ft	2.7	1			0.36	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	2 - 3 ft	0.02	1			0.007	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	1 - 2 ft	0.58	1			0.27	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	2 - 3 ft	0.27	1			0.19	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	1 - 2 ft	0.0094	1			0.0018	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	5/21/2013	2.5 - 3.5 ft			110	1			6	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	2.5 - 3.5 ft	0.76	1			0.16	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	3.5 - 5 ft	0.013	1			0.0019	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	1 - 2 ft	0.15	1			0.3	0		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	2 - 3 ft	0.3	1			0.17	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/15/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	1 - 2 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1A	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1B	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1C	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1D	1/25/2017	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1E	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1F	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1G	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	2/3/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2A	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2B	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2D	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2E	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2F	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2L	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2M	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2N	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2O	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2P	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1B	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1D	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1F	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1H	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1A	1/27/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1B	1/27/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1C	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1E	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1F	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1G	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	2/5/2013	0.5 - 1 ft	0.21	1	210	1	0.12	1	9.8	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	0 - 1 ft	0.2	1			0.07	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	2/6/2013	0 - 1 ft	1.3	1	120	1	0.23	1	27	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	0 - 1 ft	0.085	1			0.056	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	0 - 1 ft	1.4	1			0.72	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	0 - 1 ft	0.68	1			0.15	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	0 - 1 ft	0.37	1			0.051	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	0 - 1 ft	0.75	1			0.14	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	0 - 1 ft	0.1	1			0.018	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	0 - 1 ft	0.22	1			0.22	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	0 - 1 ft	0.28	1			0.043	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	0 - 1 ft	1.5	1			0.14	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	0 - 1 ft	1.3	1			0.32	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	0 - 1 ft	0.11	1			0.0084	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	0 - 1 ft	2	1			0.27	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	0 - 1 ft	0.16	1			0.055	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	0 - 1 ft	0.14	0			0.14	0		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	1.5 - 2.5 ft	0.44	1			0.032	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	1/25/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	1/27/2017	1.5 - 2.5 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	1/26/2017	0 - 1 ft	0.028	1	500	1	0.036	1	14	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	0 - 1 ft								
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/28/2013	3.5 - 4.5 ft	0.0047	0			0.12	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/29/2013	13.5 - 14.5 ft	0.0047	0			0.039	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	5/15/2013	4.5 - 5.5 ft	0.0047	0	0.000000138	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	14.5 - 15.5 ft	0.0099	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	9.5 - 10.5 ft	0.0046	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	1 - 2 ft	0.0094	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	2 - 5 ft	0.00095	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	1 - 2 ft	0.32	1	0.00000542	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	1 - 2 ft			0.0000235	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	2 - 3 ft			0.00000542	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	1 - 2 ft	2.2	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	2 - 3 ft	1.9	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	3 - 4 ft	1.9	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	4 - 5 ft	0.53	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4E	2/1/2018	1 - 2 ft	0.0022	1	0.00000125	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	1 - 2 ft	0.17	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	2 - 3 ft	0.1	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	3 - 4 ft	0.012	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	4.5 - 5.5 ft	0.39	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	9.5 - 10.5 ft	0.0051	0			0.07	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	14.5 - 15.5 ft	0.0054	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	1 - 2 ft	0.095	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	2 - 5 ft	1.1	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	5 - 10 ft	0.22	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	10 - 15 ft	0.019	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	1 - 2 ft	0.054	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	2 - 3 ft	0.0011	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	3 - 4 ft	0.00087	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	4 - 5 ft	0.00094	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	10 - 11 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	11 - 12 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	12 - 13 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	13 - 14 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	14 - 15 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	1 - 2 ft	0.0093	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	2 - 3 ft	0.0064	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	3 - 4 ft	0.065	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	4 - 5 ft	0.0097	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	5 - 6 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	10 - 11 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	11 - 12 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	2 - 3 ft	0.01	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	3 - 4 ft	0.00086	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	4 - 5 ft	0.0011	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	10 - 11 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	11 - 12 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	12 - 13 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	13 - 14 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	14 - 15 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	2 - 3 ft	0.0049	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	3 - 4 ft	0.00099	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	4 - 5 ft	0.43	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	10 - 11 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	11 - 12 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	12 - 13 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	13 - 14 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	14 - 15 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	3/28/2018	10 - 11 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	5/17/2013	3.5 - 4.5 ft	0.014	1			0.11	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	14.5 - 15.5 ft	0.0071	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	9.5 - 10.5 ft	0.28	1			0.1	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	1 - 2 ft	1.8	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	2 - 5 ft	1.4	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	5 - 10 ft	0.27	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	10 - 15 ft	0.036	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	1 - 2 ft	0.16	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	2 - 3 ft	0.00098	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	3 - 4 ft	0.001	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	4 - 5 ft	0.0023	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	1 - 2 ft	0.18	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	2 - 3 ft	0.00095	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	3 - 4 ft	0.002	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	4 - 5 ft	0.001	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	1 - 2 ft	0.47	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	2 - 3 ft	0.018	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	3 - 4 ft	0.0023	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	4 - 5 ft	0.0049	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	5/21/2013	2.5 - 3.5 ft	3.1	1			0.19	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	14.5 - 15.5 ft	0.0053	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	9.5 - 10.5 ft	0.0045	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	2.5 - 3.5 ft	4.6	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	3.5 - 5 ft	0.043	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	1 - 2 ft			0.00000126	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	2 - 3 ft	0.032	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	3 - 4 ft	0.0099	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	2 - 3 ft	1.8	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	3 - 4 ft	0.22	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	1 - 2 ft	0.36	1	0.0000219	1		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	2 - 3 ft	0.51	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	1 - 2 ft	0.63	1				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	2 - 3 ft	0.01	0				
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/15/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	1 - 2 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1A	1/27/2017	0 - 1 ft	3.2	1	0.0000909	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1B	1/25/2017	0 - 1 ft	2.7	1	0.000129	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1C	1/25/2017	0 - 1 ft	0.78	1	0.000049	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1D	1/25/2017	0 - 1 ft	0.0021	1	0.00000287	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1E	1/25/2017	0 - 1 ft	0.028	1	0.00000237	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1F	1/27/2017	0 - 1 ft	0.13	1	0.0000201	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1G	1/27/2017	0 - 1 ft	0.031	1	0.0000335	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	1/27/2017	0 - 1 ft	0.94	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	2/3/2017	0 - 1 ft			0.000109	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2A	3/23/2017	0 - 1 ft	1.4	1	0.0000193	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2B	3/23/2017	0 - 1 ft	0.73	1	0.000484	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2D	3/23/2017	0 - 1 ft	2.3	1	0.0000875	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2E	3/23/2017	0 - 1 ft			0.000156	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2F	3/22/2017	0 - 1 ft			0.00000265	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2L	3/22/2017	0 - 1 ft			0.00000764	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2M	3/22/2017	0 - 1 ft			0.00000785	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2N	3/22/2017	0 - 1 ft			0.00000578	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2O	3/22/2017	0 - 1 ft			0.00000268	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2P	3/23/2017	0 - 1 ft	0.49	1	0.0000413	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1B	1/25/2017	0 - 1 ft	0.0042	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1D	1/25/2017	0 - 1 ft	0.014	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1F	1/25/2017	0 - 1 ft	0.0026	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1H	1/25/2017	0 - 1 ft	0.0067	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1A	1/27/2017	1.5 - 2.5 ft	0.17	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1B	1/27/2017	1.5 - 2.5 ft	0.9	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1C	1/25/2017	1.5 - 2.5 ft	0.00092	0				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1E	1/25/2017	1.5 - 2.5 ft	0.019	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1F	1/25/2017	1.5 - 2.5 ft	0.033	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1G	1/25/2017	1.5 - 2.5 ft	0.012	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	2/5/2013	0.5 - 1 ft	1	1	0.000027	1	0.16	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	0 - 1 ft	0.081	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	0 - 1 ft	3.9	1	0.000079	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	0 - 1 ft	0.83	1	0.0000345	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	0 - 1 ft	1.2	1	0.00000578	1		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	0 - 1 ft	0.034	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	2/6/2013	0 - 1 ft	2.9	1			0.18	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	0 - 1 ft	0.3	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	1/25/2017	0 - 1 ft	0.3	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	1/25/2017	0 - 1 ft	0.24	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	1/25/2017	0 - 1 ft	0.7	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	1/25/2017	0 - 1 ft	0.74	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	0 - 1 ft	2.7	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	0 - 1 ft	0.28	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	0 - 1 ft	0.44	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	1.5 - 2.5 ft	3.2	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	1/25/2017	1.5 - 2.5 ft	0.011	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	1/27/2017	1.5 - 2.5 ft	14	1				
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	1/26/2017	0 - 1 ft	0.15	1	0.0000053	1	0.2	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	0 - 1 ft						
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/28/2013	3.5 - 4.5 ft	33	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	DP26	3/29/2013	13.5 - 14.5 ft	13	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	5/15/2013	4.5 - 5.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	6/10/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4E	2/1/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	4.5 - 5.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	9.5 - 10.5 ft	17	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	6/13/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	5 - 10 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	10 - 15 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/30/2017	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	10 - 11 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	11 - 12 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	12 - 13 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	13 - 14 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/23/2017	14 - 15 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	5 - 6 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	10 - 11 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/23/2017	11 - 12 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	10 - 11 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	11 - 12 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	12 - 13 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	13 - 14 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/23/2017	14 - 15 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	10 - 11 ft		

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	11 - 12 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	12 - 13 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	13 - 14 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/23/2017	14 - 15 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	3/28/2018	10 - 11 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	5/17/2013	3.5 - 4.5 ft	25	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	6/7/2013	9.5 - 10.5 ft	24	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	5 - 10 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/30/2017	10 - 15 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3A	8/10/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4NW	2/23/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	5/21/2013	2.5 - 3.5 ft	27	1
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	6/10/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	2.5 - 3.5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	3.5 - 5 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	8/9/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	8/9/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-2N	8/9/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	8/10/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/15/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	1 - 2 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1A	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1B	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1C	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1D	1/25/2017	0 - 1 ft		

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1E	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1F	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1G	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-1H	2/3/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2A	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2B	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2D	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2E	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2F	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2L	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2M	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2N	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2O	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS10-2P	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1B	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1D	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1F	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS12-1H	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1A	1/27/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1B	1/27/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1C	1/25/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1E	1/25/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1F	1/25/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUS44-1G	1/25/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	2/5/2013	0.5 - 1 ft	22	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3F	8/8/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3G	8/8/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-3X	8/8/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP10-4NW	1/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	2/6/2013	0 - 1 ft	36	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12	1/26/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1A	8/10/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1C	8/10/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1E	8/11/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-1G	8/11/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-2K	1/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP12-3A	2/1/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43	1/26/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2J	8/8/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-2M	8/9/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3P	1/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-3T	1/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-4SW	2/23/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP43-5NW	3/15/2018	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44	1/27/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1D	1/25/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP44-1H	1/27/2017	1.5 - 2.5 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50	1/26/2017	0 - 1 ft	16	1
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-2A	8/8/2017	0 - 1 ft		
SO	Surface	mg/kg	Salvage Yard and Waste Storage Area	SUSDP50-3A	1/30/2018	0 - 1 ft		

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181A	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181B	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181C	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181D	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181E	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181F	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181G	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181H	1/25/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/6/2013	0.17 - 1 ft	5.7	1	0.55	1	0.44	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	0 - 1 ft			0.36	1	0.32	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP16	2/6/2013	0.5 - 1 ft	3.2	1	0.037	1	0.041	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP17	2/6/2013	0.5 - 1 ft	3	1	0.012	1	0.011	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	2/6/2013	0 - 1 ft	7	1	0.08	1	0.087	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	0 - 1 ft			0.065	1	0.054	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	0 - 1 ft			0.9	1	1.1	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	6.4	1	0.31	1	0.32	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft			0.22	1	0.26	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49	1/26/2017	0 - 1 ft	7.5	1	0.32	1	0.26	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	0 - 1 ft						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	5.1	1	0.047	1	0.051	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft			0.24	1	0.28	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP52	1/26/2017	0 - 1 ft	4.1	1	0.0071	0	0.0071	0
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	0 - 1 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP32	4/1/2013	9.5 - 10.5 ft	2.8	1	0.008	0	0.008	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	5/23/2013	2.5 - 3.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	5/21/2013	3.5 - 4.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/6/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/10/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	1 - 2 ft			0.14	1	0.11	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	2 - 5 ft			0.098	1	0.083	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	5 - 10 ft			35	1	16	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	10 - 15 ft			0.44	1	0.36	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	5 - 6 ft			0.14	1	0.12	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	6 - 7 ft			0.1	1	0.089	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	7 - 8 ft			0.56	1	0.66	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	8 - 9 ft			0.087	1	0.074	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	9 - 10 ft			0.031	1	0.029	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	10 - 11 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	5 - 6 ft			0.037	1	0.033	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	6 - 7 ft			0.17	1	0.13	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	7 - 8 ft			0.16	1	0.13	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	8 - 9 ft			0.055	1	0.052	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	9 - 10 ft			0.072	1	0.063	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	10 - 11 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	5/15/2013	4.5 - 5.5 ft	3	1				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	5/23/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	14 - 15 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	5/23/2013	2.5 - 3.5 ft	1.6	1				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	6/4/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	1 - 2 ft			0.081	1	0.078	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	2 - 5 ft			0.0029	1	0.0012	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	1 - 2 ft			0.61	1	0.49	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	2 - 3 ft			0.26	1	0.24	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	3 - 4 ft			0.43	1	0.39	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	4 - 5 ft			6.5	1	5.4	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	1 - 2 ft			0.037	1	0.024	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	2 - 5 ft			0.56	1	0.58	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	5 - 10 ft			0.27	1	0.26	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	10 - 15 ft			0.43	1	0.41	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1E	8/16/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1G	8/16/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	3 - 4 ft			0.081	1	0.042	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	4 - 5 ft			0.014	1	0.0092	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	1 - 2 ft			0.15	1	0.14	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	2 - 5 ft			0.022	1	0.021	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	5 - 10 ft			0.0074	0	0.0074	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	10 - 15 ft			0.0075	0	0.0075	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP64	8/10/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	1 - 2 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181A	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181B	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181C	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181D	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181E	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181F	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181G	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181H	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/6/2013	0.17 - 1 ft	0.54	1	0.31	1	0.59	1	4.8	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	0 - 1 ft	0.42	1	0.16	1	0.36	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP16	2/6/2013	0.5 - 1 ft	0.05	1	0.021	1	0.049	1	3.2	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP17	2/6/2013	0.5 - 1 ft	0.015	1	0.0078	1	0.025	1	3.1	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	2/6/2013	0 - 1 ft	0.15	1	0.036	1	0.19	1	3.8	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	0 - 1 ft	0.076	1	0.036	1	0.066	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	0 - 1 ft	1.4	1	0.52	1	1.4	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.43	1	0.17	1	0.33	1	7.9	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.32	1	0.14	1	0.26	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49	1/26/2017	0 - 1 ft	0.37	1	0.14	1	0.35	1	7.1	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.08	1	0.032	1	0.049	1	3.9	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.36	1	0.14	1	0.25	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP52	1/26/2017	0 - 1 ft	0.0071	0	0.0071	0	0.0071	0	2	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	0 - 1 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP32	4/1/2013	9.5 - 10.5 ft	0.008	0	0.008	0	0.008	0	1	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	5/23/2013	2.5 - 3.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	5/21/2013	3.5 - 4.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/6/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	1 - 2 ft	0.23	1	0.063	1	0.21	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	2 - 5 ft	0.12	1	0.046	1	0.098	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	5 - 10 ft	35	1	7.1	1	32	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	10 - 15 ft	0.44	1	0.18	1	0.57	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	5 - 6 ft	0.17	1	0.042	1	0.16	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	6 - 7 ft	0.13	1	0.046	1	0.14	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	7 - 8 ft	0.78	1	0.26	1	0.65	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	8 - 9 ft	0.095	1	0.035	1	0.099	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	9 - 10 ft	0.044	1	0.013	1	0.041	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	10 - 11 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	5 - 6 ft	0.059	1	0.018	1	0.049	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	6 - 7 ft	0.19	1	0.063	1	0.16	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	7 - 8 ft	0.21	1	0.079	1	0.17	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	8 - 9 ft	0.077	1	0.021	1	0.058	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	9 - 10 ft	0.09	1	0.029	1	0.068	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	10 - 11 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	5/15/2013	4.5 - 5.5 ft							3.1	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	5/23/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	14 - 15 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	5/23/2013	2.5 - 3.5 ft							4	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	6/4/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	1 - 2 ft	0.1	1	0.049	1	0.088	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	2 - 5 ft	0.0027	1	0.0071	0	0.0022	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	1 - 2 ft	0.81	1	0.25	1	0.72	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	2 - 3 ft	0.23	1	0.12	1	0.23	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	3 - 4 ft	0.53	1	0.15	1	0.41	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	4 - 5 ft	6.2	1	2.2	1	5.3	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	1 - 2 ft	0.037	1	0.02	1	0.037	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	2 - 5 ft	0.75	1	0.33	1	0.62	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	5 - 10 ft	0.4	1	0.12	1	0.29	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	10 - 15 ft	0.47	1	0.2	1	0.43	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1E	8/16/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1G	8/16/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	3 - 4 ft	0.11	1	0.035	1	0.18	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	4 - 5 ft	0.026	1	0.0046	1	0.033	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	1 - 2 ft	0.21	1	0.083	1	0.17	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	2 - 5 ft	0.027	1	0.012	1	0.024	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	5 - 10 ft	0.0074	0	0.0074	0	0.0074	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	10 - 15 ft	0.0075	0	0.0075	0	0.0075	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP64	8/10/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	1 - 2 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181A	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181B	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181C	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181D	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181E	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181F	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181G	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181H	1/25/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/6/2013	0.17 - 1 ft	0.09	1	170	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	0 - 1 ft	0.068	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP16	2/6/2013	0.5 - 1 ft	0.0095	1	19	0
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP17	2/6/2013	0.5 - 1 ft	0.0029	1	19	0
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	2/6/2013	0 - 1 ft	0.025	1	21	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	0 - 1 ft	0.0097	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	0 - 1 ft	0.29	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.067	1	34	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.065	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49	1/26/2017	0 - 1 ft	0.045	1	99	0
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	0 - 1 ft				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.013	1	19	0
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.05	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP52	1/26/2017	0 - 1 ft	0.0071	0	18	0
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	0 - 1 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP32	4/1/2013	9.5 - 10.5 ft	0.008	0	20	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	5/23/2013	2.5 - 3.5 ft			20	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	9.5 - 10.5 ft			18	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	14.5 - 15.5 ft			19	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	5/21/2013	3.5 - 4.5 ft			210	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/6/2013	9.5 - 10.5 ft			280	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/10/2013	14.5 - 15.5 ft			140	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	1 - 2 ft	0.032	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	2 - 5 ft	0.017	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	5 - 10 ft	2.9	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	10 - 15 ft	0.071	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	5 - 6 ft	0.035	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	6 - 7 ft	0.03	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	7 - 8 ft	0.16	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	8 - 9 ft	0.018	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	9 - 10 ft	0.0088	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	5 - 6 ft	0.0082	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	6 - 7 ft	0.031	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	7 - 8 ft	0.04	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	8 - 9 ft	0.013	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	9 - 10 ft	0.008	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	5/15/2013	4.5 - 5.5 ft			20	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	14.5 - 15.5 ft			19	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	9.5 - 10.5 ft			19	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	5/23/2013	4.5 - 5.5 ft			19	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	9.5 - 10.5 ft			18	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	14 - 15 ft			18	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	5/23/2013	2.5 - 3.5 ft			18	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	6/4/2013	9.5 - 10.5 ft			19	0
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	1 - 2 ft	0.018	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	2 - 5 ft	0.0071	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	1 - 2 ft	0.15	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	2 - 3 ft	0.2	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	3 - 4 ft	0.078	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	4 - 5 ft	1	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	1 - 2 ft	0.0036	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	2 - 5 ft	0.11	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	5 - 10 ft	0.05	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	10 - 15 ft	0.073	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1E	8/16/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1G	8/16/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	3 - 4 ft	0.016	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	4 - 5 ft	0.0041	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	1 - 2 ft	0.023	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	2 - 5 ft	0.0043	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	5 - 10 ft	0.0074	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	10 - 15 ft	0.0075	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP64	8/10/2017	1 - 2 ft			70	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	1 - 2 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181A	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181B	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181C	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181D	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181E	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181F	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181G	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181H	1/25/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/6/2013	0.17 - 1 ft	0.34	1	110	1	0.067	1	19	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	0 - 1 ft	0.23	1			0.04	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP16	2/6/2013	0.5 - 1 ft	0.033	1	150	1	0.0043	1	2.2	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP17	2/6/2013	0.5 - 1 ft	0.0098	1	58	1	0.0062	1	3.4	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	2/6/2013	0 - 1 ft	0.074	1	220	1	0.016	1	7.7	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	0 - 1 ft	0.038	1			0.0035	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	0 - 1 ft	0.9	1			0.061	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.24	1	110	1	0.041	1	31	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.19	1			0.023	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49	1/26/2017	0 - 1 ft	0.21	1	160	1	0.066	1	20	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.039	1	93	1	0.0052	1	4.7	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.18	1			0.024	1		
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP52	1/26/2017	0 - 1 ft	0.0071	0	42	1	0.0071	0	2.6	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	0 - 1 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP32	4/1/2013	9.5 - 10.5 ft	0.008	0	14	1	0.008	0	1.7	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	5/23/2013	2.5 - 3.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	5/21/2013	3.5 - 4.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/6/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	1 - 2 ft	0.089	1			0.091	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	2 - 5 ft	0.059	1			0.038	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	5 - 10 ft	7.8	1			0.68	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	10 - 15 ft	0.21	1			0.047	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	5 - 6 ft	0.094	1			0.037	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	6 - 7 ft	0.079	1			0.06	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	7 - 8 ft	0.43	1			0.058	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	8 - 9 ft	0.056	1			0.017	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	9 - 10 ft	0.027	1			0.014	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	10 - 11 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	5 - 6 ft	0.027	1			0.016	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	6 - 7 ft	0.093	1			0.03	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	7 - 8 ft	0.11	1			0.038	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	8 - 9 ft	0.039	1			0.011	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	9 - 10 ft	0.052	1			0.009	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	10 - 11 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	5/15/2013	4.5 - 5.5 ft			110	1			3.7	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	5/23/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	14 - 15 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	5/23/2013	2.5 - 3.5 ft			230	1			3.5	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	6/4/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	1 - 2 ft	0.057	1			0.0044	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	2 - 5 ft	0.0071	0			0.0071	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	1 - 2 ft	0.39	1			0.15	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	2 - 3 ft	0.21	1			0.2	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	3 - 4 ft	0.29	1			0.022	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	4 - 5 ft	3.4	1			0.5	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	1 - 2 ft	0.017	1			0.0081	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	2 - 5 ft	0.34	1			0.083	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	5 - 10 ft	0.2	1			0.093	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	10 - 15 ft	0.3	1			0.035	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1E	8/16/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1G	8/16/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	3 - 4 ft	0.038	1			0.056	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	4 - 5 ft	0.0086	1			0.014	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	1 - 2 ft	0.081	1			0.015	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	2 - 5 ft	0.014	1			0.0035	1		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	5 - 10 ft	0.0074	0			0.0074	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	10 - 15 ft	0.0075	0			0.0075	0		
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP64	8/10/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	1 - 2 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181A	1/25/2017	0 - 1 ft	0.17	1	0.000000152	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181B	1/25/2017	0 - 1 ft	0.038	1	0.000000101	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181C	1/25/2017	0 - 1 ft	0.00091	0	0.000000393	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181D	1/25/2017	0 - 1 ft	0.0082	1	0.0000197	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181E	1/25/2017	0 - 1 ft	0.0022	1	0.000000473	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181F	1/25/2017	0 - 1 ft	0.0079	1	0.00000367	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181G	1/25/2017	0 - 1 ft	0.47	1	0.00000133	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUS181H	1/25/2017	0 - 1 ft	0.016	1	0.00000988	1				
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/6/2013	0.17 - 1 ft	0.33	1			0.14	1	26	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	0 - 1 ft	0.76	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	0 - 1 ft	1.3	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	0 - 1 ft	4.8	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP16	2/6/2013	0.5 - 1 ft	0.00095	1			0.11	0	11	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP17	2/6/2013	0.5 - 1 ft	0.086	1	0.00000389	1	0.11	0	12	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	2/6/2013	0 - 1 ft	1.4	1	0.0000223	1	0.11	0	13	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	0 - 1 ft	0.004	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	0 - 1 ft								
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	0.96	1	0.0000106	1	0.15	1	30	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	0 - 1 ft	2	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	0 - 1 ft	1.6	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	0 - 1 ft	0.013	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49	1/26/2017	0 - 1 ft	3.5	1	0.0000112	1	0.17	1	28	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	0 - 1 ft	0.049	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	0 - 1 ft	0.001	0						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.077	1	0.00000207	1	0.085	1	24	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	0 - 1 ft	0.43	1						
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP52	1/26/2017	0 - 1 ft	0.00091	0	0.000000937	1	0.06	1	22	1
SO	Surface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	0 - 1 ft	0.34	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP32	4/1/2013	9.5 - 10.5 ft	0.00099	0			0.12	0	22	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	5/23/2013	2.5 - 3.5 ft	0.0025	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	9.5 - 10.5 ft	0.0044	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	DP45	6/4/2013	14.5 - 15.5 ft	0.0047	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	5/21/2013	3.5 - 4.5 ft	0.57	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/6/2013	9.5 - 10.5 ft	1.1	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	6/10/2013	14.5 - 15.5 ft	0.38	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	1 - 2 ft	1.3	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	1/30/2017	2 - 5 ft	0.3	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	5 - 10 ft	0.16	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15	2/2/2017	10 - 15 ft	0.0011	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	1 - 2 ft	1	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	2 - 3 ft	1.2	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/14/2017	3 - 4 ft	0.51	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	5 - 6 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	6 - 7 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	7 - 8 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	8 - 9 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	9 - 10 ft	0.18	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1C	8/22/2017	10 - 11 ft	0.0097	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/15/2017	1 - 2 ft	0.36	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	5 - 6 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	6 - 7 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	7 - 8 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	8 - 9 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	9 - 10 ft	0.0099	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP15-1G	8/30/2017	10 - 11 ft	0.13	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	5/15/2013	4.5 - 5.5 ft	0.00097	0			0.082	1	19	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	14.5 - 15.5 ft	0.0046	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP16	6/10/2013	9.5 - 10.5 ft	0.0047	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	5/23/2013	4.5 - 5.5 ft	0.0046	0	0.00000137	1				
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	9.5 - 10.5 ft	0.0045	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP17	6/11/2013	14 - 15 ft	0.0047	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	5/23/2013	2.5 - 3.5 ft	0.0046	1	3.67E-08	1	0.047	1	12	1
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	6/4/2013	9.5 - 10.5 ft	0.0047	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	1 - 2 ft	0.15	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP18	1/26/2017	2 - 5 ft	0.001	1						

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP19-7NW	4/5/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	1 - 2 ft	0.013	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/26/2017	2 - 5 ft	0.36	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	5 - 10 ft	0.23	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48	1/27/2017	10 - 15 ft	0.03	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1C	8/15/2017	1 - 2 ft	0.81	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1E	8/16/2017	1 - 2 ft	0.42	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-1G	8/16/2017	1 - 2 ft	0.0088	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP48-2E	1/30/2018	1 - 2 ft	0.91	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	1 - 2 ft	2.1	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49	8/11/2017	2 - 3 ft	0.53	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	1 - 2 ft	3.5	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1C	8/11/2017	2 - 3 ft	0.01	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	1 - 2 ft	1.4	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	2 - 3 ft	0.068	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP49-1E	8/11/2017	4 - 5 ft								
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	1 - 2 ft	0.17	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/26/2017	2 - 5 ft	0.025	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	5 - 10 ft	0.00095	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP51	1/27/2017	10 - 15 ft	0.00095	0						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP64	8/10/2017	1 - 2 ft	0.82	1						
SO	Subsurface	mg/kg	Stores and Fleet Mainenance	SUSDP65	1/30/2018	1 - 2 ft	0.43	1						

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene
SO	Surface	mg/kg	Offices and Parking Lot	SUS19-2E	3/22/2017	0 - 1 ft			0.93	1	0.94	1	1.2	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP09	2/5/2013	0 - 1 ft	2.2	1	0.25	1	0.29	1	0.32	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP14	2/6/2013	0.17 - 1 ft	3.7	1	0.68	1	0.7	1	0.82	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	2/6/2013	0.83 - 1 ft	3	1	2.9	1	2.8	1	3.3	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	0 - 1 ft			1	1	1	1	1.4	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	0 - 1 ft			0.38	1	0.43	1	0.49	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	0 - 1 ft			0.06	1	0.067	1	0.074	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	0 - 1 ft			1.8	1	1.8	1	2.6	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	0 - 1 ft			2.3	1	2.3	1	2.8	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	0 - 1 ft			4.2	1	3.8	1	4.7	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	0 - 1 ft			0.78	1	0.67	1	0.92	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2D	3/22/2017	0 - 1 ft			2.7	1	2.3	1	2.9	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	0 - 1 ft			0.64	1	0.61	1	0.73	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	0 - 1 ft			0.13	1	0.13	1	0.14	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	0 - 1 ft			0.027	1	0.029	1	0.036	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	0 - 1 ft			1	1	1	1	1.3	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	0 - 1 ft			0.25	1	0.31	1	0.34	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	0 - 1 ft			0.07	0	0.07	0	0.07	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	0 - 1 ft			0.0059	1	0.0066	1	0.0096	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	0 - 1 ft			0.046	1	0.14	1	0.28	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	0 - 1 ft			0.21	1	0.2	1	0.28	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	0 - 1 ft			0.17	1	0.15	1	0.22	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	0 - 1 ft			0.18	1	0.18	1	0.26	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	0 - 1 ft			0.23	1	0.22	1	0.3	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	0 - 1 ft			14	1	11	1	12	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	0 - 1 ft			0.16	0	0.16	0	0.16	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	0 - 1 ft			0.0027	1	0.0022	1	0.0039	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	0 - 1 ft			1.9	1	1.6	1	2	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	0 - 1 ft			0.034	1	0.031	1	0.037	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	0 - 1 ft			0.21	1	0.35	1	0.41	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	5/17/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	9.5 - 10.5 ft	2.4	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	5/22/2013	2.5 - 3.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	5/23/2013	1.5 - 2.5 ft	3	1	1.9	1	2.3	1	2.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	14.5 - 15.5 ft			0.0011	1	0.0077	0	0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	9.5 - 10.5 ft	4.2	1	15	1	14	1	16	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	1 - 2 ft			3.2	1	2.8	1	3.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	2 - 5 ft			2.5	1	2.5	1	3.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	5 - 10 ft			12	1	12	1	15	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	10 - 15 ft			0.0058	1	0.0068	1	0.011	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	2 - 3 ft			1.2	1	1.3	1	1.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	10 - 11 ft			0.0017	1	0.008	0	0.008	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	15 - 16 ft			0.0085	0	0.0085	0	0.0085	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	2 - 3 ft			0.83	1	0.86	1	1.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	10 - 11 ft			0.039	1	0.033	1	0.037	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	15 - 16 ft			0.0082	0	0.0082	0	0.0082	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	2 - 3 ft			0.35	1	0.41	1	0.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	10 - 11 ft			0.012	1	0.0094	1	0.014	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	15 - 16 ft			0.008	0	0.008	0	0.008	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	1 - 2 ft			5.2	1	5.1	1	5.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	2 - 3 ft			5.2	1	4.5	1	5.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	3 - 4 ft			8.1	1	9	1	9.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	4 - 5 ft			2.9	1	2.9	1	2.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	5 - 6 ft			3.4	1	3.5	1	3.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	1 - 2 ft			0.44	1	0.45	1	0.51	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	2 - 3 ft			1.3	1	1.3	1	1.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	3 - 4 ft			1	1	0.94	1	1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	4 - 5 ft			7	1	7.5	1	9	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	2 - 3 ft			29	1	21	1	25	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	10 - 11 ft			0.064	1	0.054	1	0.064	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	15 - 16 ft			0.0084	0	0.0084	0	0.0084	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	2 - 3 ft			6	1	5.5	1	7	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	10 - 11 ft			0.27	1	0.2	1	0.29	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	15 - 16 ft			0.0077	0	0.0077	0	0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	1 - 2 ft			5.2	1	4.3	1	5.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	2 - 3 ft			8.2	1	7.7	1	9.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	3 - 4 ft			3	1	2.9	1	4.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	4 - 5 ft			3.1	1	2.8	1	3.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	5 - 6 ft			1.1	1	1.1	1	1.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	2 - 3 ft			3.4	1	3	1	4.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	3 - 4 ft			7.8	1	6.6	1	8.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	4 - 5 ft			36	1	28	1	33	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	5 - 6 ft			7.6	1	6.6	1	7.9	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	2 - 3 ft			0.091	1	0.08	1	0.097	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	2 - 3 ft			19	1	16	1	20	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	3 - 4 ft			3.8	1	3.8	1	4.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	4 - 5 ft			17	1	13	1	17	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	5 - 6 ft			9.1	1	7.9	1	9.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	6 - 7 ft			8	1	8.9	1	11	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	7 - 8 ft			14	1	14	1	16	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	10 - 11 ft			6.8	1	5.5	1	6.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	11 - 12 ft			0.0053	1	0.0037	1	0.0058	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	2 - 3 ft			7	1	5.8	1	6.9	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	3 - 4 ft			3.2	1	3.5	1	4.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	4 - 5 ft			3.5	1	3.2	1	3.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	5 - 6 ft			1.2	1	1.2	1	1.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	1 - 2 ft			1.6	1	1.4	1	1.9	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	2 - 3 ft			0.22	1	0.22	1	0.25	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	3 - 4 ft			0.16	1	0.15	1	0.18	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	4 - 5 ft			0.1	1	0.095	1	0.11	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	5 - 6 ft			0.21	1	0.16	1	0.18	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	1 - 2 ft			0.73	1	0.67	1	0.81	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	2 - 3 ft			2.9	1	2.8	1	3.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	3 - 4 ft			1.8	1	1.8	1	2.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	4 - 5 ft			6.1	1	5.3	1	7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	5 - 6 ft			5.8	1	5.1	1	6.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	1 - 2 ft			4.4	1	4	1	4.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	2 - 3 ft			8.1	1	7.8	1	9.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	3 - 4 ft			6.8	1	6.8	1	6.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	4 - 5 ft			6.1	1	5.2	1	6.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	5 - 6 ft			2.5	1	2.4	1	3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	1 - 2 ft			6.6	1	5.6	1	6.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	2 - 3 ft			14	1	13	1	15	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	3 - 4 ft			13	1	11	1	13	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	4 - 5 ft			2.9	1	2.5	1	3.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	5 - 6 ft			1.4	1	1.7	1	2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	1 - 2 ft			0.35	1	0.28	1	0.41	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	2 - 3 ft			12	1	9.8	1	12	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	3 - 4 ft			39	1	37	1	57	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	4 - 5 ft			15	1	14	1	16	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	5 - 6 ft			14	1	14	1	19	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	6 - 7 ft			3.9	1	3.7	1	5.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	7 - 8 ft			26	1	23	1	31	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	10 - 11 ft			0.41	1	0.41	1	0.51	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	11 - 12 ft			0.0077	0	0.0077	0	0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	1 - 2 ft			3.5	1	2.6	1	4.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	2 - 3 ft			2.3	1	2.1	1	3.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	3 - 4 ft			0.72	1	0.66	1	0.88	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	4 - 5 ft			15	1	14	1	22	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	5 - 6 ft			15	1	16	1	21	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	6 - 7 ft			2.3	1	2.3	1	2.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	7 - 8 ft			27	1	30	1	32	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	10 - 11 ft			2.3	1	2.3	1	2.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	11 - 12 ft			0.0051	1	0.0045	1	0.0063	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	1 - 2 ft			1.3	1	1.1	1	1.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	2 - 3 ft			6.7	1	6.6	1	8.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	3 - 4 ft			4.7	1	4.1	1	5.5	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	4 - 5 ft			2.1	1	1.9	1	2.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	5 - 6 ft			0.1	1	0.11	1	0.14	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	1 - 2 ft			2.5	1	2.2	1	3.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	2 - 3 ft			0.13	1	0.12	1	0.17	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	3 - 4 ft			7	1	5.7	1	7.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	4 - 5 ft			11	1	9	1	12	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	5 - 6 ft			2.8	1	2.4	1	3.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	1 - 2 ft			4.3	1	4.1	1	5.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	2 - 3 ft			4	1	3.3	1	4.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	3 - 4 ft			12	1	10	1	14	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	4 - 5 ft			3	1	3.2	1	4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	5 - 6 ft			2.1	1	2.1	1	3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	1 - 2 ft			1.3	1	1.1	1	1.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	2 - 3 ft			1.6	1	1.3	1	1.9	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	3 - 4 ft			31	1	25	1	31	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	4 - 5 ft			0.42	1	0.33	1	0.45	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	1 - 2 ft			0.67	1	0.76	1	0.92	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	2 - 3 ft			5.9	1	5.2	1	6.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	3 - 4 ft			5.2	1	4.7	1	6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	4 - 5 ft			0.0093	1	0.0081	1	0.0095	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	1 - 2 ft			0.7	1	0.57	1	0.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	2 - 3 ft			16	1	14	1	19	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	3 - 4 ft			0.39	1	0.31	1	0.32	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	4 - 5 ft			46	1	46	1	36	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	5 - 6 ft			16	1	14	1	17	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	1 - 2 ft			5.9	1	5.5	1	5.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	2 - 3 ft			720	1	640	1	420	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	3 - 4 ft			240	1	200	1	200	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	1 - 2 ft			24	1	19	1	23	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	2 - 3 ft			0.94	1	0.86	1	1.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	3 - 4 ft			2.4	1	2.2	1	2.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	4 - 5 ft			0.34	1	0.32	1	0.36	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	1 - 2 ft			0.007	0	0.007	0	0.007	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	2 - 3 ft			0.007	0	0.007	0	0.007	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	3 - 4 ft			0.0075	0	0.0075	0	0.0075	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	4 - 5 ft			0.0079	0	0.0079	0	0.0079	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	5 - 6 ft			0.0076	0	0.0076	0	0.0076	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	1 - 2 ft			0.011	1	0.011	1	0.016	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	2 - 5 ft			0.0011	1	0.0081	0	0.0081	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	5 - 10 ft			0.0018	1	0.0081	0	0.0081	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	10 - 15 ft			0.0017	1	0.0091	0	0.0019	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Surface	mg/kg	Offices and Parking Lot	SUS19-2E	3/22/2017	0 - 1 ft	0.43	1	0.98	1			0.22	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP09	2/5/2013	0 - 1 ft	0.087	1	0.26	1	4.6	1	0.045	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP14	2/6/2013	0.17 - 1 ft	0.29	1	0.67	1	5	1	0.15	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	2/6/2013	0.83 - 1 ft	1.1	1	2.8	1	11	1	0.69	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	0 - 1 ft	0.46	1	1.1	1			0.24	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	0 - 1 ft	0.22	1	0.39	1			0.09	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	0 - 1 ft	0.03	1	0.06	1			0.014	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	0 - 1 ft	0.92	1	1.8	1			0.36	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	0 - 1 ft	0.86	1	2.3	1			0.61	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	0 - 1 ft	1.9	1	3.9	1			0.71	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	0 - 1 ft	0.28	1	0.81	1			0.13	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2D	3/22/2017	0 - 1 ft	1.2	1	2.6	1			0.56	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	0 - 1 ft	0.33	1	0.63	1			0.14	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	0 - 1 ft	0.36	0	0.14	1			0.36	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	0 - 1 ft	0.019	1	0.031	1			0.0069	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	0 - 1 ft	0.48	1	1.1	1			0.24	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	0 - 1 ft	0.14	1	0.28	1			0.091	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	0 - 1 ft	0.07	0	0.07	0			0.07	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	0 - 1 ft	0.003	1	0.0058	1			0.0072	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	0 - 1 ft	0.044	1	0.13	1			0.023	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	0 - 1 ft	0.092	1	0.2	1			0.072	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	0 - 1 ft	0.063	1	0.15	1			0.034	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	0 - 1 ft	0.089	1	0.16	1			0.059	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	0 - 1 ft	0.12	1	0.24	1			0.084	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	0 - 1 ft	5.5	1	12	1			2.2	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	0 - 1 ft	0.16	0	0.16	0			0.16	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	0 - 1 ft	0.0072	0	0.0031	1			0.0072	0
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	0 - 1 ft	0.76	1	1.9	1			0.38	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	0 - 1 ft	0.016	1	0.032	1			0.0076	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	0 - 1 ft	0.13	1	0.22	1			0.07	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	5/17/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	9.5 - 10.5 ft					8.6	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	5/22/2013	2.5 - 3.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	5/23/2013	1.5 - 2.5 ft	0.95	1	1.9	1	13	1	0.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	14.5 - 15.5 ft	0.0077	0	0.0013	1			0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	9.5 - 10.5 ft	6.3	1	15	1	7.3	1	2.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	1 - 2 ft	1.5	1	3	1			0.58	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	2 - 5 ft	1.2	1	2.4	1			0.57	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	5 - 10 ft	3.6	1	12	1			2.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	10 - 15 ft	0.0029	1	0.0087	1			0.0074	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	2 - 3 ft	0.5	1	1.2	1			0.27	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	10 - 11 ft	0.008	0	0.0016	1			0.008	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	15 - 16 ft	0.0085	0	0.0085	0			0.0085	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	2 - 3 ft	0.35	1	0.87	1			0.21	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	10 - 11 ft	0.019	1	0.039	1			0.0073	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	15 - 16 ft	0.0082	0	0.0082	0			0.0082	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	2 - 3 ft	0.2	1	0.41	1			0.081	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	10 - 11 ft	0.0045	1	0.012	1			0.0031	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	15 - 16 ft	0.008	0	0.008	0			0.008	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	1 - 2 ft	2.3	1	5.3	1			1.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	2 - 3 ft	1.8	1	5	1			1.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	3 - 4 ft	2.9	1	8	1			2.1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	4 - 5 ft	1.5	1	2.7	1			0.69	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	5 - 6 ft	1.6	1	3.4	1			1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	1 - 2 ft	0.23	1	0.48	1			0.13	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	2 - 3 ft	0.56	1	1.4	1			0.36	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	3 - 4 ft	0.51	1	1.2	1			0.28	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	4 - 5 ft	2.4	1	6.9	1			1.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	2 - 3 ft	12	1	25	1			4.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	10 - 11 ft	0.026	1	0.058	1			0.013	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	15 - 16 ft	0.0084	0	0.0084	0			0.0084	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	2 - 3 ft	2.8	1	5.5	1			1.1	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	10 - 11 ft	0.084	1	0.26	1			0.042	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	15 - 16 ft	0.0077	0	0.0077	0			0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	1 - 2 ft	2.5	1	4.9	1			0.59	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	2 - 3 ft	4	1	8.3	1			1.7	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	3 - 4 ft	1.3	1	2.9	1			1.1	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	4 - 5 ft	1.5	1	3.2	1			0.91	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	5 - 6 ft	0.54	1	1.1	1			0.34	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	2 - 3 ft	1.1	1	3.1	1			0.63	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	3 - 4 ft	3.3	1	7.8	1			1.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	4 - 5 ft	14	1	34	1			6.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	5 - 6 ft	2.9	1	7.7	1			1.9	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	2 - 3 ft	0.35	0	0.071	1			0.35	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	2 - 3 ft	7.1	1	18	1			3.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	3 - 4 ft	1.8	1	3.7	1			0.81	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	4 - 5 ft	5.6	1	16	1			3.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	5 - 6 ft	3.6	1	8.5	1			2.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	6 - 7 ft	4.6	1	7.4	1			1.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	7 - 8 ft	5.9	1	12	1			2.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	10 - 11 ft	2.3	1	7.1	1			0.87	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	11 - 12 ft	0.0023	1	0.0049	1			0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	2 - 3 ft	2.7	1	6.6	1			1.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	3 - 4 ft	1.4	1	3.3	1			0.73	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	4 - 5 ft	1.6	1	3.7	1			0.88	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	5 - 6 ft	1.5	0	1.2	1			1.5	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	1 - 2 ft	0.59	1	1.7	1			0.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	2 - 3 ft	0.097	1	0.22	1			0.055	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	3 - 4 ft	0.053	1	0.16	1			0.035	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	4 - 5 ft	0.046	1	0.11	1			0.027	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	5 - 6 ft	0.3	0	0.19	1			0.3	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	1 - 2 ft	0.28	1	0.74	1			0.15	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	2 - 3 ft	1.1	1	2.9	1			0.74	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	3 - 4 ft	0.71	1	2	1			1.2	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	4 - 5 ft	2.4	1	5.6	1			0.59	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	5 - 6 ft	2.3	1	5.2	1			1.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	1 - 2 ft	1.6	1	4.2	1			0.89	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	2 - 3 ft	3.5	1	8	1			1.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	3 - 4 ft	3.6	1	7	1			1.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	4 - 5 ft	2.4	1	5.8	1			0.58	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	5 - 6 ft	0.92	1	2.4	1			0.73	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	1 - 2 ft	2	1	6.5	1			1.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	2 - 3 ft	6	1	14	1			2.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	3 - 4 ft	5.6	1	12	1			2.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	4 - 5 ft	0.97	1	2.9	1			0.86	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	5 - 6 ft	0.71	1	1.7	1			0.68	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	1 - 2 ft	0.11	1	0.31	1			0.07	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	2 - 3 ft	5.6	1	11	1			2.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	3 - 4 ft	15	1	33	1			12	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	4 - 5 ft	6.9	1	13	1			3.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	5 - 6 ft	4.1	1	12	1			3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	6 - 7 ft	2.3	1	4.7	1			1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	7 - 8 ft	11	1	29	1			4.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	10 - 11 ft	0.14	1	0.43	1			0.058	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	11 - 12 ft	0.0077	0	0.0077	0			0.0077	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	1 - 2 ft	0.85	1	3	1			0.44	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	2 - 3 ft	0.7	1	2	1			0.53	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	3 - 4 ft	0.28	1	0.56	1			0.32	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	4 - 5 ft	2.8	1	13	1			4.4	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	5 - 6 ft	4.3	1	13	1			3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	6 - 7 ft	1.1	1	2.2	1			0.36	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	7 - 8 ft	15	1	28	1			6.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	10 - 11 ft	1.5	1	2.6	1			0.45	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	11 - 12 ft	0.0026	1	0.0055	1			0.0087	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	1 - 2 ft	0.37	1	1.2	1			0.16	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	2 - 3 ft	3.7	1	6	1			1.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	3 - 4 ft	1.8	1	4.1	1			0.79	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	4 - 5 ft	0.85	1	1.8	1			0.73	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	5 - 6 ft	0.048	1	0.097	1			0.022	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	1 - 2 ft	1.1	1	2.3	1			0.58	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	2 - 3 ft	0.05	1	0.11	1			0.026	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	3 - 4 ft	2.9	1	5.7	1			1.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	4 - 5 ft	4.9	1	9.3	1			1.6	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	5 - 6 ft	1.1	1	2.5	1			0.51	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	1 - 2 ft	1.9	1	4	1			0.94	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	2 - 3 ft	1.8	1	3.4	1			0.74	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	3 - 4 ft	2.9	1	10	1			2.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	4 - 5 ft	1.3	1	2.7	1			1.5	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	5 - 6 ft	0.59	1	2	1			0.67	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	1 - 2 ft	0.46	1	1.2	1			0.21	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	2 - 3 ft	0.53	1	1.4	1			0.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	3 - 4 ft	14	1	26	1			5.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	4 - 5 ft	0.13	1	0.38	1			0.073	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	1 - 2 ft	0.32	1	0.68	1			0.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	2 - 3 ft	2.8	1	5.5	1			1.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	3 - 4 ft	2.3	1	5.2	1			1.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	4 - 5 ft	0.0049	1	0.0085	1			0.0087	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	1 - 2 ft	0.33	1	0.7	1			0.11	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	2 - 3 ft	8.2	1	16	1			3.2	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	3 - 4 ft	0.21	1	0.32	1			0.061	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	4 - 5 ft	17	1	39	1			5.3	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	5 - 6 ft	6.4	1	14	1			2.8	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	1 - 2 ft	3.2	1	5.4	1			1	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	2 - 3 ft	570	1	620	1			100	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	3 - 4 ft	120	1	210	1			39	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	1 - 2 ft	8.6	1	20	1			3.7	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	2 - 3 ft	0.44	1	1	1			0.25	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	3 - 4 ft	1.1	1	2.3	1			0.48	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	4 - 5 ft	0.17	1	0.34	1			0.064	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	1 - 2 ft	0.007	0	0.007	0			0.007	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	2 - 3 ft	0.007	0	0.007	0			0.007	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	3 - 4 ft	0.0075	0	0.0075	0			0.0075	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	4 - 5 ft	0.0079	0	0.0079	0			0.0079	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	5 - 6 ft	0.0076	0	0.0076	0			0.0076	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	1 - 2 ft	0.0046	1	0.013	1			0.0021	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	2 - 5 ft	0.0081	0	0.0081	0			0.0081	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	5 - 10 ft	0.0081	0	0.0028	1			0.0081	0
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	10 - 15 ft	0.0091	0	0.002	1			0.0091	0

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese
SO	Surface	mg/kg	Offices and Parking Lot	SUS19-2E	3/22/2017	0 - 1 ft			0.72	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP09	2/5/2013	0 - 1 ft	18	0	0.17	1	130	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP14	2/6/2013	0.17 - 1 ft	99	0	0.49	1	260	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	2/6/2013	0.83 - 1 ft	94	0	1.9	1	170	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	0 - 1 ft			0.77	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	0 - 1 ft			0.33	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	0 - 1 ft			0.04	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	0 - 1 ft			1.2	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	0 - 1 ft			2	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	0 - 1 ft			2.5	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	0 - 1 ft			0.42	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2D	3/22/2017	0 - 1 ft			1.9	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	0 - 1 ft			0.48	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	0 - 1 ft			0.12	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	0 - 1 ft			0.023	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	0 - 1 ft			0.79	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	0 - 1 ft			0.3	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	0 - 1 ft			0.07	0		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	0 - 1 ft			0.0071	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	0 - 1 ft			0.066	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	0 - 1 ft			0.17	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	0 - 1 ft			0.11	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	0 - 1 ft			0.17	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	0 - 1 ft			0.17	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	0 - 1 ft			7.1	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	0 - 1 ft			0.16	0		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	0 - 1 ft			0.0021	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	0 - 1 ft			1.1	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	0 - 1 ft			0.023	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	0 - 1 ft			0.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	5/17/2013	4.5 - 5.5 ft	20	0				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	9.5 - 10.5 ft	21	0			67	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	14.5 - 15.5 ft	18	0				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	5/22/2013	2.5 - 3.5 ft	23	1				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	9.5 - 10.5 ft	21	0				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	14.5 - 15.5 ft	21	0				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	5/23/2013	1.5 - 2.5 ft	96	0	1.5	1	200	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	14.5 - 15.5 ft	20	0	0.0077	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	9.5 - 10.5 ft	380	0	8.9	1	400	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	1 - 2 ft			2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	2 - 5 ft			1.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	5 - 10 ft			8.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	10 - 15 ft			0.006	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	2 - 3 ft			0.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	10 - 11 ft			0.008	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	15 - 16 ft			0.0085	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	2 - 3 ft			0.59	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	10 - 11 ft			0.021	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	15 - 16 ft			0.0082	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	2 - 3 ft			0.26	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	10 - 11 ft			0.0071	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	15 - 16 ft			0.008	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	1 - 2 ft			4.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	2 - 3 ft			3.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	3 - 4 ft			7.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	4 - 5 ft			2.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	5 - 6 ft			2.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	1 - 2 ft			0.37	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	2 - 3 ft			1.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	3 - 4 ft			0.75	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	4 - 5 ft			7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	2 - 3 ft			12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	10 - 11 ft			0.036	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	15 - 16 ft			0.0084	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	2 - 3 ft			3.5	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	10 - 11 ft			0.12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	15 - 16 ft			0.0077	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	1 - 2 ft			3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	2 - 3 ft			5.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	3 - 4 ft			2.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	4 - 5 ft			2.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	5 - 6 ft			0.99	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	2 - 3 ft			2.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	3 - 4 ft			4.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	4 - 5 ft			22	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	5 - 6 ft			5.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	2 - 3 ft			0.09	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	2 - 3 ft			11	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	3 - 4 ft			3.5	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	4 - 5 ft			11	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	5 - 6 ft			6.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	6 - 7 ft			6.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	7 - 8 ft			9.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	10 - 11 ft			2.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	11 - 12 ft			0.0031	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	2 - 3 ft			3.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	3 - 4 ft			2.5	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	4 - 5 ft			2.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	5 - 6 ft			0.98	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	1 - 2 ft			1.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	2 - 3 ft			0.18	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	3 - 4 ft			0.12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	4 - 5 ft			0.086	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	5 - 6 ft			0.15	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	1 - 2 ft			0.52	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	2 - 3 ft			2.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	3 - 4 ft			1.5	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	4 - 5 ft			4.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	5 - 6 ft			3.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	1 - 2 ft			3.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	2 - 3 ft			6.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	3 - 4 ft			5.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	4 - 5 ft			4.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	5 - 6 ft			2.5	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	1 - 2 ft			3.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	2 - 3 ft			9.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	3 - 4 ft			8.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	4 - 5 ft			2.3	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	5 - 6 ft			2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	1 - 2 ft			0.21	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	2 - 3 ft			7.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	3 - 4 ft			43	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	4 - 5 ft			12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	5 - 6 ft			12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	6 - 7 ft			2.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	7 - 8 ft			16	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	10 - 11 ft			0.26	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	11 - 12 ft			0.0077	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	1 - 2 ft			1.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	2 - 3 ft			1.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	3 - 4 ft			0.69	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	4 - 5 ft			11	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	5 - 6 ft			12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	6 - 7 ft			1.5	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	7 - 8 ft			19	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	10 - 11 ft			1.6	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	11 - 12 ft			0.0032	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	1 - 2 ft			0.71	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	2 - 3 ft			4.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	3 - 4 ft			2.4	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	4 - 5 ft			1.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	5 - 6 ft			0.083	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	1 - 2 ft			1.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	2 - 3 ft			0.082	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	3 - 4 ft			3.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	4 - 5 ft			6	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	5 - 6 ft			1.8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	1 - 2 ft			3.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	2 - 3 ft			2.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	3 - 4 ft			7.6	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	4 - 5 ft			3.7	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	5 - 6 ft			2.1	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	1 - 2 ft			0.79	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	2 - 3 ft			0.99	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	3 - 4 ft			17	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	4 - 5 ft			0.24	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	1 - 2 ft			0.58	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	2 - 3 ft			3.9	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	3 - 4 ft			3.6	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	4 - 5 ft			0.0066	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	1 - 2 ft			0.44	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	2 - 3 ft			11	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	3 - 4 ft			0.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	4 - 5 ft			20	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	5 - 6 ft			8	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	1 - 2 ft			3.2	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	2 - 3 ft			380	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	3 - 4 ft			120	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	1 - 2 ft			12	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	2 - 3 ft			0.71	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	3 - 4 ft			1.4	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	4 - 5 ft			0.21	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	1 - 2 ft			0.007	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	2 - 3 ft			0.007	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	3 - 4 ft			0.0075	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	4 - 5 ft			0.0079	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	5 - 6 ft			0.0076	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	1 - 2 ft			0.0074	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	2 - 5 ft			0.0081	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	5 - 10 ft			0.0081	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	10 - 15 ft			0.0091	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Naphthalene	D_Naphthalene	Nickel	D_Nickel	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Surface	mg/kg	Offices and Parking Lot	SUS19-2E	3/22/2017	0 - 1 ft	0.023	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP09	2/5/2013	0 - 1 ft	0.027	1	19	1	0.23	1	0.00000555	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP14	2/6/2013	0.17 - 1 ft	0.028	1	19	1	0.29	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	2/6/2013	0.83 - 1 ft	0.056	1	30	1	0.18	1	0.0000137	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	0 - 1 ft	0.046	1			0.33	1		
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	0 - 1 ft	0.021	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	0 - 1 ft	0.0066	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	0 - 1 ft	0.04	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	0 - 1 ft	0.23	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	0 - 1 ft	0.074	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	0 - 1 ft	0.041	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2D	3/22/2017	0 - 1 ft	0.068	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	0 - 1 ft	0.031	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	0 - 1 ft	0.36	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	0 - 1 ft	0.0039	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	0 - 1 ft	0.03	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	0 - 1 ft	0.02	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	0 - 1 ft	0.07	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	0 - 1 ft	0.0072	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	0 - 1 ft	0.0071	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	0 - 1 ft	0.075	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	0 - 1 ft	0.011	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	0 - 1 ft	0.028	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	0 - 1 ft	0.077	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	0 - 1 ft	0.41	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	0 - 1 ft	0.16	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	0 - 1 ft	0.0072	0						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	0 - 1 ft	0.047	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	0 - 1 ft	0.0016	1						
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	0 - 1 ft	0.013	1			0.14	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	5/17/2013	4.5 - 5.5 ft					0.0051	0	0.00000047	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	9.5 - 10.5 ft			11	1	0.0051	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	14.5 - 15.5 ft					0.0045	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	5/22/2013	2.5 - 3.5 ft					0.71	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	9.5 - 10.5 ft					0.0052	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	14.5 - 15.5 ft					0.0051	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	5/23/2013	1.5 - 2.5 ft	0.09	1	13	1	0.11	1	0.00000656	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	14.5 - 15.5 ft	0.0077	0			0.017	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	9.5 - 10.5 ft	1.1	1	18	1	0.0095	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	1 - 2 ft	0.088	1			0.26	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	2 - 5 ft	0.08	1			0.045	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	5 - 10 ft	0.37	1			0.01	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	10 - 15 ft	0.0074	0			0.0046	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	2 - 3 ft	0.028	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	10 - 11 ft	0.008	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	15 - 16 ft	0.0085	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	2 - 3 ft	0.02	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	10 - 11 ft	0.0025	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	15 - 16 ft	0.0082	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	2 - 3 ft	0.017	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	10 - 11 ft	0.0079	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	15 - 16 ft	0.008	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	1 - 2 ft	0.12	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	2 - 3 ft	0.17	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	3 - 4 ft	0.44	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	4 - 5 ft	0.27	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	5 - 6 ft	0.82	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	1 - 2 ft	0.043	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	2 - 3 ft	0.064	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	3 - 4 ft	0.19	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	4 - 5 ft	0.76	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	2 - 3 ft	1.2	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	10 - 11 ft	0.0061	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	15 - 16 ft	0.0084	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	2 - 3 ft	0.088	1						

Matrix	horizon	Units	Area	Location	Collected	Depth	Naphthalene	D_Naphthalene	Nickel	D_Nickel	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	10 - 11 ft	0.013	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	15 - 16 ft	0.0077	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	1 - 2 ft	0.59	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	2 - 3 ft	1.7	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	3 - 4 ft	1.1	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	4 - 5 ft	0.15	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	5 - 6 ft	0.073	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	2 - 3 ft	0.31	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	3 - 4 ft	0.61	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	4 - 5 ft	1.7	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	5 - 6 ft	0.26	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	2 - 3 ft	0.35	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	2 - 3 ft	1.2	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	3 - 4 ft	0.18	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	4 - 5 ft	0.7	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	5 - 6 ft	0.43	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	6 - 7 ft	0.3	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	7 - 8 ft	0.59	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	10 - 11 ft	1	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	11 - 12 ft	0.0077	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	2 - 3 ft	0.13	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	3 - 4 ft	0.73	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	4 - 5 ft	0.76	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	5 - 6 ft	1.5	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	1 - 2 ft	0.74	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	2 - 3 ft	0.0064	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	3 - 4 ft	0.0045	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	4 - 5 ft	0.0034	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	5 - 6 ft	0.3	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	1 - 2 ft	0.02	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	2 - 3 ft	0.37	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	3 - 4 ft	1.2	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	4 - 5 ft	0.59	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	5 - 6 ft	0.24	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	1 - 2 ft	0.15	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	2 - 3 ft	0.15	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	3 - 4 ft	1.7	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	4 - 5 ft	0.58	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	5 - 6 ft	0.44	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	1 - 2 ft	0.15	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	2 - 3 ft	0.76	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	3 - 4 ft	0.7	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	4 - 5 ft	1.7	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	5 - 6 ft	0.71	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	1 - 2 ft	0.011	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	2 - 3 ft	0.34	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	3 - 4 ft	16	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	4 - 5 ft	7.9	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	5 - 6 ft	2.5	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	6 - 7 ft	0.59	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	7 - 8 ft	1.8	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	10 - 11 ft	0.015	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	11 - 12 ft	0.0077	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	1 - 2 ft	0.23	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	2 - 3 ft	0.22	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	3 - 4 ft	0.36	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	4 - 5 ft	2.8	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	5 - 6 ft	1.2	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	6 - 7 ft	0.14	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	7 - 8 ft	0.75	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	10 - 11 ft	0.25	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	11 - 12 ft	0.0087	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	1 - 2 ft	0.067	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	2 - 3 ft	0.15	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	3 - 4 ft	0.14	1						

Matrix	horizon	Units	Area	Location	Collected	Depth	Naphthalene	D_Naphthalene	Nickel	D_Nickel	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	4 - 5 ft	0.75	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	5 - 6 ft	0.0085	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	1 - 2 ft	0.19	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	2 - 3 ft	0.004	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	3 - 4 ft	0.2	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	4 - 5 ft	0.43	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	5 - 6 ft	0.063	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	1 - 2 ft	0.11	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	2 - 3 ft	0.16	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	3 - 4 ft	0.19	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	4 - 5 ft	1.3	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	5 - 6 ft	0.18	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	1 - 2 ft	0.087	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	2 - 3 ft	0.1	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	3 - 4 ft	0.97	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	4 - 5 ft	0.021	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	1 - 2 ft	0.31	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	2 - 3 ft	0.23	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	3 - 4 ft	0.071	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	4 - 5 ft	0.0087	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	1 - 2 ft	0.39	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	2 - 3 ft	0.15	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	3 - 4 ft	0.019	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	4 - 5 ft	2.8	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	5 - 6 ft	2	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	1 - 2 ft	2.1	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	2 - 3 ft	100	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	3 - 4 ft	11	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	1 - 2 ft	5.2	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	2 - 3 ft	0.057	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	3 - 4 ft	0.087	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	4 - 5 ft	0.011	1						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	1 - 2 ft	0.007	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	2 - 3 ft	0.007	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	3 - 4 ft	0.0075	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	4 - 5 ft	0.0079	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	5 - 6 ft	0.0076	0						
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	1 - 2 ft	0.0013	1			0.05	1		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	2 - 5 ft	0.0081	0			0.00098	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	5 - 10 ft	0.0018	1			0.001	0		
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	10 - 15 ft	0.0018	1			0.0011	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Surface	mg/kg	Offices and Parking Lot	SUS19-2E	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP09	2/5/2013	0 - 1 ft	0.1	0	16	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP14	2/6/2013	0.17 - 1 ft	0.12	0	23	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	2/6/2013	0.83 - 1 ft	0.11	0	19	1
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2D	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	0 - 1 ft				
SO	Surface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	0 - 1 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	5/17/2013	4.5 - 5.5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	9.5 - 10.5 ft	0.13	1	31	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP09	6/11/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	5/22/2013	2.5 - 3.5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	9.5 - 10.5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP14	6/6/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	5/23/2013	1.5 - 2.5 ft	0.1	1	20	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	14.5 - 15.5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	6/5/2013	9.5 - 10.5 ft	0.071	1	36	1
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	1/30/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19	2/8/2017	10 - 15 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1A	2/8/2017	15 - 16 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1B	2/8/2017	15 - 16 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	1/27/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1C	2/8/2017	15 - 16 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1D	8/22/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1F	8/22/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/1/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1G	2/8/2017	15 - 16 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/1/2017	2 - 3 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-1H	2/8/2017	15 - 16 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2D	8/17/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	3/23/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2M	8/16/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2N	3/23/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/23/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	8/23/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	6 - 7 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	7 - 8 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2O	3/28/2018	11 - 12 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	3/23/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-2P	8/17/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3F	8/18/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3S	8/24/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3V	8/24/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-3X	8/18/2017	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	1/26/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	6 - 7 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	7 - 8 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4N	3/28/2018	11 - 12 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	2/1/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	6 - 7 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	7 - 8 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	10 - 11 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4NW	3/28/2018	11 - 12 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	3 - 4 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Thallium	D_Thallium	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-4W	2/1/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5N	2/21/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5NW	2/21/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-5W	2/21/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6N	3/15/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/15/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6NW	3/16/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-6W	3/16/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7N	4/5/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP19-7W	4/5/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	1/31/2017	2 - 5 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	5 - 10 ft				
SO	Subsurface	mg/kg	Offices and Parking Lot	SUSDP53	2/2/2017	10 - 15 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Substation #7	SUS201A	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201B	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201C	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201D	2/2/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201E	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201F	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201G	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS201H	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Substation #7	SUS25	2/7/2013	0.5 - 1 ft	2.6	1	0.057	1	0.058	1
SO	Surface	mg/kg	Substation #7	SUSDP20	2/7/2013	0.42 - 1 ft	33	1	0.11	1	0.08	1
SO	Surface	mg/kg	Substation #7	SUSDP20	1/27/2017	0 - 1 ft			0.019	1	0.023	1
SO	Surface	mg/kg	Substation #7	SUSDP23	2/7/2013	0.5 - 1 ft	0.65	1	0.036	0	0.036	0
SO	Surface	mg/kg	Substation #7	SUSDP24	2/7/2013	0 - 1 ft	3.8	1	1.8	1	1.4	1
SO	Subsurface	mg/kg	Substation #7	DP33	4/4/2013	14 - 16 ft	3.7	1	0.008	0	0.008	0
SO	Subsurface	mg/kg	Substation #7	DP34	3/13/2013	4.5 - 5.5 ft	1.5	1	0.0079	0	0.0079	0
SO	Subsurface	mg/kg	Substation #7	SUSDP20	5/30/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Substation #7	SUSDP20	6/12/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	1 - 2 ft			0.014	1	0.015	1
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	2 - 5 ft			0.009	1	0.0079	1
SO	Subsurface	mg/kg	Substation #7	SUSDP23	5/28/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Substation #7	SUSDP24	5/20/2013	4.5 - 5.5 ft			0.0073	0	0.0073	0
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	14.5 - 15.5 ft			0.0074	0	0.0074	0
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	9.5 - 10.5 ft	1.2	1	0.0075	0	0.0075	0

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Surface	mg/kg	Substation #7	SUS201A	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201B	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201C	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201D	2/2/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201E	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201F	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201G	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201H	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS25	2/7/2013	0.5 - 1 ft	0.083	1	0.033	1	0.064	1	3.1	1
SO	Surface	mg/kg	Substation #7	SUSDP20	2/7/2013	0.42 - 1 ft	0.2	1	0.055	1	0.22	1	4.6	1
SO	Surface	mg/kg	Substation #7	SUSDP20	1/27/2017	0 - 1 ft	0.046	1	0.014	1	0.034	1		
SO	Surface	mg/kg	Substation #7	SUSDP23	2/7/2013	0.5 - 1 ft	0.036	0	0.036	0	0.036	0	3.7	1
SO	Surface	mg/kg	Substation #7	SUSDP24	2/7/2013	0 - 1 ft	3.2	1	1.7	1	3.2	1	4.7	1
SO	Subsurface	mg/kg	Substation #7	DP33	4/4/2013	14 - 16 ft	0.008	0	0.008	0	0.008	0	4.6	1
SO	Subsurface	mg/kg	Substation #7	DP34	3/13/2013	4.5 - 5.5 ft	0.0079	0	0.0079	0	0.0079	0	1.8	1
SO	Subsurface	mg/kg	Substation #7	SUSDP20	5/30/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP20	6/12/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	1 - 2 ft	0.019	1	0.0074	1	0.016	1		
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	2 - 5 ft	0.012	1	0.0047	1	0.0098	1		
SO	Subsurface	mg/kg	Substation #7	SUSDP23	5/28/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP24	5/20/2013	4.5 - 5.5 ft	0.004	1	0.0073	0	0.0073	0		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	14.5 - 15.5 ft	0.0074	0	0.0074	0	0.0074	0		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	9.5 - 10.5 ft	0.0075	0	0.0075	0	0.0075	0	4	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Surface	mg/kg	Substation #7	SUS201A	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201B	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201C	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201D	2/2/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201E	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201F	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201G	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS201H	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Substation #7	SUS25	2/7/2013	0.5 - 1 ft	0.012	1	20	1
SO	Surface	mg/kg	Substation #7	SUSDP20	2/7/2013	0.42 - 1 ft	0.035	1	94	0
SO	Surface	mg/kg	Substation #7	SUSDP20	1/27/2017	0 - 1 ft	0.007	1		
SO	Surface	mg/kg	Substation #7	SUSDP23	2/7/2013	0.5 - 1 ft	0.036	0	18	0
SO	Surface	mg/kg	Substation #7	SUSDP24	2/7/2013	0 - 1 ft	0.4	1	97	0
SO	Subsurface	mg/kg	Substation #7	DP33	4/4/2013	14 - 16 ft	0.008	0	20	0
SO	Subsurface	mg/kg	Substation #7	DP34	3/13/2013	4.5 - 5.5 ft	0.0079	0	20	0
SO	Subsurface	mg/kg	Substation #7	SUSDP20	5/30/2013	4.5 - 5.5 ft			21	0
SO	Subsurface	mg/kg	Substation #7	SUSDP20	6/12/2013	9.5 - 10.5 ft			19	0
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	1 - 2 ft	0.0021	1		
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	2 - 5 ft	0.002	1		
SO	Subsurface	mg/kg	Substation #7	SUSDP23	5/28/2013	4.5 - 5.5 ft			18	0
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	9.5 - 10.5 ft			20	0
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	14.5 - 15.5 ft			21	0
SO	Subsurface	mg/kg	Substation #7	SUSDP24	5/20/2013	4.5 - 5.5 ft	0.0073	0	18	0
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	14.5 - 15.5 ft	0.0074	0	19	0
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	9.5 - 10.5 ft	0.0075	0	19	0

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Substation #7	SUS201A	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201B	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201C	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201D	2/2/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201E	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201F	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201G	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS201H	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Substation #7	SUS25	2/7/2013	0.5 - 1 ft	0.048	1	140	1	0.0038	1	3.6	1
SO	Surface	mg/kg	Substation #7	SUSDP20	2/7/2013	0.42 - 1 ft	0.085	1	120	1	0.067	1	14	1
SO	Surface	mg/kg	Substation #7	SUSDP20	1/27/2017	0 - 1 ft	0.02	1			0.0061	1		
SO	Surface	mg/kg	Substation #7	SUSDP23	2/7/2013	0.5 - 1 ft	0.036	0	370	1	0.036	0	12	1
SO	Surface	mg/kg	Substation #7	SUSDP24	2/7/2013	0 - 1 ft	1.3	1	160	1	0.053	1	12	1
SO	Subsurface	mg/kg	Substation #7	DP33	4/4/2013	14 - 16 ft	0.008	0	35	1	0.008	0	7	1
SO	Subsurface	mg/kg	Substation #7	DP34	3/13/2013	4.5 - 5.5 ft	0.0079	0	32	1	0.0079	0	1.3	1
SO	Subsurface	mg/kg	Substation #7	SUSDP20	5/30/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP20	6/12/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	1 - 2 ft	0.01	1			0.0081	0		
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	2 - 5 ft	0.0061	1			0.0087	0		
SO	Subsurface	mg/kg	Substation #7	SUSDP23	5/28/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Substation #7	SUSDP24	5/20/2013	4.5 - 5.5 ft	0.0073	0			0.0073	0		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	14.5 - 15.5 ft	0.0074	0			0.0074	0		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	9.5 - 10.5 ft	0.0075	0	79	1	0.0075	0	3	1

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Surface	mg/kg	Substation #7	SUS201A	1/27/2017	0 - 1 ft	0.00092	0				
SO	Surface	mg/kg	Substation #7	SUS201B	1/27/2017	0 - 1 ft	0.0091	1				
SO	Surface	mg/kg	Substation #7	SUS201C	1/27/2017	0 - 1 ft	0.0011	1				
SO	Surface	mg/kg	Substation #7	SUS201D	2/2/2017	0 - 1 ft	0.0015	1				
SO	Surface	mg/kg	Substation #7	SUS201E	1/27/2017	0 - 1 ft	0.022	1				
SO	Surface	mg/kg	Substation #7	SUS201F	1/27/2017	0 - 1 ft	0.42	1				
SO	Surface	mg/kg	Substation #7	SUS201G	1/27/2017	0 - 1 ft	0.093	1				
SO	Surface	mg/kg	Substation #7	SUS201H	1/27/2017	0 - 1 ft	0.00095	0				
SO	Surface	mg/kg	Substation #7	SUS25	2/7/2013	0.5 - 1 ft	0.25	1	0.00000437	1	0.11	0
SO	Surface	mg/kg	Substation #7	SUSDP20	2/7/2013	0.42 - 1 ft	5.1	1			0.25	1
SO	Surface	mg/kg	Substation #7	SUSDP20	1/27/2017	0 - 1 ft	0.026	1				
SO	Surface	mg/kg	Substation #7	SUSDP23	2/7/2013	0.5 - 1 ft	0.0087	1			0.1	0
SO	Surface	mg/kg	Substation #7	SUSDP24	2/7/2013	0 - 1 ft	0.074	1			0.11	0
SO	Subsurface	mg/kg	Substation #7	DP33	4/4/2013	14 - 16 ft	0.00098	0			0.11	0
SO	Subsurface	mg/kg	Substation #7	DP34	3/13/2013	4.5 - 5.5 ft	0.00098	0			0.02	1
SO	Subsurface	mg/kg	Substation #7	SUSDP20	5/30/2013	4.5 - 5.5 ft	0.0052	0				
SO	Subsurface	mg/kg	Substation #7	SUSDP20	6/12/2013	9.5 - 10.5 ft	0.0074	1				
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	1 - 2 ft	0.00098	0				
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	2 - 5 ft	0.0011	0				
SO	Subsurface	mg/kg	Substation #7	SUSDP23	5/28/2013	4.5 - 5.5 ft	0.0046	0				
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	9.5 - 10.5 ft	0.003	1				
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	14.5 - 15.5 ft	0.0053	0				
SO	Subsurface	mg/kg	Substation #7	SUSDP24	5/20/2013	4.5 - 5.5 ft	0.0046	0	0.000000362	1		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	14.5 - 15.5 ft	0.0047	0				
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	9.5 - 10.5 ft	0.0048	0			0.047	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Surface	mg/kg	Substation #7	SUS201A	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201B	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201C	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201D	2/2/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201E	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201F	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201G	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS201H	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUS25	2/7/2013	0.5 - 1 ft	11	1
SO	Surface	mg/kg	Substation #7	SUSDP20	2/7/2013	0.42 - 1 ft	21	1
SO	Surface	mg/kg	Substation #7	SUSDP20	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Substation #7	SUSDP23	2/7/2013	0.5 - 1 ft	3.4	1
SO	Surface	mg/kg	Substation #7	SUSDP24	2/7/2013	0 - 1 ft	23	1
SO	Subsurface	mg/kg	Substation #7	DP33	4/4/2013	14 - 16 ft	32	1
SO	Subsurface	mg/kg	Substation #7	DP34	3/13/2013	4.5 - 5.5 ft	9.7	1
SO	Subsurface	mg/kg	Substation #7	SUSDP20	5/30/2013	4.5 - 5.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP20	6/12/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP20	1/27/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP23	5/28/2013	4.5 - 5.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP23	6/12/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	5/20/2013	4.5 - 5.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Substation #7	SUSDP24	6/4/2013	9.5 - 10.5 ft	12	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Transformer Shop	DP35	3/28/2013	14.5 - 15.5 ft	0.81	1	0.0079	0	0.0079	0
SO	Subsurface	mg/kg	Transformer Shop	DP46	5/22/2013	4.5 - 5.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	DP47	5/28/2013	1.5 - 2.5 ft	7.7	1				
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	14 - 15 ft						
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	1 - 2 ft			2	1	1.9	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	2 - 5 ft			3.7	1	3.6	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	2/2/2017	5 - 10 ft			0.56	1	0.49	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	1 - 2 ft			1.1	0	1.1	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	1 - 2 ft			0.85	1	0.78	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	1 - 2 ft			6.6	1	5.6	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	2 - 3 ft			12	1	11	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	3 - 4 ft			8.2	1	8.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	4 - 5 ft			3.4	1	2.7	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	1 - 2 ft			4	1	3.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	2 - 3 ft			1.6	1	1.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3V	8/25/2017	1 - 2 ft			0.098	1	0.098	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	1 - 2 ft			3.7	1	3.3	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	2 - 3 ft			0.75	0	0.75	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	1 - 2 ft			1.8	1	1.4	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	5/22/2013	2.5 - 3.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	9.5 - 10.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	14.5 - 15.5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	1 - 2 ft			1.8	1	1.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	2 - 3 ft			0.95	1	1.2	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	3 - 4 ft			0.072	1	0.088	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	1 - 2 ft			1.1	1	1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	2 - 3 ft			2.7	1	2.2	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	3 - 4 ft			0.33	1	0.28	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	1 - 2 ft			0.4	1	0.42	1

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	2 - 3 ft			0.18	1	0.2	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	1 - 2 ft			1.4	1	1.6	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	2 - 3 ft			12	1	9	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	3 - 4 ft			6.5	1	4.4	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	4 - 5 ft			0.008	1	0.0073	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	5 - 6 ft			0.0077	0	0.0077	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	1 - 2 ft			0.37	1	0.36	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	2 - 3 ft			0.13	1	0.11	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	3 - 4 ft			0.7	1	0.68	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	1 - 2 ft			2.9	1	3.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	2 - 3 ft			0.54	1	0.52	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	3 - 4 ft			3.9	1	3.4	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	4 - 5 ft			3.5	1	3.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	5 - 6 ft			0.0039	1	0.0035	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	1 - 2 ft			0.88	1	0.82	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	2 - 3 ft			2.5	1	2	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	3 - 4 ft			19	1	15	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	4 - 5 ft			1.9	1	1.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	1 - 2 ft			1	1	0.91	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	2 - 3 ft			0.58	1	0.56	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	1 - 2 ft			5.3	1	4.6	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	2 - 3 ft			2.6	1	2.3	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	3 - 4 ft			3.8	0	3.8	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	4 - 5 ft			2.3	0	2.3	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	1 - 2 ft			1.1	1	0.95	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	2 - 3 ft			1.2	1	1.2	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	3 - 4 ft			9.2	1	6.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	4 - 5 ft			3.8	0	3.8	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	1 - 2 ft			23	1	18	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	2 - 3 ft			4.9	1	3.9	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	3 - 4 ft			2.6	1	2.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	4 - 5 ft			3	0	3	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	1 - 2 ft			2.8	1	2.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	2 - 3 ft			3.4	1	2.7	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	3 - 4 ft			0.07	1	0.076	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	4 - 5 ft			0.91	1	1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	1 - 2 ft			0.89	1	0.72	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	2 - 3 ft			12	1	9.7	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	3 - 4 ft			1.4	1	1.4	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	1 - 2 ft			0.3	1	0.31	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	2 - 3 ft			10	1	8.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	1 - 2 ft			0.97	1	0.79	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	2 - 3 ft			0.46	1	0.42	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	1 - 2 ft			4.7	1	3.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	2 - 3 ft			3.4	1	2.8	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	3 - 4 ft			0.37	1	0.42	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	1 - 2 ft			0.47	1	0.5	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	2 - 3 ft			0.53	1	0.53	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	3 - 4 ft			1.1	1	1.1	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	1 - 2 ft			0.61	1	0.52	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	2 - 3 ft			0.34	1	0.31	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	1 - 2 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-1A	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-1B	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-1E	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-1F	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-1G	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-1H	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2D	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2E	3/23/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2I	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2J	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2L	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2M	3/22/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUS21-2N	3/22/2017	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene
SO	Surface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	0 - 1 ft			2	1	1.7	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21	2/7/2013	1 - 1.75 ft	1.7	1	1.9	1	1.6	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	1/27/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	0 - 1 ft			0.068	0	0.068	0
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	0 - 1 ft			0.14	1	0.37	0
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	0 - 1 ft			1.8	1	1.6	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3Q	8/24/2017	0 - 1 ft			0.0033	1	0.0077	0
SO	Surface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	0 - 1 ft			0.066	1	0.068	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	0 - 1 ft			0.035	1	0.037	1
SO	Surface	mg/kg	Transformer Shop	SUSDP22	6/13/2013	0.5 - 1 ft			0.77	1	0.69	1
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	0 - 1 ft			0.0069	0	0.0069	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	0 - 1 ft			0.0069	0	0.0069	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	0 - 1 ft			0.014	0	0.014	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	0 - 1 ft			0.0069	0	0.0069	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	0 - 1 ft			0.007	0	0.007	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	0 - 1 ft			0.0037	1	0.0029	1
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	0 - 1 ft			0.0069	0	0.0069	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	0 - 1 ft			0.038	1	0.049	1
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	0 - 1 ft			0.0069	0	0.0069	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	0 - 1 ft			0.55	1	0.6	1
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	0 - 1 ft			0.014	0	0.014	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	0 - 1 ft			0.069	0	0.069	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	0 - 1 ft			0.007	0	0.007	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	0 - 1 ft			0.021	0	0.021	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	0 - 1 ft			0.73	1	0.72	1
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	0 - 1 ft			0.0072	1	0.0069	1
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	0 - 1 ft						

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Subsurface	mg/kg	Transformer Shop	DP35	3/28/2013	14.5 - 15.5 ft	0.0079	0	0.0079	0	0.0079	0	1.2	1
SO	Subsurface	mg/kg	Transformer Shop	DP46	5/22/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP47	5/28/2013	1.5 - 2.5 ft							6.5	1
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	14 - 15 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	1 - 2 ft	2.1	1	0.81	1	1.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	2 - 5 ft	4.2	1	1.7	1	3.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	2/2/2017	5 - 10 ft	0.75	1	0.22	1	0.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	1 - 2 ft	1.1	0	1.1	0	1.1	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	1 - 2 ft	1	1	0.43	1	0.94	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	1 - 2 ft	7.2	1	2.4	1	6.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	2 - 3 ft	13	1	5.5	1	11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	3 - 4 ft	9.9	1	3.3	1	7.7	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	4 - 5 ft	3.5	1	1.2	1	2.8	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	1 - 2 ft	4.4	1	1.5	1	3.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	2 - 3 ft	1.9	1	0.65	1	1.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3V	8/25/2017	1 - 2 ft	0.12	1	0.052	1	0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	1 - 2 ft	4.9	1	1.5	1	3.3	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	2 - 3 ft	0.75	0	0.75	0	0.75	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	1 - 2 ft	1.9	1	0.72	1	1.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	5/22/2013	2.5 - 3.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	1 - 2 ft	2	1	0.83	1	1.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	2 - 3 ft	1.4	1	0.63	1	0.99	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	3 - 4 ft	0.13	1	0.043	1	0.15	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	5 - 6 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	1 - 2 ft	1.3	1	0.5	1	0.94	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	2 - 3 ft	3	1	1.3	1	2.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	3 - 4 ft	0.37	1	0.1	1	0.29	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	1 - 2 ft	0.62	1	0.16	1	0.35	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	2 - 3 ft	0.24	1	0.1	1	0.18	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	1 - 2 ft	2.2	1	0.8	1	1.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	2 - 3 ft	12	1	4.2	1	10	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	3 - 4 ft	7	1	2.3	1	6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	4 - 5 ft	0.0087	1	0.0056	1	0.0071	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	5 - 6 ft	0.0077	0	0.0077	0	0.0077	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	1 - 2 ft	0.44	1	0.18	1	0.34	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	2 - 3 ft	0.17	1	0.062	1	0.13	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	3 - 4 ft	0.95	1	0.45	1	0.65	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	1 - 2 ft	4.7	1	1.6	1	3.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	2 - 3 ft	0.71	1	0.21	1	0.52	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	3 - 4 ft	4	1	1.7	1	3.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	4 - 5 ft	3.7	1	1.7	1	3.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	5 - 6 ft	0.0059	1	0.0073	0	0.0029	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	1 - 2 ft	1.2	1	0.35	1	0.83	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	2 - 3 ft	2.5	1	0.87	1	2	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	3 - 4 ft	18	1	6.6	1	17	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	4 - 5 ft	1.7	1	0.48	1	1.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	1 - 2 ft	1.3	1	0.42	1	0.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	2 - 3 ft	0.88	1	0.17	1	0.58	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	1 - 2 ft	6.3	1	2.5	1	4.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	2 - 3 ft	3.4	1	0.85	1	2.3	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	3 - 4 ft	3.8	0	3.8	0	3.8	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	4 - 5 ft	2.3	0	2.3	0	2.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	1 - 2 ft	1.5	1	0.38	1	0.99	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	2 - 3 ft	1.5	1	0.54	1	1.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	3 - 4 ft	10	1	2.4	1	8.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	4 - 5 ft	3.8	0	3.8	0	3.8	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	1 - 2 ft	23	1	8.2	1	20	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	2 - 3 ft	5.9	1	2.1	1	4.8	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	3 - 4 ft	3.2	1	5.9	0	2.5	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	4 - 5 ft	3	0	3	0	3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	1 - 2 ft	3	1	1.3	1	2.8	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	2 - 3 ft	3.8	1	1.5	1	3	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	3 - 4 ft	0.099	1	0.033	1	0.077	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	4 - 5 ft	1.2	1	0.48	1	0.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	1 - 2 ft	1.1	1	0.38	1	0.81	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	2 - 3 ft	12	1	5.2	1	11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	3 - 4 ft	1.9	1	0.66	1	1.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	1 - 2 ft	0.37	1	0.18	1	0.3	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	2 - 3 ft	11	1	5.1	1	9.5	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	1 - 2 ft	1	1	0.6	1	1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	2 - 3 ft	0.44	1	1.1	0	0.5	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	1 - 2 ft	4.5	1	1.8	1	4.3	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	2 - 3 ft	3.3	1	1.7	1	3.2	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	3 - 4 ft	0.53	1	0.23	1	0.45	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	1 - 2 ft	0.55	1	0.26	1	0.47	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	2 - 3 ft	0.65	1	0.24	1	0.53	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	3 - 4 ft	1.2	1	0.56	1	1.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	1 - 2 ft	0.64	1	0.32	1	0.55	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	2 - 3 ft	0.38	1	0.21	1	0.33	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	1 - 2 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1A	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1B	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1E	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1F	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1G	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1H	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2D	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2E	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2I	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2J	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2L	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2M	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2N	3/22/2017	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Benzo(b)fluoranthene	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Surface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	0 - 1 ft	2.1	1	0.76	1	1.9	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21	2/7/2013	1 - 1.75 ft	1.9	1	0.77	1	1.8	1	2.7	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	0 - 1 ft	0.068	0	0.068	0	0.068	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	0 - 1 ft	0.69	1	0.15	1	0.2	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	0 - 1 ft	2.1	1	0.79	1	1.9	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3Q	8/24/2017	0 - 1 ft	0.0038	1	0.0077	0	0.0038	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	0 - 1 ft	0.091	1	0.034	1	0.059	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	0 - 1 ft	0.053	1	0.015	1	0.038	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP22	6/13/2013	0.5 - 1 ft	0.77	1	0.32	1	0.79	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	0 - 1 ft	0.0069	0	0.0069	0	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	0 - 1 ft	0.0069	0	0.0069	0	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	0 - 1 ft	0.014	0	0.014	0	0.014	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	0 - 1 ft	0.0069	0	0.0069	0	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	0 - 1 ft	0.007	0	0.007	0	0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	0 - 1 ft	0.0044	1	0.0069	0	0.0039	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	0 - 1 ft	0.0069	0	0.0069	0	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	0 - 1 ft	0.072	1	0.022	1	0.038	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	0 - 1 ft	0.0069	0	0.0069	0	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	0 - 1 ft	0.82	1	0.27	1	0.54	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	0 - 1 ft	0.014	0	0.014	0	0.014	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	0 - 1 ft	0.069	0	0.069	0	0.069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	0 - 1 ft	0.007	0	0.007	0	0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	0 - 1 ft	0.021	0	0.021	0	0.021	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	0 - 1 ft	0.84	1	0.35	1	0.72	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	0 - 1 ft	0.0081	1	0.0041	1	0.007	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Subsurface	mg/kg	Transformer Shop	DP35	3/28/2013	14.5 - 15.5 ft	0.0079	0	20	0
SO	Subsurface	mg/kg	Transformer Shop	DP46	5/22/2013	4.5 - 5.5 ft			87	0
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	14.5 - 15.5 ft			20	0
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	9.5 - 10.5 ft			19	0
SO	Subsurface	mg/kg	Transformer Shop	DP47	5/28/2013	1.5 - 2.5 ft			19	1
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	14 - 15 ft			19	0
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	9.5 - 10.5 ft			10	1
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	1 - 2 ft	0.35	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	2 - 5 ft	0.46	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	2/2/2017	5 - 10 ft	0.15	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	1 - 2 ft	1.1	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	1 - 2 ft	0.19	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	1 - 2 ft	1.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	2 - 3 ft	1.7	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	3 - 4 ft	1.5	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	4 - 5 ft	0.52	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	1 - 2 ft	0.67	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	2 - 3 ft	0.24	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3V	8/25/2017	1 - 2 ft	0.022	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	1 - 2 ft	0.75	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	2 - 3 ft	0.75	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	1 - 2 ft	0.35	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	5/22/2013	2.5 - 3.5 ft			190	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	9.5 - 10.5 ft			20	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	14.5 - 15.5 ft			21	0
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	3 - 4 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	1 - 2 ft	0.19	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	2 - 3 ft	0.26	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	3 - 4 ft	0.028	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	4 - 5 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	5 - 6 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	1 - 2 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	2 - 3 ft				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	1 - 2 ft	0.47	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	2 - 3 ft	0.38	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	3 - 4 ft	0.062	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	1 - 2 ft	0.13	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	2 - 3 ft	0.059	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	1 - 2 ft	0.36	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	2 - 3 ft	1.7	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	3 - 4 ft	3.9	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	4 - 5 ft	0.0062	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	5 - 6 ft	0.0077	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	1 - 2 ft	0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	2 - 3 ft	0.054	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	3 - 4 ft	0.19	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	1 - 2 ft	0.79	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	2 - 3 ft	0.19	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	3 - 4 ft	0.88	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	4 - 5 ft	0.58	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	5 - 6 ft	0.0073	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	1 - 2 ft	0.2	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	2 - 3 ft	0.35	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	3 - 4 ft	2.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	4 - 5 ft	0.29	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	1 - 2 ft	0.26	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	2 - 3 ft	0.14	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	1 - 2 ft	0.98	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	2 - 3 ft	0.48	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	3 - 4 ft	3.8	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	4 - 5 ft	2.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	1 - 2 ft	0.2	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	2 - 3 ft	0.29	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	3 - 4 ft	1.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	4 - 5 ft	3.8	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	1 - 2 ft	4.2	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	2 - 3 ft	0.9	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	3 - 4 ft	3.4	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	4 - 5 ft	3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	1 - 2 ft	0.54	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	2 - 3 ft	0.66	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	3 - 4 ft	0.075	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	4 - 5 ft	0.27	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	1 - 2 ft	0.14	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	2 - 3 ft	2	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	3 - 4 ft	0.33	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	1 - 2 ft	0.087	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	2 - 3 ft	1.8	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	1 - 2 ft	0.18	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	2 - 3 ft	1.1	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	1 - 2 ft	0.74	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	2 - 3 ft	0.58	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	3 - 4 ft	0.095	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	1 - 2 ft	0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	2 - 3 ft	0.13	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	3 - 4 ft	0.24	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	1 - 2 ft	0.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	2 - 3 ft	0.31	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	1 - 2 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-1A	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-1B	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-1E	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-1F	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-1G	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-1H	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2D	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2E	3/23/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2I	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2J	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2L	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2M	3/22/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUS21-2N	3/22/2017	0 - 1 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Surface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	0 - 1 ft	0.34	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21	2/7/2013	1 - 1.75 ft	0.35	1	80	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	1/27/2017	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	0 - 1 ft	0.068	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	0 - 1 ft	0.37	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	0 - 1 ft	0.45	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3Q	8/24/2017	0 - 1 ft	0.0077	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	0 - 1 ft	0.021	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	0 - 1 ft	0.027	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP22	6/13/2013	0.5 - 1 ft	0.15	1	18	0
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	0 - 1 ft	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	0 - 1 ft	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	0 - 1 ft	0.014	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	0 - 1 ft	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	0 - 1 ft	0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	0 - 1 ft	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	0 - 1 ft	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	0 - 1 ft	0.019	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	0 - 1 ft	0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	0 - 1 ft	0.2	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	0 - 1 ft	0.014	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	0 - 1 ft	0.069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	0 - 1 ft	0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	0 - 1 ft	0.021	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	0 - 1 ft	0.15	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	0 - 1 ft	0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	0 - 1 ft				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	0 - 1 ft				

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Transformer Shop	DP35	3/28/2013	14.5 - 15.5 ft	0.0079	0	9.9	1	0.0079	0	2.8	1
SO	Subsurface	mg/kg	Transformer Shop	DP46	5/22/2013	4.5 - 5.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP47	5/28/2013	1.5 - 2.5 ft			200	1			23	1
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	14 - 15 ft								
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	1 - 2 ft	1.2	1			0.23	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	2 - 5 ft	1.8	1			0.028	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	2/2/2017	5 - 10 ft	0.45	1			0.099	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	1 - 2 ft	1.1	0			1.1	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	1 - 2 ft	0.65	1			0.081	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	1 - 2 ft	4.3	1			0.16	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	2 - 3 ft	7.2	1			0.24	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	3 - 4 ft	5.9	1			0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	4 - 5 ft	1.5	1			0.13	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	1 - 2 ft	2.7	1			0.09	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	2 - 3 ft	0.95	1			0.038	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3V	8/25/2017	1 - 2 ft	0.076	1			0.0071	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	1 - 2 ft	2.8	1			0.078	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	2 - 3 ft	0.75	0			0.75	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	1 - 2 ft	1.2	1			0.093	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	5/22/2013	2.5 - 3.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	9.5 - 10.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	14.5 - 15.5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	3 - 4 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	1 - 2 ft	1	1			0.32	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	2 - 3 ft	0.8	1			0.13	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	3 - 4 ft	0.088	1			0.02	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	4 - 5 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	5 - 6 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	1 - 2 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	2 - 3 ft								
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	1 - 2 ft	0.96	1			0.37	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	2 - 3 ft	1.4	1			0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	3 - 4 ft	0.21	1			0.0094	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	1 - 2 ft	0.35	1			0.021	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	2 - 3 ft	0.19	1			0.036	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	1 - 2 ft	1.4	1			0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	2 - 3 ft	6.1	1			0.6	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	3 - 4 ft	5.2	1			3.9	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	4 - 5 ft	0.011	1			0.0078	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	5 - 6 ft	0.005	1			0.0077	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	1 - 2 ft	0.3	1			0.072	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	2 - 3 ft	0.12	1			0.055	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	3 - 4 ft	0.56	1			0.17	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	1 - 2 ft	2.8	1			0.16	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	2 - 3 ft	0.48	1			0.19	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	3 - 4 ft	2.3	1			0.21	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	4 - 5 ft	2.1	1			0.23	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	5 - 6 ft	0.0056	1			0.0073	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	1 - 2 ft	0.7	1			0.032	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	2 - 3 ft	1.4	1			0.063	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	3 - 4 ft	9	1			0.43	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	4 - 5 ft	0.83	1			0.11	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	1 - 2 ft	1	1			0.073	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	2 - 3 ft	0.47	1			0.033	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	1 - 2 ft	3.6	1			0.12	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	2 - 3 ft	1.7	1			0.046	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	3 - 4 ft	3.8	0			3.8	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	4 - 5 ft	2.3	0			2.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	1 - 2 ft	0.71	1			0.078	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	2 - 3 ft	0.87	1			0.062	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	3 - 4 ft	3.9	1			0.77	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	4 - 5 ft	3.8	0			3.8	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	1 - 2 ft	13	1			0.97	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	2 - 3 ft	3.1	1			0.38	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	3 - 4 ft	4.3	1			5.9	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	4 - 5 ft	3	0			3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	1 - 2 ft	1.8	1			0.75	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	2 - 3 ft	1.9	1			0.72	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	3 - 4 ft	0.083	1			0.075	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	4 - 5 ft	0.79	1			0.37	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	1 - 2 ft	0.51	1			0.88	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	2 - 3 ft	6.3	1			0.17	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	3 - 4 ft	1	1			0.066	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	1 - 2 ft	0.25	1			0.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	2 - 3 ft	5.6	1			0.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	1 - 2 ft	0.71	1			1.1	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	2 - 3 ft	0.32	1			1.1	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	1 - 2 ft	2.2	1			0.057	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	2 - 3 ft	1.9	1			0.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	3 - 4 ft	0.32	1			0.08	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	1 - 2 ft	0.36	1			0.075	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	2 - 3 ft	0.38	1			0.15	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	3 - 4 ft	0.74	1			0.034	1		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	1 - 2 ft	0.34	1			0.3	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	2 - 3 ft	0.2	1			0.31	0		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	1 - 2 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1A	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1B	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1E	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1F	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1G	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-1H	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2D	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2E	3/23/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2I	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2J	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2L	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2M	3/22/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUS21-2N	3/22/2017	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	0 - 1 ft	1.3	1			0.096	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21	2/7/2013	1 - 1.75 ft	1.1	1	260	1	0.073	1	16	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	1/27/2017	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	0 - 1 ft	0.068	0			0.068	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	0 - 1 ft	0.44	1			0.37	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	0 - 1 ft	1.4	1			0.028	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3Q	8/24/2017	0 - 1 ft	0.0077	0			0.0077	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	0 - 1 ft	0.058	1			0.0029	1		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	0 - 1 ft	0.042	1			0.035	0		
SO	Surface	mg/kg	Transformer Shop	SUSDP22	6/13/2013	0.5 - 1 ft	0.5	1			0.066	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	0 - 1 ft	0.0069	0			0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	0 - 1 ft	0.0069	0			0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	0 - 1 ft	0.014	0			0.014	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	0 - 1 ft	0.0069	0			0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	0 - 1 ft	0.007	0			0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	0 - 1 ft	0.0059	1			0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	0 - 1 ft	0.0069	0			0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	0 - 1 ft	0.055	1			0.0054	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	0 - 1 ft	0.0069	0			0.0069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	0 - 1 ft	0.57	1			0.028	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	0 - 1 ft	0.014	0			0.014	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	0 - 1 ft	0.069	0			0.069	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	0 - 1 ft	0.007	0			0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	0 - 1 ft	0.021	0			0.021	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	0 - 1 ft	0.47	1			0.026	1		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	0 - 1 ft	0.0053	1			0.007	0		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	0 - 1 ft								
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	0 - 1 ft								

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Subsurface	mg/kg	Transformer Shop	DP35	3/28/2013	14.5 - 15.5 ft	0.0049	0			0.085	1
SO	Subsurface	mg/kg	Transformer Shop	DP46	5/22/2013	4.5 - 5.5 ft	0.0015	1				
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	14.5 - 15.5 ft	0.0049	0				
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	9.5 - 10.5 ft	0.0048	0				
SO	Subsurface	mg/kg	Transformer Shop	DP47	5/28/2013	1.5 - 2.5 ft	0.34	1			0.17	1
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	14 - 15 ft	0.0049	0				
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	9.5 - 10.5 ft	0.0046	0				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	1 - 2 ft	1	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	2 - 5 ft	0.89	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	2/2/2017	5 - 10 ft	0.0097	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	1 - 2 ft	17	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	2 - 3 ft	0.32	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	3 - 4 ft	0.022	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	1 - 2 ft	1.2	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	2 - 3 ft	0.86	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	1 - 2 ft	0.3	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	2 - 3 ft	0.56	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	1 - 2 ft	16	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	2 - 3 ft	0.27	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	1 - 2 ft	2.9	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	2 - 3 ft	1.8	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	3 - 4 ft	0.07	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3V	8/25/2017	1 - 2 ft	0.055	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	1 - 2 ft	0.43	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	2 - 3 ft	0.098	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	1 - 2 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	5/22/2013	2.5 - 3.5 ft	0.03	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	9.5 - 10.5 ft	0.0021	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	14.5 - 15.5 ft	0.078	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	1 - 2 ft	0.16	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	2 - 3 ft	0.0039	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	3 - 4 ft	0.001	0				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	1 - 2 ft	0.094	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	2 - 3 ft	0.057	0				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	3 - 4 ft	0.055	0				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	4 - 5 ft	0.057	0				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	1 - 2 ft	11	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	2 - 3 ft	7	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	3 - 4 ft	1.6	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	4 - 5 ft	0.059	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	1 - 2 ft	7.7	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	2 - 3 ft	0.028	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	3 - 4 ft	0.21	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	4 - 5 ft	0.087	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	1 - 2 ft	52	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	2 - 3 ft	0.021	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	3 - 4 ft	0.19	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	4 - 5 ft	0.25	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	1 - 2 ft	450	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	2 - 3 ft	77	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	3 - 4 ft	180	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	4 - 5 ft	23	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	5 - 6 ft	0.19	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	1 - 2 ft	5.3	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	2 - 3 ft	1.5	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	1 - 2 ft	1.9	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	2 - 3 ft	0.23	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	1 - 2 ft	2.4	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	2 - 3 ft	0.9	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	1 - 2 ft	24	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	2 - 3 ft	0.13	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	1 - 2 ft	14	1				

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	2 - 3 ft	4.9	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	1 - 2 ft	9.5	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	2 - 3 ft	0.05	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	1 - 2 ft	7.7	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	2 - 3 ft	0.69	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	1 - 2 ft	42	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	2 - 3 ft	0.034	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	5 - 6 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	1 - 2 ft	8.8	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	2 - 3 ft	0.064	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	1 - 2 ft	42	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	2 - 3 ft	0.81	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	1 - 2 ft	9.7	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	2 - 3 ft	0.096	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	1 - 2 ft	0.99	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	2 - 3 ft	1.1	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	1 - 2 ft	0.12	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	2 - 3 ft	0.056	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	1 - 2 ft	5.9	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	2 - 3 ft	0.73	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	4 - 5 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	1 - 2 ft	0.36	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	1 - 2 ft	0.81	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	1 - 2 ft	15	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	2 - 3 ft	0.14	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	1 - 2 ft	0.022	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	1 - 2 ft	0.22	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	3 - 4 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	1 - 2 ft	0.27	1				
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	2 - 3 ft						
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	1 - 2 ft	0.0094	0				
SO	Surface	mg/kg	Transformer Shop	SUS21-1A	1/27/2017	0 - 1 ft	0.94	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-1B	1/27/2017	0 - 1 ft	0.098	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-1E	1/27/2017	0 - 1 ft	1.5	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-1F	1/27/2017	0 - 1 ft	0.49	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-1G	1/27/2017	0 - 1 ft	2	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-1H	1/27/2017	0 - 1 ft	0.96	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2D	3/23/2017	0 - 1 ft	0.3	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2E	3/23/2017	0 - 1 ft	4	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2I	3/22/2017	0 - 1 ft	4.5	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2J	3/22/2017	0 - 1 ft	11	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2L	3/22/2017	0 - 1 ft	1.6	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2M	3/22/2017	0 - 1 ft	2.7	1				
SO	Surface	mg/kg	Transformer Shop	SUS21-2N	3/22/2017	0 - 1 ft	3	1				

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Surface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	0 - 1 ft	0.52	1				
SO	Surface	mg/kg	Transformer Shop	SUSDP21	2/7/2013	1 - 1.75 ft	7.2	1			0.11	0
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	1/27/2017	0 - 1 ft	43	1				
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	0 - 1 ft	8800	1				
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	0 - 1 ft	130	1				
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3Q	8/24/2017	0 - 1 ft	0.066	1				
SO	Surface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	0 - 1 ft	0.025	1				
SO	Surface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	0 - 1 ft						
SO	Surface	mg/kg	Transformer Shop	SUSDP22	6/13/2013	0.5 - 1 ft	0.036	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	0 - 1 ft	0.08	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	0 - 1 ft	0.05	0				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	0 - 1 ft	9.6	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	0 - 1 ft	0.036	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	0 - 1 ft	0.099	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	0 - 1 ft	56	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	0 - 1 ft	0.068	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	0 - 1 ft	0.046	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	0 - 1 ft	0.016	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	0 - 1 ft	0.013	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	0 - 1 ft	0.0083	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	0 - 1 ft	0.0062	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	0 - 1 ft	0.0079	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	0 - 1 ft	0.0088	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	0 - 1 ft	0.013	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	0 - 1 ft	0.0068	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	0 - 1 ft	4.1	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	0 - 1 ft	0.014	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	0 - 1 ft	2.3	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	0 - 1 ft	0.03	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	0 - 1 ft	0.053	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	0 - 1 ft	0.061	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	0 - 1 ft	0.002	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	0 - 1 ft	0.07	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	0 - 1 ft	0.005	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	0 - 1 ft	0.091	1				
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	0 - 1 ft	0.048	1				

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Transformer Shop	DP35	3/28/2013	14.5 - 15.5 ft	17	1
SO	Subsurface	mg/kg	Transformer Shop	DP46	5/22/2013	4.5 - 5.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	DP46	6/5/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	DP47	5/28/2013	1.5 - 2.5 ft	23	1
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	14 - 15 ft		
SO	Subsurface	mg/kg	Transformer Shop	DP47	6/5/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21	2/2/2017	5 - 10 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3A	8/25/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3T	8/25/2017	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-3V	8/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	5/22/2013	2.5 - 3.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDP22	6/12/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	5 - 6 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	1 - 2 ft		

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	5 - 6 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	5 - 6 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	4 - 5 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	3 - 4 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	1 - 2 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	2 - 3 ft		
SO	Subsurface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	1 - 2 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-1A	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-1B	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-1E	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-1F	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-1G	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-1H	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2D	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2E	3/23/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2I	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2J	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2L	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2M	3/22/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUS21-2N	3/22/2017	0 - 1 ft		

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Surface	mg/kg	Transformer Shop	SUSDP21	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21	2/7/2013	1 - 1.75 ft	9.7	1
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	1/27/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-1C	8/24/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3G	8/28/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3M	8/28/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-3Q	8/24/2017	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-5W	1/26/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP21-6W	2/21/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDP22	6/13/2013	0.5 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C3	7/2/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-C5	5/31/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-D1	5/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-E1	5/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-F1	5/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G1	4/4/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-G2	4/4/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H1	3/14/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-H2	3/14/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I1	2/20/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-I2	2/20/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J1	1/24/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-J2	1/24/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1	1/24/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K1.5	1/26/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-K2	1/24/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L1	2/20/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-L2	2/20/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M1	3/14/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-M2	3/14/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N1	4/4/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-N2	4/4/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-P1	5/30/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R1	1/23/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-R2	1/23/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S1	1/23/2018	0 - 1 ft		
SO	Surface	mg/kg	Transformer Shop	SUSDPGD21-S2	1/24/2018	0 - 1 ft		

Matrix	horizon	Units	Area	Location	Collected	Depth	Arsenic	D_Arsenic	Benzo(a)anthracene	D_Benzo(a)anthracene	Benzo(a)pyrene	D_Benzo(a)pyrene	Benzo(b)fluoranthene
SO	Surface	mg/kg	Vehicle Refueling	AST3A-1A	8/2/2017	0 - 1 ft							
SO	Surface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	0 - 1 ft			2.6	1	1.3	1	2.2
SO	Surface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	0 - 1 ft			0.87	1	0.47	1	0.75
SO	Subsurface	mg/kg	Vehicle Refueling	DP28	4/2/2013	7.5 - 8.5 ft	1.8	1	0.0073	0	0.0073	0	0.0073
SO	Subsurface	mg/kg	Vehicle Refueling	DP29	4/2/2013	9 - 11 ft	2.9	1	0.068	1	0.061	1	0.06
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/16/2013	4.5 - 5.5 ft	1.6	1	0.21	1	0.2	1	0.21
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	9.5 - 10.5 ft			0.38	1	0.35	1	0.32
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	14 - 15 ft			0.71	1	0.61	1	0.61
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/16/2013	2.5 - 3.5 ft	3.7	1	0.17	1	0.18	1	0.13
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	9.5 - 10.5 ft			0.0072	0	0.0072	0	0.0072
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	14.5 - 15.5 ft			0.007	0	0.007	0	0.007
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	1 - 2 ft			0.21	1	0.19	1	0.22
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	2 - 5 ft			0.081	1	0.066	1	0.099
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/17/2013	2.5 - 3.5 ft			0.15	1	0.0076	0	0.046
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	9.5 - 10.5 ft	2.4	1	1.3	1	1.4	1	1.3
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	14.5 - 15.5 ft			0.0094	1	0.0099	1	0.011
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	1 - 2 ft			0.26	1	1.3	1	2.3
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	2 - 5 ft			0.0051	1	0.009	1	0.013
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	5 - 10 ft			0.057	1	0.051	1	0.063
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	10 - 15 ft			0.0015	1	0.0091	0	0.0091

Matrix	horizon	Units	Area	Location	Collected	Depth	D_Benzo(b)fluoranthene	Benzo(k)fluoranthene	D_Benzo(k)fluoranthene	Chrysene	D_Chrysene	Cobalt	D_Cobalt
SO	Surface	mg/kg	Vehicle Refueling	AST3A-1A	8/2/2017	0 - 1 ft							
SO	Surface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	0 - 1 ft	1	0.61	1	2.5	1		
SO	Surface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	0 - 1 ft	1	0.31	1	0.92	1		
SO	Subsurface	mg/kg	Vehicle Refueling	DP28	4/2/2013	7.5 - 8.5 ft	0	0.0073	0	0.0073	0	7.3	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP29	4/2/2013	9 - 11 ft	1	0.033	1	0.063	1	6.8	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/16/2013	4.5 - 5.5 ft	1	0.092	1	0.21	1	4	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	9.5 - 10.5 ft	1	0.16	1	0.36	1		
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	14 - 15 ft	1	0.27	1	0.68	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/16/2013	2.5 - 3.5 ft	1	0.13	1	0.19	1	6.9	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	9.5 - 10.5 ft	0	0.0072	0	0.0072	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	14.5 - 15.5 ft	0	0.007	0	0.007	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	1 - 2 ft	1	0.086	1	0.26	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	2 - 5 ft	1	0.027	1	0.091	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/17/2013	2.5 - 3.5 ft	1	0.071	1	0.14	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	9.5 - 10.5 ft	1	0.56	1	1.3	1	2.6	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	14.5 - 15.5 ft	1	0.0034	1	0.0098	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	1 - 2 ft	1	0.014	0	0.64	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	2 - 5 ft	1	0.0031	1	0.0072	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	5 - 10 ft	1	0.023	1	0.055	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	10 - 15 ft	0	0.0091	0	0.0011	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	Dibenzo(a,h)anthracene	D_Dibenzo(a,h)anthracene	Diesel Range Organics (C10-C20)	D_Diesel Range Organics (C10-C20)
SO	Surface	mg/kg	Vehicle Refueling	AST3A-1A	8/2/2017	0 - 1 ft			380	1
SO	Surface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	0 - 1 ft	0.31	1		
SO	Surface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	0 - 1 ft	0.12	1		
SO	Subsurface	mg/kg	Vehicle Refueling	DP28	4/2/2013	7.5 - 8.5 ft	0.0073	0	18	0
SO	Subsurface	mg/kg	Vehicle Refueling	DP29	4/2/2013	9 - 11 ft	0.01	1	12	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/16/2013	4.5 - 5.5 ft	0.027	1	18	0
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	9.5 - 10.5 ft	0.068	1	19	0
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	14 - 15 ft	0.1	1	18	0
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/16/2013	2.5 - 3.5 ft	0.049	1	15	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	9.5 - 10.5 ft	0.0072	0	18	0
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	14.5 - 15.5 ft	0.007	0	18	0
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	1 - 2 ft	0.19	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	2 - 5 ft	0.017	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/17/2013	2.5 - 3.5 ft	0.0076	0	320	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	9.5 - 10.5 ft	0.29	1	27	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	14.5 - 15.5 ft	0.0079	0	20	0
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	1 - 2 ft	0.31	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	2 - 5 ft	0.0071	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	5 - 10 ft	0.0081	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	10 - 15 ft	0.0091	0		

Matrix	horizon	Units	Area	Location	Collected	Depth	Indeno(1,2,3-cd)pyrene	D_Indeno(1,2,3-cd)pyrene	Manganese	D_Manganese	Naphthalene	D_Naphthalene	Nickel	D_Nickel
SO	Surface	mg/kg	Vehicle Refueling	AST3A-1A	8/2/2017	0 - 1 ft								
SO	Surface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	0 - 1 ft	0.78	1			0.63	1		
SO	Surface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	0 - 1 ft	0.33	1			0.055	1		
SO	Subsurface	mg/kg	Vehicle Refueling	DP28	4/2/2013	7.5 - 8.5 ft	0.0073	0	140	1	0.0073	0	3.4	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP29	4/2/2013	9 - 11 ft	0.03	1	160	1	0.0036	1	8.6	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/16/2013	4.5 - 5.5 ft	0.11	1	65	1	0.0046	1	3.6	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	9.5 - 10.5 ft	0.2	1			0.037	0		
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	14 - 15 ft	0.34	1			0.035	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/16/2013	2.5 - 3.5 ft	0.11	1	200	1	0.012	1	12	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	9.5 - 10.5 ft	0.0072	0			0.0072	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	14.5 - 15.5 ft	0.007	0			0.007	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	1 - 2 ft	0.12	1			0.1	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	2 - 5 ft	0.054	1			0.026	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/17/2013	2.5 - 3.5 ft	0.0076	0			0.41	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	9.5 - 10.5 ft	0.87	1	140	1	0.061	1	4.1	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	14.5 - 15.5 ft	0.0066	1			0.0079	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	1 - 2 ft	1	1			0.027	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	2 - 5 ft	0.0065	1			0.0071	0		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	5 - 10 ft	0.028	1			0.0032	1		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	10 - 15 ft	0.0091	0			0.00091	1		

Matrix	horizon	Units	Area	Location	Collected	Depth	PCB, Total Aroclors (AECOM Calc)	D_PCB, Total Aroclors (AECOM Calc)	TCDD TEQ HH	D_TCDD TEQ HH	Thallium	D_Thallium
SO	Surface	mg/kg	Vehicle Refueling	AST3A-1A	8/2/2017	0 - 1 ft						
SO	Surface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	0 - 1 ft	0.0082	1				
SO	Surface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	0 - 1 ft	0.14	1				
SO	Subsurface	mg/kg	Vehicle Refueling	DP28	4/2/2013	7.5 - 8.5 ft	0.0009	0			0.11	0
SO	Subsurface	mg/kg	Vehicle Refueling	DP29	4/2/2013	9 - 11 ft	0.001	0			0.14	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/16/2013	4.5 - 5.5 ft	0.00092	0			0.042	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	9.5 - 10.5 ft	0.0052	1				
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	14 - 15 ft	0.0019	1				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/16/2013	2.5 - 3.5 ft	0.0027	1			0.14	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	9.5 - 10.5 ft	0.0045	0				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	14.5 - 15.5 ft	0.0045	0				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	1 - 2 ft	0.0093	0				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	2 - 5 ft	0.0046	0				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/17/2013	2.5 - 3.5 ft	0.093	1				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	9.5 - 10.5 ft	0.057	1			0.15	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	14.5 - 15.5 ft	0.0019	1				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	1 - 2 ft	0.11	1				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	2 - 5 ft	0.0093	1				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	5 - 10 ft	0.0011	0				
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	10 - 15 ft	0.0011	0				

Matrix	horizon	Units	Area	Location	Collected	Depth	Vanadium	D_Vanadium
SO	Surface	mg/kg	Vehicle Refueling	AST3A-1A	8/2/2017	0 - 1 ft		
SO	Surface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	0 - 1 ft		
SO	Surface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	0 - 1 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	DP28	4/2/2013	7.5 - 8.5 ft	15	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP29	4/2/2013	9 - 11 ft	26	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/16/2013	4.5 - 5.5 ft	13	1
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	DP38	5/22/2013	14 - 15 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/16/2013	2.5 - 3.5 ft	29	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	9.5 - 10.5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	5/23/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP37	1/25/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/17/2013	2.5 - 3.5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	9.5 - 10.5 ft	26	1
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	5/22/2013	14.5 - 15.5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	1 - 2 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/25/2017	2 - 5 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	5 - 10 ft		
SO	Subsurface	mg/kg	Vehicle Refueling	SUSDP39	1/26/2017	10 - 15 ft		

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)
WG	T	ug/l	Open Lot	DP36	5/20/2013	1	0	0.53
WG	T	ug/l	Open Lot	MW01A	11/5/2014	1	0	1.6
WG	T	ug/l	Open Lot	MW01A	12/22/2016	1	0	1.7
WG	T	ug/l	Open Lot	MW02A	11/5/2014	1	0	1
WG	T	ug/l	Open Lot	MW02A	12/22/2016	1	0	1
WG	T	ug/l	Open Lot	MW03A	11/4/2014	1.2	1	1
WG	T	ug/l	Open Lot	MW04A	11/4/2014	0.22	1	0.29
WG	T	ug/l	Open Lot	SUSDP01	5/20/2013	1	0	1
WG	T	ug/l	Open Lot	SUSDP02	5/20/2013	0.3	1	1
WG	T	ug/l	Open Lot	TA19A1	3/20/2017	1	0	0.29
WG	T	ug/l	Open Lot	TA19A2	3/20/2017	1	0	0.28
WG	T	ug/l	Open Lot	TA19A3	3/20/2017	1	0	0.71
WG	T	ug/l	Open Lot	TA19B3	2/7/2017	1	0	1
WG	T	ug/l	Open Lot	TA19C1	2/8/2017	1	0	3.9
WG	T	ug/l	Open Lot	TA19C2	2/7/2017	1	0	0.73
WG	T	ug/l	Open Lot	TA19C3	2/7/2017	1	0	1
WG	T	ug/l	Open Lot	TA19D1	3/3/2017	1	0	0.51
WG	T	ug/l	Open Lot	TA19D3	3/8/2017	1	0	1
WG	T	ug/l	Open Lot	TA19E1	2/7/2017	1	0	0.39
WG	T	ug/l	Open Lot	TA19E2	2/7/2017	1	0	1

Matrix	Fraction	Units	EA	Location	Collected	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	RA17_GW_VOCs|Tetrachloroethylene	D_RA17_GW_VOCs|Tetrachloroethylene
WG	T	ug/l	Open Lot	DP36	5/20/2013	1	1	0
WG	T	ug/l	Open Lot	MW01A	11/5/2014	1	4.4	1
WG	T	ug/l	Open Lot	MW01A	12/22/2016	1	5.5	1
WG	T	ug/l	Open Lot	MW02A	11/5/2014	0	2.3	1
WG	T	ug/l	Open Lot	MW02A	12/22/2016	0	1.8	1
WG	T	ug/l	Open Lot	MW03A	11/4/2014	0	0.32	1
WG	T	ug/l	Open Lot	MW04A	11/4/2014	1	0.25	1
WG	T	ug/l	Open Lot	SUSDP01	5/20/2013	0	0.25	1
WG	T	ug/l	Open Lot	SUSDP02	5/20/2013	0	1	0
WG	T	ug/l	Open Lot	TA19A1	3/20/2017	1	1	0
WG	T	ug/l	Open Lot	TA19A2	3/20/2017	1	1	0
WG	T	ug/l	Open Lot	TA19A3	3/20/2017	1	2.2	1
WG	T	ug/l	Open Lot	TA19B3	2/7/2017	0	0.24	1
WG	T	ug/l	Open Lot	TA19C1	2/8/2017	1	30	1
WG	T	ug/l	Open Lot	TA19C2	2/7/2017	1	18	1
WG	T	ug/l	Open Lot	TA19C3	2/7/2017	0	6.7	1
WG	T	ug/l	Open Lot	TA19D1	3/3/2017	1	1	0
WG	T	ug/l	Open Lot	TA19D3	3/8/2017	0	1	0
WG	T	ug/l	Open Lot	TA19E1	2/7/2017	1	1	0
WG	T	ug/l	Open Lot	TA19E2	2/7/2017	0	0.8	1

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene	RA17_GW_VOCs|Vinyl Chloride	D_RA17_GW_VOCs|Vinyl Chloride
WG	T	ug/l	Open Lot	DP36	5/20/2013	1	0	1	0
WG	T	ug/l	Open Lot	MW01A	11/5/2014	0.43	1	1	0
WG	T	ug/l	Open Lot	MW01A	12/22/2016	1.2	1	1	0
WG	T	ug/l	Open Lot	MW02A	11/5/2014	1	0	1	0
WG	T	ug/l	Open Lot	MW02A	12/22/2016	0.22	1	1	0
WG	T	ug/l	Open Lot	MW03A	11/4/2014	1	0	1	0
WG	T	ug/l	Open Lot	MW04A	11/4/2014	1	0	1	0
WG	T	ug/l	Open Lot	SUSDP01	5/20/2013	1	0	1	0
WG	T	ug/l	Open Lot	SUSDP02	5/20/2013	1	0	1	0
WG	T	ug/l	Open Lot	TA19A1	3/20/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19A2	3/20/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19A3	3/20/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19B3	2/7/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19C1	2/8/2017	3.2	1	1	0
WG	T	ug/l	Open Lot	TA19C2	2/7/2017	5.9	1	1	0
WG	T	ug/l	Open Lot	TA19C3	2/7/2017	0.23	1	1	0
WG	T	ug/l	Open Lot	TA19D1	3/3/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19D3	3/8/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19E1	2/7/2017	1	0	1	0
WG	T	ug/l	Open Lot	TA19E2	2/7/2017	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Butyl alcohol, tert-	D_RA17_GW_VOCs|Butyl alcohol, tert-
WG	T	ug/l	Open Lot	DP36	5/20/2013		
WG	T	ug/l	Open Lot	MW01A	11/5/2014		
WG	T	ug/l	Open Lot	MW01A	12/22/2016	40	0
WG	T	ug/l	Open Lot	MW02A	11/5/2014		
WG	T	ug/l	Open Lot	MW02A	12/22/2016	40	0
WG	T	ug/l	Open Lot	MW03A	11/4/2014		
WG	T	ug/l	Open Lot	MW04A	11/4/2014		
WG	T	ug/l	Open Lot	SUSDP01	5/20/2013		
WG	T	ug/l	Open Lot	SUSDP02	5/20/2013		
WG	T	ug/l	Open Lot	TA19A1	3/20/2017	40	0
WG	T	ug/l	Open Lot	TA19A2	3/20/2017	40	0
WG	T	ug/l	Open Lot	TA19A3	3/20/2017	40	0
WG	T	ug/l	Open Lot	TA19B3	2/7/2017	40	0
WG	T	ug/l	Open Lot	TA19C1	2/8/2017	40	0
WG	T	ug/l	Open Lot	TA19C2	2/7/2017	40	0
WG	T	ug/l	Open Lot	TA19C3	2/7/2017	40	0
WG	T	ug/l	Open Lot	TA19D1	3/3/2017	40	0
WG	T	ug/l	Open Lot	TA19D3	3/8/2017	40	0
WG	T	ug/l	Open Lot	TA19E1	2/7/2017	40	0
WG	T	ug/l	Open Lot	TA19E2	2/7/2017	40	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Warehouse	DP30	4/3/2013	1	0	1	0
WG	T	ug/l	Warehouse	DP31	4/1/2013	1	0	1	0
WG	T	ug/l	Warehouse	DP40	5/28/2013	1	0	1.5	1
WG	T	ug/l	Warehouse	DP42	5/29/2013	1	0	1.1	1
WG	T	ug/l	Warehouse	DPA1	4/17/2014				
WG	T	ug/l	Warehouse	MW05A	11/4/2014	1	0	0.77	1
WG	T	ug/l	Warehouse	MW05A	12/21/2016	1	0	1	0
WG	T	ug/l	Warehouse	MW07A	11/5/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW08A	11/10/2014	1	0	1.2	1
WG	T	ug/l	Warehouse	MW10A	11/4/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW11A	11/4/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW11A	12/22/2016	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP03	5/21/2013	0.36	1	1.4	1
WG	T	ug/l	Warehouse	SUSDP04	5/20/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP05	5/21/2013	1	0	2.1	1
WG	T	ug/l	Warehouse	SUSDP06	5/23/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP07	5/22/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP08	5/24/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP11	5/28/2013	1	0	0.28	1
WG	T	ug/l	Warehouse	SUSDP13	5/29/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP41	5/24/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)
WG	T	ug/l	Warehouse	DP30	4/3/2013	0.47	1
WG	T	ug/l	Warehouse	DP31	4/1/2013	2	1
WG	T	ug/l	Warehouse	DP40	5/28/2013	0.96	1
WG	T	ug/l	Warehouse	DP42	5/29/2013	1	0
WG	T	ug/l	Warehouse	DPA1	4/17/2014		
WG	T	ug/l	Warehouse	MW05A	11/4/2014	0.73	1
WG	T	ug/l	Warehouse	MW05A	12/21/2016	0.78	1
WG	T	ug/l	Warehouse	MW07A	11/5/2014	1	0
WG	T	ug/l	Warehouse	MW08A	11/10/2014	1	0
WG	T	ug/l	Warehouse	MW10A	11/4/2014	1	0
WG	T	ug/l	Warehouse	MW11A	11/4/2014	1	0
WG	T	ug/l	Warehouse	MW11A	12/22/2016	1	0
WG	T	ug/l	Warehouse	SUSDP03	5/21/2013	1	0
WG	T	ug/l	Warehouse	SUSDP04	5/20/2013	0.71	1
WG	T	ug/l	Warehouse	SUSDP05	5/21/2013	1	0
WG	T	ug/l	Warehouse	SUSDP06	5/23/2013	1	0
WG	T	ug/l	Warehouse	SUSDP07	5/22/2013	1	0
WG	T	ug/l	Warehouse	SUSDP08	5/24/2013	3.1	1
WG	T	ug/l	Warehouse	SUSDP11	5/28/2013	1	0
WG	T	ug/l	Warehouse	SUSDP13	5/29/2013	1	0
WG	T	ug/l	Warehouse	SUSDP41	5/24/2013	1.6	1

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Tetrachloroethylene	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Warehouse	DP30	4/3/2013	1	0	1	0
WG	T	ug/l	Warehouse	DP31	4/1/2013	1	0	1	0
WG	T	ug/l	Warehouse	DP40	5/28/2013	1	0	1	0
WG	T	ug/l	Warehouse	DP42	5/29/2013	1	0	1	0
WG	T	ug/l	Warehouse	DPA1	4/17/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW05A	11/4/2014	2.2	1	0.23	1
WG	T	ug/l	Warehouse	MW05A	12/21/2016	15	1	2.3	1
WG	T	ug/l	Warehouse	MW07A	11/5/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW08A	11/10/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW10A	11/4/2014	1	0	1	0
WG	T	ug/l	Warehouse	MW11A	11/4/2014	0.18	1	1	0
WG	T	ug/l	Warehouse	MW11A	12/22/2016	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP03	5/21/2013	2	1	0.93	1
WG	T	ug/l	Warehouse	SUSDP04	5/20/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP05	5/21/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP06	5/23/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP07	5/22/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP08	5/24/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP11	5/28/2013	1	0	1	0
WG	T	ug/l	Warehouse	SUSDP13	5/29/2013	0.44	1	1	0
WG	T	ug/l	Warehouse	SUSDP41	5/24/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Salvage	DP26	3/29/2013	1	0	1	0
WG	T	ug/l	Salvage	DP61	2/6/2017	1	0	1	0
WG	T	ug/l	Salvage	DP62	2/6/2017	1	0	1	0
WG	T	ug/l	Salvage	DP63	2/6/2017	1	0	1	0
WG	T	ug/l	Salvage	SUSDP10	6/10/2013	1	0	1	0
WG	T	ug/l	Salvage	SUSDP12	6/13/2013	1	0	1	0
WG	T	ug/l	Salvage	SUSDP43	6/6/2013	1	0	1	0
WG	T	ug/l	Salvage	SUSDP44	6/10/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	RA17_GW_VOCs|Tetrachloroethylene
WG	T	ug/l	Salvage	DP26	3/29/2013	2.2	1	0.27
WG	T	ug/l	Salvage	DP61	2/6/2017	0.31	1	1
WG	T	ug/l	Salvage	DP62	2/6/2017	0.28	1	1
WG	T	ug/l	Salvage	DP63	2/6/2017	0.28	1	1
WG	T	ug/l	Salvage	SUSDP10	6/10/2013	4.9	1	0.21
WG	T	ug/l	Salvage	SUSDP12	6/13/2013	0.39	1	1
WG	T	ug/l	Salvage	SUSDP43	6/6/2013	0.25	1	1
WG	T	ug/l	Salvage	SUSDP44	6/10/2013	3.9	1	1

Matrix	Fraction	Units	EA	Location	Collected	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Salvage	DP26	3/29/2013	1	1	0
WG	T	ug/l	Salvage	DP61	2/6/2017	0	1	0
WG	T	ug/l	Salvage	DP62	2/6/2017	0	1	0
WG	T	ug/l	Salvage	DP63	2/6/2017	0	1	0
WG	T	ug/l	Salvage	SUSDP10	6/10/2013	1	1	0
WG	T	ug/l	Salvage	SUSDP12	6/13/2013	0	1	0
WG	T	ug/l	Salvage	SUSDP43	6/6/2013	0	1	0
WG	T	ug/l	Salvage	SUSDP44	6/10/2013	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Maintenance	DP45	6/4/2013	1	0	1	0
WG	T	ug/l	Maintenance	DP56	2/3/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP57	2/3/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP58	2/6/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP59	2/3/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP60	2/6/2017	2.6	1	15	1
WG	T	ug/l	Maintenance	DPD5	4/18/2014				
WG	T	ug/l	Maintenance	DPD6	4/17/2014				
WG	T	ug/l	Maintenance	MW13A	11/3/2014	1	0	0.67	1
WG	T	ug/l	Maintenance	MW13A	12/20/2016	1	0	1	0
WG	T	ug/l	Maintenance	SUSDP15	6/6/2013	1	0	1	0
WG	T	ug/l	Maintenance	SUSDP16	6/10/2013	1	0	1	0
WG	T	ug/l	Maintenance	SUSDP17	6/11/2013	1	0	0.26	1
WG	T	ug/l	Maintenance	SUSDP18	6/4/2013	1	0	1	0
WG	T	ug/l	Maintenance	SUSDP52	2/3/2017	1	0	0.43	1

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)
WG	T	ug/l	Maintenance	DP45	6/4/2013	48	1
WG	T	ug/l	Maintenance	DP56	2/3/2017	0.55	1
WG	T	ug/l	Maintenance	DP57	2/3/2017	37	1
WG	T	ug/l	Maintenance	DP58	2/6/2017	6.8	1
WG	T	ug/l	Maintenance	DP59	2/3/2017	1	0
WG	T	ug/l	Maintenance	DP60	2/6/2017	0.21	1
WG	T	ug/l	Maintenance	DPD5	4/18/2014		
WG	T	ug/l	Maintenance	DPD6	4/17/2014		
WG	T	ug/l	Maintenance	MW13A	11/3/2014	0.26	1
WG	T	ug/l	Maintenance	MW13A	12/20/2016	1	0
WG	T	ug/l	Maintenance	SUSDP15	6/6/2013	3.1	1
WG	T	ug/l	Maintenance	SUSDP16	6/10/2013	14	1
WG	T	ug/l	Maintenance	SUSDP17	6/11/2013	1	0
WG	T	ug/l	Maintenance	SUSDP18	6/4/2013	0.42	1
WG	T	ug/l	Maintenance	SUSDP52	2/3/2017	1.9	1

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Tetrachloroethylene	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Maintenance	DP45	6/4/2013	0.7	1	0.19	1
WG	T	ug/l	Maintenance	DP56	2/3/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP57	2/3/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP58	2/6/2017	1	0	1	0
WG	T	ug/l	Maintenance	DP59	2/3/2017	0.3	1	1	0
WG	T	ug/l	Maintenance	DP60	2/6/2017	0.44	1	1	0
WG	T	ug/l	Maintenance	DPD5	4/18/2014	24	1	1	0
WG	T	ug/l	Maintenance	DPD6	4/17/2014	4.9	1	1	0
WG	T	ug/l	Maintenance	MW13A	11/3/2014	1	0	1	0
WG	T	ug/l	Maintenance	MW13A	12/20/2016	1	0	1	0
WG	T	ug/l	Maintenance	SUSDP15	6/6/2013	1	0	1	0
WG	T	ug/l	Maintenance	SUSDP16	6/10/2013	0.56	1	1	0
WG	T	ug/l	Maintenance	SUSDP17	6/11/2013	0.3	1	1	0
WG	T	ug/l	Maintenance	SUSDP18	6/4/2013	0.35	1	0.58	1
WG	T	ug/l	Maintenance	SUSDP52	2/3/2017	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Butyl alcohol, tert-	D_RA17_GW_VOCs|Butyl alcohol, tert-
WG	T	ug/l	Maintenance	DP45	6/4/2013		
WG	T	ug/l	Maintenance	DP56	2/3/2017	40	0
WG	T	ug/l	Maintenance	DP57	2/3/2017	40	0
WG	T	ug/l	Maintenance	DP58	2/6/2017	110	1
WG	T	ug/l	Maintenance	DP59	2/3/2017	40	0
WG	T	ug/l	Maintenance	DP60	2/6/2017	40	0
WG	T	ug/l	Maintenance	DPD5	4/18/2014		
WG	T	ug/l	Maintenance	DPD6	4/17/2014		
WG	T	ug/l	Maintenance	MW13A	11/3/2014		
WG	T	ug/l	Maintenance	MW13A	12/20/2016	40	0
WG	T	ug/l	Maintenance	SUSDP15	6/6/2013		
WG	T	ug/l	Maintenance	SUSDP16	6/10/2013		
WG	T	ug/l	Maintenance	SUSDP17	6/11/2013		
WG	T	ug/l	Maintenance	SUSDP18	6/4/2013		
WG	T	ug/l	Maintenance	SUSDP52	2/3/2017	40	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Offices/Parking	DP55	2/2/2017	1	0	1	0
WG	T	ug/l	Offices/Parking	DPA2	4/17/2014				
WG	T	ug/l	Offices/Parking	DPA3	4/16/2014				
WG	T	ug/l	Offices/Parking	DPA4	4/16/2014				
WG	T	ug/l	Offices/Parking	DPA5	4/16/2014				
WG	T	ug/l	Offices/Parking	DPB10	4/17/2014				
WG	T	ug/l	Offices/Parking	DPB11	4/17/2014				
WG	T	ug/l	Offices/Parking	DPB12	4/17/2014				
WG	T	ug/l	Offices/Parking	DPB2	4/17/2014				
WG	T	ug/l	Offices/Parking	DPB3	4/16/2014				
WG	T	ug/l	Offices/Parking	DPB5	4/16/2014				
WG	T	ug/l	Offices/Parking	DPB6	4/16/2014				
WG	T	ug/l	Offices/Parking	DPB7	4/16/2014				
WG	T	ug/l	Offices/Parking	DPB9	4/17/2014				
WG	T	ug/l	Offices/Parking	DPC3	4/16/2014				
WG	T	ug/l	Offices/Parking	DPC4	4/16/2014				
WG	T	ug/l	Offices/Parking	DPC5	4/16/2014				
WG	T	ug/l	Offices/Parking	DPC7	4/17/2014				
WG	T	ug/l	Offices/Parking	DPC8	4/17/2014				
WG	T	ug/l	Offices/Parking	DPC9	4/18/2014				
WG	T	ug/l	Offices/Parking	DPD7	4/17/2014				
WG	T	ug/l	Offices/Parking	MW09A	11/3/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	MW09A	12/21/2016	1	0	1.3	1
WG	T	ug/l	Offices/Parking	MW12A	11/3/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	SUSDP09	6/11/2013	1	0	0.32	1
WG	T	ug/l	Offices/Parking	SUSDP14	6/6/2013	1	0	1	0
WG	T	ug/l	Offices/Parking	SUSDP19	6/5/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)
WG	T	ug/l	Offices/Parking	DP55	2/2/2017	1	0
WG	T	ug/l	Offices/Parking	DPA2	4/17/2014		
WG	T	ug/l	Offices/Parking	DPA3	4/16/2014		
WG	T	ug/l	Offices/Parking	DPA4	4/16/2014		
WG	T	ug/l	Offices/Parking	DPA5	4/16/2014		
WG	T	ug/l	Offices/Parking	DPB10	4/17/2014		
WG	T	ug/l	Offices/Parking	DPB11	4/17/2014		
WG	T	ug/l	Offices/Parking	DPB12	4/17/2014		
WG	T	ug/l	Offices/Parking	DPB2	4/17/2014		
WG	T	ug/l	Offices/Parking	DPB3	4/16/2014		
WG	T	ug/l	Offices/Parking	DPB5	4/16/2014		
WG	T	ug/l	Offices/Parking	DPB6	4/16/2014		
WG	T	ug/l	Offices/Parking	DPB7	4/16/2014		
WG	T	ug/l	Offices/Parking	DPB9	4/17/2014		
WG	T	ug/l	Offices/Parking	DPC3	4/16/2014		
WG	T	ug/l	Offices/Parking	DPC4	4/16/2014		
WG	T	ug/l	Offices/Parking	DPC5	4/16/2014		
WG	T	ug/l	Offices/Parking	DPC7	4/17/2014		
WG	T	ug/l	Offices/Parking	DPC8	4/17/2014		
WG	T	ug/l	Offices/Parking	DPC9	4/18/2014		
WG	T	ug/l	Offices/Parking	DPD7	4/17/2014		
WG	T	ug/l	Offices/Parking	MW09A	11/3/2014	0.58	1
WG	T	ug/l	Offices/Parking	MW09A	12/21/2016	0.65	1
WG	T	ug/l	Offices/Parking	MW12A	11/3/2014	1	0
WG	T	ug/l	Offices/Parking	SUSDP09	6/11/2013	5	1
WG	T	ug/l	Offices/Parking	SUSDP14	6/6/2013	0.71	1
WG	T	ug/l	Offices/Parking	SUSDP19	6/5/2013	0.21	1

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Tetrachloroethylene	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Offices/Parking	DP55	2/2/2017	1	0	1	0
WG	T	ug/l	Offices/Parking	DPA2	4/17/2014	2.3	1	1	0
WG	T	ug/l	Offices/Parking	DPA3	4/16/2014	270	1	19	1
WG	T	ug/l	Offices/Parking	DPA4	4/16/2014	300	1	26	1
WG	T	ug/l	Offices/Parking	DPA5	4/16/2014	260	1	23	1
WG	T	ug/l	Offices/Parking	DPB10	4/17/2014	25	1	0.94	1
WG	T	ug/l	Offices/Parking	DPB11	4/17/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	DPB12	4/17/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	DPB2	4/17/2014	3	1	1	0
WG	T	ug/l	Offices/Parking	DPB3	4/16/2014	140	1	10	1
WG	T	ug/l	Offices/Parking	DPB5	4/16/2014	190	1	14	1
WG	T	ug/l	Offices/Parking	DPB6	4/16/2014	330	1	22	1
WG	T	ug/l	Offices/Parking	DPB7	4/16/2014	470	1	26	1
WG	T	ug/l	Offices/Parking	DPB9	4/17/2014	190	1	14	1
WG	T	ug/l	Offices/Parking	DPC3	4/16/2014	0.99	1	1	0
WG	T	ug/l	Offices/Parking	DPC4	4/16/2014	53	1	4.1	1
WG	T	ug/l	Offices/Parking	DPC5	4/16/2014	69	1	4.2	1
WG	T	ug/l	Offices/Parking	DPC7	4/17/2014	88	1	6.9	1
WG	T	ug/l	Offices/Parking	DPC8	4/17/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	DPC9	4/18/2014	0.96	1	1	0
WG	T	ug/l	Offices/Parking	DPD7	4/17/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	MW09A	11/3/2014	130	1	15	1
WG	T	ug/l	Offices/Parking	MW09A	12/21/2016	320	1	41	1
WG	T	ug/l	Offices/Parking	MW12A	11/3/2014	1	0	1	0
WG	T	ug/l	Offices/Parking	SUSDP09	6/11/2013	160	1	12	1
WG	T	ug/l	Offices/Parking	SUSDP14	6/6/2013	1	0	1	0
WG	T	ug/l	Offices/Parking	SUSDP19	6/5/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Vinyl Chloride	D_RA17_GW_VOCs|Vinyl Chloride
WG	T	ug/l	Offices/Parking	DP55	2/2/2017	1	0
WG	T	ug/l	Offices/Parking	DPA2	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPA3	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPA4	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPA5	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPB10	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPB11	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPB12	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPB2	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPB3	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPB5	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPB6	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPB7	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPB9	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPC3	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPC4	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPC5	4/16/2014	1	0
WG	T	ug/l	Offices/Parking	DPC7	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPC8	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	DPC9	4/18/2014	1	0
WG	T	ug/l	Offices/Parking	DPD7	4/17/2014	1	0
WG	T	ug/l	Offices/Parking	MW09A	11/3/2014	1	0
WG	T	ug/l	Offices/Parking	MW09A	12/21/2016	5.3	1
WG	T	ug/l	Offices/Parking	MW12A	11/3/2014	1	0
WG	T	ug/l	Offices/Parking	SUSDP09	6/11/2013	1	0
WG	T	ug/l	Offices/Parking	SUSDP14	6/6/2013	1	0
WG	T	ug/l	Offices/Parking	SUSDP19	6/5/2013	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Substation #7	DP33	4/4/2013	1	0	1	0
WG	T	ug/l	Substation #7	MW14A	11/3/2014	1	0	1	0
WG	T	ug/l	Substation #7	MW14A	12/20/2016	1	0	1	0
WG	T	ug/l	Substation #7	MW15A	11/3/2014	1	0	1	0
WG	T	ug/l	Substation #7	MW15A	12/21/2016	1	0	1	0
WG	T	ug/l	Substation #7	SUSDP20	6/12/2013	1	0	1	0
WG	T	ug/l	Substation #7	SUSDP23	6/12/2013	1	0	1	0
WG	T	ug/l	Substation #7	SUSDP24	6/4/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	RA17_GW_VOCs|Tetrachloroethylene
WG	T	ug/l	Substation #7	DP33	4/4/2013	21	1	0.81
WG	T	ug/l	Substation #7	MW14A	11/3/2014	1	0	0.96
WG	T	ug/l	Substation #7	MW14A	12/20/2016	1	0	0.73
WG	T	ug/l	Substation #7	MW15A	11/3/2014	4.3	1	1
WG	T	ug/l	Substation #7	MW15A	12/21/2016	8.3	1	1
WG	T	ug/l	Substation #7	SUSDP20	6/12/2013	14	1	0.24
WG	T	ug/l	Substation #7	SUSDP23	6/12/2013	0.33	1	1
WG	T	ug/l	Substation #7	SUSDP24	6/4/2013	1	0	1

Matrix	Fraction	Units	EA	Location	Collected	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Substation #7	DP33	4/4/2013	1	0.17	1
WG	T	ug/l	Substation #7	MW14A	11/3/2014	1	1	0
WG	T	ug/l	Substation #7	MW14A	12/20/2016	1	1	0
WG	T	ug/l	Substation #7	MW15A	11/3/2014	0	1	0
WG	T	ug/l	Substation #7	MW15A	12/21/2016	0	1	0
WG	T	ug/l	Substation #7	SUSDP20	6/12/2013	1	1	0
WG	T	ug/l	Substation #7	SUSDP23	6/12/2013	0	1	0
WG	T	ug/l	Substation #7	SUSDP24	6/4/2013	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Transformer Shop	DP35	3/28/2013	1	0	1	0
WG	T	ug/l	Transformer Shop	DP46	6/5/2013	1	0	0.44	1
WG	T	ug/l	Transformer Shop	DP47	6/5/2013	1	0	1	0
WG	T	ug/l	Transformer Shop	DP54	2/2/2017	1	0	1	0
WG	T	ug/l	Transformer Shop	SUSDP22	6/12/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)
WG	T	ug/l	Transformer Shop	DP35	3/28/2013	1	0
WG	T	ug/l	Transformer Shop	DP46	6/5/2013	1	0
WG	T	ug/l	Transformer Shop	DP47	6/5/2013	1	0
WG	T	ug/l	Transformer Shop	DP54	2/2/2017	1	0
WG	T	ug/l	Transformer Shop	SUSDP22	6/12/2013	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Tetrachloroethylene	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Transformer Shop	DP35	3/28/2013	0.2	1	1	0
WG	T	ug/l	Transformer Shop	DP46	6/5/2013	1	0	1	0
WG	T	ug/l	Transformer Shop	DP47	6/5/2013	1	0	1	0
WG	T	ug/l	Transformer Shop	DP54	2/2/2017	1	0	1	0
WG	T	ug/l	Transformer Shop	SUSDP22	6/12/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Bromodichloromethane	D_RA17_GW_VOCs|Bromodichloromethane	RA17_GW_VOCs|Chloroform	D_RA17_GW_VOCs|Chloroform
WG	T	ug/l	Vehicle Refueling	DP28	4/2/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	DP38	5/23/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	MW06A	11/4/2014	1	0	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP37	5/23/2013	1	0	3.3	1
WG	T	ug/l	Vehicle Refueling	SUSDP37	5/23/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP39	5/22/2013	1	0	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)	D_RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)
WG	T	ug/l	Vehicle Refueling	DP28	4/2/2013	1.2	1
WG	T	ug/l	Vehicle Refueling	DP38	5/23/2013	1	0
WG	T	ug/l	Vehicle Refueling	MW06A	11/4/2014	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP37	5/23/2013	1.6	1
WG	T	ug/l	Vehicle Refueling	SUSDP37	5/23/2013	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP39	5/22/2013	1	0

Matrix	Fraction	Units	EA	Location	Collected	RA17_GW_VOCs|Tetrachloroethylene	D_RA17_GW_VOCs|Tetrachloroethylene	RA17_GW_VOCs|Trichloroethene	D_RA17_GW_VOCs|Trichloroethene
WG	T	ug/l	Vehicle Refueling	DP28	4/2/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	DP38	5/23/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	MW06A	11/4/2014	0.26	1	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP37	5/23/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP37	5/23/2013	1	0	1	0
WG	T	ug/l	Vehicle Refueling	SUSDP39	5/22/2013	1	0	1	0

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_DioxinFurans|TCDD TEQ HH	D_RA18_SE_DioxinFurans|TCDD TEQ HH	RA18_SE_Metals|Aluminum	D_RA18_SE_Metals|Aluminum	RA18_SE_Metals|Antimony	D_RA18_SE_Metals|Antimony
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft			7500	1	0.62	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft			8000	1	0.39	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft	0.00000702	1				
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft			15500	1	0.64	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft			4400	1	1.7	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft			7100	1	0.46	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	0.00000914	1	12000	1	0.58	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	0.0000789	1	6000	1	0.67	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	0.0000119	1	12000	1	0.48	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	0.0000084	1	12000	1	0.47	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	0.000011	1	7500	1	0.785	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	0.00000775	1	8200	1	0.82	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	0.000369	1	4300	1	1.2	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	0.000000712	1	6300	1	0.68	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft			5600	1	0.6	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft			5300	1	0.31	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft			5200	1	0.39	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft			6500	1	0.39	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	0.0000525	1	6200	1	0.5	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft			10000	1	0.64	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft			13000	1	0.77	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft	0.0000131	1	8200	1	1.3	1
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	0.000205	1	6000	1	1.4	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft	0.0000421	1	7000	1	2.8	1
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft			9800	1	0.49	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft	0.0000129	1	13000	1	1	1
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft			13000	1	0.43	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft	0.0000537	1	12000	1	1.7	1
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft			15000	1	1	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft	0.0000375	1	8900	1	2.3	1
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft			7300	1	0.69	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft	0.0000275	1	10000	1	1.1	1
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft			4500	1	1.2	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft	0.000032	1	4000	1	1.1	1
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft			3700	1	1.4	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	0.000707	1	7300	1	2.8	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft	0.0000269	1	7500	1	43	1
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	0.0000106	1	2400	1	0.38	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	0.00000596	1	7700	1	0.35	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft	0.00000892	1	10000	1	0.89	1
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft			4500	1	0.27	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	0.00000122	1	6300	1	0.48	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft						
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft						

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_Metals|Arsenic	D_RA18_SE_Metals|Arsenic	RA18_SE_Metals|Cobalt	D_RA18_SE_Metals|Cobalt	RA18_SE_Metals|Manganese	D_RA18_SE_Metals|Manganese
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft	3.2	1	11	1	170	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft	2.3	1	10	1	180	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft						
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft	9.05	1	19.5	1	305	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft	7.1	1	6.9	1	150	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft	2.9	1	11	1	210	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	5.1	1	25	1	370	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	5.1	1	9.8	1	120	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	4.3	1	18	1	260	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	3.8	1	18	1	230	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	4.55	1	14.5	1	220	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	4.1	1	14	1	200	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	4	1	9.6	1	97	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	3.3	1	14	1	170	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	3	1	13	1	130	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft	2.1	1	16	1	210	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft	2	1	11	1	160	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft	1.9	1	12	1	210	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	2.6	1	18	1	200	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft	3.4	1	19	1	390	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft	14	1	17	1	130	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft	7	1	16	1	190	1
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	5.9	1	16	1	150	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft	6.1	1	16	1	160	1
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft	3.6	1	19	1	390	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft	6.4	1	22	1	430	1
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft	11	1	15	1	180	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft	6.8	1	20	1	250	1
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft	17	1	32	1	230	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft	17	1	23	1	190	1
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft	4.3	1	16	1	180	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft	5.7	1	19	1	270	1
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft	4.6	1	13	1	120	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft	5.1	1	9.3	1	100	1
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	5.6	1	4.9	1	86	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	11	1	13	1	200	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft	7.2	1	14	1	200	1
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	2.5	1	7.1	1	120	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	3.6	1	16	1	330	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft	5.1	1	18	1	350	1
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft	2.1	1	9.1	1	140	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	2.5	1	12	1	230	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft						
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft						

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_Metals|Nickel	D_RA18_SE_Metals|Nickel	RA18_SE_Metals|Thallium	D_RA18_SE_Metals|Thallium	RA18_SE_Metals|Vanadium	D_RA18_SE_Metals|Vanadium
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft	22	1	0.16	1	33	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft	20	1	0.15	1	27	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft						
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft	59	1	0.33	1	140	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft	110	1	0.13	1	180	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft	24	1	0.175	1	22	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	42	1	0.28	1	42	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	28	1	0.15	1	59	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	36	1	0.25	1	40	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	33	1	0.22	1	36	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	27.5	1	0.18	1	34	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	29	1	0.19	1	35	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	50	1	0.13	1	75	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	25	1	0.16	1	28	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	23	1	0.15	1	27	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft	26	1	0.17	1	23	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft	19	1	0.15	1	21	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft	22	1	0.16	1	22	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	29	1	0.19	1	27	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft	37	1	0.25	1	41	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft	91	1	0.53	1	250	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft	47	1	0.22	1	63	1
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	65	1	0.16	1	120	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft	47	1	0.18	1	77	1
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft	36	1	0.23	1	37	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft	42	1	0.24	1	48	1
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft	59	1	0.35	1	180	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft	57	1	0.26	1	88	1
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft	150	1	0.63	1	360	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft	97	1	0.27	1	160	1
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft	50	1	0.25	1	110	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft	46	1	0.24	1	56	1
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft	120	1	0.15	1	150	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft	56	1	0.13	1	110	1
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	38	1	0.14	1	94	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	160	1	0.13	1	440	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft	75	1	0.2	1	140	1
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	84	1	0.037	1	56	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	28	1	0.18	1	36	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft	35	1	0.22	1	39	1
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft	15	1	0.12	1	25	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	20	1	0.16	1	29	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft						
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft						
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft						
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft						
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft						

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_PestPCBs|PCB, Total Aroclors (AECOM Calc)	D_RA18_SE_PestPCBs|PCB, Total Aroclors (AECOM Calc)
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft	0.097	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft	0.11	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft		
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft	0.98	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft	1.4	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft	0.0845	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	0.088	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	0.42	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	0.089	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	0.066	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	0.24	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	0.043	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	0.73	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	0.022	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	0.087	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft	0.077	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft	0.11	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft	0.076	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	0.23	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft	0.39	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft	1.8	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft	0.16	1
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	0.4	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft	0.25	1
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft	0.24	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft	0.29	1
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft	0.87	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft	0.54	1
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft	1.9	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft	0.78	1
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft	0.62	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft	0.053	1
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft	0.96	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft	0.63	1
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	0.79	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	0.77	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft	0.3	1
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	0.23	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	0.59	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft	0.26	1
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft	0.38	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	0.17	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft		
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft		
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft		
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft		
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft		
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft		
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft		
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft		
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft		
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft		
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft		
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft		
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft		

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_Petroleum|Diesel Range Organics (C10-C20)	D_RA18_SE_Petroleum|Diesel Range Organics (C10-C20)	RA18_SE_SVOCs|Benzo(a)anthracene	D_RA18_SE_SVOCs|Benzo(a)anthracene
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft			0.8	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft			0.85	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft				
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft			0.35	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft			2.3	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft			0.37	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft			1	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft			0.21	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft			0.6	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft			0.72	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft			0.56	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft			0.58	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft			1	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft			0.52	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	48	1	0.4	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft			0.48	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft			0.49	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft			0.61	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft			0.59	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft			0.47	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft			0.19	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft	87	1		
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft			0.4	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft	100	1		
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft			0.42	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft	88	1		
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft			0.16	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft	79	1		
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft			0.36	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft	100	1		
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft			0.48	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft	51	1		
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft			0.49	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft	110	1		
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	220	1	0.55	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft			0.59	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft	69	1		
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft			0.95	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft			0.45	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft	50	1		
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft			0.45	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft			0.48	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft				
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft				

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_SVOCs|Benzo(a)pyrene	D_RA18_SE_SVOCs|Benzo(a)pyrene	RA18_SE_SVOCs|Benzo(b)fluoranthene	D_RA18_SE_SVOCs|Benzo(b)fluoranthene
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft	0.94	1	1.4	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft	0.99	1	1.4	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft				
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft	0.43	1	0.65	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft	2	1	2.6	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft	0.43	1	0.69	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	1.1	1	1.7	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	0.24	1	0.37	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	0.73	1	1.1	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	0.79	1	1.1	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	0.76	1	1.2	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	0.67	1	1.1	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	1.1	1	1.7	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	0.58	1	0.94	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	0.56	1	0.88	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft	0.58	1	0.84	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft	0.55	1	0.73	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft	0.71	1	1	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	0.67	1	0.73	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft	0.55	1	0.94	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft	0.19	1	0.32	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	0.46	1	0.73	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft	0.53	1	0.85	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft	0.16	1	0.29	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft	0.31	1	0.5	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft	0.54	1	0.86	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft	0.52	1	0.85	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	0.44	1	0.65	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	0.6	1	0.86	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	0.89	1	1.2	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	0.63	1	0.92	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft				
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft	0.54	1	0.88	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	0.62	1	0.99	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft				
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft				

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_SVOCs|Benzo(k)fluoranthene	D_RA18_SE_SVOCs|Benzo(k)fluoranthene	RA18_SE_SVOCs|Chrysene	D_RA18_SE_SVOCs|Chrysene
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft	0.43	1	1.3	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft	0.59	1	1.3	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft				
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft	0.295	1	0.575	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft	0.96	1	2.4	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft	0.245	1	0.575	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	0.42	1	1.3	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	0.13	1	0.34	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	0.32	1	0.94	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	0.42	1	1.1	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	0.43	1	1	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	0.43	1	0.98	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	0.58	1	1.5	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	0.3	1	0.81	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	0.31	1	0.65	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft	0.35	1	0.7	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft	0.4	1	0.71	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft	0.47	1	0.94	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	0.56	1	0.9	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft	0.32	1	0.83	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft	0.096	1	0.32	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	0.25	1	0.74	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft	0.33	1	0.85	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft	0.1	1	0.27	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft	0.14	1	0.49	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft	0.19	1	0.63	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft	0.27	1	0.76	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	0.22	1	0.62	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	0.3	1	0.89	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	0.43	1	1.2	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	0.57	1	0.75	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft				
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft	0.2	1	0.79	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	0.29	1	0.88	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft				
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft				

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_SVOCs|Dibenzo(a,h)anthracene	D_RA18_SE_SVOCs|Dibenzo(a,h)anthracene	RA18_SE_SVOCs|Indeno(1,2,3-cd)pyrene	D_RA18_SE_SVOCs|Indeno(1,2,3-cd)pyrene
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft	0.22	1	0.95	1
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft	0.25	1	0.94	1
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft				
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft	0.13	0	0.38	1
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft	0.47	1	1.4	1
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft	0.11	1	0.41	1
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft	0.27	1	1.1	1
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft	0.058	1	0.18	1
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft	0.2	1	0.8	1
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft	0.19	1	0.86	1
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft	0.037	0	0.92	1
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft	0.16	1	0.65	1
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft	0.25	1	0.91	1
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft	0.15	1	0.55	1
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft	0.13	1	0.44	1
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft	0.14	1	0.42	1
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft	0.11	1	0.4	1
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft	0.17	1	0.61	1
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft	0.2	1	0.58	1
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft	0.16	1	0.59	1
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft	0.052	1	0.14	1
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft	0.14	1	0.42	1
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft	0.089	1	0.35	1
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft	0.04	1	0.12	1
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft	0.055	1	0.23	1
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft	0.086	1	0.37	1
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft	0.094	1	0.38	1
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft	0.084	1	0.26	1
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft	0.16	1	0.51	1
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft				
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft	0.15	1	0.64	1
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft	0.16	1	0.62	1
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft				
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft	0.12	1	0.43	1
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft	0.14	1	0.57	1
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft				
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft				
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft				
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft				
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft				

Matrix	Fraction	Units	Location	Collected	Depth	RA18_SE_Other|Cyanide	D_RA18_SE_Other|Cyanide
SE	T	mg/kg	R5-03	7/25/2014	0 - 0.5 ft		
SE	T	mg/kg	R5-05	7/30/2014	0 - 0.5 ft		
SE	T	mg/kg	R5-09	6/28/2016	0 - 0.5 ft		
SE	T	mg/kg	R6-04	7/28/2014	0 - 0.5 ft		
SE	T	mg/kg	R6-05	8/4/2014	0 - 0.5 ft		
SE	T	mg/kg	R6-06	8/4/2014	0 - 0.5 ft		
SE	T	mg/kg	R6-18	4/30/2015	0 - 0.5 ft		
SE	T	mg/kg	R6-21	4/29/2015	0 - 0.5 ft		
SE	T	mg/kg	R6-22	4/30/2015	0 - 0.5 ft		
SE	T	mg/kg	R6-23	4/30/2015	0 - 0.5 ft		
SE	T	mg/kg	R6-30	6/9/2016	0 - 0.5 ft		
SE	T	mg/kg	R6-31	6/28/2016	0 - 0.5 ft		
SE	T	mg/kg	R6-32	6/28/2016	0 - 0.5 ft		
SE	T	mg/kg	R6-33	6/28/2016	0 - 0.5 ft		
SE	T	mg/kg	SED1.5C	6/21/2017	0 - 0.33 ft		
SE	T	mg/kg	SED10C	11/11/2013	0 - 0.5 ft		
SE	T	mg/kg	SED1C	11/7/2013	0 - 0.5 ft		
SE	T	mg/kg	SED2.5B	11/7/2013	0 - 0.5 ft		
SE	T	mg/kg	SED2C	11/6/2013	0 - 0.5 ft		
SE	T	mg/kg	SED4C	11/12/2013	0 - 0.5 ft		
SE	T	mg/kg	SED6.5D	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED6.5D	6/9/2017	0 - 0.33 ft		
SE	T	mg/kg	SED6.5E	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED6.5E	6/8/2017	0 - 0.33 ft		
SE	T	mg/kg	SED6C	11/14/2013	0 - 0.5 ft		
SE	T	mg/kg	SED6C	6/7/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7.5D	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED7.5D	6/9/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7.5E	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED7.5E	6/8/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7D	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED7D	6/9/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7E	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED7E	6/8/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7E	6/22/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7F	11/25/2013	0 - 0.5 ft		
SE	T	mg/kg	SED7F	6/8/2017	0 - 0.33 ft		
SE	T	mg/kg	SED7G	1/30/2014	0 - 0.5 ft		
SE	T	mg/kg	SED8C	11/14/2013	0 - 0.5 ft		
SE	T	mg/kg	SED8C	6/7/2017	0 - 0.33 ft		
SE	T	mg/kg	SED9.5B	11/11/2013	0 - 0.5 ft		
SE	T	mg/kg	SED9C	11/11/2013	0 - 0.5 ft		
SE	T	ug/kg	R5-03	7/25/2014	0 - 0.5 ft	140	0
SE	T	ug/kg	R5-05	7/30/2014	0 - 0.5 ft	180	1
SE	T	ug/kg	R6-04	7/28/2014	0 - 0.5 ft	295	1
SE	T	ug/kg	R6-05	8/4/2014	0 - 0.5 ft	270	1
SE	T	ug/kg	R6-06	8/4/2014	0 - 0.5 ft	620	1
SE	T	ug/kg	R6-18	4/30/2015	0 - 0.5 ft	4900	1
SE	T	ug/kg	R6-21	4/29/2015	0 - 0.5 ft	170	0
SE	T	ug/kg	R6-22	4/30/2015	0 - 0.5 ft	740	1
SE	T	ug/kg	R6-23	4/30/2015	0 - 0.5 ft	1800	1
SE	T	ug/kg	R6-30	6/9/2016	0 - 0.5 ft	895	1
SE	T	ug/kg	R6-31	6/28/2016	0 - 0.5 ft	380	1
SE	T	ug/kg	R6-32	6/28/2016	0 - 0.5 ft	550	1
SE	T	ug/kg	R6-33	6/28/2016	0 - 0.5 ft	480	1

Matrix	Fraction	Units	Task	Group-ID	Location	Collected	RA_SW_Metals|Arsenic	D_RA_SW_Metals|Arsenic	RA_SW_Metals|Cobalt	D_RA_SW_Metals|Cobalt
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW10B	9/26/2013	0.62	1	1.1	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW1B	9/23/2013	0.73	1	0.96	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW2B	9/23/2013	0.59	1	0.93	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW3C	9/23/2013	0.7	1	1.1	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW4B	9/24/2013	1.2	1	1	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW5C	9/24/2013	0.83	1	0.97	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW6B	9/24/2013	1.2	1	1.1	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW7B	9/24/2013	0.48	1	0.8	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW8B	9/24/2013	0.82	1	0.98	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW9C	9/25/2013	0.62	1	0.89	1

Matrix	Fraction	Units	Task	Group-ID	Location	Collected	RA_SW_Metals|Manganese	D_RA_SW_Metals|Manganese
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW10B	9/26/2013	170	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW1B	9/23/2013	140	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW2B	9/23/2013	130	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW3C	9/23/2013	120	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW4B	9/24/2013	140	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW5C	9/24/2013	140	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW6B	9/24/2013	140	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW7B	9/24/2013	140	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW8B	9/24/2013	130	1
WS	T	ug/l	Phase2-2013	RA_Waterside_Area	SUW9C	9/25/2013	150	1

Matrix	Units	Location	Collected	4,4'-DDD	D_4,4'-DDD	4,4'-DDE	D_4,4'-DDE	ALDRIN	D_ALDRIN	alpha-Chlordane	D_alpha-Chlordane	Arsenic	D_Arsenic	Chlordane, gamma	D_Chlordane, gamma
TA_BCAT_F	mg/kg	Lower Anacostia	9/26/2013									0.091	0		
TA_BCAT_F	ug/kg	Lower Anacostia	9/26/2013	1.97	1	53.1	1	0.089	1	8.16	1			0.05	0
TA_CARP_F	mg/kg	Lower Anacostia	9/26/2013									0.245	1		
TA_CARP_F	ug/kg	Lower Anacostia	9/26/2013	21.3	1	34.3	1	0.617	1	36.8	1			26.1	1
TA_CCAT_F	mg/kg	Lower Anacostia	9/26/2013									0.093	0		
TA_CCAT_F	ug/kg	Lower Anacostia	9/26/2013	4.09	1	13.5	1	0.328	1	8.84	1			0.856	1
TA_EEL_F	mg/kg	Lower Anacostia	9/26/2013									0.146	0		
TA_EEL_F	ug/kg	Lower Anacostia	9/26/2013	33.2	1	100.7	1	0.1	0	52.7	1			25.1	1
TA_LMB_F	mg/kg	Lower Anacostia	9/26/2013									0.1	0		
TA_LMB_F	ug/kg	Lower Anacostia	9/26/2013	3.46	1	13.4	1	0.0472	0	6.02	1			2.18	1
TA_SUN_F	mg/kg	Lower Anacostia	9/26/2013									0.091	0		
TA_SUN_F	ug/kg	Lower Anacostia	9/26/2013	0.95	1	2.96	1	0.073	1	0.957	1			0.146	1

Matrix	Units	Location	Collected	cis-NONACHLOR	D_cis-NONACHLOR	DIELDRIN	D_DIELDRIN	HEPTACHLOR EPOXIDE	D_HEPTACHLOR EPOXIDE	Mercury	D_Mercury	MIREX	D_MIREX	OXYCHLORDANE	D_OXYCHLORDANE
TA_BCAT_F	mg/kg	Lower Anacostia	9/26/2013							0.068	1				
TA_BCAT_F	ug/kg	Lower Anacostia	9/26/2013	0.05	0	2.76	1	3.36	1			0.496	1	0.05	0
TA_CARP_F	mg/kg	Lower Anacostia	9/26/2013							0.025	1				
TA_CARP_F	ug/kg	Lower Anacostia	9/26/2013	10.3	1	13.4	1	4.46	1			0.077	1	4.29	1
TA_CCAT_F	mg/kg	Lower Anacostia	9/26/2013							0.085	1				
TA_CCAT_F	ug/kg	Lower Anacostia	9/26/2013	2.38	1	1.32	1	0.539	1			0.15	1	0.777	1
TA_EEL_F	mg/kg	Lower Anacostia	9/26/2013							0.095	1				
TA_EEL_F	ug/kg	Lower Anacostia	9/26/2013	26	1	17.8	1	5.36	1			0.454	1	14.3	1
TA_LMB_F	mg/kg	Lower Anacostia	9/26/2013							0.11	1				
TA_LMB_F	ug/kg	Lower Anacostia	9/26/2013	2.94	1	1.24	1	0.192	1			0.0472	0	1.28	1
TA_SUN_F	mg/kg	Lower Anacostia	9/26/2013							0.049	1				
TA_SUN_F	ug/kg	Lower Anacostia	9/26/2013	1.09	1	0.753	1	0.193	1			0.0478	0	0.374	1

Matrix	Units	Location	Collected	PCB-TEQ (Mammal)	D_PCB-TEQ (Mammal)	Thallium	D_Thallium	Total PCBs (Congeners)	D_Total PCBs (Congeners)	trans-NONACHLOR	D_trans-NONACHLOR
TA_BCAT_F	mg/kg	Lower Anacostia	9/26/2013			0.004	0				
TA_BCAT_F	ug/kg	Lower Anacostia	9/26/2013	0.01797245	1			437.156	1	0.165	1
TA_CARP_F	mg/kg	Lower Anacostia	9/26/2013			0.006	0				
TA_CARP_F	ug/kg	Lower Anacostia	9/26/2013	0.00736028	1			543.039	1	21.1	1
TA_CCAT_F	mg/kg	Lower Anacostia	9/26/2013			0.004	0				
TA_CCAT_F	ug/kg	Lower Anacostia	9/26/2013	0.00031611	1			119.541	1	6.96	1
TA_EEL_F	mg/kg	Lower Anacostia	9/26/2013			0.006	0				
TA_EEL_F	ug/kg	Lower Anacostia	9/26/2013	0.0137754	1			645.165	1	80.2	1
TA_LMB_F	mg/kg	Lower Anacostia	9/26/2013			0.004	0				
TA_LMB_F	ug/kg	Lower Anacostia	9/26/2013	0.00934443	1			114.156	1	7.72	1
TA_SUN_F	mg/kg	Lower Anacostia	9/26/2013			0.004	0				
TA_SUN_F	ug/kg	Lower Anacostia	9/26/2013	0.00011781	1			41.114	1	1.95	1

Matrix	Units	Location	Collected	4,4'-DDD	D_4,4'-DDD	4,4'-DDE	D_4,4'-DDE	ALDRIN	D_ALDRIN	alpha-Chlordane	D_alpha-Chlordane	beta-BHC	D_beta-BHC	Chlordane, gamma	D_Chlordane, gamma
TA_BB_F	mg/kg	Upper Anacostia	9/26/2013												
TA_BB_F	ug/kg	Upper Anacostia	9/26/2013	1.87	1	4.29	1	0.056	1	5.41	1	0.599	1	3.98	1
TA_BCAT_F	mg/kg	Upper Anacostia	9/26/2013												
TA_BCAT_F	ug/kg	Upper Anacostia	9/26/2013	2.76	1	13.5	1	0.0494	0	7.03	1	0.894	1	4.34	1
TA_CARP_F	mg/kg	Upper Anacostia	9/26/2013												
TA_CARP_F	ug/kg	Upper Anacostia	9/26/2013	21.89	1	44.3	1	0.062	1	31	1	0.535	1	4.37	1
TA_CCAT_F	mg/kg	Upper Anacostia	9/26/2013												
TA_CCAT_F	ug/kg	Upper Anacostia	9/26/2013	7.2	1	29.04	1	0.351	1	15.1	1	0.518	1	9.19	1
TA_LMB_F	mg/kg	Upper Anacostia	9/26/2013												
TA_LMB_F	ug/kg	Upper Anacostia	9/26/2013	2.29	1	9.37	1	0.069	1	4.65	1	0.652	1	1.76	1
TA_NS_F	mg/kg	Upper Anacostia	9/26/2013												
TA_NS_F	ug/kg	Upper Anacostia	9/26/2013	1.38	1	4.94	1	0.382	1	2.65	1	0.777	1	0.459	1
TA_SUN_F	mg/kg	Upper Anacostia	9/23/2013												
TA_SUN_F	ug/kg	Upper Anacostia	9/23/2013	0.92	1	3.46	1	0.0502	0	1.23	1	0.68	1	0.217	1

Matrix	Units	Location	Collected	cis-NONACHLOR	D_cis-NONACHLOR	DIELDRIN	D_DIELDRIN	HEPTACHLOR EPOXIDE	D_HEPTACHLOR EPOXIDE	Mercury	D_Mercury	MIREX	D_MIREX	OXYCHLORDANE
TA_BB_F	mg/kg	Upper Anacostia	9/26/2013							0.033	1			
TA_BB_F	ug/kg	Upper Anacostia	9/26/2013	1.44	1	1.19	1	0.593	1			0.051	1	0.635
TA_BCAT_F	mg/kg	Upper Anacostia	9/26/2013							0.121	1			
TA_BCAT_F	ug/kg	Upper Anacostia	9/26/2013	2.48	1	1.69	1	0.737	1			0.135	1	1.01
TA_CARP_F	mg/kg	Upper Anacostia	9/26/2013							0.063	1			
TA_CARP_F	ug/kg	Upper Anacostia	9/26/2013	12.9	1	8.49	1	3.69	1			0.541	1	4.82
TA_CCAT_F	mg/kg	Upper Anacostia	9/26/2013							0.125	1			
TA_CCAT_F	ug/kg	Upper Anacostia	9/26/2013	6.08	1	2.49	1	1.12	1			0.268	1	1.71
TA_LMB_F	mg/kg	Upper Anacostia	9/26/2013							0.236	1			
TA_LMB_F	ug/kg	Upper Anacostia	9/26/2013	3.11	1	2.53	1	1.07	1			0.138	1	2.1
TA_NS_F	mg/kg	Upper Anacostia	9/26/2013							0.124	1			
TA_NS_F	ug/kg	Upper Anacostia	9/26/2013	1.64	1	2.8	1	1.63	1			0.0494	0	1.72
TA_SUN_F	mg/kg	Upper Anacostia	9/23/2013							0.055	1			
TA_SUN_F	ug/kg	Upper Anacostia	9/23/2013	1.29	1	1.03	1	0.357	1			0.0502	0	0.723

Matrix	Units	Location	Collected	D_OXYCHLORDANE	PCB-TEQ (Mammal)	D_PCB-TEQ (Mammal)	Total PCBs (Congeners)	D_Total PCBs (Congeners)	trans-NONACHLOR	D_trans-NONACHLOR
TA_BB_F	mg/kg	Upper Anacostia	9/26/2013							
TA_BB_F	ug/kg	Upper Anacostia	9/26/2013	1	0.00015093	1	56.239	1	4.08	1
TA_BCAT_F	mg/kg	Upper Anacostia	9/26/2013							
TA_BCAT_F	ug/kg	Upper Anacostia	9/26/2013	1	0.00051159	1	141.143	1	7.01	1
TA_CARP_F	mg/kg	Upper Anacostia	9/26/2013							
TA_CARP_F	ug/kg	Upper Anacostia	9/26/2013	1	0.0019266	1	680.568	1	30	1
TA_CCAT_F	mg/kg	Upper Anacostia	9/26/2013							
TA_CCAT_F	ug/kg	Upper Anacostia	9/26/2013	1	0.00093222	1	253.414	1	16.6	1
TA_LMB_F	mg/kg	Upper Anacostia	9/26/2013							
TA_LMB_F	ug/kg	Upper Anacostia	9/26/2013	1	0.00532586	1	119.685	1	9.22	1
TA_NS_F	mg/kg	Upper Anacostia	9/26/2013							
TA_NS_F	ug/kg	Upper Anacostia	9/26/2013	1	0.00011661	1	49.55	1	4.75	1
TA_SUN_F	mg/kg	Upper Anacostia	9/23/2013							
TA_SUN_F	ug/kg	Upper Anacostia	9/23/2013	1	0.00013002	1	41.648	1	2.94	1

Matrix	Units	Location	4,4'-DDD	D_4,4'-DDD	4,4'-DDE	D_4,4'-DDE	alpha-Chlordane	D_alpha-Chlordane	Arsenic	D_Arsenic	Chlordane, gamma	D_Chlordane, gamma
TA_BB_F	mg/kg	Lower Potomac	0.00171	1	0.00754	1	0.0025	1	0.089	0	0.00138	1
TA_BCAT_F	mg/kg	Lower Potomac	0.00293	1	0.0132	1	0.00591	1	0.092	0	0.00355	1
TA_CARP_F	mg/kg	Lower Potomac	0.0042	1	0.011	1	0.0101	1	0.192	1	0.00665	1
TA_CCAT_F	mg/kg	Lower Potomac	0.00161	1	0.00886	1	0.00254	1	0.09	0	0.00176	1
TA_EEL_F	mg/kg	Lower Potomac	0.014	1	0.0601	1	0.0241	1	0.167	0	0.00943	1
TA_EEL_F	mg/kg	Lower Potomac	0.00326	1	0.0396	1	0.00224	1	0.121	0	0.000786	1
TA_LMB_F	mg/kg	Lower Potomac	0.00054	1	0.00414	1	0.00111	1	0.096	0	0.000384	1
TA_SHAD_F	mg/kg	Lower Potomac	0.0024	1	0.00728	1	0.00249	1	3.71	1	0.00108	1
TA_SUN_F	mg/kg	Lower Potomac	0.000452	1	0.00243	1	0.000417	1	0.09	0	0.0000496	0

Matrix	Units	Location	DIELDRIN	D_DIELDRIN	HEPTACHLOR EPOXIDE	D_HEPTACHLOR EPOXIDE	Mercury	D_Mercury	OXYCHLORDANE	D_OXYCHLORDANE
TA_BB_F	mg/kg	Lower Potomac	0.00147	1	0.000539	1	0.058	1	0.000576	1
TA_BCAT_F	mg/kg	Lower Potomac	0.00202	1	0.0011	1	0.064	1	0.000968	1
TA_CARP_F	mg/kg	Lower Potomac	0.00587	1	0.00223	1	0.048	1	0.00149	1
TA_CCAT_F	mg/kg	Lower Potomac	0.000928	1	0.00045	1	0.091	1	0.000773	1
TA_EEL_F	mg/kg	Lower Potomac	0.0148	1	0.0056	1	0.141	1	0.00725	1
TA_EEL_F	mg/kg	Lower Potomac	0.00511	1	0.000752	1	0.127	1	0.00231	1
TA_LMB_F	mg/kg	Lower Potomac	0.000817	1	0.000414	1	0.143	1	0.000523	1
TA_SHAD_F	mg/kg	Lower Potomac	0.00267	1	0.000798	1	0.039	1	0.000673	1
TA_SUN_F	mg/kg	Lower Potomac	0.00068	1	0.000468	1	0.037	1	0.000546	1

Matrix	Units	Location	PCB-TEQ_MAMMAL	D_PCB-TEQ_MAMMAL	Total PCBs (Congeners)	D_Total PCBs (Congeners)	trans-NONACHLOR	D_trans-NONACHLOR
TA_BB_F	mg/kg	Lower Potomac	7.4737E-06	1	0.181767	1	0.00339	1
TA_BCAT_F	mg/kg	Lower Potomac	5.32328E-06	1	0.093894	1	0.00527	1
TA_CARP_F	mg/kg	Lower Potomac	3.0219E-07	1	0.101165	1	0.00696	1
TA_CCAT_F	mg/kg	Lower Potomac	7.4577E-06	1	0.173604	1	0.00316	1
TA_EEL_F	mg/kg	Lower Potomac	6.87183E-06	1	0.309094	1	0.0358	1
TA_EEL_F	mg/kg	Lower Potomac	6.3633E-07	1	0.469314	1	0.00948	1
TA_LMB_F	mg/kg	Lower Potomac	1.4958E-07	1	0.059013	1	0.00218	1
TA_SHAD_F	mg/kg	Lower Potomac	4.026E-07	1	0.052248	1	0.00281	1
TA_SUN_F	mg/kg	Lower Potomac	2.06234E-06	1	0.033297	1	0.00123	1

Matrix	Units	Location	4,4'-DDD	D_4,4'-DDD	4,4'-DDE	D_4,4'-DDE	alpha-Chlordane	D_alpha-Chlordane	Arsenic	D_Arsenic	beta-BHC	D_beta-BHC
TA_BB_F	mg/kg	Upper Potomac	0.00108	1	0.00515	1	0.00284	1	0.095	0	0.000496	1
TA_CARP_F	mg/kg	Upper Potomac	0.00623	1	0.0228	1	0.012	1	0.247	1	0.00006	1
TA_CCAT_F	mg/kg	Upper Potomac	0.00457	1	0.0273	1	0.0101	1	0.1	0	0.000089	1
TA_EEL_F	mg/kg	Upper Potomac	0.0251	1	0.243	1	0.0294	1	0.235	1	0.000798	1
TA_LMB_F	mg/kg	Upper Potomac	0.000291	1	0.0047	1	0.000796	1	0.101	0	0.000611	1
TA_NS_F	mg/kg	Upper Potomac	0.00188	1	0.00967	1	0.000205	1	0.108	0	0.00044	1
TA_SB_F	mg/kg	Upper Potomac	0.0516	1	0.237	1	0.0537	1	0.846	1	0.00274	1
TA_SUN_F	mg/kg	Upper Potomac	0.000406	1	0.00416	1	0.00053	1	0.112	1	0.000266	1
TA_WP_F	mg/kg	Upper Potomac	0.00127	1	0.00781	1	0.00101	1	0.328	1	0.000722	1

Matrix	Units	Location	Chlordane, gamma	D_Chlordane, gamma	cis-NONACHLOR	D_cis-NONACHLOR	DIELDRIN	D_DIELDRIN	HEPTACHLOR EPOXIDE	D_HEPTACHLOR EPOXIDE
TA_BB_F	mg/kg	Upper Potomac	0.00174	1	0.00125	1	0.001	1	0.000725	1
TA_CARP_F	mg/kg	Upper Potomac	0.00597	1	0.00498	1	0.00469	1	0.00158	1
TA_CCAT_F	mg/kg	Upper Potomac	0.00572	1	0.00378	1	0.00404	1	0.00213	1
TA_EEL_F	mg/kg	Upper Potomac	0.00876	1	0.0222	1	0.0156	1	0.00453	1
TA_LMB_F	mg/kg	Upper Potomac	0.000221	1	0.000102	1	0.000345	1	0.000213	1
TA_NS_F	mg/kg	Upper Potomac	0.0001	1	0.000912	1	0.000589	1	0.000592	1
TA_SB_F	mg/kg	Upper Potomac	0.0000497	0	0.0000497	0	0.0378	1	0.0069	1
TA_SUN_F	mg/kg	Upper Potomac	0.000057	1	0.000572	1	0.000465	1	0.000369	1
TA_WP_F	mg/kg	Upper Potomac	0.000205	1	0.00101	1	0.00101	1	0.000679	1

Matrix	Units	Location	Mercury	D_Mercury	MIREX	D_MIREX	OXYCHLORDANE	D_OXYCHLORDANE	PCB-TEQ_MAMMAL	D_PCB-TEQ_MAMMAL	Total PCBs (Congeners)	D_Total PCBs (Congeners)
TA_BB_F	mg/kg	Upper Potomac	0.05	1	0.00005	0	0.000657	1	4.67659E-06	1	0.031463	1
TA_CARP_F	mg/kg	Upper Potomac	0.099	1	4.99E-05	0	0.00174	1	1.9674E-06	1	0.525487	1
TA_CCAT_F	mg/kg	Upper Potomac	0.076	1	0.000106	1	0.00185	1	0.000014645	1	0.231523	1
TA_EEL_F	mg/kg	Upper Potomac	0.209	1	0.000785	1	0.00985	1	3.84169E-05	1	1.515214	1
TA_LMB_F	mg/kg	Upper Potomac	0.241	1	4.94E-05	0	0.00045	1	3.4104E-06	1	0.043569	1
TA_NS_F	mg/kg	Upper Potomac	0.11	1	0.000064	1	0.000796	1	8.1374E-06	1	0.061373	1
TA_SB_F	mg/kg	Upper Potomac	0.117	1	0.000371	1	0.000118	1	5.64692E-05	1	1.608326	1
TA_SUN_F	mg/kg	Upper Potomac	0.097	1	4.92E-05	0	0.000899	1	3.08529E-06	1	0.044284	1
TA_WP_F	mg/kg	Upper Potomac	0.104	1	4.98E-05	0	0.000454	1	2.1803E-06	1	0.067273	1

Matrix	Units	Location	trans-NONACHLOR	D_trans-NONACHLOR	HEXACHLOROBENZENE	D_HEXACHLOROBENZENE
TA_BB_F	mg/kg	Upper Potomac	0.00333	1	0.00005	0
TA_CARP_F	mg/kg	Upper Potomac	0.0104	1	0.000651	1
TA_CCAT_F	mg/kg	Upper Potomac	0.0116	1	0.000471	1
TA_EEL_F	mg/kg	Upper Potomac	0.0626	1	0.00185	1
TA_LMB_F	mg/kg	Upper Potomac	0.00195	1	0.0000494	0
TA_NS_F	mg/kg	Upper Potomac	0.00145	1	0.0000496	0
TA_SB_F	mg/kg	Upper Potomac	0.0000497	0	0.0035	1
TA_SUN_F	mg/kg	Upper Potomac	0.00137	1	0.0000492	0
TA_WP_F	mg/kg	Upper Potomac	0.00147	1	0.0000498	0

Matrix	Units	Area	Location	Collected	Arsenic	D_Arsenic	CHLORDANE (ALL)	D_CHLORDANE (ALL)	Cobalt	D_Cobalt	DIELDRIN	D_DIELDRIN	HEPTACHLOR EPOXIDE
TA_LMB_F	mg/kg	NonTidalAnacostia	IC2	8/3/2016	0.029	1			0.014	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	IC2	8/3/2016	0.036	1			0.023	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	IC3	8/3/2016	0.028	1			0.018	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB1	8/3/2016	0.045	1			0.046	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB2	8/3/2016	0.066	1			0.015	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB2	8/3/2016	0.045	1			0.047	1			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB1	8/12/2016	0.074	1			0.015	1			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB1	8/12/2016	0.059	1			0.0066	1			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/8/2016	0.091	1			0.02	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/8/2016	0.073	1			0.017	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016	0.074	1			0.008	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016	0.058	1			0.011	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016	0.068	1			0.011	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB3	8/10/2016	0.073	1			0.013	1			
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB3	8/10/2016	0.041	1			0.0062	1			
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/3/2016	0.034	1			0.029	0			
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/15/2016	0.028	1			0.02	1			
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/15/2016	0.027	1			0.011	1			
TA_LMB_F	ug/kg	NonTidalAnacostia	IC2	8/3/2016			19	1			1.3	1	0.34
TA_LMB_F	ug/kg	NonTidalAnacostia	IC2	8/3/2016			12	1			0.43	1	0.05
TA_LMB_F	ug/kg	NonTidalAnacostia	IC3	8/3/2016			10	1			0.37	1	0.12
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB1	8/3/2016			8	1			0.33	1	0.05
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB2	8/3/2016			18	1			1.4	1	0.41
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB2	8/3/2016			9.5	1			0.36	1	0.05
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB1	8/12/2016									
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB1	8/12/2016			27	1			1.6	1	0.86
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/8/2016			21	1			1.8	1	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/8/2016			62	1			4.7	1	4.8
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016			29	1			2.3	1	2.4
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016			7.1	1			0.079	0	0.1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016			6.3	1			0.078	0	0.099
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016			39	1			3.4	1	3.5
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016			26	1			2	1	2.3
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016			31	1			1.4	1	1.3
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/3/2016			0.47	0			2.4	1	1.3
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/15/2016			17	1			0.8	1	0.15
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/15/2016			35	1			3	1	2.5
TA_NS_F	mg/kg	NonTidalAnacostia	NWB1	8/16/2016	0.027	1			0.012	1			
TA_NS_F	ug/kg	NonTidalAnacostia	NWB1	8/16/2016			22	1			2.9	1	1.3
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016									
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016			25	1			0.69	1	0.15
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016			13	1			0.14	0	0.18
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.14	1			0.012	1			
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.1	1			0.024	1			
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.088	1			0.0082	1			
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.13	1			0.01	1			
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB4	8/5/2016	0.11	1			0.011	0			
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			37	1			2.7	1	3.4
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			8.9	1			0.44	1	0.32
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			22	1			1.6	1	1.8
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			37	1			3.7	1	3.9
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016									
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB4	8/5/2016			19	1			0.2	1	0.2

Matrix	Units	Area	Location	Collected	D_HEPTACHLOR EPOXIDE	Mercury	D_Mercury	PCB-TEQ (Mammal)	D_PCB-TEQ (Mammal)	TCDD-TEQ (Mammal)	D_TCDD-TEQ (Mammal)
TA_LMB_F	mg/kg	NonTidalAnacostia	IC2	8/3/2016		0.2	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	IC2	8/3/2016		0.21	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	IC3	8/3/2016		0.24	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB1	8/3/2016		0.19	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB2	8/3/2016		0.26	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB2	8/3/2016		0.28	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB1	8/12/2016		0.2	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB1	8/12/2016		0.18	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/8/2016		0.31	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/8/2016		0.19	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016		0.36	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016		0.27	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016		0.32	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB3	8/10/2016		0.076	0				
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB3	8/10/2016		0.16	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/3/2016		0.39	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/15/2016		0.42	1				
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/15/2016		0.33	1				
TA_LMB_F	ug/kg	NonTidalAnacostia	IC2	8/3/2016	1			0.00019124	1	0.0000684	1
TA_LMB_F	ug/kg	NonTidalAnacostia	IC2	8/3/2016	0			0.00021444	1	0.000135	1
TA_LMB_F	ug/kg	NonTidalAnacostia	IC3	8/3/2016	1			0.00108426	1	0.000023	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB1	8/3/2016	0			0.00253768	1	0.000061	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB2	8/3/2016	1			0.00037224	1	0.0000212	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB2	8/3/2016	0			0.00041434	1	0.000016	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB1	8/12/2016				0.00037806	1	0.0000493	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB1	8/12/2016	1			0.00076685	1	0.0000739	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/8/2016	1			0.00063029	1	0.000011	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/8/2016	1			0.00079689	1	0.000083	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016	1			0.000557015	1	0.00018805	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016	0			0.00053845	1	0.0000721	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016	0			0.00032864	1	0.00009292	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016	1			0.00061996	1	0.00011687	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016	1			0.00075982	1	0.0001164	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016	1			0.00048728	1	0.0000513	1
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/3/2016	1			0.00125889	1	0.000178	1
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/15/2016	1			0.00057487	1	0.0001586	1
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/15/2016	1			0.00071794	1	0.000136	1
TA_NS_F	mg/kg	NonTidalAnacostia	NWB1	8/16/2016		0.34	1				
TA_NS_F	ug/kg	NonTidalAnacostia	NWB1	8/16/2016	1			0.00081726	1	0.0001236	1
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016				0.00104565	1		
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016	0			0.0010929	1	0.00023	1
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016	0			0.00045107	1	0.000086	1
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016		0.16	1				
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016		0.5	1				
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016		0.21	1				
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016		0.2	1				
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB4	8/5/2016		0.17	1				
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016	1			0.00149844	1	0.000289	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016	1			0.00002365	1	0.000022	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016	1			0.0003215	1	0.0001234	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016	1			0.00029299	1	0.000146	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016				0.00004401	1	0.0000429	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB4	8/5/2016	0			0.000461608	1	0.0000123	1

Matrix	Units	Area	Location	Collected	Thallium	D_Thallium	Total PCBs (Congeners)	D_Total PCBs (Congeners)
TA_LMB_F	mg/kg	NonTidalAnacostia	IC2	8/3/2016	0.0022	0		
TA_LMB_F	mg/kg	NonTidalAnacostia	IC2	8/3/2016	0.0025	0		
TA_LMB_F	mg/kg	NonTidalAnacostia	IC3	8/3/2016	0.0028	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB1	8/3/2016	0.0024	0		
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB2	8/3/2016	0.0041	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NEB2	8/3/2016	0.0029	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB1	8/12/2016	0.0029	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB1	8/12/2016	0.0033	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/8/2016	0.0036	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/8/2016	0.0026	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016	0.00355	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016	0.0027	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB2	8/9/2016	0.0026	0		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB3	8/10/2016	0.0043	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	NWB3	8/10/2016	0.0024	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/3/2016	0.0047	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/15/2016	0.0062	1		
TA_LMB_F	mg/kg	NonTidalAnacostia	PB1	8/15/2016	0.0053	1		
TA_LMB_F	ug/kg	NonTidalAnacostia	IC2	8/3/2016			23.1291	1
TA_LMB_F	ug/kg	NonTidalAnacostia	IC2	8/3/2016			17.79497	1
TA_LMB_F	ug/kg	NonTidalAnacostia	IC3	8/3/2016			33.8748	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB1	8/3/2016			41.1407	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB2	8/3/2016			43.3265	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NEB2	8/3/2016			45.9758	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB1	8/12/2016			14.591	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB1	8/12/2016			17.9688	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/8/2016			22.28657	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/8/2016			34.60831	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016			23.35653	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016			17.0777	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB2	8/9/2016			16.464	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016			24.9069	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016			27.30435	1
TA_LMB_F	ug/kg	NonTidalAnacostia	NWB3	8/10/2016			18.1185	1
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/3/2016			53.48618	1
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/15/2016			30.98556	1
TA_LMB_F	ug/kg	NonTidalAnacostia	PB1	8/15/2016			27.6725	1
TA_NS_F	mg/kg	NonTidalAnacostia	NWB1	8/16/2016	0.0041	1		
TA_NS_F	ug/kg	NonTidalAnacostia	NWB1	8/16/2016			41.2486	1
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016			45.93929	1
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016			59.6597	1
TA_SB_F	ug/kg	NonTidalAnacostia	IC2	8/12/2016			33.3589	1
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.0041	1		
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.006	1		
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.003	1		
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB3	8/4/2016	0.003	1		
TA_SMB_F	mg/kg	NonTidalAnacostia	NWB4	8/5/2016	0.0021	0		
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			30.2029	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			9.494	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			18.3847	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			17.72092	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB3	8/4/2016			16.5971	1
TA_SMB_F	ug/kg	NonTidalAnacostia	NWB4	8/5/2016			16.93565	1

ProUCL Output Files

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/23/2018 4:52:25 PM
From File	HH_Pepco_OpenLot_Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	1.8	Mean	2.2
Maximum	2.6	Median	2.2

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 Arsenic 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.

Benzo(a)anthracene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.077	Mean	0.137
Maximum	0.19	Median	0.14
SD	0.0491	Std. Error of Mean	0.0245
Coefficient of Variation	0.359	Skewness	-0.307

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.195	95% Adjusted-CLT UCL (Chen-1995)	0.173
		95% Modified-t UCL (Johnson-1978)	0.194

Gamma GOF Test

A-D Test Statistic	0.242	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.226	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.291	k star (bias corrected MLE)	2.489
Theta hat (MLE)	0.0147	Theta star (bias corrected MLE)	0.0549
nu hat (MLE)	74.33	nu star (bias corrected)	19.92
MLE Mean (bias corrected)	0.137	MLE Sd (bias corrected)	0.0867
		Approximate Chi Square Value (0.05)	10.79
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.252	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.564	Mean of logged Data	-2.044
Maximum of Logged Data	-1.661	SD of logged Data	0.395

Assuming Lognormal Distribution

95% H-UCL	0.287	90% Chebyshev (MVUE) UCL	0.217
95% Chebyshev (MVUE) UCL	0.254	97.5% Chebyshev (MVUE) UCL	0.304
99% Chebyshev (MVUE) UCL	0.403		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.177	95% Jackknife UCL	0.195
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.21	95% Chebyshev(Mean, Sd) UCL	0.244
97.5% Chebyshev(Mean, Sd) UCL	0.29	99% Chebyshev(Mean, Sd) UCL	0.381

Suggested UCL to Use

95% Student's-t UCL 0.195

Recommended UCL exceeds the maximum observation

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

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.099	Mean	0.155
Maximum	0.18	Median	0.17
SD	0.0383	Std. Error of Mean	0.0192
Coefficient of Variation	0.248	Skewness	-1.667

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.79	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.2	95% Adjusted-CLT UCL (Chen-1995)	0.169
		95% Modified-t UCL (Johnson-1978)	0.197

Gamma GOF Test

A-D Test Statistic	0.614	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.337	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.394	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	18.18	k star (bias corrected MLE)	4.711
Theta hat (MLE)	0.00851	Theta star (bias corrected MLE)	0.0328
nu hat (MLE)	145.4	nu star (bias corrected)	37.69
MLE Mean (bias corrected)	0.155	MLE Sd (bias corrected)	0.0713
		Approximate Chi Square Value (0.05)	24.63
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.237	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.762	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.335	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.313	Mean of logged Data	-1.894
Maximum of Logged Data	-1.715	SD of logged Data	0.285

Assuming Lognormal Distribution

95% H-UCL	0.245	90% Chebyshev (MVUE) UCL	0.221
95% Chebyshev (MVUE) UCL	0.251	97.5% Chebyshev (MVUE) UCL	0.292
99% Chebyshev (MVUE) UCL	0.374		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.186	95% Jackknife UCL	0.2
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.212	95% Chebyshev(Mean, Sd) UCL	0.238
97.5% Chebyshev(Mean, Sd) UCL	0.274	99% Chebyshev(Mean, Sd) UCL	0.346

Suggested UCL to Use

95% Student's-t UCL 0.2

Recommended UCL exceeds the maximum observation

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

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.098	Mean	0.165
Maximum	0.26	Median	0.15
SD	0.0701	Std. Error of Mean	0.0351
Coefficient of Variation	0.426	Skewness	1.035

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.247	95% Adjusted-CLT UCL (Chen-1995)	0.242
		95% Modified-t UCL (Johnson-1978)	0.25

Gamma GOF Test

A-D Test Statistic	0.227	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.658	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.195	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.777	k star (bias corrected MLE)	2.111
Theta hat (MLE)	0.0212	Theta star (bias corrected MLE)	0.0779
nu hat (MLE)	62.22	nu star (bias corrected)	16.89
MLE Mean (bias corrected)	0.165	MLE Sd (bias corrected)	0.113
		Approximate Chi Square Value (0.05)	8.592
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.323	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.99	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.323	Mean of logged Data	-1.871
Maximum of Logged Data	-1.347	SD of logged Data	0.415

Assuming Lognormal Distribution

95% H-UCL	0.365	90% Chebyshev (MVUE) UCL	0.265
95% Chebyshev (MVUE) UCL	0.311	97.5% Chebyshev (MVUE) UCL	0.374
99% Chebyshev (MVUE) UCL	0.499		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.222	95% Jackknife UCL	0.247
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.27	95% Chebyshev(Mean, Sd) UCL	0.317
97.5% Chebyshev(Mean, Sd) UCL	0.384	99% Chebyshev(Mean, Sd) UCL	0.513

Suggested UCL to Use

95% Student's-t UCL 0.247

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.04	Mean	0.068
Maximum	0.091	Median	0.0705
SD	0.021	Std. Error of Mean	0.0105
Coefficient of Variation	0.309	Skewness	-0.699

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0927	95% Adjusted-CLT UCL (Chen-1995)	0.0814
		95% Modified-t UCL (Johnson-1978)	0.0921

Gamma GOF Test

A-D Test Statistic	0.394	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.328	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	12.13	k star (bias corrected MLE)	3.2
Theta hat (MLE)	0.00561	Theta star (bias corrected MLE)	0.0213
nu hat (MLE)	97.06	nu star (bias corrected)	25.6
MLE Mean (bias corrected)	0.068	MLE Sd (bias corrected)	0.038
		Approximate Chi Square Value (0.05)	15.07
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.116	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.331	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.219	Mean of logged Data	-2.73
Maximum of Logged Data	-2.397	SD of logged Data	0.347

Assuming Lognormal Distribution

95% H-UCL	0.125	90% Chebyshev (MVUE) UCL	0.103
95% Chebyshev (MVUE) UCL	0.119	97.5% Chebyshev (MVUE) UCL	0.142
99% Chebyshev (MVUE) UCL	0.185		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0853	95% Jackknife UCL	0.0927
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.0995	95% Chebyshev(Mean, Sd) UCL	0.114
97.5% Chebyshev(Mean, Sd) UCL	0.134	99% Chebyshev(Mean, Sd) UCL	0.173

Suggested UCL to Use

95% Student's-t UCL 0.0927

Recommended UCL exceeds the maximum observation

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

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

Chrysene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.092	Mean	0.153
Maximum	0.2	Median	0.16
SD	0.0511	Std. Error of Mean	0.0255
Coefficient of Variation	0.334	Skewness	-0.424

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.213	95% Adjusted-CLT UCL (Chen-1995)	0.189
		95% Modified-t UCL (Johnson-1978)	0.212

Gamma GOF Test

A-D Test Statistic	0.358	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.299	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.85	k star (bias corrected MLE)	2.88
Theta hat (MLE)	0.0141	Theta star (bias corrected MLE)	0.0531
nu hat (MLE)	86.83	nu star (bias corrected)	23.04
MLE Mean (bias corrected)	0.153	MLE Sd (bias corrected)	0.0902
		Approximate Chi Square Value (0.05)	13.12
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.269	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.386	Mean of logged Data	-1.924
Maximum of Logged Data	-1.609	SD of logged Data	0.363

Assuming Lognormal Distribution

95% H-UCL	0.293	90% Chebyshev (MVUE) UCL	0.236
95% Chebyshev (MVUE) UCL	0.273	97.5% Chebyshev (MVUE) UCL	0.325
99% Chebyshev (MVUE) UCL	0.427		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.195	95% Jackknife UCL	0.213
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.23	95% Chebyshev(Mean, Sd) UCL	0.264
97.5% Chebyshev(Mean, Sd) UCL	0.313	99% Chebyshev(Mean, Sd) UCL	0.407

Suggested UCL to Use

95% Student's-t UCL 0.213

Recommended UCL exceeds the maximum observation

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

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

Cobalt

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	92	Mean	111
Maximum	130	Median	111

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 Cobalt 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.

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.023	Mean	0.0323
Maximum	0.046	Median	0.03
SD	0.00974	Std. Error of Mean	0.00487
Coefficient of Variation	0.302	Skewness	1.287

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0437	95% Adjusted-CLT UCL (Chen-1995)	0.0436
		95% Modified-t UCL (Johnson-1978)	0.0442

Gamma GOF Test

A-D Test Statistic	0.397	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.329	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	15.85	k star (bias corrected MLE)	4.128
Theta hat (MLE)	0.00204	Theta star (bias corrected MLE)	0.00781
nu hat (MLE)	126.8	nu star (bias corrected)	33.03
MLE Mean (bias corrected)	0.0323	MLE Sd (bias corrected)	0.0159
		Approximate Chi Square Value (0.05)	20.89
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.051	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.306	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.772	Mean of logged Data	-3.466
Maximum of Logged Data	-3.079	SD of logged Data	0.287

Assuming Lognormal Distribution

95% H-UCL	0.0512	90% Chebyshev (MVUE) UCL	0.046
95% Chebyshev (MVUE) UCL	0.0522	97.5% Chebyshev (MVUE) UCL	0.0609
99% Chebyshev (MVUE) UCL	0.0779		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0403	95% Jackknife UCL	0.0437
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.0469	95% Chebyshev(Mean, Sd) UCL	0.0535
97.5% Chebyshev(Mean, Sd) UCL	0.0627	99% Chebyshev(Mean, Sd) UCL	0.0807

Suggested UCL to Use

95% Student's-t UCL 0.0437

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Diesel Range Organics (C10-C20) 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.

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.082	Mean	0.104
Maximum	0.15	Median	0.091
SD	0.0317	Std. Error of Mean	0.0158
Coefficient of Variation	0.306	Skewness	1.763

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.79	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.331	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.141	95% Adjusted-CLT UCL (Chen-1995)	0.144
		95% Modified-t UCL (Johnson-1978)	0.143

Gamma GOF Test

A-D Test Statistic	0.53	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.32	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.394	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	16.35	k star (bias corrected MLE)	4.254
Theta hat (MLE)	0.00633	Theta star (bias corrected MLE)	0.0243
nu hat (MLE)	130.8	nu star (bias corrected)	34.03
MLE Mean (bias corrected)	0.104	MLE Sd (bias corrected)	0.0502
		Approximate Chi Square Value (0.05)	21.69
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.162	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.827	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.299	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.501	Mean of logged Data	-2.299
Maximum of Logged Data	-1.897	SD of logged Data	0.278

Assuming Lognormal Distribution

95% H-UCL	0.161	90% Chebyshev (MVUE) UCL	0.146
95% Chebyshev (MVUE) UCL	0.165	97.5% Chebyshev (MVUE) UCL	0.192
99% Chebyshev (MVUE) UCL	0.245		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.13	95% Jackknife UCL	0.141
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.151	95% Chebyshev(Mean, Sd) UCL	0.173
97.5% Chebyshev(Mean, Sd) UCL	0.202	99% Chebyshev(Mean, Sd) UCL	0.261

Suggested UCL to Use

95% Student's-t UCL 0.141

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

Manganese

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	36	Mean	118
Maximum	200	Median	118

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 Manganese 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.

Naphthalene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.0064	Minimum Non-Detect	0.039
Maximum Detect	0.018	Maximum Non-Detect	0.11
Variance Detects	6.7280E-5	Percent Non-Detects	50%
Mean Detects	0.0122	SD Detects	0.0082
Median Detects	0.0122	CV Detects	0.672
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-4.534	SD of Logged Detects	0.731

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.0122	KM Standard Error of Mean	0.0058
KM SD	0.0058	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0258	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0217	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0296	95% KM Chebyshev UCL	0.0375
97.5% KM Chebyshev UCL	0.0484	99% KM Chebyshev UCL	0.0699

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	4.062	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.003	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	16.25	nu star (bias corrected)	N/A
Mean (detects)	0.0122		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0122	SD (KM)	0.0058
Variance (KM)	3.3640E-5	SE of Mean (KM)	0.0058
k hat (KM)	4.424	k star (KM)	1.273
nu hat (KM)	35.4	nu star (KM)	10.18
theta hat (KM)	0.00276	theta star (KM)	0.00959
80% gamma percentile (KM)	0.0192	90% gamma percentile (KM)	0.0265
95% gamma percentile (KM)	0.0336	99% gamma percentile (KM)	0.0499

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (10.18, α)	4.056	Adjusted Chi Square Value (10.18, β)	2.238
95% Gamma Approximate KM-UCL (use when n>=50)	0.0306	95% Gamma Adjusted KM-UCL (use when n<50)	0.0555

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0115	Mean in Log Scale	-4.534
SD in Original Scale	0.00481	SD in Log Scale	0.422
95% t UCL (assumes normality of ROS data)	0.0171	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	0.0261		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.534	KM Geo Mean	0.0107
KM SD (logged)	0.517	95% Critical H Value (KM-Log)	3.747
KM Standard Error of Mean (logged)	0.517	95% H-UCL (KM -Log)	0.0375
KM SD (logged)	0.517	95% Critical H Value (KM-Log)	3.747
KM Standard Error of Mean (logged)	0.517		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0247	Mean in Log Scale	-3.977
SD in Original Scale	0.021	SD in Log Scale	0.879
95% t UCL (Assumes normality)	0.0495	95% H-Stat UCL	0.552

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 0.0375

Warning: Recommended UCL exceeds the maximum observation

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

Nickel

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	8.7	Mean	10.35
Maximum	12	Median	10.35

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 Nickel 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.

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	1
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.021	Minimum Non-Detect	0.0096
Maximum Detect	0.092	Maximum Non-Detect	0.0096
Variance Detects	0.00126	Percent Non-Detects	25%
Mean Detects	0.0557	SD Detects	0.0355
Median Detects	0.054	CV Detects	0.638
Skewness Detects	0.211	Kurtosis Detects	N/A
Mean of Logged Detects	-3.056	SD of Logged Detects	0.748

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.998	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.185	Lilliefors GOF Test
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0442	KM Standard Error of Mean	0.0196
KM SD	0.0321	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0904	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0765	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.103	95% KM Chebyshev UCL	0.13
97.5% KM Chebyshev UCL	0.167	99% KM Chebyshev UCL	0.24

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.14	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0177	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	18.84	nu star (bias corrected)	N/A
Mean (detects)	0.0557		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0443
Maximum	0.092	Median	0.0375
SD	0.0369	CV	0.834
k hat (MLE)	1.684	k star (bias corrected MLE)	0.588
Theta hat (MLE)	0.0263	Theta star (bias corrected MLE)	0.0753
nu hat (MLE)	13.47	nu star (bias corrected)	4.701
Adjusted Level of Significance (β)	0.00498		
Approximate Chi Square Value (4.70, α)	1.017	Adjusted Chi Square Value (4.70, β)	N/A
95% Gamma Approximate UCL (use when n>=50)	0.205	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0442	SD (KM)	0.0321
Variance (KM)	0.00103	SE of Mean (KM)	0.0196
k hat (KM)	1.894	k star (KM)	0.64
nu hat (KM)	15.15	nu star (KM)	5.122
theta hat (KM)	0.0233	theta star (KM)	0.069
80% gamma percentile (KM)	0.0727	90% gamma percentile (KM)	0.113
95% gamma percentile (KM)	0.155	99% gamma percentile (KM)	0.256

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.12, α)	1.209	Adjusted Chi Square Value (5.12, β)	0.456
95% Gamma Approximate KM-UCL (use when n>=50)	0.187	95% Gamma Adjusted KM-UCL (use when n<50)	0.496

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0432	Mean in Log Scale	-3.581
SD in Original Scale	0.0383	SD in Log Scale	1.214
95% t UCL (assumes normality of ROS data)	0.0882	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	16.24		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.453	KM Geo Mean	0.0316
KM SD (logged)	0.868	95% Critical H Value (KM-Log)	5.839
KM Standard Error of Mean (logged)	0.532	95% H-UCL (KM -Log)	0.861
KM SD (logged)	0.868	95% Critical H Value (KM-Log)	5.839
KM Standard Error of Mean (logged)	0.532		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.043	Mean in Log Scale	-3.627
SD in Original Scale	0.0386	SD in Log Scale	1.295
95% t UCL (Assumes normality)	0.0883	95% H-Stat UCL	36.75

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0904

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

TCDD TEQ HH

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	1.2700E-6	Mean	1.8900E-6
Maximum	2.5100E-6	Median	1.8900E-6

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 TCDD TEQ HH 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.

Thallium

General Statistics

Total Number of Observations	2	Number of Distinct Observations	1
		Number of Missing Observations	1
Number of Detects	0	Number of Non-Detects	2
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Thallium 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.

Vanadium

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	16	Mean	37
Maximum	58	Median	37

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 Vanadium was not processed!

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 3:24:02 PM
From File	Soil-WH_Laydown-SS.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	44	Number of Distinct Observations	36
		Number of Missing Observations	59
Minimum	2	Mean	18.31
Maximum	190	Median	8.75
SD	30.77	Std. Error of Mean	4.638
Coefficient of Variation	1.68	Skewness	4.412

Normal GOF Test

Shapiro Wilk Test Statistic	0.509	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	26.11	95% Adjusted-CLT UCL (Chen-1995)	29.24
		95% Modified-t UCL (Johnson-1978)	26.62

Gamma GOF Test

A-D Test Statistic	1.975	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.781	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.213	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.932	k star (bias corrected MLE)	0.883
Theta hat (MLE)	19.66	Theta star (bias corrected MLE)	20.73
nu hat (MLE)	81.99	nu star (bias corrected)	77.73
MLE Mean (bias corrected)	18.31	MLE Sd (bias corrected)	19.49
		Approximate Chi Square Value (0.05)	58.42
Adjusted Level of Significance	0.0445	Adjusted Chi Square Value	57.85

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	24.37	95% Adjusted Gamma UCL (use when n<50)	24.61

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.132	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.693	Mean of logged Data	2.283
Maximum of Logged Data	5.247	SD of logged Data	1.028

Assuming Lognormal Distribution

95% H-UCL	24.23	90% Chebyshev (MVUE) UCL	25.29
95% Chebyshev (MVUE) UCL	29.35	97.5% Chebyshev (MVUE) UCL	34.98
99% Chebyshev (MVUE) UCL	46.03		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	25.94	95% Jackknife UCL	26.11
95% Standard Bootstrap UCL	25.79	95% Bootstrap-t UCL	34.18
95% Hall's Bootstrap UCL	55.65	95% Percentile Bootstrap UCL	26.12
95% BCA Bootstrap UCL	30.41		
90% Chebyshev(Mean, Sd) UCL	32.23	95% Chebyshev(Mean, Sd) UCL	38.53
97.5% Chebyshev(Mean, Sd) UCL	47.28	99% Chebyshev(Mean, Sd) UCL	64.46

Suggested UCL to Use

95% H-UCL 24.23

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

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	41
Minimum	0.02	Mean	0.436
Maximum	1.2	Median	0.36
SD	0.357	Std. Error of Mean	0.0842
Coefficient of Variation	0.819	Skewness	0.979

Normal GOF Test

Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.583	95% Adjusted-CLT UCL (Chen-1995)	0.595
		95% Modified-t UCL (Johnson-1978)	0.586

Gamma GOF Test

A-D Test Statistic	0.199	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.103	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.208	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.37	k star (bias corrected MLE)	1.179
Theta hat (MLE)	0.318	Theta star (bias corrected MLE)	0.37
nu hat (MLE)	49.32	nu star (bias corrected)	42.44
MLE Mean (bias corrected)	0.436	MLE Sd (bias corrected)	0.402
		Approximate Chi Square Value (0.05)	28.5
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	27.41

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.649	95% Adjusted Gamma UCL (use when n<50)	0.675

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level

Lilliefors Test Statistic	0.128	Lilliefors Lognormal GOF Test		
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level		

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.912	Mean of logged Data	-1.237
Maximum of Logged Data	0.182	SD of logged Data	1.057

Assuming Lognormal Distribution

95% H-UCL	1.019	90% Chebyshev (MVUE) UCL	0.891
95% Chebyshev (MVUE) UCL	1.074	97.5% Chebyshev (MVUE) UCL	1.329
99% Chebyshev (MVUE) UCL	1.83		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.575	95% Jackknife UCL	0.583
95% Standard Bootstrap UCL	0.569	95% Bootstrap-t UCL	0.613
95% Hall's Bootstrap UCL	0.609	95% Percentile Bootstrap UCL	0.575
95% BCA Bootstrap UCL	0.591		
90% Chebyshev(Mean, Sd) UCL	0.689	95% Chebyshev(Mean, Sd) UCL	0.803
97.5% Chebyshev(Mean, Sd) UCL	0.962	99% Chebyshev(Mean, Sd) UCL	1.273

Suggested UCL to Use

95% Student's-t UCL	0.583

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	15
		Number of Missing Observations	41
Minimum	0.015	Mean	0.431
Maximum	1.2	Median	0.38
SD	0.356	Std. Error of Mean	0.0838
Coefficient of Variation	0.825	Skewness	1.101

Normal GOF Test

Shapiro Wilk Test Statistic	0.878	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.147	Lilliefors GOF Test
5% Lilliefors Critical Value	0.202	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.577	95% Adjusted-CLT UCL (Chen-1995)	0.592
		95% Modified-t UCL (Johnson-1978)	0.58

Gamma GOF Test

A-D Test Statistic	0.22	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.133	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.208	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.338	k star (bias corrected MLE)	1.152

Theta hat (MLE)	0.322	Theta star (bias corrected MLE)	0.374
nu hat (MLE)	48.18	nu star (bias corrected)	41.48
MLE Mean (bias corrected)	0.431	MLE Sd (bias corrected)	0.401
		Approximate Chi Square Value (0.05)	27.72
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	26.64

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.645	95% Adjusted Gamma UCL (use when n<50)	0.671

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.2	Mean of logged Data	-1.26
Maximum of Logged Data	0.182	SD of logged Data	1.093

Assuming Lognormal Distribution

95% H-UCL	1.077	90% Chebyshev (MVUE) UCL	0.918
95% Chebyshev (MVUE) UCL	1.112	97.5% Chebyshev (MVUE) UCL	1.38
99% Chebyshev (MVUE) UCL	1.907		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.569	95% Jackknife UCL	0.577
95% Standard Bootstrap UCL	0.565	95% Bootstrap-t UCL	0.618
95% Hall's Bootstrap UCL	0.615	95% Percentile Bootstrap UCL	0.568
95% BCA Bootstrap UCL	0.587		
90% Chebyshev(Mean, Sd) UCL	0.682	95% Chebyshev(Mean, Sd) UCL	0.796
97.5% Chebyshev(Mean, Sd) UCL	0.954	99% Chebyshev(Mean, Sd) UCL	1.265

Suggested UCL to Use

95% Student's-t UCL	0.577

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	41
Minimum	0.024	Mean	0.516
Maximum	1.4	Median	0.43
SD	0.404	Std. Error of Mean	0.0952
Coefficient of Variation	0.783	Skewness	1.104

Normal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL | **95% UCLs (Adjusted for Skewness)**

95% Student's-t UCL	0.681	95% Adjusted-CLT UCL (Chen-1995)	0.699
		95% Modified-t UCL (Johnson-1978)	0.686

Gamma GOF Test

A-D Test Statistic	0.196	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.107	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.207	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.504	k star (bias corrected MLE)	1.29
Theta hat (MLE)	0.343	Theta star (bias corrected MLE)	0.4
nu hat (MLE)	54.14	nu star (bias corrected)	46.45
MLE Mean (bias corrected)	0.516	MLE Sd (bias corrected)	0.454
		Approximate Chi Square Value (0.05)	31.81
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	30.65

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.753	95% Adjusted Gamma UCL (use when n<50)	0.782

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.73	Mean of logged Data	-1.03
Maximum of Logged Data	0.336	SD of logged Data	1.014

Assuming Lognormal Distribution

95% H-UCL	1.148	90% Chebyshev (MVUE) UCL	1.03
95% Chebyshev (MVUE) UCL	1.238	97.5% Chebyshev (MVUE) UCL	1.525
99% Chebyshev (MVUE) UCL	2.089		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.672	95% Jackknife UCL	0.681
95% Standard Bootstrap UCL	0.671	95% Bootstrap-t UCL	0.732
95% Hall's Bootstrap UCL	0.764	95% Percentile Bootstrap UCL	0.674
95% BCA Bootstrap UCL	0.701		
90% Chebyshev(Mean, Sd) UCL	0.801	95% Chebyshev(Mean, Sd) UCL	0.931
97.5% Chebyshev(Mean, Sd) UCL	1.11	99% Chebyshev(Mean, Sd) UCL	1.463

Suggested UCL to Use

95% Student's-t UCL	0.681

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

Iowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	15
		Number of Missing Observations	41
Minimum	0.0091	Mean	0.195
Maximum	0.54	Median	0.17
SD	0.155	Std. Error of Mean	0.0365
Coefficient of Variation	0.796	Skewness	0.748

Normal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.258	95% Adjusted-CLT UCL (Chen-1995)	0.262
		95% Modified-t UCL (Johnson-1978)	0.259

Gamma GOF Test

A-D Test Statistic	0.311	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.127	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.208	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.324	k star (bias corrected MLE)	1.14
Theta hat (MLE)	0.147	Theta star (bias corrected MLE)	0.171
nu hat (MLE)	47.65	nu star (bias corrected)	41.04
MLE Mean (bias corrected)	0.195	MLE Sd (bias corrected)	0.182
		Approximate Chi Square Value (0.05)	27.36
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	26.29

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.292	95% Adjusted Gamma UCL (use when n<50)	0.304

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.16	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.699	Mean of logged Data	-2.06
Maximum of Logged Data	-0.616	SD of logged Data	1.088

Assuming Lognormal Distribution

95% H-UCL	0.479	90% Chebyshev (MVUE) UCL	0.41
95% Chebyshev (MVUE) UCL	0.496	97.5% Chebyshev (MVUE) UCL	0.615
99% Chebyshev (MVUE) UCL	0.85		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.255	95% Jackknife UCL	0.258
95% Standard Bootstrap UCL	0.254	95% Bootstrap-t UCL	0.268
95% Hall's Bootstrap UCL	0.262	95% Percentile Bootstrap UCL	0.254
95% BCA Bootstrap UCL	0.26		
90% Chebyshev(Mean, Sd) UCL	0.304	95% Chebyshev(Mean, Sd) UCL	0.354
97.5% Chebyshev(Mean, Sd) UCL	0.423	99% Chebyshev(Mean, Sd) UCL	0.558

Suggested UCL to Use

95% Student's-t UCL	0.258

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

Chrysene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	41
Minimum	0.018	Mean	0.49
Maximum	1.3	Median	0.37
SD	0.364	Std. Error of Mean	0.0858
Coefficient of Variation	0.743	Skewness	1.017

Normal GOF Test

Shapiro Wilk Test Statistic	0.905	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.897	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.178	Lilliefors GOF Test
5% Lilliefors Critical Value	0.202	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.639	95% Adjusted-CLT UCL (Chen-1995)	0.653
		95% Modified-t UCL (Johnson-1978)	0.643

Gamma GOF Test

A-D Test Statistic	0.196	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.113	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.207	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.611	k star (bias corrected MLE)	1.379
Theta hat (MLE)	0.304	Theta star (bias corrected MLE)	0.355
nu hat (MLE)	57.99	nu star (bias corrected)	49.66
MLE Mean (bias corrected)	0.49	MLE Sd (bias corrected)	0.417
		Approximate Chi Square Value (0.05)	34.48
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	33.27

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.706	95% Adjusted Gamma UCL (use when n<50)	0.731

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.017	Mean of logged Data	-1.055
Maximum of Logged Data	0.262	SD of logged Data	1.006

Assuming Lognormal Distribution

95% H-UCL	1.103	90% Chebyshev (MVUE) UCL	0.995
95% Chebyshev (MVUE) UCL	1.193	97.5% Chebyshev (MVUE) UCL	1.469
99% Chebyshev (MVUE) UCL	2.012		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.631	95% Jackknife UCL	0.639
95% Standard Bootstrap UCL	0.622	95% Bootstrap-t UCL	0.681
95% Hall's Bootstrap UCL	0.673	95% Percentile Bootstrap UCL	0.635
95% BCA Bootstrap UCL	0.652		
90% Chebyshev(Mean, Sd) UCL	0.747	95% Chebyshev(Mean, Sd) UCL	0.864
97.5% Chebyshev(Mean, Sd) UCL	1.026	99% Chebyshev(Mean, Sd) UCL	1.344

Suggested UCL to Use

95% Student's-t UCL	0.639

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

Cobalt

General Statistics

Total Number of Observations	44	Number of Distinct Observations	35
		Number of Missing Observations	59
Minimum	3.1	Mean	19.49
Maximum	240	Median	7.6
SD	39.6	Std. Error of Mean	5.97
Coefficient of Variation	2.032	Skewness	4.622

Normal GOF Test

Shapiro Wilk Test Statistic	0.425	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.34	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	29.52	95% Adjusted-CLT UCL (Chen-1995)	33.75
		95% Modified-t UCL (Johnson-1978)	30.22

Gamma GOF Test

A-D Test Statistic	3.809	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.785	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.217	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.85	k star (bias corrected MLE)	0.807
Theta hat (MLE)	22.94	Theta star (bias corrected MLE)	24.15
nu hat (MLE)	74.76	nu star (bias corrected)	71
MLE Mean (bias corrected)	19.49	MLE Sd (bias corrected)	21.69
		Approximate Chi Square Value (0.05)	52.6
Adjusted Level of Significance	0.0445	Adjusted Chi Square Value	52.06

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	26.3	95% Adjusted Gamma UCL (use when n<50)	26.57

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.138	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.131	Mean of logged Data	2.277

Maximum of Logged Data	5.481	SD of logged Data	0.977

Assuming Lognormal Distribution

95% H-UCL	22.26	90% Chebyshev (MVUE) UCL	23.42
95% Chebyshev (MVUE) UCL	27.02	97.5% Chebyshev (MVUE) UCL	32.02
99% Chebyshev (MVUE) UCL	41.84		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	29.31	95% Jackknife UCL	29.52
95% Standard Bootstrap UCL	29.06	95% Bootstrap-t UCL	50.23
95% Hall's Bootstrap UCL	66.54	95% Percentile Bootstrap UCL	30.27
95% BCA Bootstrap UCL	34.99		
90% Chebyshev(Mean, Sd) UCL	37.4	95% Chebyshev(Mean, Sd) UCL	45.51
97.5% Chebyshev(Mean, Sd) UCL	56.77	99% Chebyshev(Mean, Sd) UCL	78.89

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	45.51

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	15
		Number of Missing Observations	41
Number of Detects	15	Number of Non-Detects	3
Number of Distinct Detects	13	Number of Distinct Non-Detects	3
Minimum Detect	0.023	Minimum Non-Detect	0.0075
Maximum Detect	0.31	Maximum Non-Detect	0.16
Variance Detects	0.00698	Percent Non-Detects	16.67%
Mean Detects	0.112	SD Detects	0.0836
Median Detects	0.095	CV Detects	0.748
Skewness Detects	1.521	Kurtosis Detects	1.859
Mean of Logged Detects	-2.429	SD of Logged Detects	0.717

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.822	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.241	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0993	KM Standard Error of Mean	0.0197
KM SD	0.08	95% KM (BCA) UCL	0.132
95% KM (t) UCL	0.133	95% KM (Percentile Bootstrap) UCL	0.134
95% KM (z) UCL	0.132	95% KM Bootstrap t UCL	0.152
90% KM Chebyshev UCL	0.158	95% KM Chebyshev UCL	0.185
97.5% KM Chebyshev UCL	0.222	99% KM Chebyshev UCL	0.295

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.356	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.224	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.267	k star (bias corrected MLE)	1.858
Theta hat (MLE)	0.0493	Theta star (bias corrected MLE)	0.0601
nu hat (MLE)	68.01	nu star (bias corrected)	55.74

Mean (detects)	0.112

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0987
Maximum	0.31	Median	0.082
SD	0.082	CV	0.831
k hat (MLE)	1.727	k star (bias corrected MLE)	1.476
Theta hat (MLE)	0.0572	Theta star (bias corrected MLE)	0.0669
nu hat (MLE)	62.16	nu star (bias corrected)	53.14
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (53.14, α)	37.39	Adjusted Chi Square Value (53.14, β)	36.12
95% Gamma Approximate UCL (use when n>=50)	0.14	95% Gamma Adjusted UCL (use when n<50)	0.145

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0993	SD (KM)	0.08
Variance (KM)	0.00639	SE of Mean (KM)	0.0197
k hat (KM)	1.542	k star (KM)	1.322
nu hat (KM)	55.52	nu star (KM)	47.6
theta hat (KM)	0.0644	theta star (KM)	0.0751
80% gamma percentile (KM)	0.156	90% gamma percentile (KM)	0.213
95% gamma percentile (KM)	0.27	99% gamma percentile (KM)	0.399

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (47.60, α)	32.76	Adjusted Chi Square Value (47.60, β)	31.58
95% Gamma Approximate KM-UCL (use when n>=50)	0.144	95% Gamma Adjusted KM-UCL (use when n<50)	0.15

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.97	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.112	Lilliefors GOF Test
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0995	Mean in Log Scale	-2.588
SD in Original Scale	0.0812	SD in Log Scale	0.783
95% t UCL (assumes normality of ROS data)	0.133	95% Percentile Bootstrap UCL	0.132
95% BCA Bootstrap UCL	0.14	95% Bootstrap t UCL	0.158
95% H-UCL (Log ROS)	0.159		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.651	KM Geo Mean	0.0706
KM SD (logged)	0.907	95% Critical H Value (KM-Log)	2.506
KM Standard Error of Mean (logged)	0.231	95% H-UCL (KM -Log)	0.185
KM SD (logged)	0.907	95% Critical H Value (KM-Log)	2.506
KM Standard Error of Mean (logged)	0.231		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0997	Mean in Log Scale	-2.661
SD in Original Scale	0.0818	SD in Log Scale	1.002
95% t UCL (Assumes normality)	0.133	95% H-Stat UCL	0.219

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.15	95% GROS Adjusted Gamma UCL	0.145

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	12	Number of Distinct Observations	11
		Number of Missing Observations	58
Number of Detects	7	Number of Non-Detects	5
Number of Distinct Detects	6	Number of Distinct Non-Detects	5
Minimum Detect	15	Minimum Non-Detect	88
Maximum Detect	280	Maximum Non-Detect	110
Variance Detects	12933	Percent Non-Detects	41.67%
Mean Detects	132	SD Detects	113.7
Median Detects	67	CV Detects	0.862
Skewness Detects	0.563	Kurtosis Detects	-1.845
Mean of Logged Detects	4.45	SD of Logged Detects	1.101

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	96.17	KM Standard Error of Mean	29.43
KM SD	91.99	95% KM (BCA) UCL	147.1
95% KM (t) UCL	149	95% KM (Percentile Bootstrap) UCL	142.8
95% KM (z) UCL	144.6	95% KM Bootstrap t UCL	173.9
90% KM Chebyshev UCL	184.5	95% KM Chebyshev UCL	224.4
97.5% KM Chebyshev UCL	280	99% KM Chebyshev UCL	389

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.369	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.221	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.318	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.296	k star (bias corrected MLE)	0.836
Theta hat (MLE)	101.9	Theta star (bias corrected MLE)	157.9
nu hat (MLE)	18.14	nu star (bias corrected)	11.7
Mean (detects)	132		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	15	Mean	96.81
Maximum	280	Median	47.56
SD	94.58	CV	0.977
k hat (MLE)	1.504	k star (bias corrected MLE)	1.183
Theta hat (MLE)	64.38	Theta star (bias corrected MLE)	81.81
nu hat (MLE)	36.09	nu star (bias corrected)	28.4
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (28.40, α)	17.24	Adjusted Chi Square Value (28.40, β)	15.93
95% Gamma Approximate UCL (use when n>=50)	159.5	95% Gamma Adjusted UCL (use when n<50)	172.7

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	96.17	SD (KM)	91.99
Variance (KM)	8462	SE of Mean (KM)	29.43
k hat (KM)	1.093	k star (KM)	0.875
nu hat (KM)	26.23	nu star (KM)	21

theta hat (KM)	88	theta star (KM)	109.9
80% gamma percentile (KM)	156.3	90% gamma percentile (KM)	228.8
95% gamma percentile (KM)	302.1	99% gamma percentile (KM)	473.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (21.00, α)	11.6	Adjusted Chi Square Value (21.00, β)	10.54
95% Gamma Approximate KM-UCL (use when n>=50)	174.2	95% Gamma Adjusted KM-UCL (use when n<50)	191.6

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	94.31	Mean in Log Scale	4.148
SD in Original Scale	96.04	SD in Log Scale	0.894
95% t UCL (assumes normality of ROS data)	144.1	95% Percentile Bootstrap UCL	140.4
95% BCA Bootstrap UCL	149.9	95% Bootstrap t UCL	186.8
95% H-UCL (Log ROS)	197.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.125	KM Geo Mean	61.9
KM SD (logged)	0.953	95% Critical H Value (KM-Log)	2.831
KM Standard Error of Mean (logged)	0.35	95% H-UCL (KM -Log)	219.9
KM SD (logged)	0.953	95% Critical H Value (KM-Log)	2.831
KM Standard Error of Mean (logged)	0.35		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	97	Mean in Log Scale	4.207
SD in Original Scale	94.51	SD in Log Scale	0.868
95% t UCL (Assumes normality)	146	95% H-Stat UCL	197.7

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 149

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	41
Minimum	0.012	Mean	0.319
Maximum	1.1	Median	0.27
SD	0.299	Std. Error of Mean	0.0706
Coefficient of Variation	0.938	Skewness	1.613

Normal GOF Test

Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.442	95% Adjusted-CLT UCL (Chen-1995)	0.464

		95% Modified-t UCL (Johnson-1978)	0.446

Gamma GOF Test

A-D Test Statistic	0.253	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.761	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.0924	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.208	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.254	k star (bias corrected MLE)	1.082
Theta hat (MLE)	0.254	Theta star (bias corrected MLE)	0.295
nu hat (MLE)	45.15	nu star (bias corrected)	38.96
MLE Mean (bias corrected)	0.319	MLE Sd (bias corrected)	0.307
		Approximate Chi Square Value (0.05)	25.66
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	24.63

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.485	95% Adjusted Gamma UCL (use when n<50)	0.505

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.13	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.423	Mean of logged Data	-1.591
Maximum of Logged Data	0.0953	SD of logged Data	1.09

Assuming Lognormal Distribution

95% H-UCL	0.767	90% Chebyshev (MVUE) UCL	0.656
95% Chebyshev (MVUE) UCL	0.793	97.5% Chebyshev (MVUE) UCL	0.985
99% Chebyshev (MVUE) UCL	1.36		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.435	95% Jackknife UCL	0.442
95% Standard Bootstrap UCL	0.432	95% Bootstrap-t UCL	0.512
95% Hall's Bootstrap UCL	0.578	95% Percentile Bootstrap UCL	0.44
95% BCA Bootstrap UCL	0.453		
90% Chebyshev(Mean, Sd) UCL	0.531	95% Chebyshev(Mean, Sd) UCL	0.627
97.5% Chebyshev(Mean, Sd) UCL	0.76	99% Chebyshev(Mean, Sd) UCL	1.021

Suggested UCL to Use

95% Student's-t UCL	0.442

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Manganese

General Statistics

Total Number of Observations	44	Number of Distinct Observations	29
		Number of Missing Observations	59
Minimum	10	Mean	398.8
Maximum	6600	Median	200
SD	990.7	Std. Error of Mean	149.4
Coefficient of Variation	2.484	Skewness	5.991

Normal GOF Test

Shapiro Wilk Test Statistic	0.32	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	649.8	95% Adjusted-CLT UCL (Chen-1995)	788.6
		95% Modified-t UCL (Johnson-1978)	672.3

Gamma GOF Test

A-D Test Statistic	3.162	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.787	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.254	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.797	k star (bias corrected MLE)	0.758
Theta hat (MLE)	500.2	Theta star (bias corrected MLE)	526
nu hat (MLE)	70.16	nu star (bias corrected)	66.71
MLE Mean (bias corrected)	398.8	MLE Sd (bias corrected)	458
		Approximate Chi Square Value (0.05)	48.91
Adjusted Level of Significance	0.0445	Adjusted Chi Square Value	48.4

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	543.9	95% Adjusted Gamma UCL (use when n<50)	549.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.303	Mean of logged Data	5.244
Maximum of Logged Data	8.795	SD of logged Data	1.06

Assuming Lognormal Distribution

95% H-UCL	492.2	90% Chebyshev (MVUE) UCL	511.1
95% Chebyshev (MVUE) UCL	595.1	97.5% Chebyshev (MVUE) UCL	711.7
99% Chebyshev (MVUE) UCL	940.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	644.4	95% Jackknife UCL	649.8
95% Standard Bootstrap UCL	647.5	95% Bootstrap-t UCL	1440
95% Hall's Bootstrap UCL	1506	95% Percentile Bootstrap UCL	688.6
95% BCA Bootstrap UCL	808.1		
90% Chebyshev(Mean, Sd) UCL	846.8	95% Chebyshev(Mean, Sd) UCL	1050
97.5% Chebyshev(Mean, Sd) UCL	1331	99% Chebyshev(Mean, Sd) UCL	1885

Suggested UCL to Use

95% H-UCL 492.2

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

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

Naphthalene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	41
Number of Detects	16	Number of Non-Detects	2
Number of Distinct Detects	14	Number of Distinct Non-Detects	2
Minimum Detect	0.0069	Minimum Non-Detect	0.0075
Maximum Detect	0.44	Maximum Non-Detect	0.16
Variance Detects	0.01	Percent Non-Detects	11.11%
Mean Detects	0.0728	SD Detects	0.1
Median Detects	0.0485	CV Detects	1.374
Skewness Detects	3.71	Kurtosis Detects	14.4
Mean of Logged Detects	-3.026	SD of Logged Detects	0.855

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.469	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.393	Lilliefors GOF Test
5% Lilliefors Critical Value	0.213	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0676	KM Standard Error of Mean	0.0226
KM SD	0.0929	95% KM (BCA) UCL	0.116
95% KM (t) UCL	0.107	95% KM (Percentile Bootstrap) UCL	0.111
95% KM (z) UCL	0.105	95% KM Bootstrap t UCL	0.188
90% KM Chebyshev UCL	0.136	95% KM Chebyshev UCL	0.166
97.5% KM Chebyshev UCL	0.209	99% KM Chebyshev UCL	0.293

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.346	Anderson-Darling GOF Test
5% A-D Critical Value	0.757	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.262	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.219	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.375	k star (bias corrected MLE)	1.159
Theta hat (MLE)	0.0529	Theta star (bias corrected MLE)	0.0628
nu hat (MLE)	44.01	nu star (bias corrected)	37.09
Mean (detects)	0.0728		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0069	Mean	0.0675
Maximum	0.44	Median	0.0435
SD	0.0954	CV	1.414
k hat (MLE)	1.308	k star (bias corrected MLE)	1.127
Theta hat (MLE)	0.0516	Theta star (bias corrected MLE)	0.0599

nu hat (MLE)	47.1	nu star (bias corrected)	40.59
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (40.59, α)	26.99	Adjusted Chi Square Value (40.59, β)	25.92
95% Gamma Approximate UCL (use when n>=50)	0.101	95% Gamma Adjusted UCL (use when n<50)	0.106

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0676	SD (KM)	0.0929
Variance (KM)	0.00863	SE of Mean (KM)	0.0226
k hat (KM)	0.53	k star (KM)	0.479
nu hat (KM)	19.09	nu star (KM)	17.24
theta hat (KM)	0.128	theta star (KM)	0.141
80% gamma percentile (KM)	0.111	90% gamma percentile (KM)	0.185
95% gamma percentile (KM)	0.264	99% gamma percentile (KM)	0.459

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.24, α)	8.847	Adjusted Chi Square Value (17.24, β)	8.274
95% Gamma Approximate KM-UCL (use when n>=50)	0.132	95% Gamma Adjusted KM-UCL (use when n<50)	0.141

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0676	Mean in Log Scale	-3.119
SD in Original Scale	0.0954	SD in Log Scale	0.88
95% t UCL (assumes normality of ROS data)	0.107	95% Percentile Bootstrap UCL	0.11
95% BCA Bootstrap UCL	0.135	95% Bootstrap t UCL	0.199
95% H-UCL (Log ROS)	0.11		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.148	KM Geo Mean	0.0429
KM SD (logged)	0.917	95% Critical H Value (KM-Log)	2.519
KM Standard Error of Mean (logged)	0.227	95% H-UCL (KM -Log)	0.114
KM SD (logged)	0.917	95% Critical H Value (KM-Log)	2.519
KM Standard Error of Mean (logged)	0.227		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0694	Mean in Log Scale	-3.14
SD in Original Scale	0.0954	SD in Log Scale	1.016
95% t UCL (Assumes normality)	0.108	95% H-Stat UCL	0.14

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.114

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

Nickel

General Statistics

Total Number of Observations	44	Number of Distinct Observations	39
		Number of Missing Observations	59
Minimum	7.2	Mean	512.8
Maximum	8000	Median	51
SD	1553	Std. Error of Mean	234.1
Coefficient of Variation	3.028	Skewness	4.33

Normal GOF Test

Shapiro Wilk Test Statistic	0.349	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.372	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	906.4	95% Adjusted-CLT UCL (Chen-1995)	1061
		95% Modified-t UCL (Johnson-1978)	931.8

Gamma GOF Test

A-D Test Statistic	3.918	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.848	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.144	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.355	k star (bias corrected MLE)	0.346
Theta hat (MLE)	1446	Theta star (bias corrected MLE)	1483
nu hat (MLE)	31.22	nu star (bias corrected)	30.42
MLE Mean (bias corrected)	512.8	MLE Sd (bias corrected)	872.2
		Approximate Chi Square Value (0.05)	18.82
Adjusted Level of Significance	0.0445	Adjusted Chi Square Value	18.51

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	828.7	95% Adjusted Gamma UCL (use when n<50)	842.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.974	Mean of logged Data	4.348
Maximum of Logged Data	8.987	SD of logged Data	1.77

Assuming Lognormal Distribution

95% H-UCL	916	90% Chebyshev (MVUE) UCL	718.4
95% Chebyshev (MVUE) UCL	889.4	97.5% Chebyshev (MVUE) UCL	1127
99% Chebyshev (MVUE) UCL	1593		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	897.9	95% Jackknife UCL	906.4
95% Standard Bootstrap UCL	895.5	95% Bootstrap-t UCL	2526
95% Hall's Bootstrap UCL	2706	95% Percentile Bootstrap UCL	916.4
95% BCA Bootstrap UCL	1112		
90% Chebyshev(Mean, Sd) UCL	1215	95% Chebyshev(Mean, Sd) UCL	1533
97.5% Chebyshev(Mean, Sd) UCL	1975	99% Chebyshev(Mean, Sd) UCL	2842

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	1533

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	57	Number of Distinct Observations	54
		Number of Missing Observations	13
Number of Detects	55	Number of Non-Detects	2
Number of Distinct Detects	52	Number of Distinct Non-Detects	2
Minimum Detect	0.0061	Minimum Non-Detect	0.0051
Maximum Detect	8.6	Maximum Non-Detect	0.0099
Variance Detects	4.284	Percent Non-Detects	3.509%
Mean Detects	1.321	SD Detects	2.07
Median Detects	0.32	CV Detects	1.567
Skewness Detects	2.08	Kurtosis Detects	3.606
Mean of Logged Detects	-0.97	SD of Logged Detects	1.802

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.657	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	7.772E-16	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.119	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.275	KM Standard Error of Mean	0.271
KM SD	2.029	95% KM (BCA) UCL	1.769
95% KM (t) UCL	1.729	95% KM (Percentile Bootstrap) UCL	1.777
95% KM (z) UCL	1.721	95% KM Bootstrap t UCL	1.834
90% KM Chebyshev UCL	2.089	95% KM Chebyshev UCL	2.457
97.5% KM Chebyshev UCL	2.969	99% KM Chebyshev UCL	3.974

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.196	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.814	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.143	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.127	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.508	k star (bias corrected MLE)	0.492
Theta hat (MLE)	2.603	Theta star (bias corrected MLE)	2.686
nu hat (MLE)	55.83	nu star (bias corrected)	54.11
Mean (detects)	1.321		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0061	Mean	1.275
Maximum	8.6	Median	0.32
SD	2.047	CV	1.605
k hat (MLE)	0.477	k star (bias corrected MLE)	0.464
Theta hat (MLE)	2.672	Theta star (bias corrected MLE)	2.75
nu hat (MLE)	54.4	nu star (bias corrected)	52.87
Adjusted Level of Significance (β)	0.0458		
Approximate Chi Square Value (52.87, α)	37.17	Adjusted Chi Square Value (52.87, β)	36.83
95% Gamma Approximate UCL (use when n>=50)	1.814	95% Gamma Adjusted UCL (use when n<50)	1.831

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.275	SD (KM)	2.029
Variance (KM)	4.117	SE of Mean (KM)	0.271
k hat (KM)	0.395	k star (KM)	0.386
nu hat (KM)	45.02	nu star (KM)	43.98
theta hat (KM)	3.229	theta star (KM)	3.305
80% gamma percentile (KM)	2.049	90% gamma percentile (KM)	3.624
95% gamma percentile (KM)	5.364	99% gamma percentile (KM)	9.756

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (43.98, α)	29.77	Adjusted Chi Square Value (43.98, β)	29.47
95% Gamma Approximate KM-UCL (use when n>=50)	1.884	95% Gamma Adjusted KM-UCL (use when n<50)	1.903

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.192	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0554	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.119	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.275	Mean in Log Scale	-1.114
SD in Original Scale	2.047	SD in Log Scale	1.93
95% t UCL (assumes normality of ROS data)	1.729	95% Percentile Bootstrap UCL	1.725
95% BCA Bootstrap UCL	1.786	95% Bootstrap t UCL	1.899
95% H-UCL (Log ROS)	5.446		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.116	KM Geo Mean	0.328
KM SD (logged)	1.913	95% Critical H Value (KM-Log)	3.649
KM Standard Error of Mean (logged)	0.256	95% H-UCL (KM -Log)	5.19
KM SD (logged)	1.913	95% Critical H Value (KM-Log)	3.649
KM Standard Error of Mean (logged)	0.256		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.275	Mean in Log Scale	-1.134
SD in Original Scale	2.047	SD in Log Scale	1.971
95% t UCL (Assumes normality)	1.729	95% H-Stat UCL	5.997

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 5.19

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

TCDD TEQ HH

General Statistics

Total Number of Observations	22	Number of Distinct Observations	21
		Number of Missing Observations	28
Minimum	2.1900E-6	Mean	1.5120E-5
Maximum	5.8700E-5	Median	5.3600E-6
SD	1.7789E-5	Std. Error of Mean	3.7926E-6
Coefficient of Variation	N/A	Skewness	1.354

Normal GOF Test

Shapiro Wilk Test Statistic	0.732	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.306	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.1646E-5	95% Adjusted-CLT UCL (Chen-1995)	2.2527E-5
		95% Modified-t UCL (Johnson-1978)	2.1828E-5

Gamma GOF Test

A-D Test Statistic	1.573	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.774	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.215	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.191	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.925	k star (bias corrected MLE)	0.829
Theta hat (MLE)	1.6348E-5	Theta star (bias corrected MLE)	1.8237E-5
nu hat (MLE)	40.69	nu star (bias corrected)	36.48
MLE Mean (bias corrected)	1.5120E-5	MLE Sd (bias corrected)	1.6605E-5
		Approximate Chi Square Value (0.05)	23.65
Adjusted Level of Significance	0.0386	Adjusted Chi Square Value	22.88

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.3317E-5	95% Adjusted Gamma UCL (use when n<50)	2.4102E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.184	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.184	Data appear Lognormal at 5% Significance Level	

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.03	Mean of logged Data	-11.73
Maximum of Logged Data	-9.743	SD of logged Data	1.122

Assuming Lognormal Distribution

95% H-UCL	2.9675E-5	90% Chebyshev (MVUE) UCL	2.6409E-5
95% Chebyshev (MVUE) UCL	3.1816E-5	97.5% Chebyshev (MVUE) UCL	3.9322E-5
99% Chebyshev (MVUE) UCL	5.4065E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.1358E-5	95% Jackknife UCL	2.1646E-5
95% Standard Bootstrap UCL	2.1331E-5	95% Bootstrap-t UCL	2.3866E-5
95% Hall's Bootstrap UCL	2.1389E-5	95% Percentile Bootstrap UCL	2.1525E-5
95% BCA Bootstrap UCL	2.2172E-5		
90% Chebyshev(Mean, Sd) UCL	2.6497E-5	95% Chebyshev(Mean, Sd) UCL	3.1651E-5
97.5% Chebyshev(Mean, Sd) UCL	3.8804E-5	99% Chebyshev(Mean, Sd) UCL	5.2855E-5

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	3.1651E-5

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

Thallium

General Statistics

Total Number of Observations	44	Number of Distinct Observations	19
		Number of Missing Observations	59
Number of Detects	29	Number of Non-Detects	15
Number of Distinct Detects	17	Number of Distinct Non-Detects	4
Minimum Detect	0.033	Minimum Non-Detect	0.1
Maximum Detect	0.46	Maximum Non-Detect	0.13
Variance Detects	0.00788	Percent Non-Detects	34.09%
Mean Detects	0.163	SD Detects	0.0887
Median Detects	0.14	CV Detects	0.545
Skewness Detects	1.565	Kurtosis Detects	3.514
Mean of Logged Detects	-1.951	SD of Logged Detects	0.542

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.926	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.161	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.131	KM Standard Error of Mean	0.0134
KM SD	0.0845	95% KM (BCA) UCL	0.153
95% KM (t) UCL	0.153	95% KM (Percentile Bootstrap) UCL	0.154
95% KM (z) UCL	0.153	95% KM Bootstrap t UCL	0.158
90% KM Chebyshev UCL	0.171	95% KM Chebyshev UCL	0.189
97.5% KM Chebyshev UCL	0.214	99% KM Chebyshev UCL	0.264

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.481	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.751	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.139	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.163	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.873	k star (bias corrected MLE)	3.495
Theta hat (MLE)	0.042	Theta star (bias corrected MLE)	0.0466
nu hat (MLE)	224.6	nu star (bias corrected)	202.7
Mean (detects)	0.163		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.125
Maximum	0.46	Median	0.12
SD	0.0904	CV	0.724
k hat (MLE)	1.964	k star (bias corrected MLE)	1.845
Theta hat (MLE)	0.0636	Theta star (bias corrected MLE)	0.0677
nu hat (MLE)	172.8	nu star (bias corrected)	162.4
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (162.38, α)	133.9	Adjusted Chi Square Value (162.38, β)	133
95% Gamma Approximate UCL (use when n>=50)	0.151	95% Gamma Adjusted UCL (use when n<50)	0.152

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.131	SD (KM)	0.0845
Variance (KM)	0.00714	SE of Mean (KM)	0.0134
k hat (KM)	2.384	k star (KM)	2.237
nu hat (KM)	209.8	nu star (KM)	196.8
theta hat (KM)	0.0547	theta star (KM)	0.0584
80% gamma percentile (KM)	0.193	90% gamma percentile (KM)	0.247
95% gamma percentile (KM)	0.299	99% gamma percentile (KM)	0.413

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (196.84, α)	165.4	Adjusted Chi Square Value (196.84, β)	164.4
)5% Gamma Approximate KM-UCL (use when n>=50)	0.155	95% Gamma Adjusted KM-UCL (use when n<50)	0.156

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.926	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.161	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.13	Mean in Log Scale	-2.216
SD in Original Scale	0.0855	SD in Log Scale	0.596

95% t UCL (assumes normality of ROS data)	0.152	95% Percentile Bootstrap UCL	0.153
95% BCA Bootstrap UCL	0.156	95% Bootstrap t UCL	0.157
95% H-UCL (Log ROS)	0.156		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.218	KM Geo Mean	0.109
KM SD (logged)	0.604	95% Critical H Value (KM-Log)	1.983
KM Standard Error of Mean (logged)	0.109	95% H-UCL (KM -Log)	0.157
KM SD (logged)	0.604	95% Critical H Value (KM-Log)	1.983
KM Standard Error of Mean (logged)	0.109		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.127	Mean in Log Scale	-2.257
SD in Original Scale	0.0875	SD in Log Scale	0.615
95% t UCL (Assumes normality)	0.149	95% H-Stat UCL	0.152

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.156	95% GROS Adjusted Gamma UCL	0.152

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

Vanadium

General Statistics

Total Number of Observations	50	Number of Distinct Observations	42
		Number of Missing Observations	53
Minimum	9.9	Mean	2240
Maximum	42000	Median	160
SD	7812	Std. Error of Mean	1105
Coefficient of Variation	3.487	Skewness	4.665

Normal GOF Test

Shapiro Wilk Test Statistic	0.308	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.947	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.397	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.125	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4093	95% Adjusted-CLT UCL (Chen-1995)	4836
		95% Modified-t UCL (Johnson-1978)	4214

Gamma GOF Test

A-D Test Statistic	5.114	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.867	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.136	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.291	k star (bias corrected MLE)	0.287
Theta hat (MLE)	7709	Theta star (bias corrected MLE)	7819
nu hat (MLE)	29.06	nu star (bias corrected)	28.65
MLE Mean (bias corrected)	2240	MLE Sd (bias corrected)	4186
		Approximate Chi Square Value (0.05)	17.44
Adjusted Level of Significance	0.0452	Adjusted Chi Square Value	17.18

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3682	95% Adjusted Gamma UCL (use when n<50)	3737

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.947	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.125	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.293	Mean of logged Data	5.329
Maximum of Logged Data	10.65	SD of logged Data	1.98

Assuming Lognormal Distribution

95% H-UCL	4048	90% Chebyshev (MVUE) UCL	2931
95% Chebyshev (MVUE) UCL	3661	97.5% Chebyshev (MVUE) UCL	4675
99% Chebyshev (MVUE) UCL	6667		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4058	95% Jackknife UCL	4093
95% Standard Bootstrap UCL	4054	95% Bootstrap-t UCL	13090
95% Hall's Bootstrap UCL	12281	95% Percentile Bootstrap UCL	4150
95% BCA Bootstrap UCL	5028		
90% Chebyshev(Mean, Sd) UCL	5555	95% Chebyshev(Mean, Sd) UCL	7056
97.5% Chebyshev(Mean, Sd) UCL	9140	99% Chebyshev(Mean, Sd) UCL	13232

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	7056

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.110/5/2018 10:57:12 AM
From File	Soil-SalvYard-SS-v2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	55
Minimum	7.1	Mean	11.37
Maximum	14	Median	13
SD	3.729	Std. Error of Mean	2.153
Coefficient of Variation	0.328	Skewness	-1.593

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	17.65	95% Adjusted-CLT UCL (Chen-1995)	12.79
		95% Modified-t UCL (Johnson-1978)	17.32

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	11.89	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.956	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	71.32	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.96	Mean of logged Data	2.388
Maximum of Logged Data	2.639	SD of logged Data	0.372

Assuming Lognormal Distribution

95% H-UCL	42.26	90% Chebyshev (MVUE) UCL	18.63
95% Chebyshev (MVUE) UCL	21.91	97.5% Chebyshev (MVUE) UCL	26.45
99% Chebyshev (MVUE) UCL	35.38		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	14.91	95% Jackknife UCL	17.65
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	17.82	95% Chebyshev(Mean, Sd) UCL	20.75
97.5% Chebyshev(Mean, Sd) UCL	24.81	99% Chebyshev(Mean, Sd) UCL	32.79

Suggested UCL to Use

95% Student's-t UCL	17.65

Recommended UCL exceeds the maximum observation

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

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	17
		Number of Missing Observations	39
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	0.062	Minimum Non-Detect	0.14
Maximum Detect	2.5	Maximum Non-Detect	0.14
Variance Detects	0.705	Percent Non-Detects	5.263%
Mean Detects	0.861	SD Detects	0.839
Median Detects	0.4	CV Detects	0.975
Skewness Detects	0.845	Kurtosis Detects	-0.87
Mean of Logged Detects	-0.719	SD of Logged Detects	1.179

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.821	KM Standard Error of Mean	0.192
KM SD	0.812	95% KM (BCA) UCL	1.171
95% KM (t) UCL	1.153	95% KM (Percentile Bootstrap) UCL	1.121
95% KM (z) UCL	1.136	95% KM Bootstrap t UCL	1.22
90% KM Chebyshev UCL	1.396	95% KM Chebyshev UCL	1.656
97.5% KM Chebyshev UCL	2.018	99% KM Chebyshev UCL	2.728

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.624	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.012	k star (bias corrected MLE)	0.881
Theta hat (MLE)	0.85	Theta star (bias corrected MLE)	0.977
nu hat (MLE)	36.44	nu star (bias corrected)	31.7
Mean (detects)	0.861		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.816
Maximum	2.5	Median	0.34
SD	0.839	CV	1.028
k hat (MLE)	0.821	k star (bias corrected MLE)	0.726
Theta hat (MLE)	0.994	Theta star (bias corrected MLE)	1.123
nu hat (MLE)	31.2	nu star (bias corrected)	27.6
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (27.60, α)	16.62	Adjusted Chi Square Value (27.60, β)	15.88
95% Gamma Approximate UCL (use when n>=50)	1.355	95% Gamma Adjusted UCL (use when n<50)	1.419

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.821	SD (KM)	0.812
Variance (KM)	0.659	SE of Mean (KM)	0.192
k hat (KM)	1.022	k star (KM)	0.895
nu hat (KM)	38.82	nu star (KM)	34.03
theta hat (KM)	0.803	theta star (KM)	0.917
80% gamma percentile (KM)	1.332	90% gamma percentile (KM)	1.942
95% gamma percentile (KM)	2.557	99% gamma percentile (KM)	3.997

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (34.03, α)	21.68	Adjusted Chi Square Value (34.03, β)	20.82
95% Gamma Approximate KM-UCL (use when n>=50)	1.288	95% Gamma Adjusted KM-UCL (use when n<50)	1.341

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.82	Mean in Log Scale	-0.81
SD in Original Scale	0.835	SD in Log Scale	1.212
95% t UCL (assumes normality of ROS data)	1.152	95% Percentile Bootstrap UCL	1.126
95% BCA Bootstrap UCL	1.154	95% Bootstrap t UCL	1.242
95% H-UCL (Log ROS)	2.138		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.805	KM Geo Mean	0.447
KM SD (logged)	1.175	95% Critical H Value (KM-Log)	2.868
KM Standard Error of Mean (logged)	0.278	95% H-UCL (KM -Log)	1.974
KM SD (logged)	1.175	95% Critical H Value (KM-Log)	2.868
KM Standard Error of Mean (logged)	0.278		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.819	Mean in Log Scale	-0.822
SD in Original Scale	0.836	SD in Log Scale	1.229
95% t UCL (Assumes normality)	1.151	95% H-Stat UCL	2.202

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

;amma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.341

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	17
		Number of Missing Observations	39
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	16	Number of Distinct Non-Detects	1
Minimum Detect	0.03	Minimum Non-Detect	0.14
Maximum Detect	2.5	Maximum Non-Detect	0.14
Variance Detects	0.665	Percent Non-Detects	5.263%
Mean Detects	0.818	SD Detects	0.816
Median Detects	0.385	CV Detects	0.998
Skewness Detects	0.908	Kurtosis Detects	-0.722
Mean of Logged Detects	-0.816	SD of Logged Detects	1.265

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.78	KM Standard Error of Mean	0.186
KM SD	0.788	95% KM (BCA) UCL	1.093
95% KM (t) UCL	1.102	95% KM (Percentile Bootstrap) UCL	1.089
95% KM (z) UCL	1.086	95% KM Bootstrap t UCL	1.175
90% KM Chebyshev UCL	1.338	95% KM Chebyshev UCL	1.591
97.5% KM Chebyshev UCL	1.942	99% KM Chebyshev UCL	2.632

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.526	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.769	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.165	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.21	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.945	k star (bias corrected MLE)	0.825
Theta hat (MLE)	0.865	Theta star (bias corrected MLE)	0.991
nu hat (MLE)	34.04	nu star (bias corrected)	29.7
Mean (detects)	0.818		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0279	Mean	0.776
Maximum	2.5	Median	0.38
SD	0.813	CV	1.048
k hat (MLE)	0.834	k star (bias corrected MLE)	0.737
Theta hat (MLE)	0.931	Theta star (bias corrected MLE)	1.053
nu hat (MLE)	31.68	nu star (bias corrected)	28.02
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (28.02, α)	16.94	Adjusted Chi Square Value (28.02, β)	16.19
95% Gamma Approximate UCL (use when n>=50)	1.284	95% Gamma Adjusted UCL (use when n<50)	1.343

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.78	SD (KM)	0.788
Variance (KM)	0.622	SE of Mean (KM)	0.186
k hat (KM)	0.978	k star (KM)	0.859
nu hat (KM)	37.17	nu star (KM)	32.63
theta hat (KM)	0.797	theta star (KM)	0.908
80% gamma percentile (KM)	1.269	90% gamma percentile (KM)	1.864
95% gamma percentile (KM)	2.466	99% gamma percentile (KM)	3.88

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (32.63, α)	20.57	Adjusted Chi Square Value (32.63, β)	19.74
95% Gamma Approximate KM-UCL (use when n>=50)	1.237	95% Gamma Adjusted KM-UCL (use when n<50)	1.289

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.779	Mean in Log Scale	-0.902
SD in Original Scale	0.81	SD in Log Scale	1.285
95% t UCL (assumes normality of ROS data)	1.102	95% Percentile Bootstrap UCL	1.077
95% BCA Bootstrap UCL	1.129	95% Bootstrap t UCL	1.164
95% H-UCL (Log ROS)	2.328		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.905	KM Geo Mean	0.405
KM SD (logged)	1.262	95% Critical H Value (KM-Log)	3.002
KM Standard Error of Mean (logged)	0.3	95% H-UCL (KM -Log)	2.191
KM SD (logged)	1.262	95% Critical H Value (KM-Log)	3.002
KM Standard Error of Mean (logged)	0.3		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.778	Mean in Log Scale	-0.913
SD in Original Scale	0.811	SD in Log Scale	1.3
95% t UCL (Assumes normality)	1.101	95% H-Stat UCL	2.388

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

iamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.289

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	39
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	0.072	Minimum Non-Detect	0.14
Maximum Detect	5	Maximum Non-Detect	0.14
Variance Detects	1.795	Percent Non-Detects	5.263%
Mean Detects	1.228	SD Detects	1.34
Median Detects	0.595	CV Detects	1.091
Skewness Detects	1.568	Kurtosis Detects	2.305
Mean of Logged Detects	-0.394	SD of Logged Detects	1.191

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.167	KM Standard Error of Mean	0.305
KM SD	1.293	95% KM (BCA) UCL	1.665
95% KM (t) UCL	1.697	95% KM (Percentile Bootstrap) UCL	1.689
95% KM (z) UCL	1.669	95% KM Bootstrap t UCL	1.913
90% KM Chebyshev UCL	2.083	95% KM Chebyshev UCL	2.498
97.5% KM Chebyshev UCL	3.074	99% KM Chebyshev UCL	4.205

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.424	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.143	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.21	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.968	k star (bias corrected MLE)	0.843
Theta hat (MLE)	1.269	Theta star (bias corrected MLE)	1.456
nu hat (MLE)	34.84	nu star (bias corrected)	30.36
Mean (detects)	1.228		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.164
Maximum	5	Median	0.53
SD	1.332	CV	1.144
k hat (MLE)	0.777	k star (bias corrected MLE)	0.689
Theta hat (MLE)	1.498	Theta star (bias corrected MLE)	1.688
nu hat (MLE)	29.52	nu star (bias corrected)	26.2
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (26.20, α)	15.53	Adjusted Chi Square Value (26.20, β)	14.81
95% Gamma Approximate UCL (use when n>=50)	1.963	95% Gamma Adjusted UCL (use when n<50)	2.058

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.167	SD (KM)	1.293
Variance (KM)	1.673	SE of Mean (KM)	0.305
k hat (KM)	0.814	k star (KM)	0.721
nu hat (KM)	30.94	nu star (KM)	27.39
theta hat (KM)	1.433	theta star (KM)	1.619
80% gamma percentile (KM)	1.916	90% gamma percentile (KM)	2.909
95% gamma percentile (KM)	3.931	99% gamma percentile (KM)	6.363

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (27.39, α)	16.45	Adjusted Chi Square Value (27.39, β)	15.71
95% Gamma Approximate KM-UCL (use when n>=50)	1.943	95% Gamma Adjusted KM-UCL (use when n<50)	2.034

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.167	Mean in Log Scale	-0.518
SD in Original Scale	1.329	SD in Log Scale	1.278
95% t UCL (assumes normality of ROS data)	1.695	95% Percentile Bootstrap UCL	1.68
95% BCA Bootstrap UCL	1.762	95% Bootstrap t UCL	1.874
95% H-UCL (Log ROS)	3.353		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.511	KM Geo Mean	0.6
KM SD (logged)	1.232	95% Critical H Value (KM-Log)	2.956
KM Standard Error of Mean (logged)	0.291	95% H-UCL (KM -Log)	3.023
KM SD (logged)	1.232	95% Critical H Value (KM-Log)	2.956
KM Standard Error of Mean (logged)	0.291		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.167	Mean in Log Scale	-0.513
SD in Original Scale	1.329	SD in Log Scale	1.269
95% t UCL (Assumes normality)	1.696	95% H-Stat UCL	3.296

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

;amma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.034

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	39
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	0.027	Minimum Non-Detect	0.14
Maximum Detect	1.3	Maximum Non-Detect	0.14
Variance Detects	0.116	Percent Non-Detects	5.263%
Mean Detects	0.373	SD Detects	0.341
Median Detects	0.265	CV Detects	0.912
Skewness Detects	1.391	Kurtosis Detects	1.805
Mean of Logged Detects	-1.425	SD of Logged Detects	1.047

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.859	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.182	Lilliefors GOF Test
5% Lilliefors Critical Value	0.202	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.357	KM Standard Error of Mean	0.0777
KM SD	0.329	95% KM (BCA) UCL	0.49
95% KM (t) UCL	0.492	95% KM (Percentile Bootstrap) UCL	0.49
95% KM (z) UCL	0.485	95% KM Bootstrap t UCL	0.545
90% KM Chebyshev UCL	0.591	95% KM Chebyshev UCL	0.696
97.5% KM Chebyshev UCL	0.843	99% KM Chebyshev UCL	1.131

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.162	Anderson-Darling GOF Test
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.109	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.208	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.278	k star (bias corrected MLE)	1.102
Theta hat (MLE)	0.292	Theta star (bias corrected MLE)	0.339
nu hat (MLE)	46.02	nu star (bias corrected)	39.68
Mean (detects)	0.373		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.027	Mean	0.355
Maximum	1.3	Median	0.23
SD	0.34	CV	0.957
k hat (MLE)	1.147	k star (bias corrected MLE)	1.001
Theta hat (MLE)	0.31	Theta star (bias corrected MLE)	0.355
nu hat (MLE)	43.59	nu star (bias corrected)	38.04
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (38.04, α)	24.92	Adjusted Chi Square Value (38.04, β)	23.99
95% Gamma Approximate UCL (use when n>=50)	0.543	95% Gamma Adjusted UCL (use when n<50)	0.563

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.357	SD (KM)	0.329
Variance (KM)	0.108	SE of Mean (KM)	0.0777
k hat (KM)	1.179	k star (KM)	1.028
nu hat (KM)	44.8	nu star (KM)	39.06
theta hat (KM)	0.303	theta star (KM)	0.348
80% gamma percentile (KM)	0.574	90% gamma percentile (KM)	0.817
95% gamma percentile (KM)	1.06	99% gamma percentile (KM)	1.623

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (39.06, α)	25.74	Adjusted Chi Square Value (39.06, β)	24.8
95% Gamma Approximate KM-UCL (use when n>=50)	0.542	95% Gamma Adjusted KM-UCL (use when n<50)	0.563

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0924	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.357	Mean in Log Scale	-1.49
SD in Original Scale	0.338	SD in Log Scale	1.055
95% t UCL (assumes normality of ROS data)	0.492	95% Percentile Bootstrap UCL	0.484
95% BCA Bootstrap UCL	0.514	95% Bootstrap t UCL	0.528
95% H-UCL (Log ROS)	0.768		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.495	KM Geo Mean	0.224
KM SD (logged)	1.04	95% Critical H Value (KM-Log)	2.668
KM Standard Error of Mean (logged)	0.247	95% H-UCL (KM -Log)	0.741
KM SD (logged)	1.04	95% Critical H Value (KM-Log)	2.668
KM Standard Error of Mean (logged)	0.247		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.357	Mean in Log Scale	-1.49
SD in Original Scale	0.338	SD in Log Scale	1.056
95% t UCL (Assumes normality)	0.492	95% H-Stat UCL	0.769

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.492

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Chrysene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	16
		Number of Missing Observations	39
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	16	Number of Distinct Non-Detects	1
Minimum Detect	0.086	Minimum Non-Detect	0.14
Maximum Detect	2.5	Maximum Non-Detect	0.14
Variance Detects	0.662	Percent Non-Detects	5.263%
Mean Detects	0.9	SD Detects	0.814
Median Detects	0.495	CV Detects	0.905
Skewness Detects	0.787	Kurtosis Detects	-0.927
Mean of Logged Detects	-0.596	SD of Logged Detects	1.102

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.858	KM Standard Error of Mean	0.186
KM SD	0.79	95% KM (BCA) UCL	1.176
95% KM (t) UCL	1.182	95% KM (Percentile Bootstrap) UCL	1.169
95% KM (z) UCL	1.165	95% KM Bootstrap t UCL	1.225
90% KM Chebyshev UCL	1.418	95% KM Chebyshev UCL	1.671
97.5% KM Chebyshev UCL	2.023	99% KM Chebyshev UCL	2.713

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.543	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.165	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.157	k star (bias corrected MLE)	1.001
Theta hat (MLE)	0.778	Theta star (bias corrected MLE)	0.899
nu hat (MLE)	41.65	nu star (bias corrected)	36.04
Mean (detects)	0.9		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0364	Mean	0.854
Maximum	2.5	Median	0.43
SD	0.815	CV	0.954
k hat (MLE)	0.993	k star (bias corrected MLE)	0.871
Theta hat (MLE)	0.861	Theta star (bias corrected MLE)	0.981
nu hat (MLE)	37.72	nu star (bias corrected)	33.1
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (33.10, α)	20.95	Adjusted Chi Square Value (33.10, β)	20.1
95% Gamma Approximate UCL (use when n>=50)	1.35	95% Gamma Adjusted UCL (use when n<50)	1.407

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.858	SD (KM)	0.79
Variance (KM)	0.623	SE of Mean (KM)	0.186
k hat (KM)	1.182	k star (KM)	1.031
nu hat (KM)	44.92	nu star (KM)	39.16
theta hat (KM)	0.726	theta star (KM)	0.833
80% gamma percentile (KM)	1.378	90% gamma percentile (KM)	1.962
95% gamma percentile (KM)	2.545	99% gamma percentile (KM)	3.894

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (39.16, α)	25.83	Adjusted Chi Square Value (39.16, β)	24.88
95% Gamma Approximate KM-UCL (use when n>=50)	1.302	95% Gamma Adjusted KM-UCL (use when n<50)	1.351

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.858	Mean in Log Scale	-0.681
SD in Original Scale	0.811	SD in Log Scale	1.132
95% t UCL (assumes normality of ROS data)	1.181	95% Percentile Bootstrap UCL	1.162
95% BCA Bootstrap UCL	1.191	95% Bootstrap t UCL	1.253
95% H-UCL (Log ROS)	2.03		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.68	KM Geo Mean	0.507
KM SD (logged)	1.101	95% Critical H Value (KM-Log)	2.758
KM Standard Error of Mean (logged)	0.26	95% H-UCL (KM -Log)	1.902
KM SD (logged)	1.101	95% Critical H Value (KM-Log)	2.758
KM Standard Error of Mean (logged)	0.26		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.856	Mean in Log Scale	-0.705
SD in Original Scale	0.814	SD in Log Scale	1.171
95% t UCL (Assumes normality)	1.18	95% H-Stat UCL	2.16

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	1.351	95% GROS Adjusted Gamma UCL	1.407

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

Cobalt

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	55
Minimum	4.4	Mean	10.33
Maximum	17	Median	9.6
SD	6.332	Std. Error of Mean	3.656
Coefficient of Variation	0.613	Skewness	0.514

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.99	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	21.01	95% Adjusted-CLT UCL (Chen-1995)	17.51
		95% Modified-t UCL (Johnson-1978)	21.19

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	3.65	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.831	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	21.9	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.992	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.482	Mean of logged Data	2.192
Maximum of Logged Data	2.833	SD of logged Data	0.678

Assuming Lognormal Distribution

95% H-UCL	782.3	90% Chebyshev (MVUE) UCL	21.93
95% Chebyshev (MVUE) UCL	27.16	97.5% Chebyshev (MVUE) UCL	34.43
99% Chebyshev (MVUE) UCL	48.69		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	16.35	95% Jackknife UCL	21.01
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	21.3	95% Chebyshev(Mean, Sd) UCL	26.27
97.5% Chebyshev(Mean, Sd) UCL	33.16	99% Chebyshev(Mean, Sd) UCL	46.71

Suggested UCL to Use

95% Student's-t UCL	21.01

Recommended UCL exceeds the maximum observation

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	39
Number of Detects	15	Number of Non-Detects	4
Number of Distinct Detects	15	Number of Distinct Non-Detects	3
Minimum Detect	0.011	Minimum Non-Detect	0.07
Maximum Detect	0.51	Maximum Non-Detect	0.72
Variance Detects	0.026	Percent Non-Detects	21.05%
Mean Detects	0.162	SD Detects	0.161
Median Detects	0.077	CV Detects	0.994
Skewness Detects	1.054	Kurtosis Detects	-0.0952
Mean of Logged Detects	-2.382	SD of Logged Detects	1.184

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.843	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	Lilliefors GOF Test
5% Lilliefors Critical Value	0.22	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.142	KM Standard Error of Mean	0.0365
KM SD	0.149	95% KM (BCA) UCL	0.203
95% KM (t) UCL	0.205	95% KM (Percentile Bootstrap) UCL	0.206
95% KM (z) UCL	0.202	95% KM Bootstrap t UCL	0.226
90% KM Chebyshev UCL	0.252	95% KM Chebyshev UCL	0.301
97.5% KM Chebyshev UCL	0.37	99% KM Chebyshev UCL	0.505

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.343	Anderson-Darling GOF Test
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.228	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.025	k star (bias corrected MLE)	0.865
Theta hat (MLE)	0.158	Theta star (bias corrected MLE)	0.187
nu hat (MLE)	30.75	nu star (bias corrected)	25.94
Mean (detects)	0.162		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.139
Maximum	0.51	Median	0.065
SD	0.15	CV	1.084
k hat (MLE)	0.982	k star (bias corrected MLE)	0.862
Theta hat (MLE)	0.141	Theta star (bias corrected MLE)	0.161
nu hat (MLE)	37.33	nu star (bias corrected)	32.77
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (32.77, α)	20.68	Adjusted Chi Square Value (32.77, β)	19.84
95% Gamma Approximate UCL (use when n>=50)	0.22	95% Gamma Adjusted UCL (use when n<50)	0.229

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.142	SD (KM)	0.149
Variance (KM)	0.0223	SE of Mean (KM)	0.0365
k hat (KM)	0.906	k star (KM)	0.798
nu hat (KM)	34.43	nu star (KM)	30.33
theta hat (KM)	0.157	theta star (KM)	0.178
80% gamma percentile (KM)	0.232	90% gamma percentile (KM)	0.346
95% gamma percentile (KM)	0.461	99% gamma percentile (KM)	0.734

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (30.33, α)	18.75	Adjusted Chi Square Value (30.33, β)	17.96
95% Gamma Approximate KM-UCL (use when n>=50)	0.23	95% Gamma Adjusted KM-UCL (use when n<50)	0.24

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.138	Mean in Log Scale	-2.532
SD in Original Scale	0.15	SD in Log Scale	1.103
95% t UCL (assumes normality of ROS data)	0.198	95% Percentile Bootstrap UCL	0.196
95% BCA Bootstrap UCL	0.208	95% Bootstrap t UCL	0.222
95% H-UCL (Log ROS)	0.3		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.543	KM Geo Mean	0.0787
KM SD (logged)	1.135	95% Critical H Value (KM-Log)	2.808
KM Standard Error of Mean (logged)	0.287	95% H-UCL (KM -Log)	0.318
KM SD (logged)	1.135	95% Critical H Value (KM-Log)	2.808
KM Standard Error of Mean (logged)	0.287		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.154	Mean in Log Scale	-2.427
SD in Original Scale	0.157	SD in Log Scale	1.14
95% t UCL (Assumes normality)	0.217	95% H-Stat UCL	0.36

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

iamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.24

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	55
Minimum	20	Mean	1299
Maximum	3400	Median	98
SD	1699	Std. Error of Mean	759.7
Coefficient of Variation	1.307	Skewness	0.656

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.742	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2919	95% Adjusted-CLT UCL (Chen-1995)	2787
		95% Modified-t UCL (Johnson-1978)	2956

Gamma GOF Test

A-D Test Statistic	0.59	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.337	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.375	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.419	k star (bias corrected MLE)	0.301
Theta hat (MLE)	3101	Theta star (bias corrected MLE)	4318
nu hat (MLE)	4.19	nu star (bias corrected)	3.009
MLE Mean (bias corrected)	1299	MLE Sd (bias corrected)	2369
		Approximate Chi Square Value (0.05)	0.375
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	0.14

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	10422	95% Adjusted Gamma UCL (use when n<50)	27895

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.271	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.996	Mean of logged Data	5.611
Maximum of Logged Data	8.132	SD of logged Data	2.311

Assuming Lognormal Distribution

95% H-UCL	1.045E+9	90% Chebyshev (MVUE) UCL	4962
95% Chebyshev (MVUE) UCL	6549	97.5% Chebyshev (MVUE) UCL	8752
99% Chebyshev (MVUE) UCL	13080		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2549	95% Jackknife UCL	2919
95% Standard Bootstrap UCL	2433	95% Bootstrap-t UCL	58840
95% Hall's Bootstrap UCL	63522	95% Percentile Bootstrap UCL	2536
95% BCA Bootstrap UCL	2536		
90% Chebyshev(Mean, Sd) UCL	3579	95% Chebyshev(Mean, Sd) UCL	4611
97.5% Chebyshev(Mean, Sd) UCL	6044	99% Chebyshev(Mean, Sd) UCL	8859

Suggested UCL to Use

95% Adjusted Gamma UCL	27895

Recommended UCL exceeds the maximum observation

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	39
Number of Detects	18	Number of Non-Detects	1
Number of Distinct Detects	17	Number of Distinct Non-Detects	1
Minimum Detect	0.028	Minimum Non-Detect	0.14
Maximum Detect	2	Maximum Non-Detect	0.14
Variance Detects	0.372	Percent Non-Detects	5.263%
Mean Detects	0.619	SD Detects	0.61
Median Detects	0.325	CV Detects	0.986
Skewness Detects	1.004	Kurtosis Detects	-0.26
Mean of Logged Detects	-1.048	SD of Logged Detects	1.197

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.59	KM Standard Error of Mean	0.139
KM SD	0.589	95% KM (BCA) UCL	0.82
95% KM (t) UCL	0.832	95% KM (Percentile Bootstrap) UCL	0.816
95% KM (z) UCL	0.819	95% KM Bootstrap t UCL	0.877
90% KM Chebyshev UCL	1.008	95% KM Chebyshev UCL	1.197
97.5% KM Chebyshev UCL	1.459	99% KM Chebyshev UCL	1.975

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.47	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.156	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.015	k star (bias corrected MLE)	0.883
Theta hat (MLE)	0.609	Theta star (bias corrected MLE)	0.701
nu hat (MLE)	36.53	nu star (bias corrected)	31.78
Mean (detects)	0.619		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.586
Maximum	2	Median	0.28
SD	0.609	CV	1.039
k hat (MLE)	0.84	k star (bias corrected MLE)	0.743
Theta hat (MLE)	0.698	Theta star (bias corrected MLE)	0.79
nu hat (MLE)	31.93	nu star (bias corrected)	28.22
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (28.22, α)	17.1	Adjusted Chi Square Value (28.22, β)	16.34
95% Gamma Approximate UCL (use when n>=50)	0.968	95% Gamma Adjusted UCL (use when n<50)	1.013

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.59	SD (KM)	0.589
Variance (KM)	0.347	SE of Mean (KM)	0.139
k hat (KM)	1.003	k star (KM)	0.879
nu hat (KM)	38.1	nu star (KM)	33.42
theta hat (KM)	0.589	theta star (KM)	0.671
80% gamma percentile (KM)	0.959	90% gamma percentile (KM)	1.403
95% gamma percentile (KM)	1.851	99% gamma percentile (KM)	2.901

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (33.42, α)	21.2	Adjusted Chi Square Value (33.42, β)	20.35
95% Gamma Approximate KM-UCL (use when n>=50)	0.93	95% Gamma Adjusted KM-UCL (use when n<50)	0.969

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.955	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	Lilliefors GOF Test
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.59	Mean in Log Scale	-1.13
SD in Original Scale	0.606	SD in Log Scale	1.216
95% t UCL (assumes normality of ROS data)	0.831	95% Percentile Bootstrap UCL	0.83
95% BCA Bootstrap UCL	0.855	95% Bootstrap t UCL	0.886
95% H-UCL (Log ROS)	1.569		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.132	KM Geo Mean	0.322
KM SD (logged)	1.193	95% Critical H Value (KM-Log)	2.896
KM Standard Error of Mean (logged)	0.284	95% H-UCL (KM -Log)	1.482
KM SD (logged)	1.193	95% Critical H Value (KM-Log)	2.896
KM Standard Error of Mean (logged)	0.284		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.59	Mean in Log Scale	-1.133
SD in Original Scale	0.606	SD in Log Scale	1.22
95% t UCL (Assumes normality)	0.831	95% H-Stat UCL	1.578

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

iamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.969

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

Manganese

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	55
Minimum	120	Mean	276.7
Maximum	500	Median	210
SD	198.6	Std. Error of Mean	114.6
Coefficient of Variation	0.718	Skewness	1.34

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.915	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.298	Lilliefors GOF Test
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	611.4	95% Adjusted-CLT UCL (Chen-1995)	560.1
		95% Modified-t UCL (Johnson-1978)	626.2

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	3.045	k star (bias corrected MLE)	N/A
Theta hat (MLE)	90.85	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	18.27	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.985	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.223	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.787	Mean of logged Data	5.45
Maximum of Logged Data	6.215	SD of logged Data	0.719

Assuming Lognormal Distribution

95% H-UCL	35333	90% Chebyshev (MVUE) UCL	596.2
95% Chebyshev (MVUE) UCL	741.9	97.5% Chebyshev (MVUE) UCL	944.1
99% Chebyshev (MVUE) UCL	1341		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	465.2	95% Jackknife UCL	611.4
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	620.6	95% Chebyshev(Mean, Sd) UCL	776.4
97.5% Chebyshev(Mean, Sd) UCL	992.7	99% Chebyshev(Mean, Sd) UCL	1417

Suggested UCL to Use

95% Student's-t UCL	611.4

Recommended UCL exceeds the maximum observation

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

Naphthalene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	17
		Number of Missing Observations	39
Number of Detects	17	Number of Non-Detects	2
Number of Distinct Detects	16	Number of Distinct Non-Detects	2
Minimum Detect	0.0084	Minimum Non-Detect	0.14
Maximum Detect	0.32	Maximum Non-Detect	0.72
Variance Detects	0.00907	Percent Non-Detects	10.53%
Mean Detects	0.115	SD Detects	0.0952
Median Detects	0.07	CV Detects	0.826
Skewness Detects	0.873	Kurtosis Detects	-0.326
Mean of Logged Detects	-2.559	SD of Logged Detects	1.011

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.207	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.112	KM Standard Error of Mean	0.0223
KM SD	0.0913	95% KM (BCA) UCL	0.15
95% KM (t) UCL	0.15	95% KM (Percentile Bootstrap) UCL	0.148
95% KM (z) UCL	0.148	95% KM Bootstrap t UCL	0.16
90% KM Chebyshev UCL	0.178	95% KM Chebyshev UCL	0.209
97.5% KM Chebyshev UCL	0.251	99% KM Chebyshev UCL	0.333

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.298	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.149	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.213	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.397	k star (bias corrected MLE)	1.19
Theta hat (MLE)	0.0825	Theta star (bias corrected MLE)	0.0969
nu hat (MLE)	47.49	nu star (bias corrected)	40.45
Mean (detects)	0.115		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0084	Mean	0.11
Maximum	0.32	Median	0.07
SD	0.0912	CV	0.827
k hat (MLE)	1.486	k star (bias corrected MLE)	1.287
Theta hat (MLE)	0.0742	Theta star (bias corrected MLE)	0.0857
nu hat (MLE)	56.47	nu star (bias corrected)	48.89
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (48.89, α)	33.84	Adjusted Chi Square Value (48.89, β)	32.75
95% Gamma Approximate UCL (use when n>=50)	0.159	95% Gamma Adjusted UCL (use when n<50)	0.165

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.112	SD (KM)	0.0913
Variance (KM)	0.00834	SE of Mean (KM)	0.0223
k hat (KM)	1.493	k star (KM)	1.292
nu hat (KM)	56.73	nu star (KM)	49.1
theta hat (KM)	0.0747	theta star (KM)	0.0863
80% gamma percentile (KM)	0.175	90% gamma percentile (KM)	0.241
95% gamma percentile (KM)	0.306	99% gamma percentile (KM)	0.453

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (49.10, α)	34.02	Adjusted Chi Square Value (49.10, β)	32.92
95% Gamma Approximate KM-UCL (use when n>=50)	0.161	95% Gamma Adjusted KM-UCL (use when n<50)	0.166

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.109	Mean in Log Scale	-2.593
SD in Original Scale	0.0917	SD in Log Scale	0.963
95% t UCL (assumes normality of ROS data)	0.146	95% Percentile Bootstrap UCL	0.145
95% BCA Bootstrap UCL	0.148	95% Bootstrap t UCL	0.154
95% H-UCL (Log ROS)	0.213		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.596	KM Geo Mean	0.0745
KM SD (logged)	0.98	95% Critical H Value (KM-Log)	2.582
KM Standard Error of Mean (logged)	0.242	95% H-UCL (KM -Log)	0.219
KM SD (logged)	0.98	95% Critical H Value (KM-Log)	2.582
KM Standard Error of Mean (logged)	0.242		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.126	Mean in Log Scale	-2.484
SD in Original Scale	0.107	SD in Log Scale	1.017
95% t UCL (Assumes normality)	0.168	95% H-Stat UCL	0.263

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.166	95% GROS Adjusted Gamma UCL	0.165

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

Nickel

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	55
Minimum	9.8	Mean	16.93
Maximum	27	Median	14
SD	8.967	Std. Error of Mean	5.177
Coefficient of Variation	0.53	Skewness	1.314

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	32.05	95% Adjusted-CLT UCL (Chen-1995)	29.65
		95% Modified-t UCL (Johnson-1978)	32.71

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	5.705	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.968	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	34.23	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.244	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.282	Mean of logged Data	2.739
Maximum of Logged Data	3.296	SD of logged Data	0.514

Assuming Lognormal Distribution

95% H-UCL	200	90% Chebyshev (MVUE) UCL	31.41
95% Chebyshev (MVUE) UCL	38	97.5% Chebyshev (MVUE) UCL	47.14
99% Chebyshev (MVUE) UCL	65.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	25.45	95% Jackknife UCL	32.05
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	32.47	95% Chebyshev(Mean, Sd) UCL	39.5
97.5% Chebyshev(Mean, Sd) UCL	49.27	99% Chebyshev(Mean, Sd) UCL	68.45

Suggested UCL to Use

95% Student's-t UCL	32.05

Recommended UCL exceeds the maximum observation

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	41	Number of Distinct Observations	38
		Number of Missing Observations	17
Number of Detects	40	Number of Non-Detects	1
Number of Distinct Detects	37	Number of Distinct Non-Detects	1
Minimum Detect	0.0021	Minimum Non-Detect	9.2000E-4
Maximum Detect	14	Maximum Non-Detect	9.2000E-4
Variance Detects	5.507	Percent Non-Detects	2.439%
Mean Detects	1.172	SD Detects	2.347
Median Detects	0.37	CV Detects	2.002
Skewness Detects	4.458	Kurtosis Detects	23.59
Mean of Logged Detects	-1.483	SD of Logged Detects	2.282

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.507	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.144	KM Standard Error of Mean	0.363
KM SD	2.296	95% KM (BCA) UCL	1.844
95% KM (t) UCL	1.755	95% KM (Percentile Bootstrap) UCL	1.798
95% KM (z) UCL	1.741	95% KM Bootstrap t UCL	2.479
90% KM Chebyshev UCL	2.233	95% KM Chebyshev UCL	2.727
97.5% KM Chebyshev UCL	3.412	99% KM Chebyshev UCL	4.757

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.469	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.835	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.112	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.149	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.401	k star (bias corrected MLE)	0.387
Theta hat (MLE)	2.926	Theta star (bias corrected MLE)	3.027
nu hat (MLE)	32.05	nu star (bias corrected)	30.98
Mean (detects)	1.172		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0021	Mean	1.144
Maximum	14	Median	0.3
SD	2.324	CV	2.032
k hat (MLE)	0.39	k star (bias corrected MLE)	0.378
Theta hat (MLE)	2.933	Theta star (bias corrected MLE)	3.028
nu hat (MLE)	31.99	nu star (bias corrected)	30.98
Adjusted Level of Significance (β)	0.0441		
Approximate Chi Square Value (30.98, α)	19.27	Adjusted Chi Square Value (30.98, β)	18.93
95% Gamma Approximate UCL (use when n>=50)	1.84	95% Gamma Adjusted UCL (use when n<50)	1.873

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.144	SD (KM)	2.296
Variance (KM)	5.271	SE of Mean (KM)	0.363
k hat (KM)	0.248	k star (KM)	0.246
nu hat (KM)	20.36	nu star (KM)	20.2
theta hat (KM)	4.608	theta star (KM)	4.644
80% gamma percentile (KM)	1.653	90% gamma percentile (KM)	3.437
95% gamma percentile (KM)	5.561	99% gamma percentile (KM)	11.23

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.20, α)	11	Adjusted Chi Square Value (20.20, β)	10.75
95% Gamma Approximate KM-UCL (use when n>=50)	2.101	95% Gamma Adjusted KM-UCL (use when n<50)	2.149

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.144	Mean in Log Scale	-1.623
SD in Original Scale	2.324	SD in Log Scale	2.427
95% t UCL (assumes normality of ROS data)	1.755	95% Percentile Bootstrap UCL	1.785
95% BCA Bootstrap UCL	2.158	95% Bootstrap t UCL	2.429
95% H-UCL (Log ROS)	19.19		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.617	KM Geo Mean	0.198
KM SD (logged)	2.382	95% Critical H Value (KM-Log)	4.192
KM Standard Error of Mean (logged)	0.377	95% H-UCL (KM -Log)	16.44
KM SD (logged)	2.382	95% Critical H Value (KM-Log)	4.192
KM Standard Error of Mean (logged)	0.377		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.144	Mean in Log Scale	-1.634
SD in Original Scale	2.324	SD in Log Scale	2.453
95% t UCL (Assumes normality)	1.755	95% H-Stat UCL	20.9

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

iamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.149

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

TCDD TEQ HH

General Statistics

Total Number of Observations	23	Number of Distinct Observations	22
		Number of Missing Observations	35
Minimum	2.3700E-6	Mean	6.1001E-5
Maximum	4.8400E-4	Median	2.7000E-5
SD	1.0266E-4	Std. Error of Mean	2.1406E-5
Coefficient of Variation	N/A	Skewness	3.46

Normal GOF Test

Shapiro Wilk Test Statistic	0.575	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.7758E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1271E-4
		95% Modified-t UCL (Johnson-1978)	1.0033E-4

Gamma GOF Test

A-D Test Statistic	0.596	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.795	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.19	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.608	k star (bias corrected MLE)	0.557
Theta hat (MLE)	1.0040E-4	Theta star (bias corrected MLE)	1.0945E-4
nu hat (MLE)	27.95	nu star (bias corrected)	25.64
MLE Mean (bias corrected)	6.1001E-5	MLE Sd (bias corrected)	8.1712E-5
		Approximate Chi Square Value (0.05)	15.1
Adjusted Level of Significance	0.0389	Adjusted Chi Square Value	14.51

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.0357E-4	95% Adjusted Gamma UCL (use when n<50)	1.0775E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.18	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-12.95	Mean of logged Data	-10.72
Maximum of Logged Data	-7.633	SD of logged Data	1.536

Assuming Lognormal Distribution

95% H-UCL	2.1231E-4	90% Chebyshev (MVUE) UCL	1.4188E-4
95% Chebyshev (MVUE) UCL	1.7663E-4	97.5% Chebyshev (MVUE) UCL	2.2486E-4
99% Chebyshev (MVUE) UCL	3.1961E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	9.6210E-5	95% Jackknife UCL	9.7758E-5
95% Standard Bootstrap UCL	9.5469E-5	95% Bootstrap-t UCL	1.3437E-4
95% Hall's Bootstrap UCL	2.3119E-4	95% Percentile Bootstrap UCL	1.0009E-4
95% BCA Bootstrap UCL	1.1613E-4		
90% Chebyshev(Mean, Sd) UCL	1.2522E-4	95% Chebyshev(Mean, Sd) UCL	1.5431E-4
97.5% Chebyshev(Mean, Sd) UCL	1.9468E-4	99% Chebyshev(Mean, Sd) UCL	2.7399E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 1.0775E-4

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

Thallium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	55
Minimum	0.16	Mean	0.18
Maximum	0.2	Median	0.18
SD	0.02	Std. Error of Mean	0.0115
Coefficient of Variation	0.111	Skewness	-6.35E-15

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.214	95% Adjusted-CLT UCL (Chen-1995)	0.199
		95% Modified-t UCL (Johnson-1978)	0.214

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	120.9	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00149	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	725.5	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.833	Mean of logged Data	-1.719
Maximum of Logged Data	-1.609	SD of logged Data	0.112

Assuming Lognormal Distribution

95% H-UCL	0.225	90% Chebyshev (MVUE) UCL	0.215
95% Chebyshev (MVUE) UCL	0.23	97.5% Chebyshev (MVUE) UCL	0.252
99% Chebyshev (MVUE) UCL	0.295		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.199	95% Jackknife UCL	0.214
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	0.215	95% Chebyshev(Mean, Sd) UCL	0.23
97.5% Chebyshev(Mean, Sd) UCL	0.252	99% Chebyshev(Mean, Sd) UCL	0.295

Suggested UCL to Use

95% Student's-t UCL 0.214

Recommended UCL exceeds the maximum observation

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

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

Vanadium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	55
Minimum	16	Mean	24.67
Maximum	36	Median	22
SD	10.26	Std. Error of Mean	5.925
Coefficient of Variation	0.416	Skewness	1.09

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	41.97	95% Adjusted-CLT UCL (Chen-1995)	38.4
		95% Modified-t UCL (Johnson-1978)	42.59

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	9.028	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.732	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	54.17	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.773	Mean of logged Data	3.149
Maximum of Logged Data	3.584	SD of logged Data	0.409

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 2:07:36 PM
From File	Soil_StoresFleet-SS.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	19
Minimum	3	Mean	5.25
Maximum	7.5	Median	5.4
SD	1.701	Std. Error of Mean	0.601
Coefficient of Variation	0.324	Skewness	-0.123

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.938	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.136	Lilliefors GOF Test
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	6.39	95% Adjusted-CLT UCL (Chen-1995)	6.212
		95% Modified-t UCL (Johnson-1978)	6.385

Gamma GOF Test

A-D Test Statistic	0.31	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.715	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.159	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.294	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.01	k star (bias corrected MLE)	6.339
Theta hat (MLE)	0.524	Theta star (bias corrected MLE)	0.828
nu hat (MLE)	160.2	nu star (bias corrected)	101.4
MLE Mean (bias corrected)	5.25	MLE Sd (bias corrected)	2.085
		Approximate Chi Square Value (0.05)	79.19
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	74.24

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.724	95% Adjusted Gamma UCL (use when n<50)	7.173

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.918	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.15	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.099	Mean of logged Data	1.607
Maximum of Logged Data	2.015	SD of logged Data	0.35

Assuming Lognormal Distribution

95% H-UCL	7.023	90% Chebyshev (MVUE) UCL	7.224
95% Chebyshev (MVUE) UCL	8.113	97.5% Chebyshev (MVUE) UCL	9.347
99% Chebyshev (MVUE) UCL	11.77		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.239	95% Jackknife UCL	6.39
95% Standard Bootstrap UCL	6.171	95% Bootstrap-t UCL	6.355
95% Hall's Bootstrap UCL	6.103	95% Percentile Bootstrap UCL	6.213
95% BCA Bootstrap UCL	6.138		
90% Chebyshev(Mean, Sd) UCL	7.054	95% Chebyshev(Mean, Sd) UCL	7.872
97.5% Chebyshev(Mean, Sd) UCL	9.006	99% Chebyshev(Mean, Sd) UCL	11.23

Suggested UCL to Use

95% Student's-t UCL	6.39

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

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.012	Minimum Non-Detect	0.0071
Maximum Detect	0.9	Maximum Non-Detect	0.0071
Variance Detects	0.0672	Percent Non-Detects	7.692%
Mean Detects	0.262	SD Detects	0.259
Median Detects	0.23	CV Detects	0.99
Skewness Detects	1.471	Kurtosis Detects	2.398
Mean of Logged Detects	-1.918	SD of Logged Detects	1.276

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.242	KM Standard Error of Mean	0.0718
KM SD	0.248	95% KM (BCA) UCL	0.371
95% KM (t) UCL	0.37	95% KM (Percentile Bootstrap) UCL	0.36
95% KM (z) UCL	0.36	95% KM Bootstrap t UCL	0.444
90% KM Chebyshev UCL	0.458	95% KM Chebyshev UCL	0.555
97.5% KM Chebyshev UCL	0.691	99% KM Chebyshev UCL	0.957

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.266	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.153	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1	k star (bias corrected MLE)	0.805
Theta hat (MLE)	0.262	Theta star (bias corrected MLE)	0.325
nu hat (MLE)	23.99	nu star (bias corrected)	19.33

Mean (detects)	0.262		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.242
Maximum	0.9	Median	0.22
SD	0.258	CV	1.063
k hat (MLE)	0.835	k star (bias corrected MLE)	0.693
Theta hat (MLE)	0.29	Theta star (bias corrected MLE)	0.35
nu hat (MLE)	21.7	nu star (bias corrected)	18.02
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (18.02, α)	9.408	Adjusted Chi Square Value (18.02, β)	8.534
95% Gamma Approximate UCL (use when n>=50)	0.464	95% Gamma Adjusted UCL (use when n<50)	0.512

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.242	SD (KM)	0.248
Variance (KM)	0.0614	SE of Mean (KM)	0.0718
k hat (KM)	0.955	k star (KM)	0.786
nu hat (KM)	24.82	nu star (KM)	20.42
theta hat (KM)	0.254	theta star (KM)	0.308
80% gamma percentile (KM)	0.396	90% gamma percentile (KM)	0.591
95% gamma percentile (KM)	0.791	99% gamma percentile (KM)	1.262

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.42, α)	11.16	Adjusted Chi Square Value (20.42, β)	10.2
95% Gamma Approximate KM-UCL (use when n>=50)	0.443	95% Gamma Adjusted KM-UCL (use when n<50)	0.485

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.242	Mean in Log Scale	-2.154
SD in Original Scale	0.258	SD in Log Scale	1.489
95% t UCL (assumes normality of ROS data)	0.37	95% Percentile Bootstrap UCL	0.362
95% BCA Bootstrap UCL	0.391	95% Bootstrap t UCL	0.425
95% H-UCL (Log ROS)	1.771		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.151	KM Geo Mean	0.116
KM SD (logged)	1.425	95% Critical H Value (KM-Log)	3.635
KM Standard Error of Mean (logged)	0.413	95% H-UCL (KM -Log)	1.431
KM SD (logged)	1.425	95% Critical H Value (KM-Log)	3.635
KM Standard Error of Mean (logged)	0.413		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.242	Mean in Log Scale	-2.204
SD in Original Scale	0.258	SD in Log Scale	1.6
95% t UCL (Assumes normality)	0.37	95% H-Stat UCL	2.475

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.37

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Benzo(a)pyrene

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.011	Minimum Non-Detect	0.0071
Maximum Detect	1.1	Maximum Non-Detect	0.0071
Variance Detects	0.0882	Percent Non-Detects	7.692%
Mean Detects	0.269	SD Detects	0.297
Median Detects	0.26	CV Detects	1.106
Skewness Detects	2.184	Kurtosis Detects	5.903
Mean of Logged Detects	-1.918	SD of Logged Detects	1.289
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.748	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.249	KM Standard Error of Mean	0.0817
KM SD	0.282	95% KM (BCA) UCL	0.392
95% KM (t) UCL	0.394	95% KM (Percentile Bootstrap) UCL	0.389
95% KM (z) UCL	0.383	95% KM Bootstrap t UCL	0.498
90% KM Chebyshev UCL	0.494	95% KM Chebyshev UCL	0.605
97.5% KM Chebyshev UCL	0.759	99% KM Chebyshev UCL	1.061
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.418	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.206	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.253	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.961	k star (bias corrected MLE)	0.776
Theta hat (MLE)	0.28	Theta star (bias corrected MLE)	0.346
nu hat (MLE)	23.07	nu star (bias corrected)	18.63
Mean (detects)	0.269		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.249
Maximum	1.1	Median	0.26
SD	0.293	CV	1.179
k hat (MLE)	0.808	k star (bias corrected MLE)	0.673
Theta hat (MLE)	0.308	Theta star (bias corrected MLE)	0.37
nu hat (MLE)	21.02	nu star (bias corrected)	17.5
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (17.50, α)	9.031	Adjusted Chi Square Value (17.50, β)	8.177
95% Gamma Approximate UCL (use when n>=50)	0.482	95% Gamma Adjusted UCL (use when n<50)	0.532
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.249	SD (KM)	0.282

Variance (KM)	0.0795	SE of Mean (KM)	0.0817
k hat (KM)	0.777	k star (KM)	0.649
nu hat (KM)	20.2	nu star (KM)	16.87
theta hat (KM)	0.32	theta star (KM)	0.383
80% gamma percentile (KM)	0.409	90% gamma percentile (KM)	0.635
95% gamma percentile (KM)	0.869	99% gamma percentile (KM)	1.433

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.87, α)	8.579	Adjusted Chi Square Value (16.87, β)	7.749
)5% Gamma Approximate KM-UCL (use when n>=50)	0.489	95% Gamma Adjusted KM-UCL (use when n<50)	0.541

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.254	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.249	Mean in Log Scale	-2.153
SD in Original Scale	0.294	SD in Log Scale	1.497
95% t UCL (assumes normality of ROS data)	0.394	95% Percentile Bootstrap UCL	0.39
95% BCA Bootstrap UCL	0.439	95% Bootstrap t UCL	0.497
95% H-UCL (Log ROS)	1.824		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.151	KM Geo Mean	0.116
KM SD (logged)	1.435	95% Critical H Value (KM-Log)	3.654
KM Standard Error of Mean (logged)	0.416	95% H-UCL (KM -Log)	1.479
KM SD (logged)	1.435	95% Critical H Value (KM-Log)	3.654
KM Standard Error of Mean (logged)	0.416		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.248	Mean in Log Scale	-2.204
SD in Original Scale	0.294	SD in Log Scale	1.609
95% t UCL (Assumes normality)	0.393	95% H-Stat UCL	2.562

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.498	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.541

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.015	Minimum Non-Detect	0.0071
Maximum Detect	1.4	Maximum Non-Detect	0.0071
Variance Detects	0.14	Percent Non-Detects	7.692%
Mean Detects	0.351	SD Detects	0.374
Median Detects	0.34	CV Detects	1.067
Skewness Detects	2.18	Kurtosis Detects	5.967
Mean of Logged Detects	-1.612	SD of Logged Detects	1.256

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.756	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.324	KM Standard Error of Mean	0.103
KM SD	0.356	95% KM (BCA) UCL	0.527
95% KM (t) UCL	0.508	95% KM (Percentile Bootstrap) UCL	0.495
95% KM (z) UCL	0.494	95% KM Bootstrap t UCL	0.646
90% KM Chebyshev UCL	0.634	95% KM Chebyshev UCL	0.774
97.5% KM Chebyshev UCL	0.969	99% KM Chebyshev UCL	1.352

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.358	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.02	k star (bias corrected MLE)	0.821
Theta hat (MLE)	0.344	Theta star (bias corrected MLE)	0.428
nu hat (MLE)	24.48	nu star (bias corrected)	19.69
Mean (detects)	0.351		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.325
Maximum	1.4	Median	0.32
SD	0.371	CV	1.142
k hat (MLE)	0.824	k star (bias corrected MLE)	0.685
Theta hat (MLE)	0.394	Theta star (bias corrected MLE)	0.474
nu hat (MLE)	21.43	nu star (bias corrected)	17.82
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (17.82, α)	9.26	Adjusted Chi Square Value (17.82, β)	8.394
95% Gamma Approximate UCL (use when n>=50)	0.625	95% Gamma Adjusted UCL (use when n<50)	0.689

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.324	SD (KM)	0.356
Variance (KM)	0.127	SE of Mean (KM)	0.103
k hat (KM)	0.829	k star (KM)	0.689
nu hat (KM)	21.56	nu star (KM)	17.92
theta hat (KM)	0.391	theta star (KM)	0.471
80% gamma percentile (KM)	0.534	90% gamma percentile (KM)	0.817
95% gamma percentile (KM)	1.111	99% gamma percentile (KM)	1.811

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.92, α)	9.331	Adjusted Chi Square Value (17.92, β)	8.461
›5% Gamma Approximate KM-UCL (use when n>=50)	0.623	95% Gamma Adjusted KM-UCL (use when n<50)	0.687

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.325	Mean in Log Scale	-1.84
SD in Original Scale	0.371	SD in Log Scale	1.458
95% t UCL (assumes normality of ROS data)	0.508	95% Percentile Bootstrap UCL	0.498
95% BCA Bootstrap UCL	0.574	95% Bootstrap t UCL	0.649
95% H-UCL (Log ROS)	2.179		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.868	KM Geo Mean	0.154
KM SD (logged)	1.458	95% Critical H Value (KM-Log)	3.699
KM Standard Error of Mean (logged)	0.422	95% H-UCL (KM -Log)	2.118
KM SD (logged)	1.458	95% Critical H Value (KM-Log)	3.699
KM Standard Error of Mean (logged)	0.422		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.324	Mean in Log Scale	-1.922
SD in Original Scale	0.371	SD in Log Scale	1.641
95% t UCL (Assumes normality)	0.508	95% H-Stat UCL	3.817

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.646	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.687

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	10
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.0078	Minimum Non-Detect	0.0071
Maximum Detect	0.52	Maximum Non-Detect	0.0071
Variance Detects	0.0218	Percent Non-Detects	7.692%
Mean Detects	0.143	SD Detects	0.148
Median Detects	0.14	CV Detects	1.034
Skewness Detects	1.71	Kurtosis Detects	3.284
Mean of Logged Detects	-2.511	SD of Logged Detects	1.23

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.132	KM Standard Error of Mean	0.0407
KM SD	0.14	95% KM (BCA) UCL	0.197
95% KM (t) UCL	0.205	95% KM (Percentile Bootstrap) UCL	0.201
95% KM (z) UCL	0.199	95% KM Bootstrap t UCL	0.251
90% KM Chebyshev UCL	0.254	95% KM Chebyshev UCL	0.31
97.5% KM Chebyshev UCL	0.386	99% KM Chebyshev UCL	0.537

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.428	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.207	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.02	k star (bias corrected MLE)	0.821
Theta hat (MLE)	0.14	Theta star (bias corrected MLE)	0.174
nu hat (MLE)	24.48	nu star (bias corrected)	19.7
Mean (detects)	0.143		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0078	Mean	0.133
Maximum	0.52	Median	0.14
SD	0.146	CV	1.102
k hat (MLE)	0.898	k star (bias corrected MLE)	0.742
Theta hat (MLE)	0.148	Theta star (bias corrected MLE)	0.179
nu hat (MLE)	23.34	nu star (bias corrected)	19.29
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (19.29, α)	10.33	Adjusted Chi Square Value (19.29, β)	9.407
95% Gamma Approximate UCL (use when n>=50)	0.247	95% Gamma Adjusted UCL (use when n<50)	0.272

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.132	SD (KM)	0.14
Variance (KM)	0.0197	SE of Mean (KM)	0.0407
k hat (KM)	0.887	k star (KM)	0.734
nu hat (KM)	23.07	nu star (KM)	19.08
theta hat (KM)	0.149	theta star (KM)	0.18
80% gamma percentile (KM)	0.217	90% gamma percentile (KM)	0.328
95% gamma percentile (KM)	0.443	99% gamma percentile (KM)	0.714

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.08, α)	10.18	Adjusted Chi Square Value (19.08, β)	9.262
)5% Gamma Approximate KM-UCL (use when n>=50)	0.248	95% Gamma Adjusted KM-UCL (use when n<50)	0.273

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.132	Mean in Log Scale	-2.737
SD in Original Scale	0.146	SD in Log Scale	1.433
95% t UCL (assumes normality of ROS data)	0.204	95% Percentile Bootstrap UCL	0.2
95% BCA Bootstrap UCL	0.217	95% Bootstrap t UCL	0.252
95% H-UCL (Log ROS)	0.817		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.699	KM Geo Mean	0.0673
KM SD (logged)	1.305	95% Critical H Value (KM-Log)	3.403
KM Standard Error of Mean (logged)	0.378	95% H-UCL (KM -Log)	0.568

KM SD (logged)	1.305	95% Critical H Value (KM-Log)	3.403
KM Standard Error of Mean (logged)	0.378		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.132	Mean in Log Scale	-2.752
SD in Original Scale	0.146	SD in Log Scale	1.463
95% t UCL (Assumes normality)	0.204	95% H-Stat UCL	0.892

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.251	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.273

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

Chrysene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.025	Minimum Non-Detect	0.0071
Maximum Detect	1.4	Maximum Non-Detect	0.0071
Variance Detects	0.142	Percent Non-Detects	7.692%
Mean Detects	0.327	SD Detects	0.377
Median Detects	0.255	CV Detects	1.155
Skewness Detects	2.366	Kurtosis Detects	6.532
Mean of Logged Detects	-1.684	SD of Logged Detects	1.184

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.723	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.302	KM Standard Error of Mean	0.103
KM SD	0.357	95% KM (BCA) UCL	0.484
95% KM (t) UCL	0.486	95% KM (Percentile Bootstrap) UCL	0.495
95% KM (z) UCL	0.472	95% KM Bootstrap t UCL	0.669
90% KM Chebyshev UCL	0.612	95% KM Chebyshev UCL	0.753
97.5% KM Chebyshev UCL	0.948	99% KM Chebyshev UCL	1.332

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.376	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.166	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.02	k star (bias corrected MLE)	0.821
Theta hat (MLE)	0.32	Theta star (bias corrected MLE)	0.398
nu hat (MLE)	24.48	nu star (bias corrected)	19.69
Mean (detects)	0.327		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.302
Maximum	1.4	Median	0.25
SD	0.372	CV	1.23
k hat (MLE)	0.83	k star (bias corrected MLE)	0.69
Theta hat (MLE)	0.364	Theta star (bias corrected MLE)	0.438
nu hat (MLE)	21.57	nu star (bias corrected)	17.93
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (17.93, α)	9.339	Adjusted Chi Square Value (17.93, β)	8.469
95% Gamma Approximate UCL (use when n>=50)	0.58	95% Gamma Adjusted UCL (use when n<50)	0.64

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.302	SD (KM)	0.357
Variance (KM)	0.128	SE of Mean (KM)	0.103
k hat (KM)	0.715	k star (KM)	0.601
nu hat (KM)	18.58	nu star (KM)	15.62
theta hat (KM)	0.423	theta star (KM)	0.503
80% gamma percentile (KM)	0.498	90% gamma percentile (KM)	0.785
95% gamma percentile (KM)	1.086	99% gamma percentile (KM)	1.814

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.62, α)	7.698	Adjusted Chi Square Value (15.62, β)	6.918
)5% Gamma Approximate KM-UCL (use when n>=50)	0.613	95% Gamma Adjusted KM-UCL (use when n<50)	0.682

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.302	Mean in Log Scale	-1.903
SD in Original Scale	0.372	SD in Log Scale	1.383
95% t UCL (assumes normality of ROS data)	0.486	95% Percentile Bootstrap UCL	0.494
95% BCA Bootstrap UCL	0.533	95% Bootstrap t UCL	0.677
95% H-UCL (Log ROS)	1.604		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.935	KM Geo Mean	0.144
KM SD (logged)	1.394	95% Critical H Value (KM-Log)	3.575
KM Standard Error of Mean (logged)	0.404	95% H-UCL (KM -Log)	1.609
KM SD (logged)	1.394	95% Critical H Value (KM-Log)	3.575
KM Standard Error of Mean (logged)	0.404		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.302	Mean in Log Scale	-1.988
SD in Original Scale	0.372	SD in Log Scale	1.578
95% t UCL (Assumes normality)	0.486	95% H-Stat UCL	2.847

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.669	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.682

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

-lowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	19
Minimum	2	Mean	4.475
Maximum	7.9	Median	3.85
SD	2.041	Std. Error of Mean	0.722
Coefficient of Variation	0.456	Skewness	0.851

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.842	95% Adjusted-CLT UCL (Chen-1995)	5.894
		95% Modified-t UCL (Johnson-1978)	5.878

Gamma GOF Test

A-D Test Statistic	0.311	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.718	etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.198	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.295	etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.805	k star (bias corrected MLE)	3.711
Theta hat (MLE)	0.771	Theta star (bias corrected MLE)	1.206
nu hat (MLE)	92.88	nu star (bias corrected)	59.38
MLE Mean (bias corrected)	4.475	MLE Sd (bias corrected)	2.323
		Approximate Chi Square Value (0.05)	42.66
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	39.11

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.229	95% Adjusted Gamma UCL (use when n<50)	6.795

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.168	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.693	Mean of logged Data	1.41
Maximum of Logged Data	2.067	SD of logged Data	0.45

Assuming Lognormal Distribution

95% H-UCL	6.673	90% Chebyshev (MVUE) UCL	6.626
95% Chebyshev (MVUE) UCL	7.601	97.5% Chebyshev (MVUE) UCL	8.956
99% Chebyshev (MVUE) UCL	11.62		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.662	95% Jackknife UCL	5.842
95% Standard Bootstrap UCL	5.603	95% Bootstrap-t UCL	6.974

95% Hall's Bootstrap UCL	14.8	95% Percentile Bootstrap UCL	5.613
95% BCA Bootstrap UCL	5.825		
90% Chebyshev(Mean, Sd) UCL	6.64	95% Chebyshev(Mean, Sd) UCL	7.62
97.5% Chebyshev(Mean, Sd) UCL	8.981	99% Chebyshev(Mean, Sd) UCL	11.65

Suggested UCL to Use

95% Student's-t UCL	5.842

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.0029	Minimum Non-Detect	0.0071
Maximum Detect	0.29	Maximum Non-Detect	0.0071
Variance Detects	0.006	Percent Non-Detects	7.692%
Mean Detects	0.0613	SD Detects	0.0775
Median Detects	0.0475	CV Detects	1.265
Skewness Detects	2.664	Kurtosis Detects	8.091
Mean of Logged Detects	-3.42	SD of Logged Detects	1.257

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.668	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.299	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0568	KM Standard Error of Mean	0.0211
KM SD	0.0729	95% KM (BCA) UCL	0.0963
95% KM (t) UCL	0.0944	95% KM (Percentile Bootstrap) UCL	0.0928
95% KM (z) UCL	0.0915	95% KM Bootstrap t UCL	0.133
90% KM Chebyshev UCL	0.12	95% KM Chebyshev UCL	0.149
97.5% KM Chebyshev UCL	0.189	99% KM Chebyshev UCL	0.267

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.366	Anderson-Darling GOF Test
5% A-D Critical Value	0.759	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.16	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.253	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.929	k star (bias corrected MLE)	0.752
Theta hat (MLE)	0.0659	Theta star (bias corrected MLE)	0.0814
nu hat (MLE)	22.3	nu star (bias corrected)	18.05
Mean (detects)	0.0613		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0029	Mean	0.0573
Maximum	0.29	Median	0.045
SD	0.0755	CV	1.318
k hat (MLE)	0.898	k star (bias corrected MLE)	0.742
Theta hat (MLE)	0.0639	Theta star (bias corrected MLE)	0.0773

nu hat (MLE)	23.34	nu star (bias corrected)	19.29
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (19.29, α)	10.33	Adjusted Chi Square Value (19.29, β)	9.404
95% Gamma Approximate UCL (use when n>=50)	0.107	95% Gamma Adjusted UCL (use when n<50)	0.118

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0568	SD (KM)	0.0729
Variance (KM)	0.00532	SE of Mean (KM)	0.0211
k hat (KM)	0.606	k star (KM)	0.517
nu hat (KM)	15.75	nu star (KM)	13.45
theta hat (KM)	0.0937	theta star (KM)	0.11
80% gamma percentile (KM)	0.0934	90% gamma percentile (KM)	0.153
95% gamma percentile (KM)	0.215	99% gamma percentile (KM)	0.37

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.45, α)	6.196	Adjusted Chi Square Value (13.45, β)	5.509
95% Gamma Approximate KM-UCL (use when n>=50)	0.123	95% Gamma Adjusted KM-UCL (use when n<50)	0.139

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.956	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.183	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0568	Mean in Log Scale	-3.596
SD in Original Scale	0.0759	SD in Log Scale	1.362
95% t UCL (assumes normality of ROS data)	0.0943	95% Percentile Bootstrap UCL	0.0937
95% BCA Bootstrap UCL	0.115	95% Bootstrap t UCL	0.131
95% H-UCL (Log ROS)	0.276		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.606	KM Geo Mean	0.0272
KM SD (logged)	1.325	95% Critical H Value (KM-Log)	3.441
KM Standard Error of Mean (logged)	0.384	95% H-UCL (KM -Log)	0.244
KM SD (logged)	1.325	95% Critical H Value (KM-Log)	3.441
KM Standard Error of Mean (logged)	0.384		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0568	Mean in Log Scale	-3.59
SD in Original Scale	0.0759	SD in Log Scale	1.352
95% t UCL (Assumes normality)	0.0943	95% H-Stat UCL	0.269

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.133	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.139

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	6
		Number of Missing Observations	19
Number of Detects	3	Number of Non-Detects	5
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	21	Minimum Non-Detect	18
Maximum Detect	170	Maximum Non-Detect	99
Variance Detects	6811	Percent Non-Detects	62.5%

Mean Detects	75	SD Detects	82.53
Median Detects	34	CV Detects	1.1
Skewness Detects	1.684	Kurtosis Detects	N/A
Mean of Logged Detects	3.902	SD of Logged Detects	1.095

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.815	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.357	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	39.77	KM Standard Error of Mean	21.47
KM SD	49.52	95% KM (BCA) UCL	N/A
95% KM (t) UCL	80.44	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	75.08	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	104.2	95% KM Chebyshev UCL	133.3
97.5% KM Chebyshev UCL	173.8	99% KM Chebyshev UCL	253.4

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.346	k star (bias corrected MLE)	N/A
Theta hat (MLE)	55.71	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	8.078	nu star (bias corrected)	N/A
Mean (detects)	75		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	28.13
Maximum	170	Median	0.01
SD	58.76	CV	2.089
k hat (MLE)	0.16	k star (bias corrected MLE)	0.183
Theta hat (MLE)	175.6	Theta star (bias corrected MLE)	153.3
nu hat (MLE)	2.563	nu star (bias corrected)	2.935
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (2.94, α)	0.354	Adjusted Chi Square Value (2.94, β)	0.203
95% Gamma Approximate UCL (use when n>=50)	233.6	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	39.77	SD (KM)	49.52
Variance (KM)	2453	SE of Mean (KM)	21.47
k hat (KM)	0.645	k star (KM)	0.486
nu hat (KM)	10.32	nu star (KM)	7.782
theta hat (KM)	61.67	theta star (KM)	81.77
80% gamma percentile (KM)	65.23	90% gamma percentile (KM)	108.2
95% gamma percentile (KM)	154.3	99% gamma percentile (KM)	267.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.78, α)	2.61	Adjusted Chi Square Value (7.78, β)	1.916
95% Gamma Approximate KM-UCL (use when n>=50)	118.6	95% Gamma Adjusted KM-UCL (use when n<50)	161.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.912	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.301	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	30.35	Mean in Log Scale	2.142
SD in Original Scale	57.58	SD in Log Scale	1.667
95% t UCL (assumes normality of ROS data)	68.92	95% Percentile Bootstrap UCL	68.48
95% BCA Bootstrap UCL	88.41	95% Bootstrap t UCL	250.1
95% H-UCL (Log ROS)	903		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.286	KM Geo Mean	26.74
KM SD (logged)	0.732	95% Critical H Value (KM-Log)	2.803
KM Standard Error of Mean (logged)	0.319	95% H-UCL (KM -Log)	75.93
KM SD (logged)	0.732	95% Critical H Value (KM-Log)	2.803
KM Standard Error of Mean (logged)	0.319		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	39	Mean in Log Scale	3.07
SD in Original Scale	54.94	SD in Log Scale	1.065
95% t UCL (Assumes normality)	75.8	95% H-Stat UCL	161

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 80.44

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.0098	Minimum Non-Detect	0.0071
Maximum Detect	0.9	Maximum Non-Detect	0.0071
Variance Detects	0.0586	Percent Non-Detects	7.692%
Mean Detects	0.207	SD Detects	0.242
Median Detects	0.185	CV Detects	1.169
Skewness Detects	2.389	Kurtosis Detects	6.778
Mean of Logged Detects	-2.181	SD of Logged Detects	1.26

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.718	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.279	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.192	KM Standard Error of Mean	0.0663
KM SD	0.229	95% KM (BCA) UCL	0.307
95% KM (t) UCL	0.31	95% KM (Percentile Bootstrap) UCL	0.298
95% KM (z) UCL	0.301	95% KM Bootstrap t UCL	0.408
90% KM Chebyshev UCL	0.391	95% KM Chebyshev UCL	0.481

97.5% KM Chebyshev UCL	0.606	99% KM Chebyshev UCL	0.851

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.387	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.758	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.168	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.253	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.958	k star (bias corrected MLE)	0.774
Theta hat (MLE)	0.216	Theta star (bias corrected MLE)	0.267
nu hat (MLE)	22.98	nu star (bias corrected)	18.57
Mean (detects)	0.207		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0098	Mean	0.192
Maximum	0.9	Median	0.18
SD	0.238	CV	1.241
k hat (MLE)	0.825	k star (bias corrected MLE)	0.686
Theta hat (MLE)	0.232	Theta star (bias corrected MLE)	0.28
nu hat (MLE)	21.45	nu star (bias corrected)	17.84
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (17.84, α)	9.273	Adjusted Chi Square Value (17.84, β)	8.406
95% Gamma Approximate UCL (use when n>=50)	0.369	95% Gamma Adjusted UCL (use when n<50)	0.407

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.192	SD (KM)	0.229
Variance (KM)	0.0524	SE of Mean (KM)	0.0663
k hat (KM)	0.701	k star (KM)	0.59
nu hat (KM)	18.22	nu star (KM)	15.35
theta hat (KM)	0.273	theta star (KM)	0.325
80% gamma percentile (KM)	0.316	90% gamma percentile (KM)	0.5
95% gamma percentile (KM)	0.694	99% gamma percentile (KM)	1.162

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.35, α)	7.504	Adjusted Chi Square Value (15.35, β)	6.737
)5% Gamma Approximate KM-UCL (use when n>=50)	0.392	95% Gamma Adjusted KM-UCL (use when n<50)	0.437

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.191	Mean in Log Scale	-2.413
SD in Original Scale	0.238	SD in Log Scale	1.467
95% t UCL (assumes normality of ROS data)	0.309	95% Percentile Bootstrap UCL	0.303
95% BCA Bootstrap UCL	0.358	95% Bootstrap t UCL	0.408
95% H-UCL (Log ROS)	1.269		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.394	KM Geo Mean	0.0913
KM SD (logged)	1.373	95% Critical H Value (KM-Log)	3.535
KM Standard Error of Mean (logged)	0.398	95% H-UCL (KM -Log)	0.952
KM SD (logged)	1.373	95% Critical H Value (KM-Log)	3.535
KM Standard Error of Mean (logged)	0.398		

DL/2 Statistics

DL/2 Normal | **DL/2 Log-Transformed**

Mean in Original Scale	0.191	Mean in Log Scale	-2.447
SD in Original Scale	0.238	SD in Log Scale	1.541
95% t UCL (Assumes normality)	0.309	95% H-Stat UCL	1.581

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.408	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.437

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

Manganese

General Statistics

Total Number of Observations	8	Number of Distinct Observations	7
		Number of Missing Observations	19
Minimum	42	Mean	117.9
Maximum	220	Median	110
SD	57.72	Std. Error of Mean	20.41
Coefficient of Variation	0.49	Skewness	0.5

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	156.5	95% Adjusted-CLT UCL (Chen-1995)	155.3
		95% Modified-t UCL (Johnson-1978)	157.1

Gamma GOF Test

A-D Test Statistic	0.204	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.719	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.132	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.295	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.389	k star (bias corrected MLE)	2.826
Theta hat (MLE)	26.86	Theta star (bias corrected MLE)	41.71
nu hat (MLE)	70.22	nu star (bias corrected)	45.22
MLE Mean (bias corrected)	117.9	MLE Sd (bias corrected)	70.12
		Approximate Chi Square Value (0.05)	30.79
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	27.82

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	173.1	95% Adjusted Gamma UCL (use when n<50)	191.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.738	Mean of logged Data	4.651
Maximum of Logged Data	5.394	SD of logged Data	0.543

Assuming Lognormal Distribution

95% H-UCL	199.7	90% Chebyshev (MVUE) UCL	188.2
95% Chebyshev (MVUE) UCL	219.5	97.5% Chebyshev (MVUE) UCL	263.1
99% Chebyshev (MVUE) UCL	348.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	151.4	95% Jackknife UCL	156.5
95% Standard Bootstrap UCL	149.1	95% Bootstrap-t UCL	161.8
95% Hall's Bootstrap UCL	164.5	95% Percentile Bootstrap UCL	149.8
95% BCA Bootstrap UCL	151.6		
90% Chebyshev(Mean, Sd) UCL	179.1	95% Chebyshev(Mean, Sd) UCL	206.8
97.5% Chebyshev(Mean, Sd) UCL	245.3	99% Chebyshev(Mean, Sd) UCL	320.9

Suggested UCL to Use

95% Student's-t UCL	156.5

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

Naphthalene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	14
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.0035	Minimum Non-Detect	0.0071
Maximum Detect	0.067	Maximum Non-Detect	0.0071
Variance Detects	6.0651E-4	Percent Non-Detects	7.692%
Mean Detects	0.0298	SD Detects	0.0246
Median Detects	0.0235	CV Detects	0.827
Skewness Detects	0.486	Kurtosis Detects	-1.364
Mean of Logged Detects	-3.976	SD of Logged Detects	1.119

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0278	KM Standard Error of Mean	0.00684
KM SD	0.0236	95% KM (BCA) UCL	0.0388
95% KM (t) UCL	0.04	95% KM (Percentile Bootstrap) UCL	0.0387
95% KM (z) UCL	0.0391	95% KM Bootstrap t UCL	0.0418
90% KM Chebyshev UCL	0.0484	95% KM Chebyshev UCL	0.0577
97.5% KM Chebyshev UCL	0.0706	99% KM Chebyshev UCL	0.0959

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.492	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.251	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.222	k star (bias corrected MLE)	0.972
Theta hat (MLE)	0.0244	Theta star (bias corrected MLE)	0.0306
nu hat (MLE)	29.34	nu star (bias corrected)	23.34
Mean (detects)	0.0298		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0035	Mean	0.0282
Maximum	0.067	Median	0.023
SD	0.0242	CV	0.857
k hat (MLE)	1.232	k star (bias corrected MLE)	0.999
Theta hat (MLE)	0.0229	Theta star (bias corrected MLE)	0.0283
nu hat (MLE)	32.04	nu star (bias corrected)	25.98
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (25.98, α)	15.36	Adjusted Chi Square Value (25.98, β)	14.21
95% Gamma Approximate UCL (use when n>=50)	0.0478	95% Gamma Adjusted UCL (use when n<50)	0.0516

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0278	SD (KM)	0.0236
Variance (KM)	5.5754E-4	SE of Mean (KM)	0.00684
k hat (KM)	1.391	k star (KM)	1.121
nu hat (KM)	36.16	nu star (KM)	29.15
theta hat (KM)	0.02	theta star (KM)	0.0248
80% gamma percentile (KM)	0.0444	90% gamma percentile (KM)	0.0623
95% gamma percentile (KM)	0.0801	99% gamma percentile (KM)	0.121

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (29.15, α)	17.83	Adjusted Chi Square Value (29.15, β)	16.57
95% Gamma Approximate KM-UCL (use when n>=50)	0.0455	95% Gamma Adjusted KM-UCL (use when n<50)	0.049

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0279	Mean in Log Scale	-4.066
SD in Original Scale	0.0245	SD in Log Scale	1.119
95% t UCL (assumes normality of ROS data)	0.04	95% Percentile Bootstrap UCL	0.039
95% BCA Bootstrap UCL	0.0405	95% Bootstrap t UCL	0.043
95% H-UCL (Log ROS)	0.0861		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.083	KM Geo Mean	0.0169
KM SD (logged)	1.095	95% Critical H Value (KM-Log)	3.015
KM Standard Error of Mean (logged)	0.318	95% H-UCL (KM -Log)	0.0796
KM SD (logged)	1.095	95% Critical H Value (KM-Log)	3.015
KM Standard Error of Mean (logged)	0.318		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0278	Mean in Log Scale	-4.104
SD in Original Scale	0.0247	SD in Log Scale	1.166
95% t UCL (Assumes normality)	0.0399	95% H-Stat UCL	0.0939

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.04

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

Nickel

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	19
Minimum	2.2	Mean	11.33
Maximum	31	Median	6.2
SD	10.69	Std. Error of Mean	3.781
Coefficient of Variation	0.944	Skewness	1.006

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.833	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.258	Lilliefors GOF Test
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	18.49	95% Adjusted-CLT UCL (Chen-1995)	18.98
		95% Modified-t UCL (Johnson-1978)	18.71

Gamma GOF Test

A-D Test Statistic	0.469	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.3	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.289	k star (bias corrected MLE)	0.889
Theta hat (MLE)	8.787	Theta star (bias corrected MLE)	12.74
nu hat (MLE)	20.62	nu star (bias corrected)	14.22
MLE Mean (bias corrected)	11.33	MLE Sd (bias corrected)	12.01
		Approximate Chi Square Value (0.05)	6.723
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	5.474

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	23.96	95% Adjusted Gamma UCL (use when n<50)	29.42

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.788	Mean of logged Data	1.991
Maximum of Logged Data	3.434	SD of logged Data	1.022

Assuming Lognormal Distribution

95% H-UCL	47.32	90% Chebyshev (MVUE) UCL	23.86
95% Chebyshev (MVUE) UCL	29.54	97.5% Chebyshev (MVUE) UCL	37.42

99% Chebyshev (MVUE) UCL	52.89		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	17.54	95% Jackknife UCL	18.49
95% Standard Bootstrap UCL	17.24	95% Bootstrap-t UCL	21.76
95% Hall's Bootstrap UCL	16.65	95% Percentile Bootstrap UCL	17.38
95% BCA Bootstrap UCL	17.94		
90% Chebyshev(Mean, Sd) UCL	22.67	95% Chebyshev(Mean, Sd) UCL	27.81
97.5% Chebyshev(Mean, Sd) UCL	34.94	99% Chebyshev(Mean, Sd) UCL	48.94

Suggested UCL to Use

95% Student's-t UCL	18.49

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	27	Number of Distinct Observations	26
		Number of Missing Observations	1
Number of Detects	24	Number of Non-Detects	3
Number of Distinct Detects	24	Number of Distinct Non-Detects	2
Minimum Detect	9.5000E-4	Minimum Non-Detect	9.1000E-4
Maximum Detect	4.8	Maximum Non-Detect	0.001
Variance Detects	1.462	Percent Non-Detects	11.11%
Mean Detects	0.765	SD Detects	1.209
Median Detects	0.25	CV Detects	1.58
Skewness Detects	2.258	Kurtosis Detects	5.217
Mean of Logged Detects	-2.055	SD of Logged Detects	2.482

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.68	KM Standard Error of Mean	0.224
KM SD	1.142	95% KM (BCA) UCL	1.099
95% KM (t) UCL	1.063	95% KM (Percentile Bootstrap) UCL	1.044
95% KM (z) UCL	1.049	95% KM Bootstrap t UCL	1.308
90% KM Chebyshev UCL	1.353	95% KM Chebyshev UCL	1.658
97.5% KM Chebyshev UCL	2.082	99% KM Chebyshev UCL	2.913

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.319	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.835	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.191	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.372	k star (bias corrected MLE)	0.354
Theta hat (MLE)	2.054	Theta star (bias corrected MLE)	2.163
nu hat (MLE)	17.88	nu star (bias corrected)	16.98
Mean (detects)	0.765		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.5000E-4	Mean	0.681
Maximum	4.8	Median	0.086
SD	1.163	CV	1.707
k hat (MLE)	0.345	k star (bias corrected MLE)	0.331
Theta hat (MLE)	1.975	Theta star (bias corrected MLE)	2.056
nu hat (MLE)	18.62	nu star (bias corrected)	17.89
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (17.89, α)	9.311	Adjusted Chi Square Value (17.89, β)	8.915
95% Gamma Approximate UCL (use when n>=50)	1.309	95% Gamma Adjusted UCL (use when n<50)	1.367

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.68	SD (KM)	1.142
Variance (KM)	1.303	SE of Mean (KM)	0.224
k hat (KM)	0.355	k star (KM)	0.34
nu hat (KM)	19.17	nu star (KM)	18.37
theta hat (KM)	1.916	theta star (KM)	1.999
80% gamma percentile (KM)	1.072	90% gamma percentile (KM)	1.973
95% gamma percentile (KM)	2.986	99% gamma percentile (KM)	5.58

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (18.37, α)	9.662	Adjusted Chi Square Value (18.37, β)	9.259
ı5% Gamma Approximate KM-UCL (use when n>=50)	1.294	95% Gamma Adjusted KM-UCL (use when n<50)	1.35

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.68	Mean in Log Scale	-2.672
SD in Original Scale	1.163	SD in Log Scale	2.94
95% t UCL (assumes normality of ROS data)	1.062	95% Percentile Bootstrap UCL	1.073
95% BCA Bootstrap UCL	1.213	95% Bootstrap t UCL	1.318
95% H-UCL (Log ROS)	134.6		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.604	KM Geo Mean	0.074
KM SD (logged)	2.768	95% Critical H Value (KM-Log)	5.342
KM Standard Error of Mean (logged)	0.544	95% H-UCL (KM -Log)	61.89
KM SD (logged)	2.768	95% Critical H Value (KM-Log)	5.342
KM Standard Error of Mean (logged)	0.544		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.68	Mean in Log Scale	-2.678
SD in Original Scale	1.163	SD in Log Scale	2.946
95% t UCL (Assumes normality)	1.062	95% H-Stat UCL	137.6

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

ˈlowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

TCDD TEQ HH

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	13
Minimum	1.0100E-7	Mean	6.1926E-6
Maximum	2.2300E-5	Median	2.8700E-6
SD	7.4414E-6	Std. Error of Mean	1.9888E-6
Coefficient of Variation	N/A	Skewness	1.245

Normal GOF Test

Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.7146E-6	95% Adjusted-CLT UCL (Chen-1995)	1.0171E-5
		95% Modified-t UCL (Johnson-1978)	9.8249E-6

Gamma GOF Test

A-D Test Statistic	0.319	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.785	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.149	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.24	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.592	k star (bias corrected MLE)	0.513
Theta hat (MLE)	1.0452E-5	Theta star (bias corrected MLE)	1.2068E-5
nu hat (MLE)	16.59	nu star (bias corrected)	14.37
MLE Mean (bias corrected)	6.1926E-6	MLE Sd (bias corrected)	8.6448E-6
		Approximate Chi Square Value (0.05)	6.824
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	6.146

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.3038E-5	95% Adjusted Gamma UCL (use when n<50)	1.4477E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.16	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.11	Mean of logged Data	-13.04
Maximum of Logged Data	-10.71	SD of logged Data	1.778

Assuming Lognormal Distribution

95% H-UCL	8.5154E-5	90% Chebyshev (MVUE) UCL	2.1965E-5
95% Chebyshev (MVUE) UCL	2.8110E-5	97.5% Chebyshev (MVUE) UCL	3.6640E-5
99% Chebyshev (MVUE) UCL	5.3396E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	9.4639E-6	95% Jackknife UCL	9.7146E-6
95% Standard Bootstrap UCL	9.4013E-6	95% Bootstrap-t UCL	1.1036E-5
95% Hall's Bootstrap UCL	1.0777E-5	95% Percentile Bootstrap UCL	9.5871E-6
95% BCA Bootstrap UCL	1.0204E-5		
90% Chebyshev(Mean, Sd) UCL	1.2159E-5	95% Chebyshev(Mean, Sd) UCL	1.4862E-5
97.5% Chebyshev(Mean, Sd) UCL	1.8613E-5	99% Chebyshev(Mean, Sd) UCL	2.5981E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 1.4477E-5

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

Thallium

General Statistics

Total Number of Observations	8	Number of Distinct Observations	6
		Number of Missing Observations	19
Number of Detects	5	Number of Non-Detects	3
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.06	Minimum Non-Detect	0.11
Maximum Detect	0.17	Maximum Non-Detect	0.11
Variance Detects	0.00216	Percent Non-Detects	37.5%
Mean Detects	0.121	SD Detects	0.0464
Median Detects	0.14	CV Detects	0.384
Skewness Detects	-0.52	Kurtosis Detects	-2.044
Mean of Logged Detects	-2.183	SD of Logged Detects	0.44

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.915	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.259	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.103	KM Standard Error of Mean	0.0169
KM SD	0.0411	95% KM (BCA) UCL	0.136
95% KM (t) UCL	0.135	95% KM (Percentile Bootstrap) UCL	0.134
95% KM (z) UCL	0.131	95% KM Bootstrap t UCL	0.13
90% KM Chebyshev UCL	0.154	95% KM Chebyshev UCL	0.177
97.5% KM Chebyshev UCL	0.209	99% KM Chebyshev UCL	0.271

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.398	Anderson-Darling GOF Test
5% A-D Critical Value	0.68	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.3	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	7.227	k star (bias corrected MLE)	3.024
Theta hat (MLE)	0.0167	Theta star (bias corrected MLE)	0.04
nu hat (MLE)	72.27	nu star (bias corrected)	30.24
Mean (detects)	0.121		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0542	Mean	0.104
Maximum	0.17	Median	0.0899
SD	0.0438	CV	0.423
k hat (MLE)	6.436	k star (bias corrected MLE)	4.106
Theta hat (MLE)	0.0161	Theta star (bias corrected MLE)	0.0253
nu hat (MLE)	103	nu star (bias corrected)	65.69

Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (65.69, α)	48.04	Adjusted Chi Square Value (65.69, β)	44.25
95% Gamma Approximate UCL (use when n>=50)	0.142	95% Gamma Adjusted UCL (use when n<50)	0.154

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.103	SD (KM)	0.0411
Variance (KM)	0.00169	SE of Mean (KM)	0.0169
k hat (KM)	6.264	k star (KM)	3.999
nu hat (KM)	100.2	nu star (KM)	63.98
theta hat (KM)	0.0164	theta star (KM)	0.0257
80% gamma percentile (KM)	0.142	90% gamma percentile (KM)	0.172
95% gamma percentile (KM)	0.199	99% gamma percentile (KM)	0.258

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (63.98, α)	46.57	Adjusted Chi Square Value (63.98, β)	42.84
)5% Gamma Approximate KM-UCL (use when n>=50)	0.141	95% Gamma Adjusted KM-UCL (use when n<50)	0.154

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.289	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.103	Mean in Log Scale	-2.35
SD in Original Scale	0.0438	SD in Log Scale	0.424
95% t UCL (assumes normality of ROS data)	0.133	95% Percentile Bootstrap UCL	0.127
95% BCA Bootstrap UCL	0.129	95% Bootstrap t UCL	0.136
95% H-UCL (Log ROS)	0.149		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.354	KM Geo Mean	0.095
KM SD (logged)	0.396	95% Critical H Value (KM-Log)	2.19
KM Standard Error of Mean (logged)	0.17	95% H-UCL (KM -Log)	0.143
KM SD (logged)	0.396	95% Critical H Value (KM-Log)	2.19
KM Standard Error of Mean (logged)	0.17		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0963	Mean in Log Scale	-2.452
SD in Original Scale	0.049	SD in Log Scale	0.499
95% t UCL (Assumes normality)	0.129	95% H-Stat UCL	0.152

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.135

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

Vanadium

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	19
Minimum	11	Mean	20.75
Maximum	30	Median	23
SD	7.649	Std. Error of Mean	2.704
Coefficient of Variation	0.369	Skewness	-0.302

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	25.87	95% Adjusted-CLT UCL (Chen-1995)	24.89
		95% Modified-t UCL (Johnson-1978)	25.83

Gamma GOF Test

A-D Test Statistic	0.615	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.717	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.236	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.295	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.409	k star (bias corrected MLE)	4.714
Theta hat (MLE)	2.801	Theta star (bias corrected MLE)	4.402
nu hat (MLE)	118.5	nu star (bias corrected)	75.42
MLE Mean (bias corrected)	20.75	MLE Sd (bias corrected)	9.557
		Approximate Chi Square Value (0.05)	56.42
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	52.28

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	27.74	95% Adjusted Gamma UCL (use when n<50)	29.93

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.846	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.247	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.398	Mean of logged Data	2.964
Maximum of Logged Data	3.401	SD of logged Data	0.411

Assuming Lognormal Distribution

95% H-UCL	29.73	90% Chebyshev (MVUE) UCL	30
95% Chebyshev (MVUE) UCL	34.15	97.5% Chebyshev (MVUE) UCL	39.91
99% Chebyshev (MVUE) UCL	51.22		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	25.2	95% Jackknife UCL	25.87
95% Standard Bootstrap UCL	24.91	95% Bootstrap-t UCL	25.37

95% Hall's Bootstrap UCL	24.22	95% Percentile Bootstrap UCL	24.63
95% BCA Bootstrap UCL	24.5		
90% Chebyshev(Mean, Sd) UCL	28.86	95% Chebyshev(Mean, Sd) UCL	32.54
97.5% Chebyshev(Mean, Sd) UCL	37.64	99% Chebyshev(Mean, Sd) UCL	47.66

Suggested UCL to Use

95% Student's-t UCL	25.87

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 8:54:22 AM
From File	Soil-Offices&ParkingLot - SS.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	1
Minimum	2.2	Mean	2.967
Maximum	3.7	Median	3
SD	0.751	Std. Error of Mean	0.433
Coefficient of Variation	0.253	Skewness	-0.199

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4.232	95% Adjusted-CLT UCL (Chen-1995)	3.626
		95% Modified-t UCL (Johnson-1978)	4.224

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	22.58	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.131	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	135.5	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.788	Mean of logged Data	1.065
Maximum of Logged Data	1.308	SD of logged Data	0.262

Assuming Lognormal Distribution

95% H-UCL	6.022	90% Chebyshev (MVUE) UCL	4.301
95% Chebyshev (MVUE) UCL	4.905	97.5% Chebyshev (MVUE) UCL	5.743
99% Chebyshev (MVUE) UCL	7.389		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.679	95% Jackknife UCL	4.232
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	4.267	95% Chebyshev(Mean, Sd) UCL	4.856
97.5% Chebyshev(Mean, Sd) UCL	5.673	99% Chebyshev(Mean, Sd) UCL	7.278

Suggested UCL to Use

95% Student's-t UCL	4.232

Recommended UCL exceeds the maximum observation

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

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	27
Number of Detects	28	Number of Non-Detects	2
Number of Distinct Detects	25	Number of Distinct Non-Detects	2
Minimum Detect	0.0027	Minimum Non-Detect	0.07
Maximum Detect	14	Maximum Non-Detect	0.16
Variance Detects	7.311	Percent Non-Detects	6.667%
Mean Detects	1.322	SD Detects	2.704
Median Detects	0.315	CV Detects	2.045
Skewness Detects	4.123	Kurtosis Detects	19.1
Mean of Logged Detects	-1.098	SD of Logged Detects	1.967

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.491	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.313	Lilliefors GOF Test
5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.236	KM Standard Error of Mean	0.481
KM SD	2.585	95% KM (BCA) UCL	2.164
95% KM (t) UCL	2.053	95% KM (Percentile Bootstrap) UCL	2.09
95% KM (z) UCL	2.027	95% KM Bootstrap t UCL	3.304
90% KM Chebyshev UCL	2.678	95% KM Chebyshev UCL	3.331
97.5% KM Chebyshev UCL	4.238	99% KM Chebyshev UCL	6.018

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.477	Anderson-Darling GOF Test
5% A-D Critical Value	0.818	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.146	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.176	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.466	k star (bias corrected MLE)	0.44
Theta hat (MLE)	2.835	Theta star (bias corrected MLE)	3.004
nu hat (MLE)	26.11	nu star (bias corrected)	24.65
Mean (detects)	1.322		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0027	Mean	1.235
Maximum	14	Median	0.25
SD	2.63	CV	2.13
k hat (MLE)	0.423	k star (bias corrected MLE)	0.403
Theta hat (MLE)	2.92	Theta star (bias corrected MLE)	3.065
nu hat (MLE)	25.37	nu star (bias corrected)	24.16
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (24.16, α)	13.97	Adjusted Chi Square Value (24.16, β)	13.53
95% Gamma Approximate UCL (use when n>=50)	2.135	95% Gamma Adjusted UCL (use when n<50)	2.205

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.236	SD (KM)	2.585
Variance (KM)	6.683	SE of Mean (KM)	0.481
k hat (KM)	0.229	k star (KM)	0.228
nu hat (KM)	13.72	nu star (KM)	13.68
theta hat (KM)	5.406	theta star (KM)	5.421
80% gamma percentile (KM)	1.733	90% gamma percentile (KM)	3.73
95% gamma percentile (KM)	6.146	99% gamma percentile (KM)	12.66

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.68, α)	6.355	Adjusted Chi Square Value (13.68, β)	6.067
95% Gamma Approximate KM-UCL (use when n>=50)	2.662	95% Gamma Adjusted KM-UCL (use when n<50)	2.788

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.236	Mean in Log Scale	-1.263
SD in Original Scale	2.629	SD in Log Scale	2
95% t UCL (assumes normality of ROS data)	2.051	95% Percentile Bootstrap UCL	2.126
95% BCA Bootstrap UCL	2.47	95% Bootstrap t UCL	3.366
95% H-UCL (Log ROS)	9.004		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.283	KM Geo Mean	0.277
KM SD (logged)	2.014	95% Critical H Value (KM-Log)	3.957
KM Standard Error of Mean (logged)	0.38	95% H-UCL (KM -Log)	9.254
KM SD (logged)	2.014	95% Critical H Value (KM-Log)	3.957
KM Standard Error of Mean (logged)	0.38		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.238	Mean in Log Scale	-1.221
SD in Original Scale	2.629	SD in Log Scale	1.958
95% t UCL (Assumes normality)	2.053	95% H-Stat UCL	8.184

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.788

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

-lowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	28
Number of Detects	28	Number of Non-Detects	2
Number of Distinct Detects	26	Number of Distinct Non-Detects	2
Minimum Detect	0.0022	Minimum Non-Detect	0.07
Maximum Detect	11	Maximum Non-Detect	0.16
Variance Detects	4.648	Percent Non-Detects	6.667%
Mean Detects	1.181	SD Detects	2.156
Median Detects	0.39	CV Detects	1.826
Skewness Detects	3.803	Kurtosis Detects	16.7
Mean of Logged Detects	-1.062	SD of Logged Detects	1.908

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.542	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.105	KM Standard Error of Mean	0.384
KM SD	2.065	95% KM (BCA) UCL	1.821
95% KM (t) UCL	1.757	95% KM (Percentile Bootstrap) UCL	1.755
95% KM (z) UCL	1.736	95% KM Bootstrap t UCL	2.492
90% KM Chebyshev UCL	2.257	95% KM Chebyshev UCL	2.778
97.5% KM Chebyshev UCL	3.502	99% KM Chebyshev UCL	4.925

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.323	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.809	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.111	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.175	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.515	k star (bias corrected MLE)	0.484
Theta hat (MLE)	2.292	Theta star (bias corrected MLE)	2.441
nu hat (MLE)	28.84	nu star (bias corrected)	27.08
Mean (detects)	1.181		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0022	Mean	1.103
Maximum	11	Median	0.33
SD	2.101	CV	1.906
k hat (MLE)	0.461	k star (bias corrected MLE)	0.437
Theta hat (MLE)	2.392	Theta star (bias corrected MLE)	2.522
nu hat (MLE)	27.66	nu star (bias corrected)	26.23
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (26.23, α)	15.55	Adjusted Chi Square Value (26.23, β)	15.08
95% Gamma Approximate UCL (use when n>=50)	1.859	95% Gamma Adjusted UCL (use when n<50)	1.918

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.105	SD (KM)	2.065
Variance (KM)	4.264	SE of Mean (KM)	0.384
k hat (KM)	0.286	k star (KM)	0.28
nu hat (KM)	17.18	nu star (KM)	16.8
theta hat (KM)	3.859	theta star (KM)	3.947
80% gamma percentile (KM)	1.664	90% gamma percentile (KM)	3.284
95% gamma percentile (KM)	5.167	99% gamma percentile (KM)	10.1

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.80, α)	8.526	Adjusted Chi Square Value (16.80, β)	8.187
95% Gamma Approximate KM-UCL (use when n>=50)	2.177	95% Gamma Adjusted KM-UCL (use when n<50)	2.267

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.104	Mean in Log Scale	-1.223
SD in Original Scale	2.101	SD in Log Scale	1.941
95% t UCL (assumes normality of ROS data)	1.756	95% Percentile Bootstrap UCL	1.775
95% BCA Bootstrap UCL	2.19	95% Bootstrap t UCL	2.609
95% H-UCL (Log ROS)	7.739		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.245	KM Geo Mean	0.288
KM SD (logged)	1.968	95% Critical H Value (KM-Log)	3.884
KM Standard Error of Mean (logged)	0.373	95% H-UCL (KM -Log)	8.252
KM SD (logged)	1.968	95% Critical H Value (KM-Log)	3.884
KM Standard Error of Mean (logged)	0.373		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.106	Mean in Log Scale	-1.187
SD in Original Scale	2.1	SD in Log Scale	1.904
95% t UCL (Assumes normality)	1.757	95% H-Stat UCL	7.131

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.267

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	29
Number of Detects	28	Number of Non-Detects	2
Number of Distinct Detects	27	Number of Distinct Non-Detects	2
Minimum Detect	0.0039	Minimum Non-Detect	0.07
Maximum Detect	12	Maximum Non-Detect	0.16
Variance Detects	5.755	Percent Non-Detects	6.667%
Mean Detects	1.424	SD Detects	2.399
Median Detects	0.45	CV Detects	1.685
Skewness Detects	3.478	Kurtosis Detects	14.36
Mean of Logged Detects	-0.809	SD of Logged Detects	1.857

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.586	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.331	KM Standard Error of Mean	0.428
KM SD	2.302	95% KM (BCA) UCL	2.144
95% KM (t) UCL	2.059	95% KM (Percentile Bootstrap) UCL	2.098
95% KM (z) UCL	2.035	95% KM Bootstrap t UCL	2.717
90% KM Chebyshev UCL	2.615	95% KM Chebyshev UCL	3.197
97.5% KM Chebyshev UCL	4.004	99% KM Chebyshev UCL	5.59

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.328	Anderson-Darling GOF Test
5% A-D Critical Value	0.806	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.11	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.174	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.54	k star (bias corrected MLE)	0.506
Theta hat (MLE)	2.638	Theta star (bias corrected MLE)	2.815
nu hat (MLE)	30.23	nu star (bias corrected)	28.32
Mean (detects)	1.424		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0039	Mean	1.33
Maximum	12	Median	0.375
SD	2.342	CV	1.762
k hat (MLE)	0.475	k star (bias corrected MLE)	0.45
Theta hat (MLE)	2.798	Theta star (bias corrected MLE)	2.956
nu hat (MLE)	28.51	nu star (bias corrected)	26.99
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (26.99, α)	16.15	Adjusted Chi Square Value (26.99, β)	15.66
95% Gamma Approximate UCL (use when n>=50)	2.223	95% Gamma Adjusted UCL (use when n<50)	2.292

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.331	SD (KM)	2.302
Variance (KM)	5.299	SE of Mean (KM)	0.428
k hat (KM)	0.334	k star (KM)	0.323
nu hat (KM)	20.07	nu star (KM)	19.39
theta hat (KM)	3.981	theta star (KM)	4.119
80% gamma percentile (KM)	2.076	90% gamma percentile (KM)	3.889
95% gamma percentile (KM)	5.944	99% gamma percentile (KM)	11.24

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.39, α)	10.4	Adjusted Chi Square Value (19.39, β)	10.02
)5% Gamma Approximate KM-UCL (use when n>=50)	2.481	95% Gamma Adjusted KM-UCL (use when n<50)	2.575

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.956	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.138	Lilliefors GOF Test
5% Lilliefors Critical Value	0.164	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.331	Mean in Log Scale	-0.985
SD in Original Scale	2.341	SD in Log Scale	1.913
95% t UCL (assumes normality of ROS data)	2.058	95% Percentile Bootstrap UCL	2.049
95% BCA Bootstrap UCL	2.31	95% Bootstrap t UCL	2.844
95% H-UCL (Log ROS)	8.964		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.017	KM Geo Mean	0.362
KM SD (logged)	1.947	95% Critical H Value (KM-Log)	3.851
KM Standard Error of Mean (logged)	0.367	95% H-UCL (KM -Log)	9.682
KM SD (logged)	1.947	95% Critical H Value (KM-Log)	3.851
KM Standard Error of Mean (logged)	0.367		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.333	Mean in Log Scale	-0.951
SD in Original Scale	2.341	SD in Log Scale	1.874
95% t UCL (Assumes normality)	2.059	95% H-Stat UCL	8.215

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) 2.575

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	30
Number of Detects	26	Number of Non-Detects	4
Number of Distinct Detects	26	Number of Distinct Non-Detects	4
Minimum Detect	0.003	Minimum Non-Detect	0.0072
Maximum Detect	5.5	Maximum Non-Detect	0.36
Variance Detects	1.215	Percent Non-Detects	13.33%
Mean Detects	0.599	SD Detects	1.102
Median Detects	0.25	CV Detects	1.842
Skewness Detects	3.829	Kurtosis Detects	16.62
Mean of Logged Detects	-1.617	SD of Logged Detects	1.677

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.529	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.92	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	Lilliefors GOF Test
5% Lilliefors Critical Value	0.17	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.525	KM Standard Error of Mean	0.191
KM SD	1.024	95% KM (BCA) UCL	0.891
95% KM (t) UCL	0.849	95% KM (Percentile Bootstrap) UCL	0.862
95% KM (z) UCL	0.839	95% KM Bootstrap t UCL	1.345
90% KM Chebyshev UCL	1.097	95% KM Chebyshev UCL	1.357
97.5% KM Chebyshev UCL	1.716	99% KM Chebyshev UCL	2.423

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.427	Anderson-Darling GOF Test
5% A-D Critical Value	0.802	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.12	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.18	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.565	k star (bias corrected MLE)	0.525
Theta hat (MLE)	1.06	Theta star (bias corrected MLE)	1.14
nu hat (MLE)	29.37	nu star (bias corrected)	27.31
Mean (detects)	0.599		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.003	Mean	0.52
Maximum	5.5	Median	0.135
SD	1.044	CV	2.007
k hat (MLE)	0.471	k star (bias corrected MLE)	0.446
Theta hat (MLE)	1.105	Theta star (bias corrected MLE)	1.166
nu hat (MLE)	28.25	nu star (bias corrected)	26.76
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (26.76, α)	15.96	Adjusted Chi Square Value (26.76, β)	15.48
95% Gamma Approximate UCL (use when n>=50)	0.872	95% Gamma Adjusted UCL (use when n<50)	0.899

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.525	SD (KM)	1.024
Variance (KM)	1.048	SE of Mean (KM)	0.191
k hat (KM)	0.263	k star (KM)	0.259
nu hat (KM)	15.8	nu star (KM)	15.55
theta hat (KM)	1.996	theta star (KM)	2.027
80% gamma percentile (KM)	0.772	90% gamma percentile (KM)	1.573
95% gamma percentile (KM)	2.516	99% gamma percentile (KM)	5.014

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.55, α)	7.645	Adjusted Chi Square Value (15.55, β)	7.326
95% Gamma Approximate KM-UCL (use when n>=50)	1.068	95% Gamma Adjusted KM-UCL (use when n<50)	1.115

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.92	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0814	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.17	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.523	Mean in Log Scale	-1.893
SD in Original Scale	1.042	SD in Log Scale	1.747
95% t UCL (assumes normality of ROS data)	0.847	95% Percentile Bootstrap UCL	0.855
95% BCA Bootstrap UCL	1.037	95% Bootstrap t UCL	1.357
95% H-UCL (Log ROS)	2.183		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.942	KM Geo Mean	0.143
KM SD (logged)	1.832	95% Critical H Value (KM-Log)	3.67
KM Standard Error of Mean (logged)	0.351	95% H-UCL (KM -Log)	2.678
KM SD (logged)	1.832	95% Critical H Value (KM-Log)	3.67
KM Standard Error of Mean (logged)	0.351		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.529	Mean in Log Scale	-1.842
SD in Original Scale	1.04	SD in Log Scale	1.749
95% t UCL (Assumes normality)	0.851	95% H-Stat UCL	2.309

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.115

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	28
Number of Detects	28	Number of Non-Detects	2
Number of Distinct Detects	27	Number of Distinct Non-Detects	2
Minimum Detect	0.0031	Minimum Non-Detect	0.07
Maximum Detect	12	Maximum Non-Detect	0.16
Variance Detects	5.477	Percent Non-Detects	6.667%
Mean Detects	1.246	SD Detects	2.34
Median Detects	0.335	CV Detects	1.878
Skewness Detects	3.888	Kurtosis Detects	17.39
Mean of Logged Detects	-1.054	SD of Logged Detects	1.912

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.531	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.298	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.166	KM Standard Error of Mean	0.417
KM SD	2.24	95% KM (BCA) UCL	1.946
95% KM (t) UCL	1.874	95% KM (Percentile Bootstrap) UCL	1.88
95% KM (z) UCL	1.851	95% KM Bootstrap t UCL	2.706
90% KM Chebyshev UCL	2.416	95% KM Chebyshev UCL	2.982
97.5% KM Chebyshev UCL	3.767	99% KM Chebyshev UCL	5.311

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.406	Anderson-Darling GOF Test	
5% A-D Critical Value	0.811	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.135	Kolmogorov-Smirnov GOF	
5% K-S Critical Value	0.175	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.499	k star (bias corrected MLE)	0.469
Theta hat (MLE)	2.499	Theta star (bias corrected MLE)	2.656
nu hat (MLE)	27.93	nu star (bias corrected)	26.27
Mean (detects)	1.246		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0031	Mean	1.164
Maximum	12	Median	0.27
SD	2.28	CV	1.959
k hat (MLE)	0.448	k star (bias corrected MLE)	0.425
Theta hat (MLE)	2.598	Theta star (bias corrected MLE)	2.735
nu hat (MLE)	26.88	nu star (bias corrected)	25.53
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (25.53, α)	15.01	Adjusted Chi Square Value (25.53, β)	14.55
95% Gamma Approximate UCL (use when n>=50)	1.978	95% Gamma Adjusted UCL (use when n<50)	2.042

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.166	SD (KM)	2.24
Variance (KM)	5.019	SE of Mean (KM)	0.417
k hat (KM)	0.271	k star (KM)	0.266
nu hat (KM)	16.25	nu star (KM)	15.96
theta hat (KM)	4.305	theta star (KM)	4.383
80% gamma percentile (KM)	1.729	90% gamma percentile (KM)	3.483
95% gamma percentile (KM)	5.539	99% gamma percentile (KM)	10.97

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.96, α)	7.935	Adjusted Chi Square Value (15.96, β)	7.609
5% Gamma Approximate KM-UCL (use when n>=50)	2.346	95% Gamma Adjusted KM-UCL (use when n<50)	2.446

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.124	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.165	Mean in Log Scale	-1.216
SD in Original Scale	2.279	SD in Log Scale	1.947
95% t UCL (assumes normality of ROS data)	1.872	95% Percentile Bootstrap UCL	1.911
95% BCA Bootstrap UCL	2.32	95% Bootstrap t UCL	2.713
95% H-UCL (Log ROS)	7.927		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.235	KM Geo Mean	0.291
KM SD (logged)	1.966	95% Critical H Value (KM-Log)	3.881
KM Standard Error of Mean (logged)	0.372	95% H-UCL (KM -Log)	8.279
KM SD (logged)	1.966	95% Critical H Value (KM-Log)	3.881
KM Standard Error of Mean (logged)	0.372		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.167	Mean in Log Scale	-1.18
SD in Original Scale	2.278	SD in Log Scale	1.909
95% t UCL (Assumes normality)	1.874	95% H-Stat UCL	7.292

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.446

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

Cobalt

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	1
Minimum	4.6	Mean	6.867
Maximum	11	Median	5
SD	3.585	Std. Error of Mean	2.07
Coefficient of Variation	0.522	Skewness	1.708

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	12.91	95% Adjusted-CLT UCL (Chen-1995)	12.45
		95% Modified-t UCL (Johnson-1978)	13.25

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	6.244	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.1	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	37.46	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.354	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.526	Mean of logged Data	1.844
Maximum of Logged Data	2.398	SD of logged Data	0.481

Assuming Lognormal Distribution

95% H-UCL	59.35	90% Chebyshev (MVUE) UCL	12.35
95% Chebyshev (MVUE) UCL	14.85	97.5% Chebyshev (MVUE) UCL	18.33
99% Chebyshev (MVUE) UCL	25.15		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	10.27	95% Jackknife UCL	12.91
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	13.08	95% Chebyshev(Mean, Sd) UCL	15.89
97.5% Chebyshev(Mean, Sd) UCL	19.79	99% Chebyshev(Mean, Sd) UCL	27.46

Suggested UCL to Use

95% Student's-t UCL	12.91

Recommended UCL exceeds the maximum observation

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	26
Number of Detects	25	Number of Non-Detects	5
Number of Distinct Detects	24	Number of Distinct Non-Detects	4
Minimum Detect	0.0069	Minimum Non-Detect	0.0072
Maximum Detect	2.2	Maximum Non-Detect	0.36
Variance Detects	0.206	Percent Non-Detects	16.67%
Mean Detects	0.289	SD Detects	0.454
Median Detects	0.13	CV Detects	1.572
Skewness Detects	3.374	Kurtosis Detects	13.48
Mean of Logged Detects	-2.122	SD of Logged Detects	1.453

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.596	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.173	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.247	KM Standard Error of Mean	0.0779
KM SD	0.418	95% KM (BCA) UCL	0.393
95% KM (t) UCL	0.379	95% KM (Percentile Bootstrap) UCL	0.391
95% KM (z) UCL	0.375	95% KM Bootstrap t UCL	0.511
90% KM Chebyshev UCL	0.481	95% KM Chebyshev UCL	0.586
97.5% KM Chebyshev UCL	0.733	99% KM Chebyshev UCL	1.022

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.414	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.789	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.128	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.182	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.688	k star (bias corrected MLE)	0.632
Theta hat (MLE)	0.42	Theta star (bias corrected MLE)	0.457
nu hat (MLE)	34.4	nu star (bias corrected)	31.6
Mean (detects)	0.289		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0069	Mean	0.243
Maximum	2.2	Median	0.087
SD	0.427	CV	1.759
k hat (MLE)	0.558	k star (bias corrected MLE)	0.525
Theta hat (MLE)	0.435	Theta star (bias corrected MLE)	0.462
nu hat (MLE)	33.49	nu star (bias corrected)	31.47
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (31.47, α)	19.65	Adjusted Chi Square Value (31.47, β)	19.12
95% Gamma Approximate UCL (use when n>=50)	0.388	95% Gamma Adjusted UCL (use when n<50)	0.399

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.247	SD (KM)	0.418
Variance (KM)	0.175	SE of Mean (KM)	0.0779
k hat (KM)	0.349	k star (KM)	0.336
nu hat (KM)	20.94	nu star (KM)	20.18
theta hat (KM)	0.707	theta star (KM)	0.734
80% gamma percentile (KM)	0.388	90% gamma percentile (KM)	0.717
95% gamma percentile (KM)	1.088	99% gamma percentile (KM)	2.038

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.18, α)	10.98	Adjusted Chi Square Value (20.18, β)	10.59
ı5% Gamma Approximate KM-UCL (use when n>=50)	0.453	95% Gamma Adjusted KM-UCL (use when n<50)	0.47

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.978	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.918	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0757	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.173	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.245	Mean in Log Scale	-2.443
SD in Original Scale	0.425	SD in Log Scale	1.557
95% t UCL (assumes normality of ROS data)	0.377	95% Percentile Bootstrap UCL	0.384
95% BCA Bootstrap UCL	0.437	95% Bootstrap t UCL	0.514
95% H-UCL (Log ROS)	0.747		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.45	KM Geo Mean	0.0863
KM SD (logged)	1.565	95% Critical H Value (KM-Log)	3.262
KM Standard Error of Mean (logged)	0.299	95% H-UCL (KM -Log)	0.757
KM SD (logged)	1.565	95% Critical H Value (KM-Log)	3.262
KM Standard Error of Mean (logged)	0.299		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.251	Mean in Log Scale	-2.396
SD in Original Scale	0.423	SD in Log Scale	1.606
95% t UCL (Assumes normality)	0.382	95% H-Stat UCL	0.891

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.47

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	1
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	3

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Diesel Range Organics (C10-C20) was not processed!

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	25
Number of Detects	28	Number of Non-Detects	2
Number of Distinct Detects	23	Number of Distinct Non-Detects	2
Minimum Detect	0.0021	Minimum Non-Detect	0.07
Maximum Detect	7.1	Maximum Non-Detect	0.16
Variance Detects	1.998	Percent Non-Detects	6.667%
Mean Detects	0.831	SD Detects	1.414
Median Detects	0.315	CV Detects	1.701
Skewness Detects	3.521	Kurtosis Detects	14.72
Mean of Logged Detects	-1.355	SD of Logged Detects	1.851

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.581	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.778	KM Standard Error of Mean	0.252
KM SD	1.356	95% KM (BCA) UCL	1.211
95% KM (t) UCL	1.206	95% KM (Percentile Bootstrap) UCL	1.246
95% KM (z) UCL	1.193	95% KM Bootstrap t UCL	1.662
90% KM Chebyshev UCL	1.534	95% KM Chebyshev UCL	1.877
97.5% KM Chebyshev UCL	2.352	99% KM Chebyshev UCL	3.286

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.3	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.806	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.105	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.174	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.537	k star (bias corrected MLE)	0.503
Theta hat (MLE)	1.548	Theta star (bias corrected MLE)	1.652
nu hat (MLE)	30.07	nu star (bias corrected)	28.18
Mean (detects)	0.831		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0021	Mean	0.776
Maximum	7.1	Median	0.25
SD	1.38	CV	1.777
k hat (MLE)	0.484	k star (bias corrected MLE)	0.458
Theta hat (MLE)	1.604	Theta star (bias corrected MLE)	1.695
nu hat (MLE)	29.05	nu star (bias corrected)	27.48
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (27.48, α)	16.52	Adjusted Chi Square Value (27.48, β)	16.03
95% Gamma Approximate UCL (use when n>=50)	1.291	95% Gamma Adjusted UCL (use when n<50)	1.331

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.778	SD (KM)	1.356
Variance (KM)	1.838	SE of Mean (KM)	0.252
k hat (KM)	0.329	k star (KM)	0.319
nu hat (KM)	19.77	nu star (KM)	19.12
theta hat (KM)	2.362	theta star (KM)	2.441
80% gamma percentile (KM)	1.21	90% gamma percentile (KM)	2.277
95% gamma percentile (KM)	3.49	99% gamma percentile (KM)	6.62

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.12, α)	10.21	Adjusted Chi Square Value (19.12, β)	9.832
95% Gamma Approximate KM-UCL (use when n>=50)	1.458	95% Gamma Adjusted KM-UCL (use when n<50)	1.514

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.963	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	Lilliefors GOF Test
5% Lilliefors Critical Value	0.164	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.778	Mean in Log Scale	-1.505
SD in Original Scale	1.379	SD in Log Scale	1.876
95% t UCL (assumes normality of ROS data)	1.205	95% Percentile Bootstrap UCL	1.215
95% BCA Bootstrap UCL	1.436	95% Bootstrap t UCL	1.711
95% H-UCL (Log ROS)	4.745		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.524	KM Geo Mean	0.218
KM SD (logged)	1.894	95% Critical H Value (KM-Log)	3.767
KM Standard Error of Mean (logged)	0.358	95% H-UCL (KM -Log)	4.921
KM SD (logged)	1.894	95% Critical H Value (KM-Log)	3.767
KM Standard Error of Mean (logged)	0.358		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.78	Mean in Log Scale	-1.461
SD in Original Scale	1.378	SD in Log Scale	1.834
95% t UCL (Assumes normality)	1.207	95% H-Stat UCL	4.363

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.514

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

Manganese

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	1
Minimum	130	Mean	186.7
Maximum	260	Median	170
SD	66.58	Std. Error of Mean	38.44
Coefficient of Variation	0.357	Skewness	1.056

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.953	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.265	Lilliefors GOF Test
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	298.9	95% Adjusted-CLT UCL (Chen-1995)	274.9
		95% Modified-t UCL (Johnson-1978)	302.8

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	12.27	k star (bias corrected MLE)	N/A
Theta hat (MLE)	15.22	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	73.59	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.868	Mean of logged Data	5.188
Maximum of Logged Data	5.561	SD of logged Data	0.35

Assuming Lognormal Distribution

95% H-UCL	596.7	90% Chebyshev (MVUE) UCL	297.7
95% Chebyshev (MVUE) UCL	348	97.5% Chebyshev (MVUE) UCL	418
99% Chebyshev (MVUE) UCL	555.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	249.9	95% Jackknife UCL	298.9
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	302	95% Chebyshev(Mean, Sd) UCL	354.2
97.5% Chebyshev(Mean, Sd) UCL	426.7	99% Chebyshev(Mean, Sd) UCL	569.2

Suggested UCL to Use

95% Student's-t UCL 298.9

Recommended UCL exceeds the maximum observation

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

Naphthalene

General Statistics

Total Number of Observations	30	Number of Distinct Observations	28
Number of Detects	20	Number of Non-Detects	10
Number of Distinct Detects	20	Number of Distinct Non-Detects	9
Minimum Detect	0.0016	Minimum Non-Detect	0.0071
Maximum Detect	0.41	Maximum Non-Detect	0.36
Variance Detects	0.00759	Percent Non-Detects	33.33%
Mean Detects	0.0499	SD Detects	0.0871
Median Detects	0.029	CV Detects	1.746
Skewness Detects	4.085	Kurtosis Detects	17.57
Mean of Logged Detects	-3.659	SD of Logged Detects	1.168

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.446	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.192	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0393	KM Standard Error of Mean	0.0136
KM SD	0.0718	95% KM (BCA) UCL	0.0679
95% KM (t) UCL	0.0624	95% KM (Percentile Bootstrap) UCL	0.0644
95% KM (z) UCL	0.0616	95% KM Bootstrap t UCL	0.103
90% KM Chebyshev UCL	0.0801	95% KM Chebyshev UCL	0.0985
97.5% KM Chebyshev UCL	0.124	99% KM Chebyshev UCL	0.174

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.925	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.773	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.2	)etected data appear Gamma Distributed at 5% Significance Leve

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.885	k star (bias corrected MLE)	0.786
Theta hat (MLE)	0.0564	Theta star (bias corrected MLE)	0.0635
nu hat (MLE)	35.41	nu star (bias corrected)	31.43
Mean (detects)	0.0499		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0016	Mean	0.037
Maximum	0.41	Median	0.0165
SD	0.0729	CV	1.969
k hat (MLE)	0.911	k star (bias corrected MLE)	0.842
Theta hat (MLE)	0.0407	Theta star (bias corrected MLE)	0.044
nu hat (MLE)	54.65	nu star (bias corrected)	50.52
Adjusted Level of Significance (β)	0.041		
Approximate Chi Square Value (50.52, α)	35.2	Adjusted Chi Square Value (50.52, β)	34.46
95% Gamma Approximate UCL (use when n>=50)	0.0531	95% Gamma Adjusted UCL (use when n<50)	0.0543

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0393	SD (KM)	0.0718
Variance (KM)	0.00515	SE of Mean (KM)	0.0136
k hat (KM)	0.3	k star (KM)	0.292
nu hat (KM)	17.98	nu star (KM)	17.51
theta hat (KM)	0.131	theta star (KM)	0.135
80% gamma percentile (KM)	0.0598	90% gamma percentile (KM)	0.116
95% gamma percentile (KM)	0.181	99% gamma percentile (KM)	0.351

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.51, α)	9.04	Adjusted Chi Square Value (17.51, β)	8.689
95% Gamma Approximate KM-UCL (use when n>=50)	0.0761	95% Gamma Adjusted KM-UCL (use when n<50)	0.0792

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.905	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.164	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.192	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0376	Mean in Log Scale	-3.941
SD in Original Scale	0.0728	SD in Log Scale	1.09
95% t UCL (assumes normality of ROS data)	0.0602	95% Percentile Bootstrap UCL	0.0623
95% BCA Bootstrap UCL	0.0741	95% Bootstrap t UCL	0.115
95% H-UCL (Log ROS)	0.0595		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.989	KM Geo Mean	0.0185
KM SD (logged)	1.251	95% Critical H Value (KM-Log)	2.808
KM Standard Error of Mean (logged)	0.269	95% H-UCL (KM -Log)	0.0777
KM SD (logged)	1.251	95% Critical H Value (KM-Log)	2.808
KM Standard Error of Mean (logged)	0.269		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0503	Mean in Log Scale	-3.688
SD in Original Scale	0.0776	SD in Log Scale	1.255
95% t UCL (Assumes normality)	0.0744	95% H-Stat UCL	0.106

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.0792

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Nickel

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	19	Mean	22.67
Maximum	30	Median	19
SD	6.351	Std. Error of Mean	3.667
Coefficient of Variation	0.28	Skewness	1.732

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	33.37	95% Adjusted-CLT UCL (Chen-1995)	32.62
		95% Modified-t UCL (Johnson-1978)	33.98

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	20.82	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.089	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	124.9	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level	

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.944	Mean of logged Data	3.097
Maximum of Logged Data	3.401	SD of logged Data	0.264

Assuming Lognormal Distribution

95% H-UCL	46.38	90% Chebyshev (MVUE) UCL	32.89
95% Chebyshev (MVUE) UCL	37.54	97.5% Chebyshev (MVUE) UCL	43.98
99% Chebyshev (MVUE) UCL	56.64		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	28.7	95% Jackknife UCL	N/A
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	33.67	95% Chebyshev(Mean, Sd) UCL	38.65
97.5% Chebyshev(Mean, Sd) UCL	45.56	99% Chebyshev(Mean, Sd) UCL	59.15

Suggested UCL to Use

95% Student's-t UCL	33.37

Recommended UCL exceeds the maximum observation

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	25
Minimum	0.14	Mean	0.234
Maximum	0.33	Median	0.23
SD	0.0777	Std. Error of Mean	0.0347
Coefficient of Variation	0.332	Skewness	0.0643

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.308	95% Adjusted-CLT UCL (Chen-1995)	0.292
		95% Modified-t UCL (Johnson-1978)	0.308

Gamma GOF Test

A-D Test Statistic	0.216	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.679	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.197	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.358	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.8	k star (bias corrected MLE)	4.455
Theta hat (MLE)	0.0217	Theta star (bias corrected MLE)	0.0525
nu hat (MLE)	108	nu star (bias corrected)	44.55
MLE Mean (bias corrected)	0.234	MLE Sd (bias corrected)	0.111
		Approximate Chi Square Value (0.05)	30.24
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	25.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.345	95% Adjusted Gamma UCL (use when n<50)	0.414

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.173	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.966	Mean of logged Data	-1.499
Maximum of Logged Data	-1.109	SD of logged Data	0.349

Assuming Lognormal Distribution

95% H-UCL	0.368	90% Chebyshev (MVUE) UCL	0.343
95% Chebyshev (MVUE) UCL	0.393	97.5% Chebyshev (MVUE) UCL	0.461
99% Chebyshev (MVUE) UCL	0.596		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.291	95% Jackknife UCL	0.308
95% Standard Bootstrap UCL	0.284	95% Bootstrap-t UCL	0.319
95% Hall's Bootstrap UCL	0.317	95% Percentile Bootstrap UCL	0.284
95% BCA Bootstrap UCL	0.284		
90% Chebyshev(Mean, Sd) UCL	0.338	95% Chebyshev(Mean, Sd) UCL	0.385
97.5% Chebyshev(Mean, Sd) UCL	0.451	99% Chebyshev(Mean, Sd) UCL	0.58

Suggested UCL to Use

95% Student's-t UCL	0.308

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

TCDD TEQ HH

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	2
Minimum	5.5500E-6	Mean	9.6250E-6
Maximum	1.3700E-5	Median	9.6250E-6

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 TCDD TEQ HH 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.

Thallium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	1
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	3

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Thallium was not processed!

Vanadium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	1
Minimum	16	Mean	19.33
Maximum	23	Median	19
SD	3.512	Std. Error of Mean	2.028
Coefficient of Variation	0.182	Skewness	0.423

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.993	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	25.25	95% Adjusted-CLT UCL (Chen-1995)	23.2
		95% Modified-t UCL (Johnson-1978)	25.34

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	45.66	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.423	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	274	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.773	Mean of logged Data	2.951
Maximum of Logged Data	3.135	SD of logged Data	0.182

Assuming Lognormal Distribution

95% H-UCL	29.22	90% Chebyshev (MVUE) UCL	25.39
95% Chebyshev (MVUE) UCL	28.13	97.5% Chebyshev (MVUE) UCL	31.93
99% Chebyshev (MVUE) UCL	39.41		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	22.67	95% Jackknife UCL	25.25
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	25.42	95% Chebyshev(Mean, Sd) UCL	28.17
97.5% Chebyshev(Mean, Sd) UCL	32	99% Chebyshev(Mean, Sd) UCL	39.51

Suggested UCL to Use

95% Student's-t UCL	25.25

Recommended UCL exceeds the maximum observation

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 2:22:36 PM
From File	Soil_Substat7-SS.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	9
Minimum	0.65	Mean	10.01
Maximum	33	Median	3.2
SD	15.38	Std. Error of Mean	7.69
Coefficient of Variation	1.536	Skewness	1.957

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.709	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.407	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	28.11	95% Adjusted-CLT UCL (Chen-1995)	30.7
		95% Modified-t UCL (Johnson-1978)	29.36

Gamma GOF Test

A-D Test Statistic	0.409	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.675	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.338	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.407	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.635	k star (bias corrected MLE)	0.325
Theta hat (MLE)	15.76	Theta star (bias corrected MLE)	30.77
nu hat (MLE)	5.081	nu star (bias corrected)	2.604
MLE Mean (bias corrected)	10.01	MLE Sd (bias corrected)	17.55
		Approximate Chi Square Value (0.05)	0.265
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	98.24	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.251	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.431	Mean of logged Data	1.339
Maximum of Logged Data	3.497	SD of logged Data	1.626

Assuming Lognormal Distribution

95% H-UCL	326977	90% Chebyshev (MVUE) UCL	26.93
95% Chebyshev (MVUE) UCL	35.1	97.5% Chebyshev (MVUE) UCL	46.44
99% Chebyshev (MVUE) UCL	68.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	22.66	95% Jackknife UCL	28.11
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	33.08	95% Chebyshev(Mean, Sd) UCL	43.53
97.5% Chebyshev(Mean, Sd) UCL	58.04	99% Chebyshev(Mean, Sd) UCL	86.53

Suggested UCL to Use

95% Adjusted Gamma UCL	N/A

Warning: One or more Recommended UCL(s) not available!

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.019	Minimum Non-Detect	0.036
Maximum Detect	1.8	Maximum Non-Detect	0.036
Variance Detects	0.757	Percent Non-Detects	20%
Mean Detects	0.497	SD Detects	0.87
Median Detects	0.0835	CV Detects	1.752
Skewness Detects	1.989	Kurtosis Detects	3.963
Mean of Logged Detects	-2.112	SD of Logged Detects	1.94

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.67	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.422	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.401	KM Standard Error of Mean	0.362
KM SD	0.7	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.172	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.996	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.486	95% KM Chebyshev UCL	1.977
97.5% KM Chebyshev UCL	2.659	99% KM Chebyshev UCL	3.999

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.5	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.686	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.365	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.412	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.456	k star (bias corrected MLE)	0.281
Theta hat (MLE)	1.088	Theta star (bias corrected MLE)	1.768
nu hat (MLE)	3.651	nu star (bias corrected)	2.246
Mean (detects)	0.497		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.399
Maximum	1.8	Median	0.057
SD	0.784	CV	1.964
k hat (MLE)	0.39	k star (bias corrected MLE)	0.289
Theta hat (MLE)	1.023	Theta star (bias corrected MLE)	1.379
nu hat (MLE)	3.904	nu star (bias corrected)	2.895
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (2.89, α)	0.342	Adjusted Chi Square Value (2.89, β)	0.128
95% Gamma Approximate UCL (use when n>=50)	3.379	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.401	SD (KM)	0.7
Variance (KM)	0.49	SE of Mean (KM)	0.362
k hat (KM)	0.328	k star (KM)	0.264
nu hat (KM)	3.279	nu star (KM)	2.645
theta hat (KM)	1.223	theta star (KM)	1.516
80% gamma percentile (KM)	0.594	90% gamma percentile (KM)	1.198
95% gamma percentile (KM)	1.908	99% gamma percentile (KM)	3.784

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.64, α)	0.275	Adjusted Chi Square Value (2.64, β)	0.105
95% Gamma Approximate KM-UCL (use when n>=50)	3.85	95% Gamma Adjusted KM-UCL (use when n<50)	10.12

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.4	Mean in Log Scale	-2.58
SD in Original Scale	0.784	SD in Log Scale	1.979
95% t UCL (assumes normality of ROS data)	1.147	95% Percentile Bootstrap UCL	1.094
95% BCA Bootstrap UCL	1.113	95% Bootstrap t UCL	13.26
95% H-UCL (Log ROS)	5307		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.482	KM Geo Mean	0.0836
KM SD (logged)	1.675	95% Critical H Value (KM-Log)	7.911
KM Standard Error of Mean (logged)	0.865	95% H-UCL (KM -Log)	256.9
KM SD (logged)	1.675	95% Critical H Value (KM-Log)	7.911
KM Standard Error of Mean (logged)	0.865		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.401	Mean in Log Scale	-2.493
SD in Original Scale	0.783	SD in Log Scale	1.884
95% t UCL (Assumes normality)	1.147	95% H-Stat UCL	2050

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	10.12

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.023	Minimum Non-Detect	0.036
Maximum Detect	1.4	Maximum Non-Detect	0.036
Variance Detects	0.454	Percent Non-Detects	20%
Mean Detects	0.39	SD Detects	0.674
Median Detects	0.069	CV Detects	1.726
Skewness Detects	1.993	Kurtosis Detects	3.976
Mean of Logged Detects	-2.202	SD of Logged Detects	1.773

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.663	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.427	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.317	KM Standard Error of Mean	0.28
KM SD	0.542	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.914	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.777	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.157	95% KM Chebyshev UCL	1.537
97.5% KM Chebyshev UCL	2.065	99% KM Chebyshev UCL	3.102

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.591	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.681	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.402	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.41	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.503	k star (bias corrected MLE)	0.292
Theta hat (MLE)	0.776	Theta star (bias corrected MLE)	1.334
nu hat (MLE)	4.025	nu star (bias corrected)	2.34
Mean (detects)	0.39		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.314
Maximum	1.4	Median	0.058
SD	0.608	CV	1.934
k hat (MLE)	0.427	k star (bias corrected MLE)	0.304
Theta hat (MLE)	0.736	Theta star (bias corrected MLE)	1.033
nu hat (MLE)	4.27	nu star (bias corrected)	3.041

Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (3.04, α)	0.385	Adjusted Chi Square Value (3.04, β)	0.144
95% Gamma Approximate UCL (use when n>=50)	2.484	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.317	SD (KM)	0.542
Variance (KM)	0.294	SE of Mean (KM)	0.28
k hat (KM)	0.342	k star (KM)	0.27
nu hat (KM)	3.416	nu star (KM)	2.7
theta hat (KM)	0.927	theta star (KM)	1.173
80% gamma percentile (KM)	0.472	90% gamma percentile (KM)	0.945
95% gamma percentile (KM)	1.498	99% gamma percentile (KM)	2.955

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.70, α)	0.289	Adjusted Chi Square Value (2.70, β)	0.109
5% Gamma Approximate KM-UCL (use when n>=50)	2.956	95% Gamma Adjusted KM-UCL (use when n<50)	7.823

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.315	Mean in Log Scale	-2.614
SD in Original Scale	0.607	SD in Log Scale	1.79
95% t UCL (assumes normality of ROS data)	0.894	95% Percentile Bootstrap UCL	0.847
95% BCA Bootstrap UCL	0.861	95% Bootstrap t UCL	9.584
95% H-UCL (Log ROS)	688.1		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.516	KM Geo Mean	0.0808
KM SD (logged)	1.51	95% Critical H Value (KM-Log)	7.166
KM Standard Error of Mean (logged)	0.78	95% H-UCL (KM -Log)	56.53
KM SD (logged)	1.51	95% Critical H Value (KM-Log)	7.166
KM Standard Error of Mean (logged)	0.78		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.316	Mean in Log Scale	-2.565
SD in Original Scale	0.607	SD in Log Scale	1.737
95% t UCL (Assumes normality)	0.894	95% H-Stat UCL	426.6

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	7.823

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.046	Minimum Non-Detect	0.036
Maximum Detect	3.2	Maximum Non-Detect	0.036
Variance Detects	2.392	Percent Non-Detects	20%
Mean Detects	0.882	SD Detects	1.547
Median Detects	0.142	CV Detects	1.753
Skewness Detects	1.989	Kurtosis Detects	3.963
Mean of Logged Detects	-1.504	SD of Logged Detects	1.878

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.667	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.42	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.713	KM Standard Error of Mean	0.643
KM SD	1.245	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.083	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.77	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.642	95% KM Chebyshev UCL	3.515
97.5% KM Chebyshev UCL	4.728	99% KM Chebyshev UCL	7.109

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.552	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.685	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.367	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.412	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.466	k star (bias corrected MLE)	0.283
Theta hat (MLE)	1.893	Theta star (bias corrected MLE)	3.116
nu hat (MLE)	3.728	nu star (bias corrected)	2.265
Mean (detects)	0.882		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.708
Maximum	3.2	Median	0.083
SD	1.395	CV	1.971
k hat (MLE)	0.374	k star (bias corrected MLE)	0.283
Theta hat (MLE)	1.892	Theta star (bias corrected MLE)	2.501
nu hat (MLE)	3.741	nu star (bias corrected)	2.83
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (2.83, α)	0.324	Adjusted Chi Square Value (2.83, β)	0.121
95% Gamma Approximate UCL (use when n>=50)	6.186	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.713	SD (KM)	1.245
Variance (KM)	1.55	SE of Mean (KM)	0.643

k hat (KM)	0.328	k star (KM)	0.265
nu hat (KM)	3.28	nu star (KM)	2.646
theta hat (KM)	2.173	theta star (KM)	2.695
80% gamma percentile (KM)	1.055	90% gamma percentile (KM)	2.131
95% gamma percentile (KM)	3.393	99% gamma percentile (KM)	6.727

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.65, α)	0.276	Adjusted Chi Square Value (2.65, β)	0.105
)5% Gamma Approximate KM-UCL (use when n>=50)	6.843	95% Gamma Adjusted KM-UCL (use when n<50)	17.99

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.887	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.272	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.706	Mean in Log Scale	-2.477
SD in Original Scale	1.396	SD in Log Scale	2.717
95% t UCL (assumes normality of ROS data)	2.037	95% Percentile Bootstrap UCL	1.937
95% BCA Bootstrap UCL	2	95% Bootstrap t UCL	26.48
95% H-UCL (Log ROS)	99592630		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.868	KM Geo Mean	0.154
KM SD (logged)	1.627	95% Critical H Value (KM-Log)	7.69
KM Standard Error of Mean (logged)	0.84	95% H-UCL (KM -Log)	301.7
KM SD (logged)	1.627	95% Critical H Value (KM-Log)	7.69
KM Standard Error of Mean (logged)	0.84		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.709	Mean in Log Scale	-2.006
SD in Original Scale	1.394	SD in Log Scale	1.977
95% t UCL (Assumes normality)	2.038	95% H-Stat UCL	9148

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	17.99

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.014	Minimum Non-Detect	0.036
Maximum Detect	1.7	Maximum Non-Detect	0.036
Variance Detects	0.694	Percent Non-Detects	20%
Mean Detects	0.451	SD Detects	0.833
Median Detects	0.044	CV Detects	1.849
Skewness Detects	1.998	Kurtosis Detects	3.992
Mean of Logged Detects	-2.512	SD of Logged Detects	2.106

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.649	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.432	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.365	KM Standard Error of Mean	0.345
KM SD	0.668	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.1	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.932	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.399	95% KM Chebyshev UCL	1.868
97.5% KM Chebyshev UCL	2.518	99% KM Chebyshev UCL	3.795

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.622	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.694	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.408	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.415	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.386	k star (bias corrected MLE)	0.263
Theta hat (MLE)	1.167	Theta star (bias corrected MLE)	1.712
nu hat (MLE)	3.087	nu star (bias corrected)	2.105
Mean (detects)	0.451		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.362
Maximum	1.7	Median	0.033
SD	0.748	CV	2.064
k hat (MLE)	0.351	k star (bias corrected MLE)	0.274
Theta hat (MLE)	1.033	Theta star (bias corrected MLE)	1.324
nu hat (MLE)	3.508	nu star (bias corrected)	2.737
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (2.74, α)	0.299	Adjusted Chi Square Value (2.74, β)	0.113
95% Gamma Approximate UCL (use when n>=50)	3.318	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.365	SD (KM)	0.668
Variance (KM)	0.446	SE of Mean (KM)	0.345
k hat (KM)	0.299	k star (KM)	0.253
nu hat (KM)	2.991	nu star (KM)	2.53
theta hat (KM)	1.221	theta star (KM)	1.443
80% gamma percentile (KM)	0.532	90% gamma percentile (KM)	1.095
95% gamma percentile (KM)	1.761	99% gamma percentile (KM)	3.531

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.53, α)	0.248	Adjusted Chi Square Value (2.53, β)	0.0962
)5% Gamma Approximate KM-UCL (use when n>=50)	3.726	95% Gamma Adjusted KM-UCL (use when n<50)	9.605

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.323	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.364	Mean in Log Scale	-2.802
SD in Original Scale	0.747	SD in Log Scale	1.935
95% t UCL (assumes normality of ROS data)	1.076	95% Percentile Bootstrap UCL	1.027
95% BCA Bootstrap UCL	1.035	95% Bootstrap t UCL	29.29
95% H-UCL (Log ROS)	2603		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.778	KM Geo Mean	0.0622
KM SD (logged)	1.726	95% Critical H Value (KM-Log)	8.141
KM Standard Error of Mean (logged)	0.9	95% H-UCL (KM -Log)	310.5
KM SD (logged)	1.726	95% Critical H Value (KM-Log)	8.141
KM Standard Error of Mean (logged)	0.9		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.364	Mean in Log Scale	-2.813
SD in Original Scale	0.747	SD in Log Scale	1.944
95% t UCL (Assumes normality)	1.076	95% H-Stat UCL	2839

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	9.605

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

Chrysene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.034	Minimum Non-Detect	0.036
Maximum Detect	3.2	Maximum Non-Detect	0.036
Variance Detects	2.4	Percent Non-Detects	20%
Mean Detects	0.88	SD Detects	1.549
Median Detects	0.142	CV Detects	1.761
Skewness Detects	1.984	Kurtosis Detects	3.943
Mean of Logged Detects	-1.62	SD of Logged Detects	2.011

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.673	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.415	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.71	KM Standard Error of Mean	0.644
KM SD	1.247	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.083	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.769	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.642	95% KM Chebyshev UCL	3.517
97.5% KM Chebyshev UCL	4.731	99% KM Chebyshev UCL	7.116

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.491	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.688	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.334	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.413	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.435	k star (bias corrected MLE)	0.275
Theta hat (MLE)	2.021	Theta star (bias corrected MLE)	3.193
nu hat (MLE)	3.481	nu star (bias corrected)	2.204
Mean (detects)	0.88		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.706
Maximum	3.2	Median	0.064
SD	1.397	CV	1.98
k hat (MLE)	0.358	k star (bias corrected MLE)	0.277
Theta hat (MLE)	1.968	Theta star (bias corrected MLE)	2.55
nu hat (MLE)	3.585	nu star (bias corrected)	2.767
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (2.77, α)	0.307	Adjusted Chi Square Value (2.77, β)	0.115
95% Gamma Approximate UCL (use when n>=50)	6.362	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.71	SD (KM)	1.247
Variance (KM)	1.554	SE of Mean (KM)	0.644
k hat (KM)	0.325	k star (KM)	0.263
nu hat (KM)	3.247	nu star (KM)	2.632
theta hat (KM)	2.188	theta star (KM)	2.699
80% gamma percentile (KM)	1.05	90% gamma percentile (KM)	2.124
95% gamma percentile (KM)	3.386	99% gamma percentile (KM)	6.721

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.63, α)	0.272	Adjusted Chi Square Value (2.63, β)	0.104
95% Gamma Approximate KM-UCL (use when n>=50)	6.866	95% Gamma Adjusted KM-UCL (use when n<50)	18.02

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.707	Mean in Log Scale	-2.096
SD in Original Scale	1.396	SD in Log Scale	2.041
95% t UCL (assumes normality of ROS data)	2.038	95% Percentile Bootstrap UCL	1.93
95% BCA Bootstrap UCL	1.977	95% Bootstrap t UCL	46.34
95% H-UCL (Log ROS)	17241		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.973	KM Geo Mean	0.139
KM SD (logged)	1.71	95% Critical H Value (KM-Log)	8.067
KM Standard Error of Mean (logged)	0.883	95% H-UCL (KM -Log)	592.9
KM SD (logged)	1.71	95% Critical H Value (KM-Log)	8.067
KM Standard Error of Mean (logged)	0.883		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.707	Mean in Log Scale	-2.1
SD in Original Scale	1.396	SD in Log Scale	2.045

95% t UCL (Assumes normality)	2.038	95% H-Stat UCL	18051

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	18.02

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

Cobalt

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	9
Minimum	3.1	Mean	4.025
Maximum	4.7	Median	4.15
SD	0.763	Std. Error of Mean	0.382
Coefficient of Variation	0.19	Skewness	-0.492

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.923	95% Adjusted-CLT UCL (Chen-1995)	4.552
		95% Modified-t UCL (Johnson-1978)	4.907

Gamma GOF Test

A-D Test Statistic	0.379	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.656	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.307	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.394	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	35.41	k star (bias corrected MLE)	9.019
Theta hat (MLE)	0.114	Theta star (bias corrected MLE)	0.446
nu hat (MLE)	283.3	nu star (bias corrected)	72.15
MLE Mean (bias corrected)	4.025	MLE Sd (bias corrected)	1.34
		Approximate Chi Square Value (0.05)	53.6
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.419	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.131	Mean of logged Data	1.378
Maximum of Logged Data	1.548	SD of logged Data	0.197

Assuming Lognormal Distribution

95% H-UCL	5.348	90% Chebyshev (MVUE) UCL	5.212
95% Chebyshev (MVUE) UCL	5.749	97.5% Chebyshev (MVUE) UCL	6.495
99% Chebyshev (MVUE) UCL	7.959		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.653	95% Jackknife UCL	4.923
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	5.17	95% Chebyshev(Mean, Sd) UCL	5.688
97.5% Chebyshev(Mean, Sd) UCL	6.408	99% Chebyshev(Mean, Sd) UCL	7.822

Suggested UCL to Use

95% Student's-t UCL	4.923

Recommended UCL exceeds the maximum observation

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

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.007	Minimum Non-Detect	0.036
Maximum Detect	0.4	Maximum Non-Detect	0.036
Variance Detects	0.0366	Percent Non-Detects	20%
Mean Detects	0.114	SD Detects	0.191
Median Detects	0.0235	CV Detects	1.686
Skewness Detects	1.976	Kurtosis Detects	3.916
Mean of Logged Detects	-3.413	SD of Logged Detects	1.794

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.683	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.409	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0944	KM Standard Error of Mean	0.0792
KM SD	0.153	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.263	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.225	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.332	95% KM Chebyshev UCL	0.44
97.5% KM Chebyshev UCL	0.589	99% KM Chebyshev UCL	0.882

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.497	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.68	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.334	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.41	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.512	k star (bias corrected MLE)	0.295
Theta hat (MLE)	0.222	Theta star (bias corrected MLE)	0.385
nu hat (MLE)	4.092	nu star (bias corrected)	2.356
Mean (detects)	0.114		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.007	Mean	0.0928
Maximum	0.4	Median	0.012
SD	0.172	CV	1.854
k hat (MLE)	0.499	k star (bias corrected MLE)	0.333
Theta hat (MLE)	0.186	Theta star (bias corrected MLE)	0.279
nu hat (MLE)	4.987	nu star (bias corrected)	3.328
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (3.33, α)	0.476	Adjusted Chi Square Value (3.33, β)	0.181
95% Gamma Approximate UCL (use when n>=50)	0.649	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0944	SD (KM)	0.153
Variance (KM)	0.0235	SE of Mean (KM)	0.0792
k hat (KM)	0.38	k star (KM)	0.285
nu hat (KM)	3.797	nu star (KM)	2.852
theta hat (KM)	0.249	theta star (KM)	0.331
80% gamma percentile (KM)	0.143	90% gamma percentile (KM)	0.28
95% gamma percentile (KM)	0.439	99% gamma percentile (KM)	0.854

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.85, α)	0.33	Adjusted Chi Square Value (2.85, β)	0.123
)5% Gamma Approximate KM-UCL (use when n>=50)	0.816	95% Gamma Adjusted KM-UCL (use when n<50)	2.182

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.094	Mean in Log Scale	-3.556
SD in Original Scale	0.171	SD in Log Scale	1.586
95% t UCL (assumes normality of ROS data)	0.257	95% Percentile Bootstrap UCL	0.245
95% BCA Bootstrap UCL	0.249	95% Bootstrap t UCL	3.77
95% H-UCL (Log ROS)	38.72		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.58	KM Geo Mean	0.0279
KM SD (logged)	1.46	95% Critical H Value (KM-Log)	6.939
KM Standard Error of Mean (logged)	0.775	95% H-UCL (KM -Log)	12.83
KM SD (logged)	1.46	95% Critical H Value (KM-Log)	6.939
KM Standard Error of Mean (logged)	0.775		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0944	Mean in Log Scale	-3.534

SD in Original Scale	0.171	SD in Log Scale	1.577
95% t UCL (Assumes normality)	0.258	95% H-Stat UCL	36.49

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.182

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	9
Number of Detects	1	Number of Non-Detects	3
Number of Distinct Detects	1	Number of Distinct Non-Detects	3

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV

The data set for variable Diesel Range Organics (C10-C20) was not processed!

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.02	Minimum Non-Detect	0.036
Maximum Detect	1.3	Maximum Non-Detect	0.036
Variance Detects	0.391	Percent Non-Detects	20%
Mean Detects	0.363	SD Detects	0.625
Median Detects	0.0665	CV Detects	1.721
Skewness Detects	1.989	Kurtosis Detects	3.964
Mean of Logged Detects	-2.288	SD of Logged Detects	1.801

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.669	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.422	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.295	KM Standard Error of Mean	0.26
KM SD	0.503	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.849	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.722	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.074	95% KM Chebyshev UCL	1.427
97.5% KM Chebyshev UCL	1.918	99% KM Chebyshev UCL	2.88

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.541	Anderson-Darling GOF Test
5% A-D Critical Value	0.681	Detected data appear Gamma Distributed at 5% Significance Leve

K-S Test Statistic	0.378	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.41	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.498	k star (bias corrected MLE)	0.291
Theta hat (MLE)	0.729	Theta star (bias corrected MLE)	1.247
nu hat (MLE)	3.987	nu star (bias corrected)	2.33
Mean (detects)	0.363		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.293
Maximum	1.3	Median	0.048
SD	0.564	CV	1.927
k hat (MLE)	0.428	k star (bias corrected MLE)	0.304
Theta hat (MLE)	0.684	Theta star (bias corrected MLE)	0.961
nu hat (MLE)	4.276	nu star (bias corrected)	3.044
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (3.04, α)	0.386	Adjusted Chi Square Value (3.04, β)	0.144
95% Gamma Approximate UCL (use when n>=50)	2.31	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.295	SD (KM)	0.503
Variance (KM)	0.253	SE of Mean (KM)	0.26
k hat (KM)	0.343	k star (KM)	0.27
nu hat (KM)	3.427	nu star (KM)	2.704
theta hat (KM)	0.86	theta star (KM)	1.089
80% gamma percentile (KM)	0.439	90% gamma percentile (KM)	0.879
95% gamma percentile (KM)	1.392	99% gamma percentile (KM)	2.746

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (2.70, α)	0.29	Adjusted Chi Square Value (2.70, β)	0.11
›5% Gamma Approximate KM-UCL (use when n>=50)	2.743	95% Gamma Adjusted KM-UCL (use when n<50)	7.262

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.289	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.293	Mean in Log Scale	-2.713
SD in Original Scale	0.564	SD in Log Scale	1.826
95% t UCL (assumes normality of ROS data)	0.83	95% Percentile Bootstrap UCL	0.792
95% BCA Bootstrap UCL	0.807	95% Bootstrap t UCL	8.986
95% H-UCL (Log ROS)	903.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.613	KM Geo Mean	0.0733
KM SD (logged)	1.539	95% Critical H Value (KM-Log)	7.296
KM Standard Error of Mean (logged)	0.795	95% H-UCL (KM -Log)	65.78
KM SD (logged)	1.539	95% Critical H Value (KM-Log)	7.296
KM Standard Error of Mean (logged)	0.795		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.294	Mean in Log Scale	-2.634
SD in Original Scale	0.563	SD in Log Scale	1.741
95% t UCL (Assumes normality)	0.831	95% H-Stat UCL	415.5

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	7.262

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

Manganese

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	9
Minimum	120	Mean	197.5
Maximum	370	Median	150
SD	116.2	Std. Error of Mean	58.08
Coefficient of Variation	0.588	Skewness	1.882

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	334.2	95% Adjusted-CLT UCL (Chen-1995)	351.4
		95% Modified-t UCL (Johnson-1978)	343.3

Gamma GOF Test

A-D Test Statistic	0.561	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.366	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.865	k star (bias corrected MLE)	1.383
Theta hat (MLE)	40.6	Theta star (bias corrected MLE)	142.8
nu hat (MLE)	38.92	nu star (bias corrected)	11.06
MLE Mean (bias corrected)	197.5	MLE Sd (bias corrected)	167.9
		Approximate Chi Square Value (0.05)	4.616
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	473.3	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.787	Mean of logged Data	5.179
Maximum of Logged Data	5.914	SD of logged Data	0.503

Assuming Lognormal Distribution

95% H-UCL	586.4	90% Chebyshev (MVUE) UCL	339.3
95% Chebyshev (MVUE) UCL	404.7	97.5% Chebyshev (MVUE) UCL	495.5
99% Chebyshev (MVUE) UCL	673.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	293	95% Jackknife UCL	334.2
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	371.7	95% Chebyshev(Mean, Sd) UCL	450.7
97.5% Chebyshev(Mean, Sd) UCL	560.2	99% Chebyshev(Mean, Sd) UCL	775.4

Suggested UCL to Use

95% Student's-t UCL	334.2

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthalene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	8
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.0038	Minimum Non-Detect	0.036
Maximum Detect	0.067	Maximum Non-Detect	0.036
Variance Detects	0.00104	Percent Non-Detects	20%
Mean Detects	0.0325	SD Detects	0.0323
Median Detects	0.0296	CV Detects	0.995
Skewness Detects	0.156	Kurtosis Detects	-5.06
Mean of Logged Detects	-4.078	SD of Logged Detects	1.468

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.027	KM Standard Error of Mean	0.0141
KM SD	0.0273	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0571	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0502	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0693	95% KM Chebyshev UCL	0.0885
97.5% KM Chebyshev UCL	0.115	99% KM Chebyshev UCL	0.168

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.496	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.668	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.306	**Kolmogorov-Smirnov GOF**

5% K-S Critical Value	0.403	Detected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.898	k star (bias corrected MLE)	0.391
Theta hat (MLE)	0.0361	Theta star (bias corrected MLE)	0.083
nu hat (MLE)	7.187	nu star (bias corrected)	3.13
Mean (detects)	0.0325		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0038	Mean	0.028
Maximum	0.067	Median	0.01
SD	0.0297	CV	1.063
k hat (MLE)	0.956	k star (bias corrected MLE)	0.516
Theta hat (MLE)	0.0293	Theta star (bias corrected MLE)	0.0543
nu hat (MLE)	9.556	nu star (bias corrected)	5.156
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (5.16, α)	1.225	Adjusted Chi Square Value (5.16, β)	0.578
95% Gamma Approximate UCL (use when n>=50)	0.118	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.027	SD (KM)	0.0273
Variance (KM)	7.4771E-4	SE of Mean (KM)	0.0141
k hat (KM)	0.973	k star (KM)	0.522
nu hat (KM)	9.728	nu star (KM)	5.225
theta hat (KM)	0.0277	theta star (KM)	0.0516
80% gamma percentile (KM)	0.0444	90% gamma percentile (KM)	0.0723
95% gamma percentile (KM)	0.102	99% gamma percentile (KM)	0.175

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.22, α)	1.257	Adjusted Chi Square Value (5.22, β)	0.597
95% Gamma Approximate KM-UCL (use when n>=50)	0.112	95% Gamma Adjusted KM-UCL (use when n<50)	0.236

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0271	Mean in Log Scale	-4.302
SD in Original Scale	0.0305	SD in Log Scale	1.367
95% t UCL (assumes normality of ROS data)	0.0561	95% Percentile Bootstrap UCL	0.0488
95% BCA Bootstrap UCL	0.0492	95% Bootstrap t UCL	0.654
95% H-UCL (Log ROS)	2.97		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.33	KM Geo Mean	0.0132
KM SD (logged)	1.248	95% Critical H Value (KM-Log)	5.993
KM Standard Error of Mean (logged)	0.648	95% H-UCL (KM -Log)	1.209
KM SD (logged)	1.248	95% Critical H Value (KM-Log)	5.993
KM Standard Error of Mean (logged)	0.648		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0296	Mean in Log Scale	-4.066
SD in Original Scale	0.0287	SD in Log Scale	1.272
95% t UCL (Assumes normality)	0.057	95% H-Stat UCL	1.862

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0571

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

Nickel

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
		Number of Missing Observations	9
Minimum	3.6	Mean	10.4
Maximum	14	Median	12
SD	4.63	Std. Error of Mean	2.315
Coefficient of Variation	0.445	Skewness	-1.743

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.794	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.85	95% Adjusted-CLT UCL (Chen-1995)	12.05
		95% Modified-t UCL (Johnson-1978)	15.51

Gamma GOF Test

A-D Test Statistic	0.709	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.659	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.429	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.396	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.349	k star (bias corrected MLE)	1.254
Theta hat (MLE)	2.391	Theta star (bias corrected MLE)	8.294
nu hat (MLE)	34.79	nu star (bias corrected)	10.03
MLE Mean (bias corrected)	10.4	MLE Sd (bias corrected)	9.288
		Approximate Chi Square Value (0.05)	3.961
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	26.34	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.727	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.411	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.281	Mean of logged Data	2.222
Maximum of Logged Data	2.639	SD of logged Data	0.632

Assuming Lognormal Distribution

95% H-UCL	55.97	90% Chebyshev (MVUE) UCL	20.5
95% Chebyshev (MVUE) UCL	24.94	97.5% Chebyshev (MVUE) UCL	31.12
99% Chebyshev (MVUE) UCL	43.25		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	14.21	95% Jackknife UCL	15.85
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	17.35	95% Chebyshev(Mean, Sd) UCL	20.49
97.5% Chebyshev(Mean, Sd) UCL	24.86	99% Chebyshev(Mean, Sd) UCL	33.44

Suggested UCL to Use

95% Student's-t UCL	15.85

Recommended UCL exceeds the maximum observation

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Number of Detects	11	Number of Non-Detects	2
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	0.0011	Minimum Non-Detect	9.2000E-4
Maximum Detect	5.1	Maximum Non-Detect	9.5000E-4
Variance Detects	2.299	Percent Non-Detects	15.38%
Mean Detects	0.546	SD Detects	1.516
Median Detects	0.026	CV Detects	2.777
Skewness Detects	3.272	Kurtosis Detects	10.78
Mean of Logged Detects	-3.257	SD of Logged Detects	2.494

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.409	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.442	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.462	KM Standard Error of Mean	0.391
KM SD	1.344	95% KM (BCA) UCL	1.245
95% KM (t) UCL	1.159	95% KM (Percentile Bootstrap) UCL	1.218
95% KM (z) UCL	1.105	95% KM Bootstrap t UCL	8.852
90% KM Chebyshev UCL	1.635	95% KM Chebyshev UCL	2.166
97.5% KM Chebyshev UCL	2.904	99% KM Chebyshev UCL	4.353

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.902	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.834	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.278	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.265	k star (bias corrected MLE)	0.254
Theta hat (MLE)	2.058	Theta star (bias corrected MLE)	2.153
nu hat (MLE)	5.836	nu star (bias corrected)	5.578
Mean (detects)	0.546		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0011	Mean	0.463
Maximum	5.1	Median	0.022
SD	1.399	CV	3.017
k hat (MLE)	0.262	k star (bias corrected MLE)	0.252
Theta hat (MLE)	1.772	Theta star (bias corrected MLE)	1.836
nu hat (MLE)	6.801	nu star (bias corrected)	6.565
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (6.56, α)	1.935	Adjusted Chi Square Value (6.56, β)	1.599
95% Gamma Approximate UCL (use when n>=50)	1.572	95% Gamma Adjusted UCL (use when n<50)	1.903

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.462	SD (KM)	1.344
Variance (KM)	1.807	SE of Mean (KM)	0.391
k hat (KM)	0.118	k star (KM)	0.142
nu hat (KM)	3.073	nu star (KM)	3.697
theta hat (KM)	3.91	theta star (KM)	3.25
80% gamma percentile (KM)	0.481	90% gamma percentile (KM)	1.359
95% gamma percentile (KM)	2.569	99% gamma percentile (KM)	6.119

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.70, α)	0.606	Adjusted Chi Square Value (3.70, β)	0.457
5% Gamma Approximate KM-UCL (use when n>=50)	2.82	95% Gamma Adjusted KM-UCL (use when n<50)	3.74

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.108	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.462	Mean in Log Scale	-4.171
SD in Original Scale	1.399	SD in Log Scale	3.188
95% t UCL (assumes normality of ROS data)	1.154	95% Percentile Bootstrap UCL	1.23
95% BCA Bootstrap UCL	1.631	95% Bootstrap t UCL	9.072
95% H-UCL (Log ROS)	2165		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.832	KM Geo Mean	0.0217
KM SD (logged)	2.569	95% Critical H Value (KM-Log)	6.015
KM Standard Error of Mean (logged)	0.747	95% H-UCL (KM -Log)	50.92
KM SD (logged)	2.569	95% Critical H Value (KM-Log)	6.015
KM Standard Error of Mean (logged)	0.747		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.462	Mean in Log Scale	-3.936
SD in Original Scale	1.399	SD in Log Scale	2.816
95% t UCL (Assumes normality)	1.154	95% H-Stat UCL	210.7

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	8.852	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	3.74

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

TCDD TEQ HH

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	4.3700E-6	Mean	4.3700E-6
Maximum	4.3700E-6	Median	4.3700E-6

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable TCDD TEQ HH 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.

Thallium

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
		Number of Missing Observations	9
Number of Detects	1	Number of Non-Detects	3
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV

The data set for variable Thallium was not processed!

Vanadium

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	9
Minimum	3.4	Mean	14.6
Maximum	23	Median	16
SD	9.127	Std. Error of Mean	4.564
Coefficient of Variation	0.625	Skewness	-0.523

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.918	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.258	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	25.34	95% Adjusted-CLT UCL (Chen-1995)	20.83
		95% Modified-t UCL (Johnson-1978)	25.14

Gamma GOF Test

A-D Test Statistic	0.376	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.66	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.289	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.397	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.321	k star (bias corrected MLE)	0.747
Theta hat (MLE)	6.29	Theta star (bias corrected MLE)	19.55
nu hat (MLE)	18.57	nu star (bias corrected)	5.976
MLE Mean (bias corrected)	14.6	MLE Sd (bias corrected)	16.89
		Approximate Chi Square Value (0.05)	1.628
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	53.61	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.224	Mean of logged Data	2.45
Maximum of Logged Data	3.135	SD of logged Data	0.881

Assuming Lognormal Distribution

95% H-UCL	347.5	90% Chebyshev (MVUE) UCL	34.34
95% Chebyshev (MVUE) UCL	42.97	97.5% Chebyshev (MVUE) UCL	54.95
99% Chebyshev (MVUE) UCL	78.49		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	22.11	95% Jackknife UCL	25.34
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	28.29	95% Chebyshev(Mean, Sd) UCL	34.49
97.5% Chebyshev(Mean, Sd) UCL	43.1	99% Chebyshev(Mean, Sd) UCL	60.01

Suggested UCL to Use

95% Student's-t UCL	25.34

Recommended UCL exceeds the maximum observation

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.110/5/2018 12:24:55 PM
From File	Soil-TransformShop-SS-v2.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	14
Minimum	1.7	Mean	1.7
Maximum	1.7	Median	1.7

Warning: This data set only has 1 observations!

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

The data set for variable Arsenic 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.

Benzo(a)anthracene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	19
		Number of Missing Observations	23
Number of Detects	13	Number of Non-Detects	12
Number of Distinct Detects	13	Number of Distinct Non-Detects	6
Minimum Detect	0.0033	Minimum Non-Detect	0.0069
Maximum Detect	2	Maximum Non-Detect	0.069
Variance Detects	0.611	Percent Non-Detects	48%
Mean Detects	0.619	SD Detects	0.781
Median Detects	0.14	CV Detects	1.263
Skewness Detects	1.037	Kurtosis Detects	-0.569
Mean of Logged Detects	-2.062	SD of Logged Detects	2.381

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.324	KM Standard Error of Mean	0.13
KM SD	0.622	95% KM (BCA) UCL	0.529
95% KM (t) UCL	0.546	95% KM (Percentile Bootstrap) UCL	0.539
95% KM (z) UCL	0.537	95% KM Bootstrap t UCL	0.671
90% KM Chebyshev UCL	0.713	95% KM Chebyshev UCL	0.889
97.5% KM Chebyshev UCL	1.133	99% KM Chebyshev UCL	1.613

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.493	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.807	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.253	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.414	k star (bias corrected MLE)	0.37
Theta hat (MLE)	1.495	Theta star (bias corrected MLE)	1.674
nu hat (MLE)	10.76	nu star (bias corrected)	9.608
Mean (detects)	0.619		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0033	Mean	0.327
Maximum	2	Median	0.01
SD	0.634	CV	1.941
k hat (MLE)	0.316	k star (bias corrected MLE)	0.305
Theta hat (MLE)	1.033	Theta star (bias corrected MLE)	1.071
nu hat (MLE)	15.8	nu star (bias corrected)	15.24
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (15.24, α)	7.428	Adjusted Chi Square Value (15.24, β)	7.057
95% Gamma Approximate UCL (use when n>=50)	0.67	95% Gamma Adjusted UCL (use when n<50)	0.705

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.324	SD (KM)	0.622
Variance (KM)	0.387	SE of Mean (KM)	0.13
k hat (KM)	0.271	k star (KM)	0.265
nu hat (KM)	13.57	nu star (KM)	13.27
theta hat (KM)	1.195	theta star (KM)	1.221
80% gamma percentile (KM)	0.48	90% gamma percentile (KM)	0.968
95% gamma percentile (KM)	1.541	99% gamma percentile (KM)	3.052

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.27, α)	6.076	Adjusted Chi Square Value (13.27, β)	5.745
95% Gamma Approximate KM-UCL (use when n>=50)	0.708	95% Gamma Adjusted KM-UCL (use when n<50)	0.749

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.324	Mean in Log Scale	-3.827
SD in Original Scale	0.635	SD in Log Scale	2.622
95% t UCL (assumes normality of ROS data)	0.541	95% Percentile Bootstrap UCL	0.559
95% BCA Bootstrap UCL	0.591	95% Bootstrap t UCL	0.639
95% H-UCL (Log ROS)	9.863		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.736	KM Geo Mean	0.0239
KM SD (logged)	2.421	95% Critical H Value (KM-Log)	4.669
KM Standard Error of Mean (logged)	0.509	95% H-UCL (KM -Log)	4.488
KM SD (logged)	2.421	95% Critical H Value (KM-Log)	4.669
KM Standard Error of Mean (logged)	0.509		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.326	Mean in Log Scale	-3.508
SD in Original Scale	0.634	SD in Log Scale	2.355
95% t UCL (Assumes normality)	0.543	95% H-Stat UCL	4.299

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ımma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.749

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	16
		Number of Missing Observations	23
Number of Detects	11	Number of Non-Detects	14
Number of Distinct Detects	10	Number of Distinct Non-Detects	8
Minimum Detect	0.0029	Minimum Non-Detect	0.0069
Maximum Detect	1.7	Maximum Non-Detect	0.37
Variance Detects	0.482	Percent Non-Detects	56%
Mean Detects	0.643	SD Detects	0.695
Median Detects	0.6	CV Detects	1.08
Skewness Detects	0.653	Kurtosis Detects	-1.31
Mean of Logged Detects	-1.778	SD of Logged Detects	2.292

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.805	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.251	Lilliefors GOF Test
5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.286	KM Standard Error of Mean	0.114
KM SD	0.542	95% KM (BCA) UCL	0.482
95% KM (t) UCL	0.48	95% KM (Percentile Bootstrap) UCL	0.478
95% KM (z) UCL	0.473	95% KM Bootstrap t UCL	0.533
90% KM Chebyshev UCL	0.627	95% KM Chebyshev UCL	0.781
97.5% KM Chebyshev UCL	0.995	99% KM Chebyshev UCL	1.416

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.572	Anderson-Darling GOF Test
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.478	k star (bias corrected MLE)	0.409
Theta hat (MLE)	1.344	Theta star (bias corrected MLE)	1.574
nu hat (MLE)	10.53	nu star (bias corrected)	8.989
Mean (detects)	0.643		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0029	Mean	0.289
Maximum	1.7	Median	0.01
SD	0.551	CV	1.91
k hat (MLE)	0.322	k star (bias corrected MLE)	0.31
Theta hat (MLE)	0.897	Theta star (bias corrected MLE)	0.931
nu hat (MLE)	16.09	nu star (bias corrected)	15.49
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (15.49, α)	7.605	Adjusted Chi Square Value (15.49, β)	7.23
95% Gamma Approximate UCL (use when n>=50)	0.588	95% Gamma Adjusted UCL (use when n<50)	0.618

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.286	SD (KM)	0.542
Variance (KM)	0.293	SE of Mean (KM)	0.114
k hat (KM)	0.278	k star (KM)	0.272
nu hat (KM)	13.91	nu star (KM)	13.58
theta hat (KM)	1.027	theta star (KM)	1.052
80% gamma percentile (KM)	0.426	90% gamma percentile (KM)	0.852
95% gamma percentile (KM)	1.349	99% gamma percentile (KM)	2.657

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.58, α)	6.282	Adjusted Chi Square Value (13.58, β)	5.945
95% Gamma Approximate KM-UCL (use when n>=50)	0.617	95% Gamma Adjusted KM-UCL (use when n<50)	0.652

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.285	Mean in Log Scale	-4.121
SD in Original Scale	0.553	SD in Log Scale	2.706
95% t UCL (assumes normality of ROS data)	0.474	95% Percentile Bootstrap UCL	0.461
95% BCA Bootstrap UCL	0.519	95% Bootstrap t UCL	0.572
95% H-UCL (Log ROS)	10.85		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.956	KM Geo Mean	0.0191
KM SD (logged)	2.451	95% Critical H Value (KM-Log)	4.719
KM Standard Error of Mean (logged)	0.523	95% H-UCL (KM -Log)	4.087
KM SD (logged)	2.451	95% Critical H Value (KM-Log)	4.719
KM Standard Error of Mean (logged)	0.523		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.295	Mean in Log Scale	-3.508
SD in Original Scale	0.549	SD in Log Scale	2.336
95% t UCL (Assumes normality)	0.483	95% H-Stat UCL	3.967

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ımma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.652

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	18
		Number of Missing Observations	23
Number of Detects	13	Number of Non-Detects	12
Number of Distinct Detects	12	Number of Distinct Non-Detects	6
Minimum Detect	0.0038	Minimum Non-Detect	0.0069
Maximum Detect	2.1	Maximum Non-Detect	0.069
Variance Detects	0.668	Percent Non-Detects	48%
Mean Detects	0.727	SD Detects	0.818
Median Detects	0.69	CV Detects	1.124
Skewness Detects	0.869	Kurtosis Detects	-0.728
Mean of Logged Detects	-1.743	SD of Logged Detects	2.368

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.798	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.38	KM Standard Error of Mean	0.14
KM SD	0.672	95% KM (BCA) UCL	0.616
95% KM (t) UCL	0.62	95% KM (Percentile Bootstrap) UCL	0.602
95% KM (z) UCL	0.61	95% KM Bootstrap t UCL	0.714
90% KM Chebyshev UCL	0.8	95% KM Chebyshev UCL	0.99
97.5% KM Chebyshev UCL	1.254	99% KM Chebyshev UCL	1.771

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.606	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.799	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.217	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.251	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.453	k star (bias corrected MLE)	0.4
Theta hat (MLE)	1.605	Theta star (bias corrected MLE)	1.819
nu hat (MLE)	11.78	nu star (bias corrected)	10.39
Mean (detects)	0.727		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0038	Mean	0.383
Maximum	2.1	Median	0.01
SD	0.684	CV	1.786
k hat (MLE)	0.317	k star (bias corrected MLE)	0.306
Theta hat (MLE)	1.208	Theta star (bias corrected MLE)	1.253
nu hat (MLE)	15.84	nu star (bias corrected)	15.28
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (15.28, α)	7.454	Adjusted Chi Square Value (15.28, β)	7.082
95% Gamma Approximate UCL (use when n>=50)	0.785	95% Gamma Adjusted UCL (use when n<50)	0.826

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.38	SD (KM)	0.672
Variance (KM)	0.451	SE of Mean (KM)	0.14
k hat (KM)	0.321	k star (KM)	0.309
nu hat (KM)	16.04	nu star (KM)	15.45
theta hat (KM)	1.186	theta star (KM)	1.231
80% gamma percentile (KM)	0.588	90% gamma percentile (KM)	1.118
95% gamma percentile (KM)	1.724	99% gamma percentile (KM)	3.292

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.45, α)	7.576	Adjusted Chi Square Value (15.45, β)	7.201
95% Gamma Approximate KM-UCL (use when n>=50)	0.776	95% Gamma Adjusted KM-UCL (use when n<50)	0.816

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.234	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.381	Mean in Log Scale	-3.514
SD in Original Scale	0.685	SD in Log Scale	2.614
95% t UCL (assumes normality of ROS data)	0.616	95% Percentile Bootstrap UCL	0.625
95% BCA Bootstrap UCL	0.677	95% Bootstrap t UCL	0.746
95% H-UCL (Log ROS)	13.01		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.518	KM Geo Mean	0.0297
KM SD (logged)	2.48	95% Critical H Value (KM-Log)	4.769
KM Standard Error of Mean (logged)	0.519	95% H-UCL (KM -Log)	7.189
KM SD (logged)	2.48	95% Critical H Value (KM-Log)	4.769
KM Standard Error of Mean (logged)	0.519		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.383	Mean in Log Scale	-3.342
SD in Original Scale	0.684	SD in Log Scale	2.458
95% t UCL (Assumes normality)	0.617	95% H-Stat UCL	7.797

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ımma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.816

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	18
		Number of Missing Observations	23
Number of Detects	11	Number of Non-Detects	14
Number of Distinct Detects	11	Number of Distinct Non-Detects	7
Minimum Detect	0.0041	Minimum Non-Detect	0.0069
Maximum Detect	0.79	Maximum Non-Detect	0.069
Variance Detects	0.101	Percent Non-Detects	56%
Mean Detects	0.317	SD Detects	0.318
Median Detects	0.27	CV Detects	1.004
Skewness Detects	0.664	Kurtosis Detects	-1.244
Mean of Logged Detects	-2.097	SD of Logged Detects	1.828

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.142	KM Standard Error of Mean	0.0533
KM SD	0.254	95% KM (BCA) UCL	0.23
95% KM (t) UCL	0.233	95% KM (Percentile Bootstrap) UCL	0.228
95% KM (z) UCL	0.23	95% KM Bootstrap t UCL	0.272
90% KM Chebyshev UCL	0.302	95% KM Chebyshev UCL	0.374
97.5% KM Chebyshev UCL	0.475	99% KM Chebyshev UCL	0.672

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.459	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.77	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.17	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.645	k star (bias corrected MLE)	0.53
Theta hat (MLE)	0.491	Theta star (bias corrected MLE)	0.598
nu hat (MLE)	14.2	nu star (bias corrected)	11.66
Mean (detects)	0.317		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0041	Mean	0.145
Maximum	0.79	Median	0.01
SD	0.258	CV	1.776
k hat (MLE)	0.416	k star (bias corrected MLE)	0.393
Theta hat (MLE)	0.348	Theta star (bias corrected MLE)	0.369
nu hat (MLE)	20.82	nu star (bias corrected)	19.65
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (19.65, α)	10.6	Adjusted Chi Square Value (19.65, β)	10.14
95% Gamma Approximate UCL (use when n>=50)	0.269	95% Gamma Adjusted UCL (use when n<50)	0.281

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.142	SD (KM)	0.254
Variance (KM)	0.0645	SE of Mean (KM)	0.0533
k hat (KM)	0.313	k star (KM)	0.302
nu hat (KM)	15.63	nu star (KM)	15.09
theta hat (KM)	0.454	theta star (KM)	0.471
80% gamma percentile (KM)	0.218	90% gamma percentile (KM)	0.419
95% gamma percentile (KM)	0.648	99% gamma percentile (KM)	1.245

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.09, α)	7.325	Adjusted Chi Square Value (15.09, β)	6.957
95% Gamma Approximate KM-UCL (use when n>=50)	0.293	95% Gamma Adjusted KM-UCL (use when n<50)	0.308

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.142	Mean in Log Scale	-4.112
SD in Original Scale	0.259	SD in Log Scale	2.288
95% t UCL (assumes normality of ROS data)	0.231	95% Percentile Bootstrap UCL	0.228
95% BCA Bootstrap UCL	0.254	95% Bootstrap t UCL	0.273
95% H-UCL (Log ROS)	1.793		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.971	KM Geo Mean	0.0189
KM SD (logged)	2.036	95% Critical H Value (KM-Log)	4.035
KM Standard Error of Mean (logged)	0.43	95% H-UCL (KM -Log)	0.802
KM SD (logged)	2.036	95% Critical H Value (KM-Log)	4.035
KM Standard Error of Mean (logged)	0.43		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.144	Mean in Log Scale	-3.807
SD in Original Scale	0.258	SD in Log Scale	2.04
95% t UCL (Assumes normality)	0.233	95% H-Stat UCL	0.959

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.233

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	16
		Number of Missing Observations	23
Number of Detects	13	Number of Non-Detects	12
Number of Distinct Detects	11	Number of Distinct Non-Detects	6
Minimum Detect	0.0038	Minimum Non-Detect	0.0069
Maximum Detect	1.9	Maximum Non-Detect	0.069
Variance Detects	0.585	Percent Non-Detects	48%
Mean Detects	0.615	SD Detects	0.765
Median Detects	0.2	CV Detects	1.243
Skewness Detects	1.012	Kurtosis Detects	-0.629
Mean of Logged Detects	-2.028	SD of Logged Detects	2.357

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.323	KM Standard Error of Mean	0.127
KM SD	0.611	95% KM (BCA) UCL	0.537
95% KM (t) UCL	0.54	95% KM (Percentile Bootstrap) UCL	0.533
95% KM (z) UCL	0.532	95% KM Bootstrap t UCL	0.632
90% KM Chebyshev UCL	0.704	95% KM Chebyshev UCL	0.877
97.5% KM Chebyshev UCL	1.117	99% KM Chebyshev UCL	1.589

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.509	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.805	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.174	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.423	k star (bias corrected MLE)	0.376
Theta hat (MLE)	1.456	Theta star (bias corrected MLE)	1.635
nu hat (MLE)	10.99	nu star (bias corrected)	9.788
Mean (detects)	0.615		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0038	Mean	0.325
Maximum	1.9	Median	0.01
SD	0.623	CV	1.917
k hat (MLE)	0.319	k star (bias corrected MLE)	0.307
Theta hat (MLE)	1.018	Theta star (bias corrected MLE)	1.057
nu hat (MLE)	15.95	nu star (bias corrected)	15.37
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (15.37, α)	7.517	Adjusted Chi Square Value (15.37, β)	7.144
95% Gamma Approximate UCL (use when n>=50)	0.664	95% Gamma Adjusted UCL (use when n<50)	0.699

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.323	SD (KM)	0.611
Variance (KM)	0.374	SE of Mean (KM)	0.127
k hat (KM)	0.278	k star (KM)	0.272
nu hat (KM)	13.92	nu star (KM)	13.58
theta hat (KM)	1.159	theta star (KM)	1.187
80% gamma percentile (KM)	0.481	90% gamma percentile (KM)	0.961
95% gamma percentile (KM)	1.522	99% gamma percentile (KM)	2.998

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.58, α)	6.286	Adjusted Chi Square Value (13.58, β)	5.949
95% Gamma Approximate KM-UCL (use when n>=50)	0.697	95% Gamma Adjusted KM-UCL (use when n<50)	0.736

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.322	Mean in Log Scale	-3.768
SD in Original Scale	0.624	SD in Log Scale	2.588
95% t UCL (assumes normality of ROS data)	0.536	95% Percentile Bootstrap UCL	0.538
95% BCA Bootstrap UCL	0.584	95% Bootstrap t UCL	0.658
95% H-UCL (Log ROS)	8.987		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.676	KM Geo Mean	0.0253
KM SD (logged)	2.387	95% Critical H Value (KM-Log)	4.612
KM Standard Error of Mean (logged)	0.501	95% H-UCL (KM -Log)	4.138
KM SD (logged)	2.387	95% Critical H Value (KM-Log)	4.612
KM Standard Error of Mean (logged)	0.501		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.325	Mean in Log Scale	-3.49
SD in Original Scale	0.623	SD in Log Scale	2.354
95% t UCL (Assumes normality)	0.538	95% H-Stat UCL	4.358

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ımma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.736

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	14
Minimum	2.7	Mean	2.7
Maximum	2.7	Median	2.7

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Cobalt 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.

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	15
		Number of Missing Observations	23
Number of Detects	9	Number of Non-Detects	16
Number of Distinct Detects	8	Number of Distinct Non-Detects	8
Minimum Detect	0.019	Minimum Non-Detect	0.0069
Maximum Detect	0.45	Maximum Non-Detect	0.37
Variance Detects	0.0254	Percent Non-Detects	64%
Mean Detects	0.19	SD Detects	0.159
Median Detects	0.15	CV Detects	0.841
Skewness Detects	0.435	Kurtosis Detects	-1.203
Mean of Logged Detects	-2.197	SD of Logged Detects	1.272

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.18	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0751	KM Standard Error of Mean	0.0272
KM SD	0.127	95% KM (BCA) UCL	0.126
95% KM (t) UCL	0.122	95% KM (Percentile Bootstrap) UCL	0.121
95% KM (z) UCL	0.12	95% KM Bootstrap t UCL	0.139
90% KM Chebyshev UCL	0.157	95% KM Chebyshev UCL	0.194
97.5% KM Chebyshev UCL	0.245	99% KM Chebyshev UCL	0.346

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.533	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.214	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.072	k star (bias corrected MLE)	0.789
Theta hat (MLE)	0.177	Theta star (bias corrected MLE)	0.24
nu hat (MLE)	19.3	nu star (bias corrected)	14.2
Mean (detects)	0.19		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0747
Maximum	0.45	Median	0.01
SD	0.127	CV	1.705
k hat (MLE)	0.548	k star (bias corrected MLE)	0.509
Theta hat (MLE)	0.136	Theta star (bias corrected MLE)	0.147
nu hat (MLE)	27.39	nu star (bias corrected)	25.43
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (25.43, α)	14.94	Adjusted Chi Square Value (25.43, β)	14.4
95% Gamma Approximate UCL (use when n>=50)	0.127	95% Gamma Adjusted UCL (use when n<50)	0.132

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0751	SD (KM)	0.127
Variance (KM)	0.0161	SE of Mean (KM)	0.0272
k hat (KM)	0.351	k star (KM)	0.336
nu hat (KM)	17.55	nu star (KM)	16.78
theta hat (KM)	0.214	theta star (KM)	0.224
80% gamma percentile (KM)	0.118	90% gamma percentile (KM)	0.218
95% gamma percentile (KM)	0.331	99% gamma percentile (KM)	0.621

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.78, α)	8.516	Adjusted Chi Square Value (16.78, β)	8.115
95% Gamma Approximate KM-UCL (use when n>=50)	0.148	95% Gamma Adjusted KM-UCL (use when n<50)	0.155

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0724	Mean in Log Scale	-4.186
SD in Original Scale	0.129	SD in Log Scale	1.809
95% t UCL (assumes normality of ROS data)	0.116	95% Percentile Bootstrap UCL	0.118
95% BCA Bootstrap UCL	0.125	95% Bootstrap t UCL	0.139
95% H-UCL (Log ROS)	0.303		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.917	KM Geo Mean	0.0199
KM SD (logged)	1.522	95% Critical H Value (KM-Log)	3.228
KM Standard Error of Mean (logged)	0.33	95% H-UCL (KM -Log)	0.173
KM SD (logged)	1.522	95% Critical H Value (KM-Log)	3.228
KM Standard Error of Mean (logged)	0.33		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0808	Mean in Log Scale	-3.969
SD in Original Scale	0.129	SD in Log Scale	1.801
95% t UCL (Assumes normality)	0.125	95% H-Stat UCL	0.367

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.122

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	21
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!

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

The data set for variable Diesel Range Organics (C10-C20) 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.

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	19
		Number of Missing Observations	23
Number of Detects	12	Number of Non-Detects	13
Number of Distinct Detects	12	Number of Distinct Non-Detects	7
Minimum Detect	0.0053	Minimum Non-Detect	0.0069
Maximum Detect	1.4	Maximum Non-Detect	0.069
Variance Detects	0.265	Percent Non-Detects	52%
Mean Detects	0.496	SD Detects	0.514
Median Detects	0.455	CV Detects	1.038
Skewness Detects	0.788	Kurtosis Detects	-0.763
Mean of Logged Detects	-1.786	SD of Logged Detects	2.008

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.842	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.219	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.241	KM Standard Error of Mean	0.0877
KM SD	0.42	95% KM (BCA) UCL	0.398
95% KM (t) UCL	0.391	95% KM (Percentile Bootstrap) UCL	0.391
95% KM (z) UCL	0.386	95% KM Bootstrap t UCL	0.45
90% KM Chebyshev UCL	0.504	95% KM Chebyshev UCL	0.624
97.5% KM Chebyshev UCL	0.789	99% KM Chebyshev UCL	1.114

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.536	Anderson-Darling GOF Test
5% A-D Critical Value	0.779	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.224	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.258	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.574	k star (bias corrected MLE)	0.486
Theta hat (MLE)	0.863	Theta star (bias corrected MLE)	1.019
nu hat (MLE)	13.78	nu star (bias corrected)	11.67
Mean (detects)	0.496		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0053	Mean	0.243
Maximum	1.4	Median	0.01
SD	0.427	CV	1.758
k hat (MLE)	0.364	k star (bias corrected MLE)	0.347
Theta hat (MLE)	0.668	Theta star (bias corrected MLE)	0.701
nu hat (MLE)	18.19	nu star (bias corrected)	17.34
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (17.34, α)	8.913	Adjusted Chi Square Value (17.34, β)	8.502
95% Gamma Approximate UCL (use when n>=50)	0.473	95% Gamma Adjusted UCL (use when n<50)	0.496

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.241	SD (KM)	0.42
Variance (KM)	0.176	SE of Mean (KM)	0.0877
k hat (KM)	0.331	k star (KM)	0.318
nu hat (KM)	16.56	nu star (KM)	15.9
theta hat (KM)	0.729	theta star (KM)	0.759
80% gamma percentile (KM)	0.375	90% gamma percentile (KM)	0.707
95% gamma percentile (KM)	1.084	99% gamma percentile (KM)	2.056

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.90, α)	7.894	Adjusted Chi Square Value (15.90, β)	7.51
95% Gamma Approximate KM-UCL (use when n>=50)	0.486	95% Gamma Adjusted KM-UCL (use when n<50)	0.511

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.243	Mean in Log Scale	-3.425
SD in Original Scale	0.427	SD in Log Scale	2.196
95% t UCL (assumes normality of ROS data)	0.389	95% Percentile Bootstrap UCL	0.385
95% BCA Bootstrap UCL	0.417	95% Bootstrap t UCL	0.452
95% H-UCL (Log ROS)	2.49		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.521	KM Geo Mean	0.0296
KM SD (logged)	2.151	95% Critical H Value (KM-Log)	4.222
KM Standard Error of Mean (logged)	0.453	95% H-UCL (KM -Log)	1.907
KM SD (logged)	2.151	95% Critical H Value (KM-Log)	4.222
KM Standard Error of Mean (logged)	0.453		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.243	Mean in Log Scale	-3.515
SD in Original Scale	0.428	SD in Log Scale	2.255
95% t UCL (Assumes normality)	0.389	95% H-Stat UCL	2.862

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.391

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Manganese

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	14
Minimum	260	Mean	260
Maximum	260	Median	260

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Manganese 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.

Naphthalene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	16
		Number of Missing Observations	23
Number of Detects	8	Number of Non-Detects	17
Number of Distinct Detects	7	Number of Distinct Non-Detects	9
Minimum Detect	0.0029	Minimum Non-Detect	0.0069
Maximum Detect	0.096	Maximum Non-Detect	0.37
Variance Detects	0.00114	Percent Non-Detects	68%
Mean Detects	0.0407	SD Detects	0.0337
Median Detects	0.028	CV Detects	0.829
Skewness Detects	0.57	Kurtosis Detects	-1.035
Mean of Logged Detects	-3.693	SD of Logged Detects	1.249

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.017	KM Standard Error of Mean	0.00565
KM SD	0.0252	95% KM (BCA) UCL	0.0264
95% KM (t) UCL	0.0267	95% KM (Percentile Bootstrap) UCL	0.027
95% KM (z) UCL	0.0263	95% KM Bootstrap t UCL	0.0298
90% KM Chebyshev UCL	0.034	95% KM Chebyshev UCL	0.0417
97.5% KM Chebyshev UCL	0.0524	99% KM Chebyshev UCL	0.0733

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.377	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.301	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.157	k star (bias corrected MLE)	0.807
Theta hat (MLE)	0.0351	Theta star (bias corrected MLE)	0.0504
nu hat (MLE)	18.52	nu star (bias corrected)	12.91
Mean (detects)	0.0407		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	0.0201
Maximum	0.096	Median	0.01
SD	0.0233	CV	1.16
k hat (MLE)	1.443	k star (bias corrected MLE)	1.296
Theta hat (MLE)	0.0139	Theta star (bias corrected MLE)	0.0155
nu hat (MLE)	72.15	nu star (bias corrected)	64.82
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (64.82, α)	47.3	Adjusted Chi Square Value (64.82, β)	46.28
95% Gamma Approximate UCL (use when n>=50)	0.0275	95% Gamma Adjusted UCL (use when n<50)	0.0281

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.017	SD (KM)	0.0252
Variance (KM)	6.3734E-4	SE of Mean (KM)	0.00565
k hat (KM)	0.456	k star (KM)	0.428
nu hat (KM)	22.79	nu star (KM)	21.39
theta hat (KM)	0.0374	theta star (KM)	0.0398
80% gamma percentile (KM)	0.0277	90% gamma percentile (KM)	0.0476
95% gamma percentile (KM)	0.0692	99% gamma percentile (KM)	0.123

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (21.39, α)	11.88	Adjusted Chi Square Value (21.39, β)	11.4
95% Gamma Approximate KM-UCL (use when n>=50)	0.0307	95% Gamma Adjusted KM-UCL (use when n<50)	0.032

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0168	Mean in Log Scale	-4.808
SD in Original Scale	0.0248	SD in Log Scale	1.139
95% t UCL (assumes normality of ROS data)	0.0253	95% Percentile Bootstrap UCL	0.0255
95% BCA Bootstrap UCL	0.0276	95% Bootstrap t UCL	0.0308
95% H-UCL (Log ROS)	0.0291		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.868	KM Geo Mean	0.00768
KM SD (logged)	1.146	95% Critical H Value (KM-Log)	2.686
KM Standard Error of Mean (logged)	0.305	95% H-UCL (KM -Log)	0.0278
KM SD (logged)	1.146	95% Critical H Value (KM-Log)	2.686
KM Standard Error of Mean (logged)	0.305		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0262	Mean in Log Scale	-4.522
SD in Original Scale	0.0414	SD in Log Scale	1.299
95% t UCL (Assumes normality)	0.0404	95% H-Stat UCL	0.0546

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0267

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Nickel

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	14
Minimum	16	Mean	16
Maximum	16	Median	16

Warning: This data set only has 1 observations!

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

The data set for variable Nickel 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.

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	48	Number of Distinct Observations	46
		Number of Missing Observations	2
Number of Detects	47	Number of Non-Detects	1
Number of Distinct Detects	45	Number of Distinct Non-Detects	1
Minimum Detect	0.002	Minimum Non-Detect	0.05
Maximum Detect	8800	Maximum Non-Detect	0.05
Variance Detects	1645771	Percent Non-Detects	2.083%
Mean Detects	193.3	SD Detects	1283
Median Detects	0.091	CV Detects	6.636
Skewness Detects	6.853	Kurtosis Detects	46.97
Mean of Logged Detects	-1.316	SD of Logged Detects	3.194

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.154	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.5	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.128	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	189.3	KM Standard Error of Mean	183.3
KM SD	1256	95% KM (BCA) UCL	556.9
95% KM (t) UCL	496.8	95% KM (Percentile Bootstrap) UCL	555.3
95% KM (z) UCL	490.8	95% KM Bootstrap t UCL	27473
90% KM Chebyshev UCL	739.1	95% KM Chebyshev UCL	988.2
97.5% KM Chebyshev UCL	1334	99% KM Chebyshev UCL	2013

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	8.469	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.988	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.334	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.147	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.12	k star (bias corrected MLE)	0.127
Theta hat (MLE)	1605	Theta star (bias corrected MLE)	1523
nu hat (MLE)	11.32	nu star (bias corrected)	11.93
Mean (detects)	193.3		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.002	Mean	189.3
Maximum	8800	Median	0.0855
SD	1269	CV	6.706
k hat (MLE)	0.12	k star (bias corrected MLE)	0.126
Theta hat (MLE)	1582	Theta star (bias corrected MLE)	1501
nu hat (MLE)	11.49	nu star (bias corrected)	12.11
Adjusted Level of Significance (β)	0.045		
Approximate Chi Square Value (12.11, α)	5.296	Adjusted Chi Square Value (12.11, β)	5.157
95% Gamma Approximate UCL (use when n>=50)	432.7	95% Gamma Adjusted UCL (use when n<50)	444.4

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	189.3	SD (KM)	1256
Variance (KM)	1577959	SE of Mean (KM)	183.3
k hat (KM)	0.0227	k star (KM)	0.0352
nu hat (KM)	2.18	nu star (KM)	3.377
theta hat (KM)	8335	theta star (KM)	5381
80% gamma percentile (KM)	5.474	90% gamma percentile (KM)	160.1
95% gamma percentile (KM)	836	99% gamma percentile (KM)	4667

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.38, α)	0.492	Adjusted Chi Square Value (3.38, β)	0.462
95% Gamma Approximate KM-UCL (use when n>=50)	1298	95% Gamma Adjusted KM-UCL (use when n<50)	1383

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.128	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	189.3	Mean in Log Scale	-1.378
SD in Original Scale	1269	SD in Log Scale	3.188
95% t UCL (assumes normality of ROS data)	496.8	95% Percentile Bootstrap UCL	556
95% BCA Bootstrap UCL	744.2	95% Bootstrap t UCL	23773
95% H-UCL (Log ROS)	485		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.378	KM Geo Mean	0.252
KM SD (logged)	3.158	95% Critical H Value (KM-Log)	5.289
KM Standard Error of Mean (logged)	0.461	95% H-UCL (KM -Log)	421.2
KM SD (logged)	3.158	95% Critical H Value (KM-Log)	5.289
KM Standard Error of Mean (logged)	0.461		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	189.3	Mean in Log Scale	-1.366
SD in Original Scale	1269	SD in Log Scale	3.178
95% t UCL (Assumes normality)	496.8	95% H-Stat UCL	468.7

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL 2013

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 9:48:37 AM
From File	Soil-VehicleRefuel-SS.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Benzo(a)anthracene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.87	Mean	1.735
Maximum	2.6	Median	1.735

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 Benzo(a)anthracene 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.

Benzo(a)pyrene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.47	Mean	0.885
Maximum	1.3	Median	0.885

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 Benzo(a)pyrene 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.

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.75	Mean	1.475
Maximum	2.2	Median	1.475

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 Benzo(b)fluoranthene 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.

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.31	Mean	0.46
Maximum	0.61	Median	0.46

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 Benzo(k)fluoranthene 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.

Chrysene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.92	Mean	1.71
Maximum	2.5	Median	1.71

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 Chrysene 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.

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.12	Mean	0.215
Maximum	0.31	Median	0.215

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 Dibenzo(a,h)anthracene 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.

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	0
Minimum	380	Mean	380
Maximum	380	Median	380

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Diesel Range Organics (C10-C20) 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.

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.33	Mean	0.555
Maximum	0.78	Median	0.555

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 Indeno(1,2,3-cd)pyrene 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.

Naphthalene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.055	Mean	0.343
Maximum	0.63	Median	0.343

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 Naphthalene 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.

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	1
Minimum	0.0082	Mean	0.0741
Maximum	0.14	Median	0.0741

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 PCB, Total Aroclors (AECOM Calc) was not processed!

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/23/2018 4:11:37 PM
From File	HH_Pepco_OpenLot_Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	12
Minimum	0.93	Mean	1.808
Maximum	2.6	Median	1.85
SD	0.685	Std. Error of Mean	0.342
Coefficient of Variation	0.379	Skewness	-0.368

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.613	95% Adjusted-CLT UCL (Chen-1995)	2.303
		95% Modified-t UCL (Johnson-1978)	2.603

Gamma GOF Test

A-D Test Statistic	0.332	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.658	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.292	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8	k star (bias corrected MLE)	2.167
Theta hat (MLE)	0.226	Theta star (bias corrected MLE)	0.834
nu hat (MLE)	64	nu star (bias corrected)	17.33
MLE Mean (bias corrected)	1.808	MLE Sd (bias corrected)	1.228
		Approximate Chi Square Value (0.05)	8.911
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.516	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.305	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.0726	Mean of logged Data	0.528
Maximum of Logged Data	0.956	SD of logged Data	0.432

Assuming Lognormal Distribution

95% H-UCL	4.262	90% Chebyshev (MVUE) UCL	2.978
95% Chebyshev (MVUE) UCL	3.504	97.5% Chebyshev (MVUE) UCL	4.234
99% Chebyshev (MVUE) UCL	5.668		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.371	95% Jackknife UCL	2.613
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	2.835	95% Chebyshev(Mean, Sd) UCL	3.3
97.5% Chebyshev(Mean, Sd) UCL	3.946	99% Chebyshev(Mean, Sd) UCL	5.214

Suggested UCL to Use

95% Student's-t UCL	2.613

Recommended UCL exceeds the maximum observation

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

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.016	Minimum Non-Detect	0.0075
Maximum Detect	0.29	Maximum Non-Detect	0.0081
Variance Detects	0.00952	Percent Non-Detects	23.08%
Mean Detects	0.135	SD Detects	0.0976
Median Detects	0.13	CV Detects	0.724
Skewness Detects	0.481	Kurtosis Detects	-0.884
Mean of Logged Detects	-2.342	SD of Logged Detects	0.976

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.105	KM Standard Error of Mean	0.0284
KM SD	0.0973	95% KM (BCA) UCL	0.148
95% KM (t) UCL	0.156	95% KM (Percentile Bootstrap) UCL	0.15
95% KM (z) UCL	0.152	95% KM Bootstrap t UCL	0.166
90% KM Chebyshev UCL	0.191	95% KM Chebyshev UCL	0.229
97.5% KM Chebyshev UCL	0.283	99% KM Chebyshev UCL	0.388

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.243	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.148	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.271	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.625	k star (bias corrected MLE)	1.204
Theta hat (MLE)	0.083	Theta star (bias corrected MLE)	0.112
nu hat (MLE)	32.49	nu star (bias corrected)	24.08
Mean (detects)	0.135		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.106
Maximum	0.29	Median	0.077
SD	0.101	CV	0.95
k hat (MLE)	0.938	k star (bias corrected MLE)	0.773
Theta hat (MLE)	0.113	Theta star (bias corrected MLE)	0.137
nu hat (MLE)	24.39	nu star (bias corrected)	20.09
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (20.09, α)	10.92	Adjusted Chi Square Value (20.09, β)	9.967
95% Gamma Approximate UCL (use when n>=50)	0.195	95% Gamma Adjusted UCL (use when n<50)	0.214

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.105	SD (KM)	0.0973
Variance (KM)	0.00947	SE of Mean (KM)	0.0284
k hat (KM)	1.174	k star (KM)	0.954
nu hat (KM)	30.52	nu star (KM)	24.81
theta hat (KM)	0.0898	theta star (KM)	0.11
80% gamma percentile (KM)	0.17	90% gamma percentile (KM)	0.246
95% gamma percentile (KM)	0.321	99% gamma percentile (KM)	0.497

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (24.81, α)	14.47	Adjusted Chi Square Value (24.81, β)	13.35
95% Gamma Approximate KM-UCL (use when n>=50)	0.181	95% Gamma Adjusted KM-UCL (use when n<50)	0.196

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.106	Mean in Log Scale	-2.863
SD in Original Scale	0.101	SD in Log Scale	1.307
95% t UCL (assumes normality of ROS data)	0.156	95% Percentile Bootstrap UCL	0.154
95% BCA Bootstrap UCL	0.156	95% Bootstrap t UCL	0.166
95% H-UCL (Log ROS)	0.485		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.931	KM Geo Mean	0.0534
KM SD (logged)	1.347	95% Critical H Value (KM-Log)	3.484
KM Standard Error of Mean (logged)	0.394	95% H-UCL (KM -Log)	0.512
KM SD (logged)	1.347	95% Critical H Value (KM-Log)	3.484
KM Standard Error of Mean (logged)	0.394		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.105	Mean in Log Scale	-3.085
SD in Original Scale	0.102	SD in Log Scale	1.645
95% t UCL (Assumes normality)	0.155	95% H-Stat UCL	1.209

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.156

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	0.013	Minimum Non-Detect	0.0075
Maximum Detect	0.29	Maximum Non-Detect	0.0081
Variance Detects	0.0076	Percent Non-Detects	23.08%
Mean Detects	0.133	SD Detects	0.0872
Median Detects	0.145	CV Detects	0.657
Skewness Detects	0.192	Kurtosis Detects	-0.47
Mean of Logged Detects	-2.344	SD of Logged Detects	0.992

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.104	KM Standard Error of Mean	0.0262
KM SD	0.0897	95% KM (BCA) UCL	0.144
95% KM (t) UCL	0.15	95% KM (Percentile Bootstrap) UCL	0.143
95% KM (z) UCL	0.147	95% KM Bootstrap t UCL	0.152
90% KM Chebyshev UCL	0.182	95% KM Chebyshev UCL	0.218
97.5% KM Chebyshev UCL	0.267	99% KM Chebyshev UCL	0.365

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.456	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.194	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.271	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.695	k star (bias corrected MLE)	1.253
Theta hat (MLE)	0.0782	Theta star (bias corrected MLE)	0.106
nu hat (MLE)	33.9	nu star (bias corrected)	25.06
Mean (detects)	0.133		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.104
Maximum	0.29	Median	0.099
SD	0.0927	CV	0.888
k hat (MLE)	0.959	k star (bias corrected MLE)	0.789
Theta hat (MLE)	0.109	Theta star (bias corrected MLE)	0.132
nu hat (MLE)	24.93	nu star (bias corrected)	20.51
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (20.51, α)	11.23	Adjusted Chi Square Value (20.51, β)	10.26
95% Gamma Approximate UCL (use when n>=50)	0.191	95% Gamma Adjusted UCL (use when n<50)	0.208

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.104	SD (KM)	0.0897
Variance (KM)	0.00804	SE of Mean (KM)	0.0262
k hat (KM)	1.339	k star (KM)	1.081
nu hat (KM)	34.8	nu star (KM)	28.11
theta hat (KM)	0.0775	theta star (KM)	0.096
80% gamma percentile (KM)	0.166	90% gamma percentile (KM)	0.234
95% gamma percentile (KM)	0.302	99% gamma percentile (KM)	0.459

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.11, α)	17.01	Adjusted Chi Square Value (28.11, β)	15.79
95% Gamma Approximate KM-UCL (use when n>=50)	0.171	95% Gamma Adjusted KM-UCL (use when n<50)	0.185

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.105	Mean in Log Scale	-2.848
SD in Original Scale	0.0924	SD in Log Scale	1.293
95% t UCL (assumes normality of ROS data)	0.15	95% Percentile Bootstrap UCL	0.145
95% BCA Bootstrap UCL	0.148	95% Bootstrap t UCL	0.156
95% H-UCL (Log ROS)	0.472		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.932	KM Geo Mean	0.0533
KM SD (logged)	1.355	95% Critical H Value (KM-Log)	3.499
KM Standard Error of Mean (logged)	0.396	95% H-UCL (KM -Log)	0.524
KM SD (logged)	1.355	95% Critical H Value (KM-Log)	3.499
KM Standard Error of Mean (logged)	0.396		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.103	Mean in Log Scale	-3.086
SD in Original Scale	0.0943	SD in Log Scale	1.652
95% t UCL (Assumes normality)	0.149	95% H-Stat UCL	1.239

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.15

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	10
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.02	Minimum Non-Detect	0.0075
Maximum Detect	0.39	Maximum Non-Detect	0.0081
Variance Detects	0.0138	Percent Non-Detects	23.08%
Mean Detects	0.159	SD Detects	0.117
Median Detects	0.15	CV Detects	0.739
Skewness Detects	0.727	Kurtosis Detects	0.0356

Mean of Logged Detects	-2.171	SD of Logged Detects	0.958

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.124	KM Standard Error of Mean	0.0341
KM SD	0.117	95% KM (BCA) UCL	0.178
95% KM (t) UCL	0.185	95% KM (Percentile Bootstrap) UCL	0.179
95% KM (z) UCL	0.18	95% KM Bootstrap t UCL	0.197
90% KM Chebyshev UCL	0.226	95% KM Chebyshev UCL	0.273
97.5% KM Chebyshev UCL	0.337	99% KM Chebyshev UCL	0.463

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.214	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.136	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.271	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.654	k star (bias corrected MLE)	1.224
Theta hat (MLE)	0.0961	Theta star (bias corrected MLE)	0.13
nu hat (MLE)	33.07	nu star (bias corrected)	24.49
Mean (detects)	0.159		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.125
Maximum	0.39	Median	0.098
SD	0.121	CV	0.97
k hat (MLE)	0.9	k star (bias corrected MLE)	0.743
Theta hat (MLE)	0.138	Theta star (bias corrected MLE)	0.168
nu hat (MLE)	23.39	nu star (bias corrected)	19.33
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (19.33, α)	10.36	Adjusted Chi Square Value (19.33, β)	9.433
95% Gamma Approximate UCL (use when n>=50)	0.232	95% Gamma Adjusted UCL (use when n<50)	0.255

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.124	SD (KM)	0.117
Variance (KM)	0.0136	SE of Mean (KM)	0.0341
k hat (KM)	1.129	k star (KM)	0.92
nu hat (KM)	29.37	nu star (KM)	23.92
theta hat (KM)	0.11	theta star (KM)	0.135
80% gamma percentile (KM)	0.201	90% gamma percentile (KM)	0.291
95% gamma percentile (KM)	0.382	99% gamma percentile (KM)	0.595

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.92, α)	13.79	Adjusted Chi Square Value (23.92, β)	12.7
95% Gamma Approximate KM-UCL (use when n>=50)	0.215	95% Gamma Adjusted KM-UCL (use when n<50)	0.233

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.125	Mean in Log Scale	-2.686
SD in Original Scale	0.12	SD in Log Scale	1.287
95% t UCL (assumes normality of ROS data)	0.185	95% Percentile Bootstrap UCL	0.179
95% BCA Bootstrap UCL	0.195	95% Bootstrap t UCL	0.197
95% H-UCL (Log ROS)	0.546		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.799	KM Geo Mean	0.0608
KM SD (logged)	1.396	95% Critical H Value (KM-Log)	3.579
KM Standard Error of Mean (logged)	0.408	95% H-UCL (KM -Log)	0.683
KM SD (logged)	1.396	95% Critical H Value (KM-Log)	3.579
KM Standard Error of Mean (logged)	0.408		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.123	Mean in Log Scale	-2.953
SD in Original Scale	0.122	SD in Log Scale	1.702
95% t UCL (Assumes normality)	0.184	95% H-Stat UCL	1.703

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.185

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.0085	Minimum Non-Detect	0.0075
Maximum Detect	0.13	Maximum Non-Detect	0.0081
Variance Detects	0.00181	Percent Non-Detects	23.08%
Mean Detects	0.0632	SD Detects	0.0426
Median Detects	0.068	CV Detects	0.674
Skewness Detects	0.248	Kurtosis Detects	-1.072
Mean of Logged Detects	-3.068	SD of Logged Detects	0.93

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0503	KM Standard Error of Mean	0.0124
KM SD	0.0425	95% KM (BCA) UCL	0.0711
95% KM (t) UCL	0.0724	95% KM (Percentile Bootstrap) UCL	0.0698
95% KM (z) UCL	0.0707	95% KM Bootstrap t UCL	0.075
90% KM Chebyshev UCL	0.0876	95% KM Chebyshev UCL	0.104
97.5% KM Chebyshev UCL	0.128	99% KM Chebyshev UCL	0.174

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.374	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.222	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.785	k star (bias corrected MLE)	1.316
Theta hat (MLE)	0.0354	Theta star (bias corrected MLE)	0.048
nu hat (MLE)	35.7	nu star (bias corrected)	26.32
Mean (detects)	0.0632		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0085	Mean	0.0509
Maximum	0.13	Median	0.04
SD	0.0436	CV	0.857
k hat (MLE)	1.266	k star (bias corrected MLE)	1.025
Theta hat (MLE)	0.0402	Theta star (bias corrected MLE)	0.0496
nu hat (MLE)	32.91	nu star (bias corrected)	26.65
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (26.65, α)	15.88	Adjusted Chi Square Value (26.65, β)	14.71
95% Gamma Approximate UCL (use when n>=50)	0.0854	95% Gamma Adjusted UCL (use when n<50)	0.0922

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0503	SD (KM)	0.0425
Variance (KM)	0.0018	SE of Mean (KM)	0.0124
k hat (KM)	1.403	k star (KM)	1.131
nu hat (KM)	36.49	nu star (KM)	29.4
theta hat (KM)	0.0358	theta star (KM)	0.0445
80% gamma percentile (KM)	0.0801	90% gamma percentile (KM)	0.112
95% gamma percentile (KM)	0.144	99% gamma percentile (KM)	0.218

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (29.40, α)	18.02	Adjusted Chi Square Value (29.40, β)	16.76
95% Gamma Approximate KM-UCL (use when n>=50)	0.0821	95% Gamma Adjusted KM-UCL (use when n<50)	0.0882

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0499	Mean in Log Scale	-3.556
SD in Original Scale	0.0446	SD in Log Scale	1.234
95% t UCL (assumes normality of ROS data)	0.072	95% Percentile Bootstrap UCL	0.0694
95% BCA Bootstrap UCL	0.0709	95% Bootstrap t UCL	0.0747
95% H-UCL (Log ROS)	0.196		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.489	KM Geo Mean	0.0305
KM SD (logged)	1.091	95% Critical H Value (KM-Log)	3.007
KM Standard Error of Mean (logged)	0.319	95% H-UCL (KM -Log)	0.143
KM SD (logged)	1.091	95% Critical H Value (KM-Log)	3.007
KM Standard Error of Mean (logged)	0.319		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0495	Mean in Log Scale	-3.643

SD in Original Scale	0.0451	SD in Log Scale	1.358
95% t UCL (Assumes normality)	0.0718	95% H-Stat UCL	0.26

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0724

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

Chrysene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.026	Minimum Non-Detect	0.0075
Maximum Detect	0.31	Maximum Non-Detect	0.0081
Variance Detects	0.00896	Percent Non-Detects	23.08%
Mean Detects	0.144	SD Detects	0.0946
Median Detects	0.14	CV Detects	0.657
Skewness Detects	0.364	Kurtosis Detects	-0.762
Mean of Logged Detects	-2.209	SD of Logged Detects	0.86

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.957	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.109	Lilliefors GOF Test
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.113	KM Standard Error of Mean	0.0285
KM SD	0.0975	95% KM (BCA) UCL	0.159
95% KM (t) UCL	0.163	95% KM (Percentile Bootstrap) UCL	0.16
95% KM (z) UCL	0.159	95% KM Bootstrap t UCL	0.171
90% KM Chebyshev UCL	0.198	95% KM Chebyshev UCL	0.237
97.5% KM Chebyshev UCL	0.291	99% KM Chebyshev UCL	0.396

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.27	Anderson-Darling GOF Test
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.14	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.997	k star (bias corrected MLE)	1.464
Theta hat (MLE)	0.0721	Theta star (bias corrected MLE)	0.0983
nu hat (MLE)	39.93	nu star (bias corrected)	29.29
Mean (detects)	0.144		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.113

Maximum	0.31	Median	0.092
SD	0.101	CV	0.892
k hat (MLE)	0.992	k star (bias corrected MLE)	0.815
Theta hat (MLE)	0.114	Theta star (bias corrected MLE)	0.139
nu hat (MLE)	25.8	nu star (bias corrected)	21.18
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (21.18, α)	11.73	Adjusted Chi Square Value (21.18, β)	10.74
95% Gamma Approximate UCL (use when n>=50)	0.204	95% Gamma Adjusted UCL (use when n<50)	0.223

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.113	SD (KM)	0.0975
Variance (KM)	0.00951	SE of Mean (KM)	0.0285
k hat (KM)	1.331	k star (KM)	1.075
nu hat (KM)	34.6	nu star (KM)	27.95
theta hat (KM)	0.0845	theta star (KM)	0.105
80% gamma percentile (KM)	0.18	90% gamma percentile (KM)	0.254
95% gamma percentile (KM)	0.329	99% gamma percentile (KM)	0.5

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (27.95, α)	16.89	Adjusted Chi Square Value (27.95, β)	15.68
95% Gamma Approximate KM-UCL (use when n>=50)	0.186	95% Gamma Adjusted KM-UCL (use when n<50)	0.201

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.114	Mean in Log Scale	-2.668
SD in Original Scale	0.0995	SD in Log Scale	1.152
95% t UCL (assumes normality of ROS data)	0.164	95% Percentile Bootstrap UCL	0.16
95% BCA Bootstrap UCL	0.16	95% Bootstrap t UCL	0.173
95% H-UCL (Log ROS)	0.38		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.828	KM Geo Mean	0.0591
KM SD (logged)	1.338	95% Critical H Value (KM-Log)	3.467
KM Standard Error of Mean (logged)	0.391	95% H-UCL (KM -Log)	0.553
KM SD (logged)	1.338	95% Critical H Value (KM-Log)	3.467
KM Standard Error of Mean (logged)	0.391		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.112	Mean in Log Scale	-2.982
SD in Original Scale	0.102	SD in Log Scale	1.648
95% t UCL (Assumes normality)	0.162	95% H-Stat UCL	1.353

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.163

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

Cobalt

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	12
Minimum	4	Mean	58.48
Maximum	130	Median	49.95
SD	62.62	Std. Error of Mean	31.31
Coefficient of Variation	1.071	Skewness	0.306

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.862	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.29	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	132.2	95% Adjusted-CLT UCL (Chen-1995)	115.1
		95% Modified-t UCL (Johnson-1978)	133

Gamma GOF Test

A-D Test Statistic	0.45	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.672	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.298	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.406	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.704	k star (bias corrected MLE)	0.343
Theta hat (MLE)	83.08	Theta star (bias corrected MLE)	170.7
nu hat (MLE)	5.631	nu star (bias corrected)	2.741
MLE Mean (bias corrected)	58.48	MLE Sd (bias corrected)	99.9
		Approximate Chi Square Value (0.05)	0.3
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	534.2	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.274	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.386	Mean of logged Data	3.211
Maximum of Logged Data	4.868	SD of logged Data	1.742

Assuming Lognormal Distribution

95% H-UCL	11159222	90% Chebyshev (MVUE) UCL	200.7
95% Chebyshev (MVUE) UCL	262.4	97.5% Chebyshev (MVUE) UCL	348.1
99% Chebyshev (MVUE) UCL	516.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	110	95% Jackknife UCL	132.2
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	152.4	95% Chebyshev(Mean, Sd) UCL	195
97.5% Chebyshev(Mean, Sd) UCL	254	99% Chebyshev(Mean, Sd) UCL	370

Suggested UCL to Use

95% Student's-t UCL	132.2

Recommended UCL exceeds the maximum observation

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	9	Number of Distinct Non-Detects	2
Minimum Detect	0.0058	Minimum Non-Detect	0.0075
Maximum Detect	0.076	Maximum Non-Detect	0.0081
Variance Detects	4.3788E-4	Percent Non-Detects	23.08%
Mean Detects	0.0282	SD Detects	0.0209
Median Detects	0.027	CV Detects	0.743
Skewness Detects	1.328	Kurtosis Detects	2.398
Mean of Logged Detects	-3.846	SD of Logged Detects	0.84

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.87	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Detected Data Not Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.023	KM Standard Error of Mean	0.00579
KM SD	0.0198	95% KM (BCA) UCL	0.0327
95% KM (t) UCL	0.0333	95% KM (Percentile Bootstrap) UCL	0.0323
95% KM (z) UCL	0.0325	95% KM Bootstrap t UCL	0.0374
90% KM Chebyshev UCL	0.0404	95% KM Chebyshev UCL	0.0482
97.5% KM Chebyshev UCL	0.0591	99% KM Chebyshev UCL	0.0806

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.383	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.956	k star (bias corrected MLE)	1.436
Theta hat (MLE)	0.0144	Theta star (bias corrected MLE)	0.0196
nu hat (MLE)	39.13	nu star (bias corrected)	28.72
Mean (detects)	0.0282		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0058	Mean	0.024
Maximum	0.076	Median	0.023
SD	0.0198	CV	0.826
k hat (MLE)	1.869	k star (bias corrected MLE)	1.489
Theta hat (MLE)	0.0128	Theta star (bias corrected MLE)	0.0161
nu hat (MLE)	48.59	nu star (bias corrected)	38.71
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (38.71, α)	25.46	Adjusted Chi Square Value (38.71, β)	23.94
95% Gamma Approximate UCL (use when n>=50)	0.0365	95% Gamma Adjusted UCL (use when n<50)	0.0388

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.023	SD (KM)	0.0198
Variance (KM)	3.9159E-4	SE of Mean (KM)	0.00579
k hat (KM)	1.353	k star (KM)	1.092
nu hat (KM)	35.18	nu star (KM)	28.4
theta hat (KM)	0.017	theta star (KM)	0.0211
80% gamma percentile (KM)	0.0368	90% gamma percentile (KM)	0.0519
95% gamma percentile (KM)	0.0669	99% gamma percentile (KM)	0.101

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.40, α)	17.24	Adjusted Chi Square Value (28.40, β)	16.01
95% Gamma Approximate KM-UCL (use when n>=50)	0.0379	95% Gamma Adjusted KM-UCL (use when n<50)	0.0408

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0232	Mean in Log Scale	-4.122
SD in Original Scale	0.0205	SD in Log Scale	0.903
95% t UCL (assumes normality of ROS data)	0.0333	95% Percentile Bootstrap UCL	0.0331
95% BCA Bootstrap UCL	0.0347	95% Bootstrap t UCL	0.0379
95% H-UCL (Log ROS)	0.049		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.145	KM Geo Mean	0.0158
KM SD (logged)	0.887	95% Critical H Value (KM-Log)	2.657
KM Standard Error of Mean (logged)	0.259	95% H-UCL (KM -Log)	0.0463
KM SD (logged)	0.887	95% Critical H Value (KM-Log)	2.657
KM Standard Error of Mean (logged)	0.259		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0226	Mean in Log Scale	-4.242
SD in Original Scale	0.021	SD in Log Scale	1.046
95% t UCL (Assumes normality)	0.033	95% H-Stat UCL	0.0602

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0333

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	5
		Number of Missing Observations	7
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	4

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Diesel Range Organics (C10-C20) was not processed!

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	9
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	2
Minimum Detect	0.011	Minimum Non-Detect	0.0075
Maximum Detect	0.25	Maximum Non-Detect	0.0081
Variance Detects	0.00495	Percent Non-Detects	23.08%
Mean Detects	0.0899	SD Detects	0.0703
Median Detects	0.0835	CV Detects	0.782
Skewness Detects	1.3	Kurtosis Detects	2.331
Mean of Logged Detects	-2.748	SD of Logged Detects	0.967

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0709	KM Standard Error of Mean	0.0199
KM SD	0.068	95% KM (BCA) UCL	0.106
95% KM (t) UCL	0.106	95% KM (Percentile Bootstrap) UCL	0.102
95% KM (z) UCL	0.104	95% KM Bootstrap t UCL	0.118
90% KM Chebyshev UCL	0.131	95% KM Chebyshev UCL	0.158
97.5% KM Chebyshev UCL	0.195	99% KM Chebyshev UCL	0.269

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.341	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.211	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.271	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.62	k star (bias corrected MLE)	1.201
Theta hat (MLE)	0.0555	Theta star (bias corrected MLE)	0.0749
nu hat (MLE)	32.4	nu star (bias corrected)	24.01
Mean (detects)	0.0899		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0715
Maximum	0.25	Median	0.074
SD	0.0703	CV	0.983
k hat (MLE)	1.065	k star (bias corrected MLE)	0.87
Theta hat (MLE)	0.0671	Theta star (bias corrected MLE)	0.0821
nu hat (MLE)	27.68	nu star (bias corrected)	22.62
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (22.62, α)	12.81	Adjusted Chi Square Value (22.62, β)	11.77
95% Gamma Approximate UCL (use when n>=50)	0.126	95% Gamma Adjusted UCL (use when n<50)	0.137

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0709	SD (KM)	0.068
Variance (KM)	0.00463	SE of Mean (KM)	0.0199
k hat (KM)	1.085	k star (KM)	0.886
nu hat (KM)	28.22	nu star (KM)	23.04
theta hat (KM)	0.0653	theta star (KM)	0.08
80% gamma percentile (KM)	0.115	90% gamma percentile (KM)	0.168
95% gamma percentile (KM)	0.222	99% gamma percentile (KM)	0.347

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.04, α)	13.12	Adjusted Chi Square Value (23.04, β)	12.07
95% Gamma Approximate KM-UCL (use when n>=50)	0.124	95% Gamma Adjusted KM-UCL (use when n<50)	0.135

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0708	Mean in Log Scale	-3.258
SD in Original Scale	0.0709	SD in Log Scale	1.285
95% t UCL (assumes normality of ROS data)	0.106	95% Percentile Bootstrap UCL	0.105
95% BCA Bootstrap UCL	0.113	95% Bootstrap t UCL	0.12
95% H-UCL (Log ROS)	0.307		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.243	KM Geo Mean	0.039
KM SD (logged)	1.21	95% Critical H Value (KM-Log)	3.224
KM Standard Error of Mean (logged)	0.354	95% H-UCL (KM -Log)	0.25
KM SD (logged)	1.21	95% Critical H Value (KM-Log)	3.224
KM Standard Error of Mean (logged)	0.354		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.07	Mean in Log Scale	-3.397
SD in Original Scale	0.0716	SD in Log Scale	1.491
95% t UCL (Assumes normality)	0.105	95% H-Stat UCL	0.514

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.106

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

Manganese

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	12
Minimum	36	Mean	209
Maximum	370	Median	215
SD	137.1	Std. Error of Mean	68.54
Coefficient of Variation	0.656	Skewness	-0.258

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.224	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	370.3	95% Adjusted-CLT UCL (Chen-1995)	312.3
		95% Modified-t UCL (Johnson-1978)	368.8

Gamma GOF Test

A-D Test Statistic	0.392	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.661	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.323	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.398	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.911	k star (bias corrected MLE)	0.644
Theta hat (MLE)	109.4	Theta star (bias corrected MLE)	324.4
nu hat (MLE)	15.28	nu star (bias corrected)	5.154
MLE Mean (bias corrected)	209	MLE Sd (bias corrected)	260.4
		Approximate Chi Square Value (0.05)	1.224
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	880	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.849	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.343	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.584	Mean of logged Data	5.058
Maximum of Logged Data	5.914	SD of logged Data	1.018

Assuming Lognormal Distribution

95% H-UCL	14215	90% Chebyshev (MVUE) UCL	545.6
95% Chebyshev (MVUE) UCL	690.4	97.5% Chebyshev (MVUE) UCL	891.3
99% Chebyshev (MVUE) UCL	1286		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	321.7	95% Jackknife UCL	370.3
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	414.6	95% Chebyshev(Mean, Sd) UCL	507.8
97.5% Chebyshev(Mean, Sd) UCL	637	99% Chebyshev(Mean, Sd) UCL	891

Suggested UCL to Use

95% Student's-t UCL	370.3

Recommended UCL exceeds the maximum observation

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

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

Naphthalene

General Statistics

Total Number of Observations	13	Number of Distinct Observations	10
		Number of Missing Observations	9
Number of Detects	8	Number of Non-Detects	5
Number of Distinct Detects	7	Number of Distinct Non-Detects	4
Minimum Detect	0.0016	Minimum Non-Detect	0.0075
Maximum Detect	0.018	Maximum Non-Detect	0.11
Variance Detects	4.0673E-5	Percent Non-Detects	38.46%
Mean Detects	0.00959	SD Detects	0.00638
Median Detects	0.0087	CV Detects	0.665
Skewness Detects	0.215	Kurtosis Detects	-1.342
Mean of Logged Detects	-4.931	SD of Logged Detects	0.903

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.00797	KM Standard Error of Mean	0.00195
KM SD	0.00585	95% KM (BCA) UCL	0.0113
95% KM (t) UCL	0.0115	95% KM (Percentile Bootstrap) UCL	0.0112
95% KM (z) UCL	0.0112	95% KM Bootstrap t UCL	0.012
90% KM Chebyshev UCL	0.0138	95% KM Chebyshev UCL	0.0165
97.5% KM Chebyshev UCL	0.0202	99% KM Chebyshev UCL	0.0274

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.323	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.159	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.298	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.911	k star (bias corrected MLE)	1.278
Theta hat (MLE)	0.00502	Theta star (bias corrected MLE)	0.0075
nu hat (MLE)	30.57	nu star (bias corrected)	20.44
Mean (detects)	0.00959		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0016	Mean	0.00975
Maximum	0.018	Median	0.01
SD	0.00488	CV	0.5
k hat (MLE)	3.015	k star (bias corrected MLE)	2.37
Theta hat (MLE)	0.00323	Theta star (bias corrected MLE)	0.00411
nu hat (MLE)	78.38	nu star (bias corrected)	61.63
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (61.63, α)	44.57	Adjusted Chi Square Value (61.63, β)	42.51
95% Gamma Approximate UCL (use when n>=50)	0.0135	95% Gamma Adjusted UCL (use when n<50)	0.0141

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00797	SD (KM)	0.00585
Variance (KM)	3.4244E-5	SE of Mean (KM)	0.00195
k hat (KM)	1.855	k star (KM)	1.478
nu hat (KM)	48.24	nu star (KM)	38.44
theta hat (KM)	0.0043	theta star (KM)	0.00539
80% gamma percentile (KM)	0.0124	90% gamma percentile (KM)	0.0167
95% gamma percentile (KM)	0.0209	99% gamma percentile (KM)	0.0303

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (38.44, α)	25.24	Adjusted Chi Square Value (38.44, β)	23.72
95% Gamma Approximate KM-UCL (use when n>=50)	0.0121	95% Gamma Adjusted KM-UCL (use when n<50)	0.0129

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00749	Mean in Log Scale	-5.166
SD in Original Scale	0.00566	SD in Log Scale	0.788
95% t UCL (assumes normality of ROS data)	0.0103	95% Percentile Bootstrap UCL	0.0101
95% BCA Bootstrap UCL	0.0105	95% Bootstrap t UCL	0.0113
95% H-UCL (Log ROS)	0.0138		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.168	KM Geo Mean	0.00569
KM SD (logged)	0.878	95% Critical H Value (KM-Log)	2.643
KM Standard Error of Mean (logged)	0.315	95% H-UCL (KM -Log)	0.0164
KM SD (logged)	0.878	95% Critical H Value (KM-Log)	2.643
KM Standard Error of Mean (logged)	0.315		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0125	Mean in Log Scale	-4.844
SD in Original Scale	0.0142	SD in Log Scale	0.996
95% t UCL (Assumes normality)	0.0196	95% H-Stat UCL	0.0293

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0115

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

Nickel

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	12
Minimum	3.4	Mean	7.075
Maximum	12	Median	6.45
SD	4.028	Std. Error of Mean	2.014
Coefficient of Variation	0.569	Skewness	0.514

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	11.81	95% Adjusted-CLT UCL (Chen-1995)	10.94
		95% Modified-t UCL (Johnson-1978)	11.9

Gamma GOF Test

A-D Test Statistic	0.341	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.284	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.011	k star (bias corrected MLE)	1.169
Theta hat (MLE)	1.764	Theta star (bias corrected MLE)	6.05
nu hat (MLE)	32.09	nu star (bias corrected)	9.356
MLE Mean (bias corrected)	7.075	MLE Sd (bias corrected)	6.542
		Approximate Chi Square Value (0.05)	3.543
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	18.68	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.224	Mean of logged Data	1.827
Maximum of Logged Data	2.485	SD of logged Data	0.595

Assuming Lognormal Distribution

95% H-UCL	31.24	90% Chebyshev (MVUE) UCL	13.22
95% Chebyshev (MVUE) UCL	16.01	97.5% Chebyshev (MVUE) UCL	19.88
99% Chebyshev (MVUE) UCL	27.48		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	10.39	95% Jackknife UCL	11.81
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	13.12	95% Chebyshev(Mean, Sd) UCL	15.85
97.5% Chebyshev(Mean, Sd) UCL	19.65	99% Chebyshev(Mean, Sd) UCL	27.11

Suggested UCL to Use

95% Student's-t UCL	11.81

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	19	Number of Distinct Observations	15
		Number of Missing Observations	3
Number of Detects	6	Number of Non-Detects	13
Number of Distinct Detects	6	Number of Distinct Non-Detects	9
Minimum Detect	8.3000E-4	Minimum Non-Detect	8.9000E-4
Maximum Detect	0.092	Maximum Non-Detect	0.0096
Variance Detects	0.00165	Percent Non-Detects	68.42%
Mean Detects	0.0428	SD Detects	0.0406
Median Detects	0.0375	CV Detects	0.95
Skewness Detects	0.239	Kurtosis Detects	-2.327
Mean of Logged Detects	-4.105	SD of Logged Detects	1.968

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0142	KM Standard Error of Mean	0.00716
KM SD	0.0285	95% KM (BCA) UCL	0.0255
95% KM (t) UCL	0.0266	95% KM (Percentile Bootstrap) UCL	0.0262
95% KM (z) UCL	0.026	95% KM Bootstrap t UCL	0.0311
90% KM Chebyshev UCL	0.0357	95% KM Chebyshev UCL	0.0454
97.5% KM Chebyshev UCL	0.0589	99% KM Chebyshev UCL	0.0854

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.405	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.229	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.346	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.642	k star (bias corrected MLE)	0.432
Theta hat (MLE)	0.0666	Theta star (bias corrected MLE)	0.0989
nu hat (MLE)	7.706	nu star (bias corrected)	5.186
Mean (detects)	0.0428		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	8.3000E-4	Mean	0.0203
Maximum	0.092	Median	0.01
SD	0.0265	CV	1.304
k hat (MLE)	1.04	k star (bias corrected MLE)	0.911
Theta hat (MLE)	0.0196	Theta star (bias corrected MLE)	0.0223
nu hat (MLE)	39.54	nu star (bias corrected)	34.63
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (34.63, α)	22.17	Adjusted Chi Square Value (34.63, β)	21.3
95% Gamma Approximate UCL (use when n>=50)	0.0318	95% Gamma Adjusted UCL (use when n<50)	0.0331

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0142	SD (KM)	0.0285
Variance (KM)	8.1158E-4	SE of Mean (KM)	0.00716
k hat (KM)	0.248	k star (KM)	0.244
nu hat (KM)	9.417	nu star (KM)	9.264
theta hat (KM)	0.0572	theta star (KM)	0.0582
80% gamma percentile (KM)	0.0204	90% gamma percentile (KM)	0.0426
95% gamma percentile (KM)	0.0692	99% gamma percentile (KM)	0.14

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.26, α)	3.487	Adjusted Chi Square Value (9.26, β)	3.183
95% Gamma Approximate KM-UCL (use when n>=50)	0.0377	95% Gamma Adjusted KM-UCL (use when n<50)	0.0413

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0142	Mean in Log Scale	-6.221
SD in Original Scale	0.0293	SD in Log Scale	1.907
95% t UCL (assumes normality of ROS data)	0.0258	95% Percentile Bootstrap UCL	0.0265
95% BCA Bootstrap UCL	0.0285	95% Bootstrap t UCL	0.0386
95% H-UCL (Log ROS)	0.0768		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.079	KM Geo Mean	0.00229
KM SD (logged)	1.701	95% Critical H Value (KM-Log)	3.728
KM Standard Error of Mean (logged)	0.439	95% H-UCL (KM -Log)	0.0434
KM SD (logged)	1.701	95% Critical H Value (KM-Log)	3.728
KM Standard Error of Mean (logged)	0.439		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0147	Mean in Log Scale	-5.826
SD in Original Scale	0.029	SD in Log Scale	1.74
95% t UCL (Assumes normality)	0.0263	95% H-Stat UCL	0.0636

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0266

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

TCDD TEQ HH

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	12
Minimum	2.1300E-7	Mean	1.1378E-6
Maximum	2.5100E-6	Median	9.1400E-7
SD	1.0152E-6	Std. Error of Mean	5.0760E-7
Coefficient of Variation	N/A	Skewness	1.02

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.3323E-6	95% Adjusted-CLT UCL (Chen-1995)	2.2493E-6
		95% Modified-t UCL (Johnson-1978)	2.3754E-6

Gamma GOF Test

A-D Test Statistic	0.203	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.662	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.4	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.49	k star (bias corrected MLE)	0.539
Theta hat (MLE)	7.6362E-7	Theta star (bias corrected MLE)	2.1103E-6
nu hat (MLE)	11.92	nu star (bias corrected)	4.313
MLE Mean (bias corrected)	1.1378E-6	MLE Sd (bias corrected)	1.5495E-6
		Approximate Chi Square Value (0.05)	0.849
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.7788E-6	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.36	Mean of logged Data	-14.06
Maximum of Logged Data	-12.9	SD of logged Data	1.065

Assuming Lognormal Distribution

95% H-UCL	1.0729E-4	90% Chebyshev (MVUE) UCL	2.8719E-6
95% Chebyshev (MVUE) UCL	3.6459E-6	97.5% Chebyshev (MVUE) UCL	4.7201E-6
99% Chebyshev (MVUE) UCL	6.8303E-6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.9727E-6	95% Jackknife UCL	2.3323E-6
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	2.6605E-6	95% Chebyshev(Mean, Sd) UCL	3.3503E-6
97.5% Chebyshev(Mean, Sd) UCL	4.3077E-6	99% Chebyshev(Mean, Sd) UCL	6.1883E-6

Suggested UCL to Use

95% Student's-t UCL 2.3323E-6

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

Thallium

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
		Number of Missing Observations	12
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.037	Minimum Non-Detect	0.11
Maximum Detect	0.053	Maximum Non-Detect	0.11
Variance Detects	1.2800E-4	Percent Non-Detects	50%
Mean Detects	0.045	SD Detects	0.0113
Median Detects	0.045	CV Detects	0.251
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-3.117	SD of Logged Detects	0.254

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.045	KM Standard Error of Mean	0.008
KM SD	0.008	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0638	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0582	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.069	95% KM Chebyshev UCL	0.0799
97.5% KM Chebyshev UCL	0.095	99% KM Chebyshev UCL	0.125

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	31.3	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00144	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	125.2	nu star (bias corrected)	N/A
Mean (detects)	0.045		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.045	SD (KM)	0.008
Variance (KM)	6.4000E-5	SE of Mean (KM)	0.008
k hat (KM)	31.64	k star (KM)	8.077
nu hat (KM)	253.1	nu star (KM)	64.61
theta hat (KM)	0.00142	theta star (KM)	0.00557
80% gamma percentile (KM)	0.0575	90% gamma percentile (KM)	0.0661
95% gamma percentile (KM)	0.0738	99% gamma percentile (KM)	0.0897

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (64.61, α)	47.12	Adjusted Chi Square Value (64.61, β)	39.07
95% Gamma Approximate KM-UCL (use when n>=50)	0.0617	95% Gamma Adjusted KM-UCL (use when n<50)	0.0744

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.045	Mean in Log Scale	-3.117
SD in Original Scale	0.00924	SD in Log Scale	0.207
95% t UCL (assumes normality of ROS data)	0.0559	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	0.0609		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.117	KM Geo Mean	0.0443
KM SD (logged)	0.18	95% Critical H Value (KM-Log)	2.408
KM Standard Error of Mean (logged)	0.18	95% H-UCL (KM -Log)	0.0578
KM SD (logged)	0.18	95% Critical H Value (KM-Log)	2.408
KM Standard Error of Mean (logged)	0.18		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.05	Mean in Log Scale	-3.009
SD in Original Scale	0.00872	SD in Log Scale	0.193
95% t UCL (Assumes normality)	0.0603	95% H-Stat UCL	0.066

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0638	KM H-UCL	0.0578
95% KM (BCA) UCL	N/A		

Warning: One or more Recommended UCL(s) not available!

Warning: Recommended UCL exceeds the maximum observation

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

Vanadium

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	12
Minimum	8.6	Mean	23.65
Maximum	58	Median	14
SD	23.1	Std. Error of Mean	11.55
Coefficient of Variation	0.977	Skewness	1.898

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.749	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.38	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	50.83	95% Adjusted-CLT UCL (Chen-1995)	54.36
		95% Modified-t UCL (Johnson-1978)	52.66

Gamma GOF Test

A-D Test Statistic	0.501	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.661	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.346	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.398	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.839	k star (bias corrected MLE)	0.626
Theta hat (MLE)	12.86	Theta star (bias corrected MLE)	37.76
nu hat (MLE)	14.71	nu star (bias corrected)	5.011
MLE Mean (bias corrected)	23.65	MLE Sd (bias corrected)	29.88
		Approximate Chi Square Value (0.05)	1.157
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	102.4	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.152	Mean of logged Data	2.867
Maximum of Logged Data	4.06	SD of logged Data	0.835

Assuming Lognormal Distribution

95% H-UCL	376	90% Chebyshev (MVUE) UCL	49.39
95% Chebyshev (MVUE) UCL	61.54	97.5% Chebyshev (MVUE) UCL	78.4
99% Chebyshev (MVUE) UCL	111.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	42.65	95% Jackknife UCL	50.83
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	58.3	95% Chebyshev(Mean, Sd) UCL	73.99
97.5% Chebyshev(Mean, Sd) UCL	95.78	99% Chebyshev(Mean, Sd) UCL	138.6

Suggested UCL to Use

95% Student's-t UCL	50.83

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 3:04:26 PM
From File	Soil-WH_Laydown.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	74	Number of Distinct Observations	51
		Number of Missing Observations	170
Minimum	0.48	Mean	14.01
Maximum	190	Median	6.3
SD	25.7	Std. Error of Mean	2.988
Coefficient of Variation	1.835	Skewness	4.946

Normal GOF Test

Shapiro Wilk Test Statistic	0.493	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.103	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	18.99	95% Adjusted-CLT UCL (Chen-1995)	20.76
		95% Modified-t UCL (Johnson-1978)	19.28

Gamma GOF Test

A-D Test Statistic	3.406	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.79	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.175	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.108	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.818	k star (bias corrected MLE)	0.794
Theta hat (MLE)	17.12	Theta star (bias corrected MLE)	17.64
nu hat (MLE)	121.1	nu star (bias corrected)	117.5
MLE Mean (bias corrected)	14.01	MLE Sd (bias corrected)	15.72
		Approximate Chi Square Value (0.05)	93.5
Adjusted Level of Significance	0.0468	Adjusted Chi Square Value	93.07

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	17.61	95% Adjusted Gamma UCL (use when n<50)	17.69

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.191	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0943	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.103	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.734	Mean of logged Data	1.917
Maximum of Logged Data	5.247	SD of logged Data	1.114

Assuming Lognormal Distribution

95% H-UCL	17.22	90% Chebyshev (MVUE) UCL	18.43
95% Chebyshev (MVUE) UCL	21.13	97.5% Chebyshev (MVUE) UCL	24.88
99% Chebyshev (MVUE) UCL	32.23		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	18.93	95% Jackknife UCL	18.99
95% Standard Bootstrap UCL	18.94	95% Bootstrap-t UCL	23.27
95% Hall's Bootstrap UCL	38.29	95% Percentile Bootstrap UCL	19.18
95% BCA Bootstrap UCL	21.8		
90% Chebyshev(Mean, Sd) UCL	22.98	95% Chebyshev(Mean, Sd) UCL	27.04
97.5% Chebyshev(Mean, Sd) UCL	32.67	99% Chebyshev(Mean, Sd) UCL	43.74

Suggested UCL to Use

95% H-UCL	17.22

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

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	58
		Number of Missing Observations	138
Number of Detects	62	Number of Non-Detects	8
Number of Distinct Detects	53	Number of Distinct Non-Detects	6
Minimum Detect	0.0014	Minimum Non-Detect	0.0072
Maximum Detect	39	Maximum Non-Detect	0.7
Variance Detects	24.33	Percent Non-Detects	11.43%
Mean Detects	1.146	SD Detects	4.932
Median Detects	0.335	CV Detects	4.304
Skewness Detects	7.656	Kurtosis Detects	59.61
Mean of Logged Detects	-1.333	SD of Logged Detects	1.621

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.206	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.431	Lilliefors GOF Test
5% Lilliefors Critical Value	0.112	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.018	KM Standard Error of Mean	0.556
KM SD	4.618	95% KM (BCA) UCL	2.13
95% KM (t) UCL	1.946	95% KM (Percentile Bootstrap) UCL	2.145
95% KM (z) UCL	1.934	95% KM Bootstrap t UCL	6.794
90% KM Chebyshev UCL	2.688	95% KM Chebyshev UCL	3.444
97.5% KM Chebyshev UCL	4.494	99% KM Chebyshev UCL	6.555

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.065	Anderson-Darling GOF Test
5% A-D Critical Value	0.83	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.232	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.121	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.441	k star (bias corrected MLE)	0.43
Theta hat (MLE)	2.599	Theta star (bias corrected MLE)	2.663
nu hat (MLE)	54.68	nu star (bias corrected)	53.37
Mean (detects)	1.146		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0014	Mean	1.016
Maximum	39	Median	0.275
SD	4.652	CV	4.578
k hat (MLE)	0.384	k star (bias corrected MLE)	0.377
Theta hat (MLE)	2.643	Theta star (bias corrected MLE)	2.692
nu hat (MLE)	53.82	nu star (bias corrected)	52.84
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (52.84, α)	37.15	Adjusted Chi Square Value (52.84, β)	36.87
95% Gamma Approximate UCL (use when n>=50)	1.446	95% Gamma Adjusted UCL (use when n<50)	1.456

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.018	SD (KM)	4.618
Variance (KM)	21.33	SE of Mean (KM)	0.556
k hat (KM)	0.0486	k star (KM)	0.0561
nu hat (KM)	6.81	nu star (KM)	7.851
theta hat (KM)	20.94	theta star (KM)	18.16
80% gamma percentile (KM)	0.202	90% gamma percentile (KM)	1.785
95% gamma percentile (KM)	5.615	99% gamma percentile (KM)	21.14

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.85, α)	2.649	Adjusted Chi Square Value (7.85, β)	2.586
95% Gamma Approximate KM-UCL (use when n>=50)	3.019	95% Gamma Adjusted KM-UCL (use when n<50)	3.092

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.152	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.11	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.018	Mean in Log Scale	-1.658
SD in Original Scale	4.651	SD in Log Scale	1.797
95% t UCL (assumes normality of ROS data)	1.945	95% Percentile Bootstrap UCL	2.081
95% BCA Bootstrap UCL	2.813	95% Bootstrap t UCL	6.833
95% H-UCL (Log ROS)	1.698		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.802	KM Geo Mean	0.165
KM SD (logged)	2.059	95% Critical H Value (KM-Log)	2.938
KM Standard Error of Mean (logged)	0.256	95% H-UCL (KM -Log)	2.845
KM SD (logged)	2.059	95% Critical H Value (KM-Log)	2.938
KM Standard Error of Mean (logged)	0.256		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.02	Mean in Log Scale	-1.745
SD in Original Scale	4.651	SD in Log Scale	1.979
95% t UCL (Assumes normality)	1.947	95% H-Stat UCL	2.45

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 2.845

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	55
		Number of Missing Observations	138
Number of Detects	58	Number of Non-Detects	12
Number of Distinct Detects	47	Number of Distinct Non-Detects	10
Minimum Detect	0.0064	Minimum Non-Detect	0.0071
Maximum Detect	34	Maximum Non-Detect	0.7
Variance Detects	19.67	Percent Non-Detects	17.14%
Mean Detects	1.089	SD Detects	4.435
Median Detects	0.345	CV Detects	4.074
Skewness Detects	7.423	Kurtosis Detects	55.97
Mean of Logged Detects	-1.234	SD of Logged Detects	1.458

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.213	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.421	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.116	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.908	KM Standard Error of Mean	0.485
KM SD	4.022	95% KM (BCA) UCL	1.864
95% KM (t) UCL	1.716	95% KM (Percentile Bootstrap) UCL	1.887
95% KM (z) UCL	1.705	95% KM Bootstrap t UCL	6.065
90% KM Chebyshev UCL	2.362	95% KM Chebyshev UCL	3.021
97.5% KM Chebyshev UCL	3.936	99% KM Chebyshev UCL	5.732

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.948	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.819	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.223	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.124	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.484	k star (bias corrected MLE)	0.471
Theta hat (MLE)	2.249	Theta star (bias corrected MLE)	2.313
nu hat (MLE)	56.15	nu star (bias corrected)	54.58
Mean (detects)	1.089		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0064	Mean	0.904
Maximum	34	Median	0.25
SD	4.051	CV	4.483
k hat (MLE)	0.387	k star (bias corrected MLE)	0.38
Theta hat (MLE)	2.336	Theta star (bias corrected MLE)	2.38
nu hat (MLE)	54.15	nu star (bias corrected)	53.16
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (53.16, α)	37.41	Adjusted Chi Square Value (53.16, β)	37.14
95% Gamma Approximate UCL (use when n>=50)	1.284	95% Gamma Adjusted UCL (use when n<50)	1.294

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.908	SD (KM)	4.022
Variance (KM)	16.17	SE of Mean (KM)	0.485
k hat (KM)	0.051	k star (KM)	0.0583
nu hat (KM)	7.133	nu star (KM)	8.161
theta hat (KM)	17.82	theta star (KM)	15.57
80% gamma percentile (KM)	0.202	90% gamma percentile (KM)	1.658
95% gamma percentile (KM)	5.054	99% gamma percentile (KM)	18.54

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.16, α)	2.829	Adjusted Chi Square Value (8.16, β)	2.763
)5% Gamma Approximate KM-UCL (use when n>=50)	2.619	95% Gamma Adjusted KM-UCL (use when n<50)	2.681

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.969	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.278	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0967	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.116	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.907	Mean in Log Scale	-1.677
SD in Original Scale	4.051	SD in Log Scale	1.675
95% t UCL (assumes normality of ROS data)	1.714	95% Percentile Bootstrap UCL	1.865
95% BCA Bootstrap UCL	2.448	95% Bootstrap t UCL	5.736
95% H-UCL (Log ROS)	1.259		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.804	KM Geo Mean	0.165
KM SD (logged)	1.876	95% Critical H Value (KM-Log)	2.743
KM Standard Error of Mean (logged)	0.229	95% H-UCL (KM -Log)	1.779
KM SD (logged)	1.876	95% Critical H Value (KM-Log)	2.743
KM Standard Error of Mean (logged)	0.229		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.91	Mean in Log Scale	-1.813
SD in Original Scale	4.05	SD in Log Scale	1.961
95% t UCL (Assumes normality)	1.717	95% H-Stat UCL	2.185

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 1.779

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	55
		Number of Missing Observations	138
Number of Detects	60	Number of Non-Detects	10
Number of Distinct Detects	47	Number of Distinct Non-Detects	8
Minimum Detect	0.0017	Minimum Non-Detect	0.0072
Maximum Detect	45	Maximum Non-Detect	0.7
Variance Detects	33.25	Percent Non-Detects	14.29%
Mean Detects	1.283	SD Detects	5.766
Median Detects	0.405	CV Detects	4.494
Skewness Detects	7.636	Kurtosis Detects	58.83
Mean of Logged Detects	-1.187	SD of Logged Detects	1.596

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.191	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.418	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.114	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.106	KM Standard Error of Mean	0.64
KM SD	5.312	95% KM (BCA) UCL	2.387
95% KM (t) UCL	2.173	95% KM (Percentile Bootstrap) UCL	2.358
95% KM (z) UCL	2.159	95% KM Bootstrap t UCL	9.768
90% KM Chebyshev UCL	3.026	95% KM Chebyshev UCL	3.896
97.5% KM Chebyshev UCL	5.104	99% KM Chebyshev UCL	7.476

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.602	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.828	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.25	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.122	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.45	k star (bias corrected MLE)	0.438
Theta hat (MLE)	2.854	Theta star (bias corrected MLE)	2.928
nu hat (MLE)	53.96	nu star (bias corrected)	52.59
Mean (detects)	1.283		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0017	Mean	1.101
Maximum	45	Median	0.315
SD	5.351	CV	4.859
k hat (MLE)	0.375	k star (bias corrected MLE)	0.369
Theta hat (MLE)	2.935	Theta star (bias corrected MLE)	2.987
nu hat (MLE)	52.54	nu star (bias corrected)	51.62
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (51.62, α)	36.12	Adjusted Chi Square Value (51.62, β)	35.84
95% Gamma Approximate UCL (use when n>=50)	1.574	95% Gamma Adjusted UCL (use when n<50)	1.586

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.106	SD (KM)	5.312
Variance (KM)	28.22	SE of Mean (KM)	0.64
k hat (KM)	0.0433	k star (KM)	0.051
nu hat (KM)	6.065	nu star (KM)	7.138
theta hat (KM)	25.52	theta star (KM)	21.68
80% gamma percentile (KM)	0.161	90% gamma percentile (KM)	1.73
95% gamma percentile (KM)	5.921	99% gamma percentile (KM)	23.86

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.14, α)	2.247	Adjusted Chi Square Value (7.14, β)	2.19
95% Gamma Approximate KM-UCL (use when n>=50)	3.513	95% Gamma Adjusted KM-UCL (use when n<50)	3.604

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.00314	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.114	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.104	Mean in Log Scale	-1.558
SD in Original Scale	5.35	SD in Log Scale	1.759
95% t UCL (assumes normality of ROS data)	2.171	95% Percentile Bootstrap UCL	2.365
95% BCA Bootstrap UCL	3.077	95% Bootstrap t UCL	9.431
95% H-UCL (Log ROS)	1.718		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.727	KM Geo Mean	0.178
KM SD (logged)	2.064	95% Critical H Value (KM-Log)	2.942
KM Standard Error of Mean (logged)	0.26	95% H-UCL (KM -Log)	3.11

KM SD (logged)	2.064	95% Critical H Value (KM-Log)	2.942
KM Standard Error of Mean (logged)	0.26		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.108	Mean in Log Scale	-1.649
SD in Original Scale	5.35	SD in Log Scale	1.972
95% t UCL (Assumes normality)	2.174	95% H-Stat UCL	2.651

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 3.896

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	53
		Number of Missing Observations	138
Number of Detects	59	Number of Non-Detects	11
Number of Distinct Detects	46	Number of Distinct Non-Detects	9
Minimum Detect	0.0019	Minimum Non-Detect	0.0072
Maximum Detect	16	Maximum Non-Detect	0.7
Variance Detects	4.275	Percent Non-Detects	15.71%
Mean Detects	0.468	SD Detects	2.068
Median Detects	0.15	CV Detects	4.414
Skewness Detects	7.562	Kurtosis Detects	57.74
Mean of Logged Detects	-2.15	SD of Logged Detects	1.474

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.195	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.418	Lilliefors GOF Test
5% Lilliefors Critical Value	0.115	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.399	KM Standard Error of Mean	0.228
KM SD	1.889	95% KM (BCA) UCL	0.875
95% KM (t) UCL	0.779	95% KM (Percentile Bootstrap) UCL	0.85
95% KM (z) UCL	0.774	95% KM Bootstrap t UCL	3.307
90% KM Chebyshev UCL	1.082	95% KM Chebyshev UCL	1.392
97.5% KM Chebyshev UCL	1.821	99% KM Chebyshev UCL	2.665

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.424	Anderson-Darling GOF Test
5% A-D Critical Value	0.825	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.229	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.123	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.462	k star (bias corrected MLE)	0.45
Theta hat (MLE)	1.014	Theta star (bias corrected MLE)	1.041
nu hat (MLE)	54.52	nu star (bias corrected)	53.08
Mean (detects)	0.468		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0019	Mean	0.396
Maximum	16	Median	0.11
SD	1.903	CV	4.801
k hat (MLE)	0.407	k star (bias corrected MLE)	0.399
Theta hat (MLE)	0.973	Theta star (bias corrected MLE)	0.992
nu hat (MLE)	57.03	nu star (bias corrected)	55.92
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (55.92, α)	39.73	Adjusted Chi Square Value (55.92, β)	39.44
95% Gamma Approximate UCL (use when n>=50)	0.558	95% Gamma Adjusted UCL (use when n<50)	0.562

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.399	SD (KM)	1.889
Variance (KM)	3.568	SE of Mean (KM)	0.228
k hat (KM)	0.0447	k star (KM)	0.0523
nu hat (KM)	6.254	nu star (KM)	7.32
theta hat (KM)	8.937	theta star (KM)	7.636
80% gamma percentile (KM)	0.0631	90% gamma percentile (KM)	0.645
95% gamma percentile (KM)	2.156	99% gamma percentile (KM)	8.531

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.32, α)	2.348	Adjusted Chi Square Value (7.32, β)	2.289
95% Gamma Approximate KM-UCL (use when n>=50)	1.245	95% Gamma Adjusted KM-UCL (use when n<50)	1.277

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.965	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.18	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.101	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.115	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.398	Mean in Log Scale	-2.496
SD in Original Scale	1.903	SD in Log Scale	1.608
95% t UCL (assumes normality of ROS data)	0.777	95% Percentile Bootstrap UCL	0.848
95% BCA Bootstrap UCL	1.083	95% Bootstrap t UCL	3.285
95% H-UCL (Log ROS)	0.481		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.572	KM Geo Mean	0.0764
KM SD (logged)	1.744	95% Critical H Value (KM-Log)	2.586
KM Standard Error of Mean (logged)	0.219	95% H-UCL (KM -Log)	0.601
KM SD (logged)	1.744	95% Critical H Value (KM-Log)	2.586
KM Standard Error of Mean (logged)	0.219		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.403	Mean in Log Scale	-2.523
SD in Original Scale	1.902	SD in Log Scale	1.734
95% t UCL (Assumes normality)	0.782	95% H-Stat UCL	0.618

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	0.601

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	51
		Number of Missing Observations	138
Number of Detects	62	Number of Non-Detects	8
Number of Distinct Detects	46	Number of Distinct Non-Detects	6
Minimum Detect	0.0023	Minimum Non-Detect	0.0072
Maximum Detect	45	Maximum Non-Detect	0.7
Variance Detects	32.25	Percent Non-Detects	11.43%
Mean Detects	1.293	SD Detects	5.679
Median Detects	0.38	CV Detects	4.391
Skewness Detects	7.719	Kurtosis Detects	60.31
Mean of Logged Detects	-1.109	SD of Logged Detects	1.54

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.195	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.428	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.15	KM Standard Error of Mean	0.641
KM SD	5.317	95% KM (BCA) UCL	2.46
95% KM (t) UCL	2.218	95% KM (Percentile Bootstrap) UCL	2.408
95% KM (z) UCL	2.203	95% KM Bootstrap t UCL	9.1
90% KM Chebyshev UCL	3.072	95% KM Chebyshev UCL	3.942
97.5% KM Chebyshev UCL	5.15	99% KM Chebyshev UCL	7.524

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.098	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.823	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.246	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.12	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.47	k star (bias corrected MLE)	0.458
Theta hat (MLE)	2.755	Theta star (bias corrected MLE)	2.827
nu hat (MLE)	58.22	nu star (bias corrected)	56.74
Mean (detects)	1.293		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0023	Mean	1.147
Maximum	45	Median	0.34
SD	5.355	CV	4.67
k hat (MLE)	0.4	k star (bias corrected MLE)	0.392
Theta hat (MLE)	2.867	Theta star (bias corrected MLE)	2.923
nu hat (MLE)	55.99	nu star (bias corrected)	54.93
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (54.93, α)	38.89	Adjusted Chi Square Value (54.93, β)	38.61
95% Gamma Approximate UCL (use when n>=50)	1.619	95% Gamma Adjusted UCL (use when n<50)	1.631

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.15	SD (KM)	5.317
Variance (KM)	28.27	SE of Mean (KM)	0.641
k hat (KM)	0.0468	k star (KM)	0.0543
nu hat (KM)	6.545	nu star (KM)	7.598
theta hat (KM)	24.59	theta star (KM)	21.18
80% gamma percentile (KM)	0.205	90% gamma percentile (KM)	1.941
95% gamma percentile (KM)	6.28	99% gamma percentile (KM)	24.19

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.60, α)	2.505	Adjusted Chi Square Value (7.60, β)	2.444
95% Gamma Approximate KM-UCL (use when n>=50)	3.487	95% Gamma Adjusted KM-UCL (use when n<50)	3.575

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.921	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	5.0908E-4	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.112	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.149	Mean in Log Scale	-1.41
SD in Original Scale	5.355	SD in Log Scale	1.693
95% t UCL (assumes normality of ROS data)	2.217	95% Percentile Bootstrap UCL	2.414
95% BCA Bootstrap UCL	3.146	95% Bootstrap t UCL	8.932
95% H-UCL (Log ROS)	1.714		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.57	KM Geo Mean	0.208
KM SD (logged)	1.98	95% Critical H Value (KM-Log)	2.871
KM Standard Error of Mean (logged)	0.244	95% H-UCL (KM -Log)	2.931
KM SD (logged)	1.98	95% Critical H Value (KM-Log)	2.871
KM Standard Error of Mean (logged)	0.244		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.151	Mean in Log Scale	-1.546
SD in Original Scale	5.355	SD in Log Scale	1.964
95% t UCL (Assumes normality)	2.218	95% H-Stat UCL	2.879

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 3.942

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

Cobalt

General Statistics

Total Number of Observations	74	Number of Distinct Observations	54
		Number of Missing Observations	170
Minimum	1.1	Mean	14.09
Maximum	240	Median	6.5
SD	31.26	Std. Error of Mean	3.634
Coefficient of Variation	2.219	Skewness	5.925

Normal GOF Test

Shapiro Wilk Test Statistic	0.368	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.34	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.103	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	20.14	95% Adjusted-CLT UCL (Chen-1995)	22.74
		95% Modified-t UCL (Johnson-1978)	20.56

Gamma GOF Test

A-D Test Statistic	5.833	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.786	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.107	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.899	k star (bias corrected MLE)	0.871
Theta hat (MLE)	15.68	Theta star (bias corrected MLE)	16.17
nu hat (MLE)	133	nu star (bias corrected)	129
MLE Mean (bias corrected)	14.09	MLE Sd (bias corrected)	15.09
		Approximate Chi Square Value (0.05)	103.7
Adjusted Level of Significance	0.0468	Adjusted Chi Square Value	103.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	17.51	95% Adjusted Gamma UCL (use when n<50)	17.59

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	6.4229E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.103	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.0953	Mean of logged Data	1.995
Maximum of Logged Data	5.481	SD of logged Data	0.938

Assuming Lognormal Distribution

95% H-UCL	14.52	90% Chebyshev (MVUE) UCL	15.64
95% Chebyshev (MVUE) UCL	17.6	97.5% Chebyshev (MVUE) UCL	20.32
99% Chebyshev (MVUE) UCL	25.67		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	20.07	95% Jackknife UCL	20.14
95% Standard Bootstrap UCL	19.88	95% Bootstrap-t UCL	31.37
95% Hall's Bootstrap UCL	43.11	95% Percentile Bootstrap UCL	20.73
95% BCA Bootstrap UCL	23.88		
90% Chebyshev(Mean, Sd) UCL	24.99	95% Chebyshev(Mean, Sd) UCL	29.93
97.5% Chebyshev(Mean, Sd) UCL	36.78	99% Chebyshev(Mean, Sd) UCL	50.25

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	29.93

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	51
		Number of Missing Observations	138
Number of Detects	53	Number of Non-Detects	17
Number of Distinct Detects	39	Number of Distinct Non-Detects	13
Minimum Detect	0.0029	Minimum Non-Detect	0.0071
Maximum Detect	7.4	Maximum Non-Detect	0.7
Variance Detects	1.013	Percent Non-Detects	24.29%
Mean Detects	0.256	SD Detects	1.007
Median Detects	0.09	CV Detects	3.932
Skewness Detects	7.137	Kurtosis Detects	51.56
Mean of Logged Detects	-2.463	SD of Logged Detects	1.177

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.211	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.403	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.121	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.199	KM Standard Error of Mean	0.105
KM SD	0.874	95% KM (BCA) UCL	0.407
95% KM (t) UCL	0.375	95% KM (Percentile Bootstrap) UCL	0.401
95% KM (z) UCL	0.372	95% KM Bootstrap t UCL	1.389
90% KM Chebyshev UCL	0.515	95% KM Chebyshev UCL	0.659
97.5% KM Chebyshev UCL	0.857	99% KM Chebyshev UCL	1.248

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.176	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.809	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.129	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.566	k star (bias corrected MLE)	0.547
Theta hat (MLE)	0.452	Theta star (bias corrected MLE)	0.468
nu hat (MLE)	60.03	nu star (bias corrected)	57.97
Mean (detects)	0.256		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	0.196
Maximum	7.4	Median	0.057
SD	0.88	CV	4.485
k hat (MLE)	0.473	k star (bias corrected MLE)	0.462
Theta hat (MLE)	0.415	Theta star (bias corrected MLE)	0.425
nu hat (MLE)	66.21	nu star (bias corrected)	64.7
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (64.70, α)	47.19	Adjusted Chi Square Value (64.70, β)	46.88
95% Gamma Approximate UCL (use when n>=50)	0.269	95% Gamma Adjusted UCL (use when n<50)	0.271

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.199	SD (KM)	0.874
Variance (KM)	0.764	SE of Mean (KM)	0.105
k hat (KM)	0.0518	k star (KM)	0.0591
nu hat (KM)	7.249	nu star (KM)	8.272
theta hat (KM)	3.84	theta star (KM)	3.365
80% gamma percentile (KM)	0.0459	90% gamma percentile (KM)	0.368
95% gamma percentile (KM)	1.111	99% gamma percentile (KM)	4.038

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.27, α)	2.893	Adjusted Chi Square Value (8.27, β)	2.827
95% Gamma Approximate KM-UCL (use when n>=50)	0.568	95% Gamma Adjusted KM-UCL (use when n<50)	0.582

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.951	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.0562	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.121	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.198	Mean in Log Scale	-2.907

SD in Original Scale	0.88	SD in Log Scale	1.337
95% t UCL (assumes normality of ROS data)	0.374	95% Percentile Bootstrap UCL	0.407
95% BCA Bootstrap UCL	0.619	95% Bootstrap t UCL	1.397
95% H-UCL (Log ROS)	0.187		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.055	KM Geo Mean	0.0471
KM SD (logged)	1.57	95% Critical H Value (KM-Log)	2.387
KM Standard Error of Mean (logged)	0.202	95% H-UCL (KM -Log)	0.254
KM SD (logged)	1.57	95% Critical H Value (KM-Log)	2.387
KM Standard Error of Mean (logged)	0.202		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.204	Mean in Log Scale	-2.98
SD in Original Scale	0.88	SD in Log Scale	1.57
95% t UCL (Assumes normality)	0.379	95% H-Stat UCL	0.273

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.254

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	71	Number of Distinct Observations	44
		Number of Missing Observations	163
Number of Detects	40	Number of Non-Detects	31
Number of Distinct Detects	34	Number of Distinct Non-Detects	12
Minimum Detect	14	Minimum Non-Detect	18
Maximum Detect	11000	Maximum Non-Detect	200
Variance Detects	5451075	Percent Non-Detects	43.66%
Mean Detects	1145	SD Detects	2335
Median Detects	150	CV Detects	2.039
Skewness Detects	2.75	Kurtosis Detects	8.088
Mean of Logged Detects	5.327	SD of Logged Detects	1.854

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.555	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	653	KM Standard Error of Mean	218.6
KM SD	1818	95% KM (BCA) UCL	1058
95% KM (t) UCL	1017	95% KM (Percentile Bootstrap) UCL	1024
95% KM (z) UCL	1013	95% KM Bootstrap t UCL	1260
90% KM Chebyshev UCL	1309	95% KM Chebyshev UCL	1606
97.5% KM Chebyshev UCL	2018	99% KM Chebyshev UCL	2828

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.037	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.839	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.15	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.386	k star (bias corrected MLE)	0.373
Theta hat (MLE)	2969	Theta star (bias corrected MLE)	3066
nu hat (MLE)	30.85	nu star (bias corrected)	29.87
Mean (detects)	1145		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	645
Maximum	11000	Median	36
SD	1834	CV	2.843
k hat (MLE)	0.141	k star (bias corrected MLE)	0.145
Theta hat (MLE)	4560	Theta star (bias corrected MLE)	4452
nu hat (MLE)	20.09	nu star (bias corrected)	20.57
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (20.57, α)	11.27	Adjusted Chi Square Value (20.57, β)	11.13
95% Gamma Approximate UCL (use when n>=50)	1177	95% Gamma Adjusted UCL (use when n<50)	1192

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	653	SD (KM)	1818
Variance (KM)	3306529	SE of Mean (KM)	218.6
k hat (KM)	0.129	k star (KM)	0.133
nu hat (KM)	18.31	nu star (KM)	18.87
theta hat (KM)	5063	theta star (KM)	4913
80% gamma percentile (KM)	637.8	90% gamma percentile (KM)	1896
95% gamma percentile (KM)	3672	99% gamma percentile (KM)	8962

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (18.87, α)	10.03	Adjusted Chi Square Value (18.87, β)	9.892
95% Gamma Approximate KM-UCL (use when n>=50)	1229	95% Gamma Adjusted KM-UCL (use when n<50)	1246

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	649.6	Mean in Log Scale	3.874
SD in Original Scale	1833	SD in Log Scale	2.26
95% t UCL (assumes normality of ROS data)	1012	95% Percentile Bootstrap UCL	1044
95% BCA Bootstrap UCL	1170	95% Bootstrap t UCL	1241
95% H-UCL (Log ROS)	1698		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.222	KM Geo Mean	68.2
KM SD (logged)	1.877	95% Critical H Value (KM-Log)	3.247
KM Standard Error of Mean (logged)	0.227	95% H-UCL (KM -Log)	822.5
KM SD (logged)	1.877	95% Critical H Value (KM-Log)	3.247
KM Standard Error of Mean (logged)	0.227		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	653.8	Mean in Log Scale	4.159
SD in Original Scale	1831	SD in Log Scale	1.984
95% t UCL (Assumes normality)	1016	95% H-Stat UCL	1022

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 822.5

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	58
		Number of Missing Observations	138
Number of Detects	58	Number of Non-Detects	12
Number of Distinct Detects	49	Number of Distinct Non-Detects	10
Minimum Detect	0.0036	Minimum Non-Detect	0.0071
Maximum Detect	21	Maximum Non-Detect	0.7
Variance Detects	7.482	Percent Non-Detects	17.14%
Mean Detects	0.681	SD Detects	2.735
Median Detects	0.25	CV Detects	4.014
Skewness Detects	7.444	Kurtosis Detects	56.19
Mean of Logged Detects	-1.625	SD of Logged Detects	1.414

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.21	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.405	Lilliefors GOF Test
5% Lilliefors Critical Value	0.116	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.57	KM Standard Error of Mean	0.299
KM SD	2.481	95% KM (BCA) UCL	1.199
95% KM (t) UCL	1.068	95% KM (Percentile Bootstrap) UCL	1.157
95% KM (z) UCL	1.062	95% KM Bootstrap t UCL	3.799
90% KM Chebyshev UCL	1.467	95% KM Chebyshev UCL	1.873
97.5% KM Chebyshev UCL	2.437	99% KM Chebyshev UCL	3.546

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.953	Anderson-Darling GOF Test
5% A-D Critical Value	0.815	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.224	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.123	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.51	k star (bias corrected MLE)	0.495
Theta hat (MLE)	1.336	Theta star (bias corrected MLE)	1.377
nu hat (MLE)	59.15	nu star (bias corrected)	57.42
Mean (detects)	0.681		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0036	Mean	0.566
Maximum	21	Median	0.165
SD	2.499	CV	4.413
k hat (MLE)	0.417	k star (bias corrected MLE)	0.409
Theta hat (MLE)	1.358	Theta star (bias corrected MLE)	1.386
nu hat (MLE)	58.37	nu star (bias corrected)	57.21
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (57.21, α)	40.82	Adjusted Chi Square Value (57.21, β)	40.53
95% Gamma Approximate UCL (use when n>=50)	0.794	95% Gamma Adjusted UCL (use when n<50)	0.799

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.57	SD (KM)	2.481
Variance (KM)	6.154	SE of Mean (KM)	0.299
k hat (KM)	0.0527	k star (KM)	0.06
nu hat (KM)	7.381	nu star (KM)	8.398
theta hat (KM)	10.8	theta star (KM)	9.496
80% gamma percentile (KM)	0.137	90% gamma percentile (KM)	1.071
95% gamma percentile (KM)	3.192	99% gamma percentile (KM)	11.49

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.40, α)	2.968	Adjusted Chi Square Value (8.40, β)	2.9
95% Gamma Approximate KM-UCL (use when n>=50)	1.612	95% Gamma Adjusted KM-UCL (use when n<50)	1.649

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.962	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.147	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0956	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.116	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.569	Mean in Log Scale	-2.04
SD in Original Scale	2.499	SD in Log Scale	1.61
95% t UCL (assumes normality of ROS data)	1.067	95% Percentile Bootstrap UCL	1.164
95% BCA Bootstrap UCL	1.526	95% Bootstrap t UCL	3.885
95% H-UCL (Log ROS)	0.761		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.205	KM Geo Mean	0.11
KM SD (logged)	1.884	95% Critical H Value (KM-Log)	2.752
KM Standard Error of Mean (logged)	0.231	95% H-UCL (KM -Log)	1.214
KM SD (logged)	1.884	95% Critical H Value (KM-Log)	2.752
KM Standard Error of Mean (logged)	0.231		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.573	Mean in Log Scale	-2.137
SD in Original Scale	2.498	SD in Log Scale	1.839
95% t UCL (Assumes normality)	1.071	95% H-Stat UCL	1.163

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	1.214

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

Manganese

General Statistics

Total Number of Observations	74	Number of Distinct Observations	47
		Number of Missing Observations	170
Minimum	10	Mean	311.7
Maximum	6600	Median	160
SD	775.5	Std. Error of Mean	90.15
Coefficient of Variation	2.488	Skewness	7.551

Normal GOF Test

Shapiro Wilk Test Statistic	0.3	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.103	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	461.8	95% Adjusted-CLT UCL (Chen-1995)	544.5
		95% Modified-t UCL (Johnson-1978)	475

Gamma GOF Test

A-D Test Statistic	4.015	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.785	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.197	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.107	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.916	k star (bias corrected MLE)	0.888
Theta hat (MLE)	340.1	Theta star (bias corrected MLE)	350.9
nu hat (MLE)	135.6	nu star (bias corrected)	131.5
MLE Mean (bias corrected)	311.7	MLE Sd (bias corrected)	330.7
		Approximate Chi Square Value (0.05)	106
Adjusted Level of Significance	0.0468	Adjusted Chi Square Value	105.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	386.6	95% Adjusted Gamma UCL (use when n<50)	388.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.974	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	0.35	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0916	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.103	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.303	Mean of logged Data	5.105
Maximum of Logged Data	8.795	SD of logged Data	0.963

Assuming Lognormal Distribution

95% H-UCL	336.6	90% Chebyshev (MVUE) UCL	362.5
95% Chebyshev (MVUE) UCL	409.1	97.5% Chebyshev (MVUE) UCL	473.7
99% Chebyshev (MVUE) UCL	600.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	459.9	95% Jackknife UCL	461.8
95% Standard Bootstrap UCL	456.9	95% Bootstrap-t UCL	824.7
95% Hall's Bootstrap UCL	999.9	95% Percentile Bootstrap UCL	486.9
95% BCA Bootstrap UCL	619.9		
90% Chebyshev(Mean, Sd) UCL	582.1	95% Chebyshev(Mean, Sd) UCL	704.6
97.5% Chebyshev(Mean, Sd) UCL	874.6	99% Chebyshev(Mean, Sd) UCL	1209

Suggested UCL to Use

95% H-UCL 336.6

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

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.

Naphthalene

General Statistics

Total Number of Observations	70	Number of Distinct Observations	59
		Number of Missing Observations	138
Number of Detects	57	Number of Non-Detects	13
Number of Distinct Detects	49	Number of Distinct Non-Detects	10
Minimum Detect	0.002	Minimum Non-Detect	0.0071
Maximum Detect	0.44	Maximum Non-Detect	0.16
Variance Detects	0.0066	Percent Non-Detects	18.57%
Mean Detects	0.0862	SD Detects	0.0812
Median Detects	0.066	CV Detects	0.943
Skewness Detects	2.226	Kurtosis Detects	6.372
Mean of Logged Detects	-2.904	SD of Logged Detects	1.114

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.794	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	2.195E-10	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.204	Lilliefors GOF Test
5% Lilliefors Critical Value	0.117	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0716	KM Standard Error of Mean	0.00956
KM SD	0.0791	95% KM (BCA) UCL	0.0896
95% KM (t) UCL	0.0876	95% KM (Percentile Bootstrap) UCL	0.0876
95% KM (z) UCL	0.0873	95% KM Bootstrap t UCL	0.092
90% KM Chebyshev UCL	0.1	95% KM Chebyshev UCL	0.113
97.5% KM Chebyshev UCL	0.131	99% KM Chebyshev UCL	0.167

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.527	Anderson-Darling GOF Test
5% A-D Critical Value	0.774	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.101	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.121	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.246	k star (bias corrected MLE)	1.192
Theta hat (MLE)	0.0692	Theta star (bias corrected MLE)	0.0723
nu hat (MLE)	142	nu star (bias corrected)	135.9
Mean (detects)	0.0862		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.002	Mean	0.0724
Maximum	0.44	Median	0.0525
SD	0.0788	CV	1.088
k hat (MLE)	1.003	k star (bias corrected MLE)	0.969
Theta hat (MLE)	0.0722	Theta star (bias corrected MLE)	0.0747
nu hat (MLE)	140.4	nu star (bias corrected)	135.7
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (135.67, α)	109.8	Adjusted Chi Square Value (135.67, β)	109.3
95% Gamma Approximate UCL (use when n>=50)	0.0895	95% Gamma Adjusted UCL (use when n<50)	0.0899

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0716	SD (KM)	0.0791
Variance (KM)	0.00626	SE of Mean (KM)	0.00956
k hat (KM)	0.82	k star (KM)	0.794
nu hat (KM)	114.8	nu star (KM)	111.2
theta hat (KM)	0.0874	theta star (KM)	0.0902
80% gamma percentile (KM)	0.117	90% gamma percentile (KM)	0.174
95% gamma percentile (KM)	0.233	99% gamma percentile (KM)	0.371

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (111.20, α)	87.86	Adjusted Chi Square Value (111.20, β)	87.42
)5% Gamma Approximate KM-UCL (use when n>=50)	0.0907	95% Gamma Adjusted KM-UCL (use when n<50)	0.0911

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	8.9246E-4	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.117	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0721	Mean in Log Scale	-3.235
SD in Original Scale	0.079	SD in Log Scale	1.237
95% t UCL (assumes normality of ROS data)	0.0878	95% Percentile Bootstrap UCL	0.0877
95% BCA Bootstrap UCL	0.0915	95% Bootstrap t UCL	0.0926
95% H-UCL (Log ROS)	0.115		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.379	KM Geo Mean	0.0341
KM SD (logged)	1.455	95% Critical H Value (KM-Log)	2.236
KM Standard Error of Mean (logged)	0.183	95% H-UCL (KM -Log)	0.145
KM SD (logged)	1.455	95% Critical H Value (KM-Log)	2.236
KM Standard Error of Mean (logged)	0.183		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0722	Mean in Log Scale	-3.326
SD in Original Scale	0.0794	SD in Log Scale	1.396
95% t UCL (Assumes normality)	0.088	95% H-Stat UCL	0.137

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	0.0907	95% GROS Approximate Gamma UCL	0.0895

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

Nickel

General Statistics

Total Number of Observations	74	Number of Distinct Observations	58
		Number of Missing Observations	170
Minimum	0.78	Mean	320.1
Maximum	8000	Median	23.5
SD	1216	Std. Error of Mean	141.3
Coefficient of Variation	3.797	Skewness	5.681

Normal GOF Test

Shapiro Wilk Test Statistic	0.277	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.396	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.103	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	555.6	95% Adjusted-CLT UCL (Chen-1995)	652.3
		95% Modified-t UCL (Johnson-1978)	571.1

Gamma GOF Test

A-D Test Statistic	6.781	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.862	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.219	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.313	k star (bias corrected MLE)	0.31
Theta hat (MLE)	1021	Theta star (bias corrected MLE)	1033
nu hat (MLE)	46.4	nu star (bias corrected)	45.85
MLE Mean (bias corrected)	320.1	MLE Sd (bias corrected)	575.2
		Approximate Chi Square Value (0.05)	31.31
Adjusted Level of Significance	0.0468	Adjusted Chi Square Value	31.08

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	468.7	95% Adjusted Gamma UCL (use when n<50)	472.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0.0149	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.12	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.103	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.248	Mean of logged Data	3.585
Maximum of Logged Data	8.987	SD of logged Data	1.877

Assuming Lognormal Distribution

95% H-UCL	429.9	90% Chebyshev (MVUE) UCL	390.4
95% Chebyshev (MVUE) UCL	477.9	97.5% Chebyshev (MVUE) UCL	599.2
99% Chebyshev (MVUE) UCL	837.6		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	552.6	95% Jackknife UCL	555.6
95% Standard Bootstrap UCL	544.4	95% Bootstrap-t UCL	1499
95% Hall's Bootstrap UCL	1602	95% Percentile Bootstrap UCL	582.2
95% BCA Bootstrap UCL	664.8		
90% Chebyshev(Mean, Sd) UCL	744.1	95% Chebyshev(Mean, Sd) UCL	936.1
97.5% Chebyshev(Mean, Sd) UCL	1203	99% Chebyshev(Mean, Sd) UCL	1726

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	936.1

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	172	Number of Distinct Observations	128
		Number of Missing Observations	60
Number of Detects	152	Number of Non-Detects	20
Number of Distinct Detects	115	Number of Distinct Non-Detects	13
Minimum Detect	9.1000E-4	Minimum Non-Detect	8.8000E-4
Maximum Detect	14	Maximum Non-Detect	0.0099
Variance Detects	5.984	Percent Non-Detects	11.63%
Mean Detects	1.316	SD Detects	2.446
Median Detects	0.28	CV Detects	1.858
Skewness Detects	2.692	Kurtosis Detects	7.578
Mean of Logged Detects	-1.423	SD of Logged Detects	2.165

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.59	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0723	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.164	KM Standard Error of Mean	0.178
KM SD	2.33	95% KM (BCA) UCL	1.477
95% KM (t) UCL	1.458	95% KM (Percentile Bootstrap) UCL	1.45
95% KM (z) UCL	1.457	95% KM Bootstrap t UCL	1.502
90% KM Chebyshev UCL	1.698	95% KM Chebyshev UCL	1.941
97.5% KM Chebyshev UCL	2.277	99% KM Chebyshev UCL	2.937

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.009	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.847	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.122	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0816	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.389	k star (bias corrected MLE)	0.386
Theta hat (MLE)	3.382	Theta star (bias corrected MLE)	3.411
nu hat (MLE)	118.3	nu star (bias corrected)	117.3
Mean (detects)	1.316		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.1000E-4	Mean	1.165
Maximum	14	Median	0.19
SD	2.337	CV	2.007
k hat (MLE)	0.346	k star (bias corrected MLE)	0.344
Theta hat (MLE)	3.363	Theta star (bias corrected MLE)	3.384
nu hat (MLE)	119.1	nu star (bias corrected)	118.4
Adjusted Level of Significance (β)	0.0486		
Approximate Chi Square Value (118.38, α)	94.25	Adjusted Chi Square Value (118.38, β)	94.07
95% Gamma Approximate UCL (use when n>=50)	1.463	95% Gamma Adjusted UCL (use when n<50)	1.465

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.164	SD (KM)	2.33
Variance (KM)	5.431	SE of Mean (KM)	0.178
k hat (KM)	0.249	k star (KM)	0.249
nu hat (KM)	85.77	nu star (KM)	85.6
theta hat (KM)	4.667	theta star (KM)	4.676
80% gamma percentile (KM)	1.687	90% gamma percentile (KM)	3.494
95% gamma percentile (KM)	5.64	99% gamma percentile (KM)	11.36

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.60, α)	65.28	Adjusted Chi Square Value (85.60, β)	65.13
ı5% Gamma Approximate KM-UCL (use when n>=50)	1.526	95% Gamma Adjusted KM-UCL (use when n<50)	1.529

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.965	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.0145	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0523	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0723	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.164	Mean in Log Scale	-1.929

SD in Original Scale	2.337	SD in Log Scale	2.48
95% t UCL (assumes normality of ROS data)	1.459	95% Percentile Bootstrap UCL	1.48
95% BCA Bootstrap UCL	1.516	95% Bootstrap t UCL	1.53
95% H-UCL (Log ROS)	6.439		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2	KM Geo Mean	0.135
KM SD (logged)	2.588	95% Critical H Value (KM-Log)	3.903
KM Standard Error of Mean (logged)	0.2	95% H-UCL (KM -Log)	8.343
KM SD (logged)	2.588	95% Critical H Value (KM-Log)	3.903
KM Standard Error of Mean (logged)	0.2		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.164	Mean in Log Scale	-1.983
SD in Original Scale	2.337	SD in Log Scale	2.566
95% t UCL (Assumes normality)	1.458	95% H-Stat UCL	7.918

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 8.343

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

TCDD TEQ HH

General Statistics

Total Number of Observations	25	Number of Distinct Observations	24
		Number of Missing Observations	144
Minimum	6.0100E-7	Mean	1.3515E-5
Maximum	5.8700E-5	Median	4.6100E-6
SD	1.7226E-5	Std. Error of Mean	3.4453E-6
Coefficient of Variation	N/A	Skewness	1.528

Normal GOF Test

Shapiro Wilk Test Statistic	0.708	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.918	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.304	Lilliefors GOF Test
5% Lilliefors Critical Value	0.173	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1.9409E-5	95% Adjusted-CLT UCL (Chen-1995)	2.0307E-5
		95% Modified-t UCL (Johnson-1978)	1.9585E-5

Gamma GOF Test

A-D Test Statistic	1.528	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.781	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.181	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.81	k star (bias corrected MLE)	0.739
Theta hat (MLE)	1.6694E-5	Theta star (bias corrected MLE)	1.8286E-5
nu hat (MLE)	40.48	nu star (bias corrected)	36.95
MLE Mean (bias corrected)	1.3515E-5	MLE Sd (bias corrected)	1.5720E-5
		Approximate Chi Square Value (0.05)	24.04
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	23.33

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.0777E-5	95% Adjusted Gamma UCL (use when n<50)	2.1410E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.918	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.173	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.32	Mean of logged Data	-11.94
Maximum of Logged Data	-9.743	SD of logged Data	1.232

Assuming Lognormal Distribution

95% H-UCL	2.8080E-5	90% Chebyshev (MVUE) UCL	2.4762E-5
95% Chebyshev (MVUE) UCL	2.9996E-5	97.5% Chebyshev (MVUE) UCL	3.7261E-5
99% Chebyshev (MVUE) UCL	5.1531E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.9182E-5	95% Jackknife UCL	1.9409E-5
95% Standard Bootstrap UCL	1.9101E-5	95% Bootstrap-t UCL	2.1379E-5
95% Hall's Bootstrap UCL	1.9384E-5	95% Percentile Bootstrap UCL	1.9306E-5
95% BCA Bootstrap UCL	2.0311E-5		
90% Chebyshev(Mean, Sd) UCL	2.3851E-5	95% Chebyshev(Mean, Sd) UCL	2.8532E-5
97.5% Chebyshev(Mean, Sd) UCL	3.5031E-5	99% Chebyshev(Mean, Sd) UCL	4.7795E-5

Suggested UCL to Use

95% H-UCL	2.8080E-5

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

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

Thallium

General Statistics

Total Number of Observations	74	Number of Distinct Observations	30
		Number of Missing Observations	170
Number of Detects	58	Number of Non-Detects	16
Number of Distinct Detects	30	Number of Distinct Non-Detects	4
Minimum Detect	0.033	Minimum Non-Detect	0.1
Maximum Detect	1.6	Maximum Non-Detect	0.13
Variance Detects	0.0463	Percent Non-Detects	21.62%
Mean Detects	0.167	SD Detects	0.215
Median Detects	0.125	CV Detects	1.293
Skewness Detects	5.545	Kurtosis Detects	35.63
Mean of Logged Detects	-2.089	SD of Logged Detects	0.677

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.457	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.287	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.116	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.146	KM Standard Error of Mean	0.0227

KM SD	0.193	95% KM (BCA) UCL	0.193
95% KM (t) UCL	0.184	95% KM (Percentile Bootstrap) UCL	0.189
95% KM (z) UCL	0.183	95% KM Bootstrap t UCL	0.232
90% KM Chebyshev UCL	0.214	95% KM Chebyshev UCL	0.245
97.5% KM Chebyshev UCL	0.288	99% KM Chebyshev UCL	0.372

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.671	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.197	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.118	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.835	k star (bias corrected MLE)	1.752
Theta hat (MLE)	0.0907	Theta star (bias corrected MLE)	0.095
nu hat (MLE)	212.9	nu star (bias corrected)	203.2
Mean (detects)	0.167		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.137
Maximum	1.6	Median	0.11
SD	0.199	CV	1.45
k hat (MLE)	1.184	k star (bias corrected MLE)	1.145
Theta hat (MLE)	0.116	Theta star (bias corrected MLE)	0.12
nu hat (MLE)	175.3	nu star (bias corrected)	169.5
Adjusted Level of Significance (β)	0.0468		
Approximate Chi Square Value (169.51, α)	140.4	Adjusted Chi Square Value (169.51, β)	139.9
95% Gamma Approximate UCL (use when n>=50)	0.165	95% Gamma Adjusted UCL (use when n<50)	0.166

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.146	SD (KM)	0.193
Variance (KM)	0.0373	SE of Mean (KM)	0.0227
k hat (KM)	0.571	k star (KM)	0.557
nu hat (KM)	84.46	nu star (KM)	82.37
theta hat (KM)	0.256	theta star (KM)	0.262
80% gamma percentile (KM)	0.24	90% gamma percentile (KM)	0.386
95% gamma percentile (KM)	0.54	99% gamma percentile (KM)	0.914

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (82.37, α)	62.46	Adjusted Chi Square Value (82.37, β)	62.11
)5% Gamma Approximate KM-UCL (use when n>=50)	0.193	95% Gamma Adjusted KM-UCL (use when n<50)	0.194

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.943	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.0157	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.116	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.145	Mean in Log Scale	-2.229
SD in Original Scale	0.195	SD in Log Scale	0.67
95% t UCL (assumes normality of ROS data)	0.183	95% Percentile Bootstrap UCL	0.186
95% BCA Bootstrap UCL	0.206	95% Bootstrap t UCL	0.232
95% H-UCL (Log ROS)	0.157		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.221	KM Geo Mean	0.109
KM SD (logged)	0.666	95% Critical H Value (KM-Log)	1.964
KM Standard Error of Mean (logged)	0.0821	95% H-UCL (KM -Log)	0.158
KM SD (logged)	0.666	95% Critical H Value (KM-Log)	1.964

KM Standard Error of Mean (logged)	0.0821

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.143	Mean in Log Scale	-2.254
SD in Original Scale	0.195	SD in Log Scale	0.677
95% t UCL (Assumes normality)	0.181	95% H-Stat UCL	0.154

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.245

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

Vanadium

General Statistics

Total Number of Observations	80	Number of Distinct Observations	61
		Number of Missing Observations	164
Minimum	2.9	Mean	1472
Maximum	42000	Median	76.5
SD	6236	Std. Error of Mean	697.2
Coefficient of Variation	4.238	Skewness	5.968

Normal GOF Test

Shapiro Wilk Test Statistic	0.247	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.407	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0991	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2632	95% Adjusted-CLT UCL (Chen-1995)	3115
		95% Modified-t UCL (Johnson-1978)	2709

Gamma GOF Test

A-D Test Statistic	8.339	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.874	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.109	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.282	k star (bias corrected MLE)	0.28
Theta hat (MLE)	5211	Theta star (bias corrected MLE)	5253
nu hat (MLE)	45.18	nu star (bias corrected)	44.82
MLE Mean (bias corrected)	1472	MLE Sd (bias corrected)	2780
		Approximate Chi Square Value (0.05)	30.47
Adjusted Level of Significance	0.047	Adjusted Chi Square Value	30.25

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2165	95% Adjusted Gamma UCL (use when n<50)	2181

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	9.1502E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.112	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.0991	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.065	Mean of logged Data	4.828
Maximum of Logged Data	10.65	SD of logged Data	1.953

Assuming Lognormal Distribution

95% H-UCL	1771	90% Chebyshev (MVUE) UCL	1580
95% Chebyshev (MVUE) UCL	1938	97.5% Chebyshev (MVUE) UCL	2435
99% Chebyshev (MVUE) UCL	3411		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2618	95% Jackknife UCL	2632
95% Standard Bootstrap UCL	2633	95% Bootstrap-t UCL	7957
95% Hall's Bootstrap UCL	7717	95% Percentile Bootstrap UCL	2716
95% BCA Bootstrap UCL	3464		
90% Chebyshev(Mean, Sd) UCL	3563	95% Chebyshev(Mean, Sd) UCL	4510
97.5% Chebyshev(Mean, Sd) UCL	5825	99% Chebyshev(Mean, Sd) UCL	8408

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	4510

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 1:42:03 PM
From File	Soil-SalvYard.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	140
Minimum	0.39	Mean	5.421
Maximum	14	Median	2.9
SD	5.161	Std. Error of Mean	1.72
Coefficient of Variation	0.952	Skewness	0.877

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.846	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.243	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.62	95% Adjusted-CLT UCL (Chen-1995)	8.789
		95% Modified-t UCL (Johnson-1978)	8.704

Gamma GOF Test

A-D Test Statistic	0.303	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.742	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.164	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.286	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.073	k star (bias corrected MLE)	0.79
Theta hat (MLE)	5.051	Theta star (bias corrected MLE)	6.866
nu hat (MLE)	19.32	nu star (bias corrected)	14.21
MLE Mean (bias corrected)	5.421	MLE Sd (bias corrected)	6.101
		Approximate Chi Square Value (0.05)	6.717
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	5.666

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	11.47	95% Adjusted Gamma UCL (use when n<50)	13.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.18	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.942	Mean of logged Data	1.157
Maximum of Logged Data	2.639	SD of logged Data	1.208

Assuming Lognormal Distribution

95% H-UCL	32.31	90% Chebyshev (MVUE) UCL	13.22
95% Chebyshev (MVUE) UCL	16.55	97.5% Chebyshev (MVUE) UCL	21.18
99% Chebyshev (MVUE) UCL	30.27		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.251	95% Jackknife UCL	8.62
95% Standard Bootstrap UCL	8.089	95% Bootstrap-t UCL	10.7
95% Hall's Bootstrap UCL	9.392	95% Percentile Bootstrap UCL	8.254
95% BCA Bootstrap UCL	8.578		
90% Chebyshev(Mean, Sd) UCL	10.58	95% Chebyshev(Mean, Sd) UCL	12.92
97.5% Chebyshev(Mean, Sd) UCL	16.16	99% Chebyshev(Mean, Sd) UCL	22.54

Suggested UCL to Use

95% Student's-t UCL 8.62

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	80
		Number of Missing Observations	68
Number of Detects	81	Number of Non-Detects	16
Number of Distinct Detects	67	Number of Distinct Non-Detects	15
Minimum Detect	0.0036	Minimum Non-Detect	0.0076
Maximum Detect	530	Maximum Non-Detect	0.14
Variance Detects	4031	Percent Non-Detects	16.49%
Mean Detects	12.25	SD Detects	63.49
Median Detects	0.38	CV Detects	5.184
Skewness Detects	7.313	Kurtosis Detects	57.55
Mean of Logged Detects	-0.845	SD of Logged Detects	2.297

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.215	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.447	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0985	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	10.23	KM Standard Error of Mean	5.909
KM SD	57.84	95% KM (BCA) UCL	21.89
95% KM (t) UCL	20.04	95% KM (Percentile Bootstrap) UCL	20.86
95% KM (z) UCL	19.95	95% KM Bootstrap t UCL	55.29
90% KM Chebyshev UCL	27.96	95% KM Chebyshev UCL	35.99
97.5% KM Chebyshev UCL	47.13	99% KM Chebyshev UCL	69.03

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	10.21	Anderson-Darling GOF Test
5% A-D Critical Value	0.907	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.29	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.11	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.217	k star (bias corrected MLE)	0.217
Theta hat (MLE)	56.48	Theta star (bias corrected MLE)	56.43
nu hat (MLE)	35.13	nu star (bias corrected)	35.16
Mean (detects)	12.25		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0036	Mean	10.23
Maximum	530	Median	0.24
SD	58.14	CV	5.684
k hat (MLE)	0.195	k star (bias corrected MLE)	0.196
Theta hat (MLE)	52.48	Theta star (bias corrected MLE)	52.26
nu hat (MLE)	37.81	nu star (bias corrected)	37.98
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (37.98, α)	24.87	Adjusted Chi Square Value (37.98, β)	24.71
95% Gamma Approximate UCL (use when n>=50)	15.62	95% Gamma Adjusted UCL (use when n<50)	15.72

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	10.23	SD (KM)	57.84
Variance (KM)	3345	SE of Mean (KM)	5.909
k hat (KM)	0.0313	k star (KM)	0.0372
nu hat (KM)	6.068	nu star (KM)	7.213
theta hat (KM)	327	theta star (KM)	275.1
80% gamma percentile (KM)	0.395	90% gamma percentile (KM)	9.679
95% gamma percentile (KM)	46.92	99% gamma percentile (KM)	247.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.21, α)	2.288	Adjusted Chi Square Value (7.21, β)	2.247
95% Gamma Approximate KM-UCL (use when n>=50)	32.24	95% Gamma Adjusted KM-UCL (use when n<50)	32.84

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.971	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.224	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0689	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0985	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	10.23	Mean in Log Scale	-1.568
SD in Original Scale	58.14	SD in Log Scale	2.664
95% t UCL (assumes normality of ROS data)	20.03	95% Percentile Bootstrap UCL	21.42
95% BCA Bootstrap UCL	27.17	95% Bootstrap t UCL	55.99
95% H-UCL (Log ROS)	23.29		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.58	KM Geo Mean	0.206
KM SD (logged)	2.67	95% Critical H Value (KM-Log)	4.299
KM Standard Error of Mean (logged)	0.274	95% H-UCL (KM -Log)	23.48
KM SD (logged)	2.67	95% Critical H Value (KM-Log)	4.299
KM Standard Error of Mean (logged)	0.274		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	10.23	Mean in Log Scale	-1.581
SD in Original Scale	58.14	SD in Log Scale	2.692
95% t UCL (Assumes normality)	20.03	95% H-Stat UCL	25.29

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 23.48

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	86
		Number of Missing Observations	68
Number of Detects	80	Number of Non-Detects	17
Number of Distinct Detects	71	Number of Distinct Non-Detects	16
Minimum Detect	0.0032	Minimum Non-Detect	0.0076
Maximum Detect	420	Maximum Non-Detect	0.14
Variance Detects	2610	Percent Non-Detects	17.53%
Mean Detects	10.28	SD Detects	51.09
Median Detects	0.415	CV Detects	4.972
Skewness Detects	7.09	Kurtosis Detects	54.51
Mean of Logged Detects	-0.844	SD of Logged Detects	2.22

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.225	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.443	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0991	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	8.477	KM Standard Error of Mean	4.728
KM SD	46.27	95% KM (BCA) UCL	18.3
95% KM (t) UCL	16.33	95% KM (Percentile Bootstrap) UCL	17.17
95% KM (z) UCL	16.25	95% KM Bootstrap t UCL	43.4
90% KM Chebyshev UCL	22.66	95% KM Chebyshev UCL	29.09
97.5% KM Chebyshev UCL	38	99% KM Chebyshev UCL	55.52

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	9.989	Anderson-Darling GOF Test
5% A-D Critical Value	0.901	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.283	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.11	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.227	k star (bias corrected MLE)	0.227
Theta hat (MLE)	45.22	Theta star (bias corrected MLE)	45.26
nu hat (MLE)	36.36	nu star (bias corrected)	36.33
Mean (detects)	10.28		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0032	Mean	8.478
Maximum	420	Median	0.22
SD	46.51	CV	5.487
k hat (MLE)	0.202	k star (bias corrected MLE)	0.202
Theta hat (MLE)	42	Theta star (bias corrected MLE)	41.87
nu hat (MLE)	39.16	nu star (bias corrected)	39.28
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (39.28, α)	25.92	Adjusted Chi Square Value (39.28, β)	25.76
95% Gamma Approximate UCL (use when n>=50)	12.85	95% Gamma Adjusted UCL (use when n<50)	12.93

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	8.477	SD (KM)	46.27
Variance (KM)	2141	SE of Mean (KM)	4.728
k hat (KM)	0.0336	k star (KM)	0.0394
nu hat (KM)	6.51	nu star (KM)	7.642
theta hat (KM)	252.6	theta star (KM)	215.2
80% gamma percentile (KM)	0.433	90% gamma percentile (KM)	8.945
95% gamma percentile (KM)	40.31	99% gamma percentile (KM)	201.4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.64, α)	2.53	Adjusted Chi Square Value (7.64, β)	2.486
95% Gamma Approximate KM-UCL (use when n>=50)	25.61	95% Gamma Adjusted KM-UCL (use when n<50)	26.06

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.972	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.26	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0736	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0991	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	8.477	Mean in Log Scale	-1.616
SD in Original Scale	46.51	SD in Log Scale	2.63
95% t UCL (assumes normality of ROS data)	16.32	95% Percentile Bootstrap UCL	17.52
95% BCA Bootstrap UCL	22.34	95% Bootstrap t UCL	38.33
95% H-UCL (Log ROS)	19.74		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.646	KM Geo Mean	0.193
KM SD (logged)	2.662	95% Critical H Value (KM-Log)	4.289
KM Standard Error of Mean (logged)	0.274	95% H-UCL (KM -Log)	21.41
KM SD (logged)	2.662	95% Critical H Value (KM-Log)	4.289
KM Standard Error of Mean (logged)	0.274		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.477	Mean in Log Scale	-1.627
SD in Original Scale	46.51	SD in Log Scale	2.656
95% t UCL (Assumes normality)	16.32	95% H-Stat UCL	21.3

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	21.41

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	80
		Number of Missing Observations	68
Number of Detects	79	Number of Non-Detects	18
Number of Distinct Detects	65	Number of Distinct Non-Detects	16
Minimum Detect	0.0073	Minimum Non-Detect	0.0076
Maximum Detect	510	Maximum Non-Detect	0.14
Variance Detects	3867	Percent Non-Detects	18.56%
Mean Detects	12.64	SD Detects	62.18
Median Detects	0.53	CV Detects	4.92
Skewness Detects	7.1	Kurtosis Detects	54.59
Mean of Logged Detects	-0.482	SD of Logged Detects	2.137

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.226	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.442	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	10.3	KM Standard Error of Mean	5.72
KM SD	55.98	95% KM (BCA) UCL	20.71
95% KM (t) UCL	19.8	95% KM (Percentile Bootstrap) UCL	20.16
95% KM (z) UCL	19.7	95% KM Bootstrap t UCL	47.26
90% KM Chebyshev UCL	27.46	95% KM Chebyshev UCL	35.23
97.5% KM Chebyshev UCL	46.02	99% KM Chebyshev UCL	67.21

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	9.752	Anderson-Darling GOF Test
5% A-D Critical Value	0.896	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.277	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.111	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.237	k star (bias corrected MLE)	0.237
Theta hat (MLE)	53.28	Theta star (bias corrected MLE)	53.41
nu hat (MLE)	37.48	nu star (bias corrected)	37.39
Mean (detects)	12.64		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0073	Mean	10.3
Maximum	510	Median	0.35
SD	56.27	CV	5.465
k hat (MLE)	0.205	k star (bias corrected MLE)	0.205
Theta hat (MLE)	50.26	Theta star (bias corrected MLE)	50.13
nu hat (MLE)	39.74	nu star (bias corrected)	39.84
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (39.84, α)	26.38	Adjusted Chi Square Value (39.84, β)	26.22
95% Gamma Approximate UCL (use when n>=50)	15.55	95% Gamma Adjusted UCL (use when n<50)	15.65

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	10.3	SD (KM)	55.98
Variance (KM)	3134	SE of Mean (KM)	5.72
k hat (KM)	0.0338	k star (KM)	0.0397
nu hat (KM)	6.563	nu star (KM)	7.693
theta hat (KM)	304.3	theta star (KM)	259.6
80% gamma percentile (KM)	0.543	90% gamma percentile (KM)	11
95% gamma percentile (KM)	49.15	99% gamma percentile (KM)	244

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.69, α)	2.559	Adjusted Chi Square Value (7.69, β)	2.514
95% Gamma Approximate KM-UCL (use when n>=50)	30.96	95% Gamma Adjusted KM-UCL (use when n<50)	31.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.968	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.168	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0723	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	10.3	Mean in Log Scale	-1.306
SD in Original Scale	56.27	SD in Log Scale	2.597
95% t UCL (assumes normality of ROS data)	19.78	95% Percentile Bootstrap UCL	20.96
95% BCA Bootstrap UCL	26.67	95% Bootstrap t UCL	47.46
95% H-UCL (Log ROS)	24		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.297	KM Geo Mean	0.273
KM SD (logged)	2.569	95% Critical H Value (KM-Log)	4.162
KM Standard Error of Mean (logged)	0.263	95% H-UCL (KM -Log)	22.09
KM SD (logged)	2.569	95% Critical H Value (KM-Log)	4.162
KM Standard Error of Mean (logged)	0.263		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	10.3	Mean in Log Scale	-1.381
SD in Original Scale	56.27	SD in Log Scale	2.715
95% t UCL (Assumes normality)	19.78	95% H-Stat UCL	33.56

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 22.09

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	80
		Number of Missing Observations	68
Number of Detects	78	Number of Non-Detects	19
Number of Distinct Detects	65	Number of Distinct Non-Detects	17
Minimum Detect	0.003	Minimum Non-Detect	0.0076
Maximum Detect	200	Maximum Non-Detect	0.3
Variance Detects	603.8	Percent Non-Detects	19.59%
Mean Detects	5.005	SD Detects	24.57
Median Detects	0.215	CV Detects	4.909
Skewness Detects	7.012	Kurtosis Detects	53.48
Mean of Logged Detects	-1.485	SD of Logged Detects	2.128

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.228	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.444	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.1	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	4.026	KM Standard Error of Mean	2.246
KM SD	21.98	95% KM (BCA) UCL	8.455
95% KM (t) UCL	7.757	95% KM (Percentile Bootstrap) UCL	8.093
95% KM (z) UCL	7.721	95% KM Bootstrap t UCL	16.84
90% KM Chebyshev UCL	10.77	95% KM Chebyshev UCL	13.82
97.5% KM Chebyshev UCL	18.06	99% KM Chebyshev UCL	26.38

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	10.36	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.899	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.296	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.112	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.232	k star (bias corrected MLE)	0.232
Theta hat (MLE)	21.55	Theta star (bias corrected MLE)	21.59
nu hat (MLE)	36.22	nu star (bias corrected)	36.16
Mean (detects)	5.005		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.003	Mean	4.027
Maximum	200	Median	0.12
SD	22.1	CV	5.488
k hat (MLE)	0.209	k star (bias corrected MLE)	0.21
Theta hat (MLE)	19.23	Theta star (bias corrected MLE)	19.19
nu hat (MLE)	40.63	nu star (bias corrected)	40.7
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (40.70, α)	27.08	Adjusted Chi Square Value (40.70, β)	26.92
95% Gamma Approximate UCL (use when n>=50)	6.052	95% Gamma Adjusted UCL (use when n<50)	6.089

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.026	SD (KM)	21.98
Variance (KM)	483.2	SE of Mean (KM)	2.246
k hat (KM)	0.0336	k star (KM)	0.0394
nu hat (KM)	6.509	nu star (KM)	7.641
theta hat (KM)	120	theta star (KM)	102.2
80% gamma percentile (KM)	0.206	90% gamma percentile (KM)	4.247
95% gamma percentile (KM)	19.14	99% gamma percentile (KM)	95.66

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.64, α)	2.529	Adjusted Chi Square Value (7.64, β)	2.485
95% Gamma Approximate KM-UCL (use when n>=50)	12.17	95% Gamma Adjusted KM-UCL (use when n<50)	12.38

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.96	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.0488	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.09	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.1	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.026	Mean in Log Scale	-2.284
SD in Original Scale	22.1	SD in Log Scale	2.522
95% t UCL (assumes normality of ROS data)	7.752	95% Percentile Bootstrap UCL	8.154
95% BCA Bootstrap UCL	10.29	95% Bootstrap t UCL	17.25
95% H-UCL (Log ROS)	7.042		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.234	KM Geo Mean	0.107
KM SD (logged)	2.45	95% Critical H Value (KM-Log)	4.002
KM Standard Error of Mean (logged)	0.255	95% H-UCL (KM -Log)	5.866
KM SD (logged)	2.45	95% Critical H Value (KM-Log)	4.002
KM Standard Error of Mean (logged)	0.255		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.028	Mean in Log Scale	-2.201
SD in Original Scale	22.1	SD in Log Scale	2.44
95% t UCL (Assumes normality)	7.754	95% H-Stat UCL	5.862

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 5.866

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

Chrysene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	79
		Number of Missing Observations	68
Number of Detects	82	Number of Non-Detects	15
Number of Distinct Detects	67	Number of Distinct Non-Detects	14
Minimum Detect	0.0033	Minimum Non-Detect	0.0076
Maximum Detect	450	Maximum Non-Detect	0.14
Variance Detects	2940	Percent Non-Detects	15.46%
Mean Detects	10.78	SD Detects	54.22
Median Detects	0.42	CV Detects	5.032
Skewness Detects	7.16	Kurtosis Detects	55.48
Mean of Logged Detects	-0.831	SD of Logged Detects	2.288

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.222	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.447	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.098	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	9.111	KM Standard Error of Mean	5.078
KM SD	49.7	95% KM (BCA) UCL	20
95% KM (t) UCL	17.54	95% KM (Percentile Bootstrap) UCL	18.08
95% KM (z) UCL	17.46	95% KM Bootstrap t UCL	43.95
90% KM Chebyshev UCL	24.34	95% KM Chebyshev UCL	31.24
97.5% KM Chebyshev UCL	40.82	99% KM Chebyshev UCL	59.63

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	9.929	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.903	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.291	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.109	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.225	k star (bias corrected MLE)	0.225
Theta hat (MLE)	47.87	Theta star (bias corrected MLE)	47.9
nu hat (MLE)	36.92	nu star (bias corrected)	36.9
Mean (detects)	10.78		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0033	Mean	9.112
Maximum	450	Median	0.23
SD	49.96	CV	5.483
k hat (MLE)	0.203	k star (bias corrected MLE)	0.203
Theta hat (MLE)	44.97	Theta star (bias corrected MLE)	44.83
nu hat (MLE)	39.31	nu star (bias corrected)	39.43
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (39.43, α)	26.04	Adjusted Chi Square Value (39.43, β)	25.88
95% Gamma Approximate UCL (use when n>=50)	13.79	95% Gamma Adjusted UCL (use when n<50)	13.88

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.111	SD (KM)	49.7
Variance (KM)	2470	SE of Mean (KM)	5.078
k hat (KM)	0.0336	k star (KM)	0.0394
nu hat (KM)	6.519	nu star (KM)	7.651
theta hat (KM)	271.1	theta star (KM)	231
80% gamma percentile (KM)	0.468	90% gamma percentile (KM)	9.634
95% gamma percentile (KM)	43.35	99% gamma percentile (KM)	216.4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.65, α)	2.535	Adjusted Chi Square Value (7.65, β)	2.491
)5% Gamma Approximate KM-UCL (use when n>=50)	27.5	95% Gamma Adjusted KM-UCL (use when n<50)	27.99

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.971	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.221	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0751	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.098	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.111	Mean in Log Scale	-1.483
SD in Original Scale	49.96	SD in Log Scale	2.605
95% t UCL (assumes normality of ROS data)	17.54	95% Percentile Bootstrap UCL	18.43
95% BCA Bootstrap UCL	24.88	95% Bootstrap t UCL	45.15
95% H-UCL (Log ROS)	20.69		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.541	KM Geo Mean	0.214
KM SD (logged)	2.678	95% Critical H Value (KM-Log)	4.31
KM Standard Error of Mean (logged)	0.275	95% H-UCL (KM -Log)	25.11
KM SD (logged)	2.678	95% Critical H Value (KM-Log)	4.31
KM Standard Error of Mean (logged)	0.275		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.112	Mean in Log Scale	-1.522
SD in Original Scale	49.96	SD in Log Scale	2.67
95% t UCL (Assumes normality)	17.54	95% H-Stat UCL	24.86

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 25.11

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

Cobalt

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	140
Minimum	2.9	Mean	6.111
Maximum	17	Median	4.4
SD	4.516	Std. Error of Mean	1.505
Coefficient of Variation	0.739	Skewness	2.187

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.675	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.392	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.91	95% Adjusted-CLT UCL (Chen-1995)	9.76
		95% Modified-t UCL (Johnson-1978)	9.093

Gamma GOF Test

A-D Test Statistic	1.041	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.726	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.366	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.281	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.176	k star (bias corrected MLE)	2.191
Theta hat (MLE)	1.924	Theta star (bias corrected MLE)	2.789
nu hat (MLE)	57.17	nu star (bias corrected)	39.45
MLE Mean (bias corrected)	6.111	MLE Sd (bias corrected)	4.128
		Approximate Chi Square Value (0.05)	26.06
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	23.79

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.251	95% Adjusted Gamma UCL (use when n<50)	10.13

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.819	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.065	Mean of logged Data	1.644
Maximum of Logged Data	2.833	SD of logged Data	0.555

Assuming Lognormal Distribution

95% H-UCL	9.544	90% Chebyshev (MVUE) UCL	9.275
95% Chebyshev (MVUE) UCL	10.79	97.5% Chebyshev (MVUE) UCL	12.9
99% Chebyshev (MVUE) UCL	17.03		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	8.587	95% Jackknife UCL	8.91
95% Standard Bootstrap UCL	8.45	95% Bootstrap-t UCL	20.78
95% Hall's Bootstrap UCL	27.52	95% Percentile Bootstrap UCL	8.722
95% BCA Bootstrap UCL	9.311		
90% Chebyshev(Mean, Sd) UCL	10.63	95% Chebyshev(Mean, Sd) UCL	12.67
97.5% Chebyshev(Mean, Sd) UCL	15.51	99% Chebyshev(Mean, Sd) UCL	21.09

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	12.67

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	75
		Number of Missing Observations	68
Number of Detects	67	Number of Non-Detects	30
Number of Distinct Detects	54	Number of Distinct Non-Detects	23
Minimum Detect	0.0046	Minimum Non-Detect	0.0076
Maximum Detect	62	Maximum Non-Detect	1.7
Variance Detects	61.39	Percent Non-Detects	30.93%
Mean Detects	1.578	SD Detects	7.835
Median Detects	0.11	CV Detects	4.966
Skewness Detects	7.273	Kurtosis Detects	55.76
Mean of Logged Detects	-2.141	SD of Logged Detects	1.9

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.216	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.445	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.096	KM Standard Error of Mean	0.665
KM SD	6.503	95% KM (BCA) UCL	2.377
95% KM (t) UCL	2.201	95% KM (Percentile Bootstrap) UCL	2.34
95% KM (z) UCL	2.19	95% KM Bootstrap t UCL	10.06
90% KM Chebyshev UCL	3.092	95% KM Chebyshev UCL	3.996
97.5% KM Chebyshev UCL	5.251	99% KM Chebyshev UCL	7.715

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	8.216	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.88	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.288	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.119	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.27	k star (bias corrected MLE)	0.268
Theta hat (MLE)	5.842	Theta star (bias corrected MLE)	5.888
nu hat (MLE)	36.19	nu star (bias corrected)	35.91
Mean (detects)	1.578		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0046	Mean	1.093
Maximum	62	Median	0.036
SD	6.537	CV	5.981
k hat (MLE)	0.239	k star (bias corrected MLE)	0.239
Theta hat (MLE)	4.571	Theta star (bias corrected MLE)	4.581
nu hat (MLE)	46.39	nu star (bias corrected)	46.29
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (46.29, α)	31.68	Adjusted Chi Square Value (46.29, β)	31.49
95% Gamma Approximate UCL (use when n>=50)	1.597	95% Gamma Adjusted UCL (use when n<50)	1.606

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.096	SD (KM)	6.503
Variance (KM)	42.29	SE of Mean (KM)	0.665
k hat (KM)	0.0284	k star (KM)	0.0344
nu hat (KM)	5.511	nu star (KM)	6.674
theta hat (KM)	38.58	theta star (KM)	31.86
80% gamma percentile (KM)	0.028	90% gamma percentile (KM)	0.883
95% gamma percentile (KM)	4.761	99% gamma percentile (KM)	27.21

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.67, α)	1.993	Adjusted Chi Square Value (6.67, β)	1.955
95% Gamma Approximate KM-UCL (use when n>=50)	3.67	95% Gamma Adjusted KM-UCL (use when n<50)	3.741

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.955	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.0405	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.077	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.092	Mean in Log Scale	-3.12
SD in Original Scale	6.537	SD in Log Scale	2.216
95% t UCL (assumes normality of ROS data)	2.195	95% Percentile Bootstrap UCL	2.33
95% BCA Bootstrap UCL	3.352	95% Bootstrap t UCL	6.504
95% H-UCL (Log ROS)	1.185		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.985	KM Geo Mean	0.0505
KM SD (logged)	2.076	95% Critical H Value (KM-Log)	3.508
KM Standard Error of Mean (logged)	0.217	95% H-UCL (KM -Log)	0.918
KM SD (logged)	2.076	95% Critical H Value (KM-Log)	3.508
KM Standard Error of Mean (logged)	0.217		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.111	Mean in Log Scale	-2.887
SD in Original Scale	6.535	SD in Log Scale	2.133
95% t UCL (Assumes normality)	2.213	95% H-Stat UCL	1.184

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.918

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	25	Number of Distinct Observations	17
		Number of Missing Observations	143
Number of Detects	13	Number of Non-Detects	12
Number of Distinct Detects	12	Number of Distinct Non-Detects	6
Minimum Detect	20	Minimum Non-Detect	18
Maximum Detect	7900	Maximum Non-Detect	370
Variance Detects	5233218	Percent Non-Detects	48%
Mean Detects	1255	SD Detects	2288
Median Detects	150	CV Detects	1.823
Skewness Detects	2.427	Kurtosis Detects	6.104
Mean of Logged Detects	5.672	SD of Logged Detects	1.802

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.607	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	663	KM Standard Error of Mean	354
KM SD	1701	95% KM (BCA) UCL	1306
95% KM (t) UCL	1269	95% KM (Percentile Bootstrap) UCL	1310
95% KM (z) UCL	1245	95% KM Bootstrap t UCL	2009
90% KM Chebyshev UCL	1725	95% KM Chebyshev UCL	2206
97.5% KM Chebyshev UCL	2874	99% KM Chebyshev UCL	4186

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.958	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.801	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.252	)etected data appear Gamma Distributed at 5% Significance Leve

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.443	k star (bias corrected MLE)	0.392
Theta hat (MLE)	2836	Theta star (bias corrected MLE)	3204
nu hat (MLE)	11.51	nu star (bias corrected)	10.18
Mean (detects)	1255		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	652.7
Maximum	7900	Median	20
SD	1740	CV	2.665
k hat (MLE)	0.136	k star (bias corrected MLE)	0.146
Theta hat (MLE)	4807	Theta star (bias corrected MLE)	4466
nu hat (MLE)	6.789	nu star (bias corrected)	7.307
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (7.31, α)	2.341	Adjusted Chi Square Value (7.31, β)	2.154
95% Gamma Approximate UCL (use when n>=50)	2038	95% Gamma Adjusted UCL (use when n<50)	2215

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	663	SD (KM)	1701
Variance (KM)	2892100	SE of Mean (KM)	354
k hat (KM)	0.152	k star (KM)	0.16
nu hat (KM)	7.6	nu star (KM)	8.021
theta hat (KM)	4362	theta star (KM)	4133
80% gamma percentile (KM)	760.6	90% gamma percentile (KM)	1982
95% gamma percentile (KM)	3600	99% gamma percentile (KM)	8231

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.02, α)	2.747	Adjusted Chi Square Value (8.02, β)	2.541
)5% Gamma Approximate KM-UCL (use when n>=50)	1936	95% Gamma Adjusted KM-UCL (use when n<50)	2093

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.188	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	655.1	Mean in Log Scale	3.52
SD in Original Scale	1739	SD in Log Scale	2.717
95% t UCL (assumes normality of ROS data)	1250	95% Percentile Bootstrap UCL	1294
95% BCA Bootstrap UCL	1566	95% Bootstrap t UCL	2072
95% H-UCL (Log ROS)	23833		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.365	KM Geo Mean	78.63
KM SD (logged)	1.86	95% Critical H Value (KM-Log)	3.753
KM Standard Error of Mean (logged)	0.389	95% H-UCL (KM -Log)	1845
KM SD (logged)	1.86	95% Critical H Value (KM-Log)	3.753
KM Standard Error of Mean (logged)	0.389		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	664.4	Mean in Log Scale	4.165
SD in Original Scale	1735	SD in Log Scale	2.125
95% t UCL (Assumes normality)	1258	95% H-Stat UCL	3775

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) 2093

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	87
		Number of Missing Observations	68
Number of Detects	79	Number of Non-Detects	18
Number of Distinct Detects	71	Number of Distinct Non-Detects	16
Minimum Detect	0.0034	Minimum Non-Detect	0.0076
Maximum Detect	260	Maximum Non-Detect	0.14
Variance Detects	1039	Percent Non-Detects	18.56%
Mean Detects	6.692	SD Detects	32.23
Median Detects	0.3	CV Detects	4.816
Skewness Detects	6.877	Kurtosis Detects	51.29
Mean of Logged Detects	-1.074	SD of Logged Detects	2.111

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.232	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.45	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	5.452	KM Standard Error of Mean	2.965
KM SD	29.02	95% KM (BCA) UCL	10.84
95% KM (t) UCL	10.38	95% KM (Percentile Bootstrap) UCL	10.88
95% KM (z) UCL	10.33	95% KM Bootstrap t UCL	25.84
90% KM Chebyshev UCL	14.35	95% KM Chebyshev UCL	18.38
97.5% KM Chebyshev UCL	23.97	99% KM Chebyshev UCL	34.95

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	9.886	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.895	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.283	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.111	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.24	k star (bias corrected MLE)	0.24
Theta hat (MLE)	27.85	Theta star (bias corrected MLE)	27.93
nu hat (MLE)	37.96	nu star (bias corrected)	37.86
Mean (detects)	6.692		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0034	Mean	5.452
Maximum	260	Median	0.17
SD	29.17	CV	5.349
k hat (MLE)	0.213	k star (bias corrected MLE)	0.213
Theta hat (MLE)	25.63	Theta star (bias corrected MLE)	25.59
nu hat (MLE)	41.28	nu star (bias corrected)	41.33
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (41.33, α)	27.6	Adjusted Chi Square Value (41.33, β)	27.43
95% Gamma Approximate UCL (use when n>=50)	8.166	95% Gamma Adjusted UCL (use when n<50)	8.216

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	5.452	SD (KM)	29.02
Variance (KM)	842	SE of Mean (KM)	2.965
k hat (KM)	0.0353	k star (KM)	0.0411
nu hat (KM)	6.848	nu star (KM)	7.969
theta hat (KM)	154.4	theta star (KM)	132.7
80% gamma percentile (KM)	0.338	90% gamma percentile (KM)	6.194
95% gamma percentile (KM)	26.55	99% gamma percentile (KM)	127.6

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.97, α)	2.717	Adjusted Chi Square Value (7.97, β)	2.671
95% Gamma Approximate KM-UCL (use when n>=50)	15.99	95% Gamma Adjusted KM-UCL (use when n<50)	16.26

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.968	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.16	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0821	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.451	Mean in Log Scale	-1.881
SD in Original Scale	29.17	SD in Log Scale	2.558
95% t UCL (assumes normality of ROS data)	10.37	95% Percentile Bootstrap UCL	11.05
95% BCA Bootstrap UCL	13.1	95% Bootstrap t UCL	26.04
95% H-UCL (Log ROS)	11.86		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.914	KM Geo Mean	0.147
KM SD (logged)	2.593	95% Critical H Value (KM-Log)	4.195
KM Standard Error of Mean (logged)	0.265	95% H-UCL (KM -Log)	12.91
KM SD (logged)	2.593	95% Critical H Value (KM-Log)	4.195
KM Standard Error of Mean (logged)	0.265		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.452	Mean in Log Scale	-1.863
SD in Original Scale	29.17	SD in Log Scale	2.542
95% t UCL (Assumes normality)	10.37	95% H-Stat UCL	11.46

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 12.91

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

Manganese

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	140
Minimum	24	Mean	142.2
Maximum	500	Median	110
SD	145.7	Std. Error of Mean	48.56
Coefficient of Variation	1.024	Skewness	2.208

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	232.5	95% Adjusted-CLT UCL (Chen-1995)	260.3
		95% Modified-t UCL (Johnson-1978)	238.5

Gamma GOF Test

A-D Test Statistic	0.288	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.284	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.495	k star (bias corrected MLE)	1.071
Theta hat (MLE)	95.15	Theta star (bias corrected MLE)	132.9
nu hat (MLE)	26.9	nu star (bias corrected)	19.27
MLE Mean (bias corrected)	142.2	MLE Sd (bias corrected)	137.5
		Approximate Chi Square Value (0.05)	10.31
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	8.965

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	265.7	95% Adjusted Gamma UCL (use when n<50)	305.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.178	Mean of logged Data	4.587
Maximum of Logged Data	6.215	SD of logged Data	0.901

Assuming Lognormal Distribution

95% H-UCL	386.1	90% Chebyshev (MVUE) UCL	268.7
95% Chebyshev (MVUE) UCL	327.4	97.5% Chebyshev (MVUE) UCL	408.8
99% Chebyshev (MVUE) UCL	568.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	222.1	95% Jackknife UCL	232.5
95% Standard Bootstrap UCL	216.5	95% Bootstrap-t UCL	356.3
95% Hall's Bootstrap UCL	600.1	95% Percentile Bootstrap UCL	228.4
95% BCA Bootstrap UCL	255.1		
90% Chebyshev(Mean, Sd) UCL	287.9	95% Chebyshev(Mean, Sd) UCL	353.9
97.5% Chebyshev(Mean, Sd) UCL	445.5	99% Chebyshev(Mean, Sd) UCL	625.4

Suggested UCL to Use

95% Adjusted Gamma UCL	305.7

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

Naphthalene

General Statistics

Total Number of Observations	97	Number of Distinct Observations	78
		Number of Missing Observations	68
Number of Detects	71	Number of Non-Detects	26
Number of Distinct Detects	61	Number of Distinct Non-Detects	21
Minimum Detect	0.0018	Minimum Non-Detect	0.0076
Maximum Detect	130	Maximum Non-Detect	0.72
Variance Detects	248.5	Percent Non-Detects	26.8%
Mean Detects	2.456	SD Detects	15.76
Median Detects	0.069	CV Detects	6.418
Skewness Detects	7.863	Kurtosis Detects	63.73
Mean of Logged Detects	-2.585	SD of Logged Detects	1.965

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.165	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.479	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.105	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.801	KM Standard Error of Mean	1.374
KM SD	13.43	95% KM (BCA) UCL	4.503
95% KM (t) UCL	4.083	95% KM (Percentile Bootstrap) UCL	4.488
95% KM (z) UCL	4.061	95% KM Bootstrap t UCL	54.32
90% KM Chebyshev UCL	5.923	95% KM Chebyshev UCL	7.789
97.5% KM Chebyshev UCL	10.38	99% KM Chebyshev UCL	15.47

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	12.66	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.91	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.365	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.117	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.21	k star (bias corrected MLE)	0.21
Theta hat (MLE)	11.71	Theta star (bias corrected MLE)	11.68
nu hat (MLE)	29.77	nu star (bias corrected)	29.85
Mean (detects)	2.456		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0018	Mean	1.8
Maximum	130	Median	0.038
SD	13.5	CV	7.5
k hat (MLE)	0.198	k star (bias corrected MLE)	0.199
Theta hat (MLE)	9.077	Theta star (bias corrected MLE)	9.043
nu hat (MLE)	38.48	nu star (bias corrected)	38.63
Adjusted Level of Significance (β)	0.0475		
Approximate Chi Square Value (38.63, α)	25.39	Adjusted Chi Square Value (38.63, β)	25.23
95% Gamma Approximate UCL (use when n>=50)	2.739	95% Gamma Adjusted UCL (use when n<50)	2.756

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.801	SD (KM)	13.43
Variance (KM)	180.5	SE of Mean (KM)	1.374
k hat (KM)	0.018	k star (KM)	0.0243
nu hat (KM)	3.488	nu star (KM)	4.713
theta hat (KM)	100.2	theta star (KM)	74.14
80% gamma percentile (KM)	0.00436	90% gamma percentile (KM)	0.56
95% gamma percentile (KM)	5.522	99% gamma percentile (KM)	48.83

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.71, α)	1.022	Adjusted Chi Square Value (4.71, β)	0.997
5% Gamma Approximate KM-UCL (use when n>=50)	8.306	95% Gamma Adjusted KM-UCL (use when n<50)	8.513

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.943	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.00558	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0941	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.105	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.8	Mean in Log Scale	-3.318
SD in Original Scale	13.5	SD in Log Scale	2.11
95% t UCL (assumes normality of ROS data)	4.077	95% Percentile Bootstrap UCL	4.454
95% BCA Bootstrap UCL	6.527	95% Bootstrap t UCL	58.18
95% H-UCL (Log ROS)	0.721		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.294	KM Geo Mean	0.0371
KM SD (logged)	2.103	95% Critical H Value (KM-Log)	3.542
KM Standard Error of Mean (logged)	0.223	95% H-UCL (KM -Log)	0.724
KM SD (logged)	2.103	95% Critical H Value (KM-Log)	3.542
KM Standard Error of Mean (logged)	0.223		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.807	Mean in Log Scale	-3.19
SD in Original Scale	13.5	SD in Log Scale	2.08
95% t UCL (Assumes normality)	4.084	95% H-Stat UCL	0.756

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.724

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Nickel

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	140
Minimum	2.5	Mean	10.79
Maximum	27	Median	9.8
SD	7.572	Std. Error of Mean	2.524
Coefficient of Variation	0.702	Skewness	1.212

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.48	95% Adjusted-CLT UCL (Chen-1995)	16.03
		95% Modified-t UCL (Johnson-1978)	15.65

Gamma GOF Test

A-D Test Statistic	0.221	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.729	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.167	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.282	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.348	k star (bias corrected MLE)	1.639
Theta hat (MLE)	4.595	Theta star (bias corrected MLE)	6.582
nu hat (MLE)	42.26	nu star (bias corrected)	29.51
MLE Mean (bias corrected)	10.79	MLE Sd (bias corrected)	8.427
		Approximate Chi Square Value (0.05)	18.11
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	16.25

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	17.58	95% Adjusted Gamma UCL (use when n<50)	19.59

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.916	Mean of logged Data	2.151
Maximum of Logged Data	3.296	SD of logged Data	0.741

Assuming Lognormal Distribution

95% H-UCL	22.93	90% Chebyshev (MVUE) UCL	19.2
95% Chebyshev (MVUE) UCL	22.96	97.5% Chebyshev (MVUE) UCL	28.18
99% Chebyshev (MVUE) UCL	38.42		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	14.94	95% Jackknife UCL	15.48
95% Standard Bootstrap UCL	14.66	95% Bootstrap-t UCL	16.77
95% Hall's Bootstrap UCL	18.01	95% Percentile Bootstrap UCL	14.89
95% BCA Bootstrap UCL	15.53		
90% Chebyshev(Mean, Sd) UCL	18.36	95% Chebyshev(Mean, Sd) UCL	21.79
97.5% Chebyshev(Mean, Sd) UCL	26.55	99% Chebyshev(Mean, Sd) UCL	35.9

Suggested UCL to Use

95% Student's-t UCL	15.48

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	110	Number of Distinct Observations	89
		Number of Missing Observations	55
Number of Detects	90	Number of Non-Detects	20
Number of Distinct Detects	75	Number of Distinct Non-Detects	15
Minimum Detect	8.6000E-4	Minimum Non-Detect	9.2000E-4
Maximum Detect	14	Maximum Non-Detect	0.01
Variance Detects	2.99	Percent Non-Detects	18.18%
Mean Detects	0.805	SD Detects	1.729
Median Detects	0.2	CV Detects	2.149
Skewness Detects	5.409	Kurtosis Detects	38.3
Mean of Logged Detects	-2.107	SD of Logged Detects	2.4

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.498	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.321	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0936	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.659	KM Standard Error of Mean	0.152
KM SD	1.586	95% KM (BCA) UCL	0.937
95% KM (t) UCL	0.911	95% KM (Percentile Bootstrap) UCL	0.925
95% KM (z) UCL	0.909	95% KM Bootstrap t UCL	1.088
90% KM Chebyshev UCL	1.115	95% KM Chebyshev UCL	1.321
97.5% KM Chebyshev UCL	1.608	99% KM Chebyshev UCL	2.171

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.248	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.854	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.11	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.102	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.355	k star (bias corrected MLE)	0.351
Theta hat (MLE)	2.266	Theta star (bias corrected MLE)	2.295
nu hat (MLE)	63.91	nu star (bias corrected)	63.11
Mean (detects)	0.805		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	8.6000E-4	Mean	0.66
Maximum	14	Median	0.0595
SD	1.592	CV	2.412
k hat (MLE)	0.318	k star (bias corrected MLE)	0.316
Theta hat (MLE)	2.074	Theta star (bias corrected MLE)	2.091
nu hat (MLE)	70.02	nu star (bias corrected)	69.44
Adjusted Level of Significance (β)	0.0478		
Approximate Chi Square Value (69.44, α)	51.26	Adjusted Chi Square Value (69.44, β)	51.05
95% Gamma Approximate UCL (use when n>=50)	0.894	95% Gamma Adjusted UCL (use when n<50)	0.898

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.659	SD (KM)	1.586
Variance (KM)	2.515	SE of Mean (KM)	0.152
k hat (KM)	0.172	k star (KM)	0.174
nu hat (KM)	37.93	nu star (KM)	38.23
theta hat (KM)	3.819	theta star (KM)	3.789
80% gamma percentile (KM)	0.799	90% gamma percentile (KM)	1.982
95% gamma percentile (KM)	3.512	99% gamma percentile (KM)	7.829

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (38.23, α)	25.07	Adjusted Chi Square Value (38.23, β)	24.93
95% Gamma Approximate KM-UCL (use when n>=50)	1.004	95% Gamma Adjusted KM-UCL (use when n<50)	1.01

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.943	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0.0011	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0976	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0936	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.659	Mean in Log Scale	-2.941
SD in Original Scale	1.593	SD in Log Scale	2.817
95% t UCL (assumes normality of ROS data)	0.911	95% Percentile Bootstrap UCL	0.93
95% BCA Bootstrap UCL	1.022	95% Bootstrap t UCL	1.076
95% H-UCL (Log ROS)	9.046		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.962	KM Geo Mean	0.0517
KM SD (logged)	2.828	95% Critical H Value (KM-Log)	4.374
KM Standard Error of Mean (logged)	0.272	95% H-UCL (KM -Log)	9.223
KM SD (logged)	2.828	95% Critical H Value (KM-Log)	4.374
KM Standard Error of Mean (logged)	0.272		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.659	Mean in Log Scale	-2.95
SD in Original Scale	1.593	SD in Log Scale	2.842
95% t UCL (Assumes normality)	0.911	95% H-Stat UCL	9.814

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 1.321

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

TCDD TEQ HH

General Statistics

Total Number of Observations	30	Number of Distinct Observations	28
		Number of Missing Observations	132
Minimum	1.3800E-7	Mean	4.8730E-5
Maximum	4.8400E-4	Median	1.9700E-5
SD	9.2344E-5	Std. Error of Mean	1.6860E-5
Coefficient of Variation	N/A	Skewness	3.905

Normal GOF Test

Shapiro Wilk Test Statistic	0.532	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	7.7377E-5	95% Adjusted-CLT UCL (Chen-1995)	8.9306E-5
		95% Modified-t UCL (Johnson-1978)	7.9380E-5

Gamma GOF Test

A-D Test Statistic	0.666	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.808	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.169	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.51	k star (bias corrected MLE)	0.481
Theta hat (MLE)	9.5635E-5	Theta star (bias corrected MLE)	1.0135E-4
nu hat (MLE)	30.57	nu star (bias corrected)	28.85
MLE Mean (bias corrected)	4.8730E-5	MLE Sd (bias corrected)	7.0277E-5
		Approximate Chi Square Value (0.05)	17.59
Adjusted Level of Significance	0.041	Adjusted Chi Square Value	17.08

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	7.9920E-5	95% Adjusted Gamma UCL (use when n<50)	8.2294E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.927	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.104	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.159	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.8	Mean of logged Data	-11.17
Maximum of Logged Data	-7.633	SD of logged Data	1.781

Assuming Lognormal Distribution

95% H-UCL	2.2509E-4	90% Chebyshev (MVUE) UCL	1.3879E-4
95% Chebyshev (MVUE) UCL	1.7409E-4	97.5% Chebyshev (MVUE) UCL	2.2309E-4
99% Chebyshev (MVUE) UCL	3.1934E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	7.6462E-5	95% Jackknife UCL	7.7377E-5
95% Standard Bootstrap UCL	7.5534E-5	95% Bootstrap-t UCL	1.1229E-4
95% Hall's Bootstrap UCL	1.8299E-4	95% Percentile Bootstrap UCL	7.9441E-5
95% BCA Bootstrap UCL	8.8166E-5		
90% Chebyshev(Mean, Sd) UCL	9.9309E-5	95% Chebyshev(Mean, Sd) UCL	1.2222E-4
97.5% Chebyshev(Mean, Sd) UCL	1.5402E-4	99% Chebyshev(Mean, Sd) UCL	2.1648E-4

Suggested UCL to Use

95% Adjusted Gamma UCL 8.2294E-5

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

Thallium

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	140
Minimum	0.039	Mean	0.13
Maximum	0.2	Median	0.12
SD	0.0561	Std. Error of Mean	0.0187
Coefficient of Variation	0.432	Skewness	-0.26

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.165	95% Adjusted-CLT UCL (Chen-1995)	0.159
		95% Modified-t UCL (Johnson-1978)	0.164

Gamma GOF Test

A-D Test Statistic	0.329	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.745	k star (bias corrected MLE)	3.238
Theta hat (MLE)	0.0274	Theta star (bias corrected MLE)	0.0401
nu hat (MLE)	85.42	nu star (bias corrected)	58.28
MLE Mean (bias corrected)	0.13	MLE Sd (bias corrected)	0.0722
		Approximate Chi Square Value (0.05)	41.73
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	38.79

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.181	95% Adjusted Gamma UCL (use when n<50)	0.195

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.244	Mean of logged Data	-2.15
Maximum of Logged Data	-1.609	SD of logged Data	0.537

Assuming Lognormal Distribution

95% H-UCL	0.208	90% Chebyshev (MVUE) UCL	0.204
95% Chebyshev (MVUE) UCL	0.237	97.5% Chebyshev (MVUE) UCL	0.282
99% Chebyshev (MVUE) UCL	0.371		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.161	95% Jackknife UCL	0.165
95% Standard Bootstrap UCL	0.158	95% Bootstrap-t UCL	0.162
95% Hall's Bootstrap UCL	0.158	95% Percentile Bootstrap UCL	0.158
95% BCA Bootstrap UCL	0.157		
90% Chebyshev(Mean, Sd) UCL	0.186	95% Chebyshev(Mean, Sd) UCL	0.211
97.5% Chebyshev(Mean, Sd) UCL	0.247	99% Chebyshev(Mean, Sd) UCL	0.316

Suggested UCL to Use

95% Student's-t UCL	0.165

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

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

Vanadium

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	140
Minimum	13	Mean	23.67
Maximum	36	Median	24
SD	7.681	Std. Error of Mean	2.56
Coefficient of Variation	0.325	Skewness	0.271

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	28.43	95% Adjusted-CLT UCL (Chen-1995)	28.12
		95% Modified-t UCL (Johnson-1978)	28.47

Gamma GOF Test

A-D Test Statistic	0.203	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.15	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.34	k star (bias corrected MLE)	6.97
Theta hat (MLE)	2.288	Theta star (bias corrected MLE)	3.395
nu hat (MLE)	186.2	nu star (bias corrected)	125.5
MLE Mean (bias corrected)	23.67	MLE Sd (bias corrected)	8.964
		Approximate Chi Square Value (0.05)	100.6
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	95.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	29.52	95% Adjusted Gamma UCL (use when n<50)	30.96

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.138	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.565	Mean of logged Data	3.115
Maximum of Logged Data	3.584	SD of logged Data	0.338

Assuming Lognormal Distribution

95% H-UCL	30.49	90% Chebyshev (MVUE) UCL	31.76
95% Chebyshev (MVUE) UCL	35.41	97.5% Chebyshev (MVUE) UCL	40.47
99% Chebyshev (MVUE) UCL	50.43		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	27.88	95% Jackknife UCL	28.43
95% Standard Bootstrap UCL	27.69	95% Bootstrap-t UCL	28.89
95% Hall's Bootstrap UCL	29.05	95% Percentile Bootstrap UCL	27.67
95% BCA Bootstrap UCL	27.67		
90% Chebyshev(Mean, Sd) UCL	31.35	95% Chebyshev(Mean, Sd) UCL	34.83
97.5% Chebyshev(Mean, Sd) UCL	39.66	99% Chebyshev(Mean, Sd) UCL	49.14

Suggested UCL to Use

95% Student's-t UCL 28.43

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 2:05:15 PM
From File	Soil_StoresFleet.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

	General Statistics		
Total Number of Observations	11	Number of Distinct Observations	10
		Number of Missing Observations	51
Minimum	1.6	Mean	4.491
Maximum	7.5	Median	4.1
SD	1.957	Std. Error of Mean	0.59
Coefficient of Variation	0.436	Skewness	0.231
	Normal GOF Test		
Shapiro Wilk Test Statistic	0.934	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.2	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.251	Data appear Normal at 5% Significance Level	
	Data appear Normal at 5% Significance Level		
	Assuming Normal Distribution		
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5.561	95% Adjusted-CLT UCL (Chen-1995)	5.505
		95% Modified-t UCL (Johnson-1978)	5.567
	Gamma GOF Test		
A-D Test Statistic	0.341	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.731	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.177	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.256	)etected data appear Gamma Distributed at 5% Significance Leve	
	Detected data appear Gamma Distributed at 5% Significance Level		
	Gamma Statistics		
k hat (MLE)	5.326	k star (bias corrected MLE)	3.934
Theta hat (MLE)	0.843	Theta star (bias corrected MLE)	1.141
nu hat (MLE)	117.2	nu star (bias corrected)	86.55
MLE Mean (bias corrected)	4.491	MLE Sd (bias corrected)	2.264
		Approximate Chi Square Value (0.05)	66.11
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	63.2
	Assuming Gamma Distribution		
95% Approximate Gamma UCL (use when n>=50))	5.88	95% Adjusted Gamma UCL (use when n<50)	6.15
	Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.935	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.148	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level	
	Data appear Lognormal at 5% Significance Level		
	Lognormal Statistics		
Minimum of Logged Data	0.47	Mean of logged Data	1.405
Maximum of Logged Data	2.015	SD of logged Data	0.479
	Assuming Lognormal Distribution		
95% H-UCL	6.329	90% Chebyshev (MVUE) UCL	6.516
95% Chebyshev (MVUE) UCL	7.42	97.5% Chebyshev (MVUE) UCL	8.675
99% Chebyshev (MVUE) UCL	11.14		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.462	95% Jackknife UCL	5.561
95% Standard Bootstrap UCL	5.432	95% Bootstrap-t UCL	5.72
95% Hall's Bootstrap UCL	5.387	95% Percentile Bootstrap UCL	5.482
95% BCA Bootstrap UCL	5.436		
90% Chebyshev(Mean, Sd) UCL	6.261	95% Chebyshev(Mean, Sd) UCL	7.063
97.5% Chebyshev(Mean, Sd) UCL	8.176	99% Chebyshev(Mean, Sd) UCL	10.36

Suggested UCL to Use

95% Student's-t UCL 5.561

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	38
		Number of Missing Observations	45
Number of Detects	40	Number of Non-Detects	4
Number of Distinct Detects	34	Number of Distinct Non-Detects	4
Minimum Detect	0.0029	Minimum Non-Detect	0.0071
Maximum Detect	35	Maximum Non-Detect	0.008
Variance Detects	31	Percent Non-Detects	9.091%
Mean Detects	1.242	SD Detects	5.568
Median Detects	0.145	CV Detects	4.483
Skewness Detects	6.032	Kurtosis Detects	37.2
Mean of Logged Detects	-1.887	SD of Logged Detects	1.645

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.225	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.474	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.129	KM Standard Error of Mean	0.802
KM SD	5.254	95% KM (BCA) UCL	2.614
95% KM (t) UCL	2.478	95% KM (Percentile Bootstrap) UCL	2.668
95% KM (z) UCL	2.449	95% KM Bootstrap t UCL	26.68
90% KM Chebyshev UCL	3.536	95% KM Chebyshev UCL	4.626
97.5% KM Chebyshev UCL	6.139	99% KM Chebyshev UCL	9.111

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.431	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.852	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.331	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.151	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.324	k star (bias corrected MLE)	0.316
Theta hat (MLE)	3.836	Theta star (bias corrected MLE)	3.928
nu hat (MLE)	25.9	nu star (bias corrected)	25.29
Mean (detects)	1.242		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0029	Mean	1.13
Maximum	35	Median	0.12
SD	5.315	CV	4.703
k hat (MLE)	0.305	k star (bias corrected MLE)	0.299
Theta hat (MLE)	3.706	Theta star (bias corrected MLE)	3.776
nu hat (MLE)	26.83	nu star (bias corrected)	26.33
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (26.33, α)	15.64	Adjusted Chi Square Value (26.33, β)	15.36
95% Gamma Approximate UCL (use when n>=50)	1.903	95% Gamma Adjusted UCL (use when n<50)	1.938

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.129	SD (KM)	5.254
Variance (KM)	27.6	SE of Mean (KM)	0.802
k hat (KM)	0.0462	k star (KM)	0.0582
nu hat (KM)	4.066	nu star (KM)	5.122
theta hat (KM)	24.44	theta star (KM)	19.4
80% gamma percentile (KM)	0.25	90% gamma percentile (KM)	2.06
95% gamma percentile (KM)	6.285	99% gamma percentile (KM)	23.08

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.12, α)	1.209	Adjusted Chi Square Value (5.12, β)	1.147
)5% Gamma Approximate KM-UCL (use when n>=50)	4.785	95% Gamma Adjusted KM-UCL (use when n<50)	5.044

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.951	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.94	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.124	Lilliefors GOF Test
5% Lilliefors Critical Value	0.139	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.13	Mean in Log Scale	-2.189
SD in Original Scale	5.315	SD in Log Scale	1.842
95% t UCL (assumes normality of ROS data)	2.476	95% Percentile Bootstrap UCL	2.693
95% BCA Bootstrap UCL	4.107	95% Bootstrap t UCL	26.13
95% H-UCL (Log ROS)	1.611		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.246	KM Geo Mean	0.106
KM SD (logged)	1.922	95% Critical H Value (KM-Log)	3.563
KM Standard Error of Mean (logged)	0.293	95% H-UCL (KM -Log)	1.905
KM SD (logged)	1.922	95% Critical H Value (KM-Log)	3.563
KM Standard Error of Mean (logged)	0.293		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.129	Mean in Log Scale	-2.223
SD in Original Scale	5.315	SD in Log Scale	1.901
95% t UCL (Assumes normality)	2.476	95% H-Stat UCL	1.837

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 4.626

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

Benzo(a)pyrene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	40

		Number of Missing Observations	45
Number of Detects	40	Number of Non-Detects	4
Number of Distinct Detects	36	Number of Distinct Non-Detects	4
Minimum Detect	0.0012	Minimum Non-Detect	0.0071
Maximum Detect	16	Maximum Non-Detect	0.008
Variance Detects	6.854	Percent Non-Detects	9.091%
Mean Detects	0.731	SD Detects	2.618
Median Detects	0.125	CV Detects	3.581
Skewness Detects	5.496	Kurtosis Detects	31.66
Mean of Logged Detects	-2.029	SD of Logged Detects	1.675

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.282	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.436	Lilliefors GOF Test
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.665	KM Standard Error of Mean	0.378
KM SD	2.474	95% KM (BCA) UCL	1.46
95% KM (t) UCL	1.3	95% KM (Percentile Bootstrap) UCL	1.37
95% KM (z) UCL	1.286	95% KM Bootstrap t UCL	6.643
90% KM Chebyshev UCL	1.798	95% KM Chebyshev UCL	2.311
97.5% KM Chebyshev UCL	3.023	99% KM Chebyshev UCL	4.423

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.726	Anderson-Darling GOF Test
5% A-D Critical Value	0.839	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.15	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.386	k star (bias corrected MLE)	0.374
Theta hat (MLE)	1.895	Theta star (bias corrected MLE)	1.957
nu hat (MLE)	30.87	nu star (bias corrected)	29.89
Mean (detects)	0.731		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	0.666
Maximum	16	Median	0.0995
SD	2.502	CV	3.76
k hat (MLE)	0.361	k star (bias corrected MLE)	0.351
Theta hat (MLE)	1.845	Theta star (bias corrected MLE)	1.895
nu hat (MLE)	31.73	nu star (bias corrected)	30.9
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (30.90, α)	19.21	Adjusted Chi Square Value (30.90, β)	18.89
95% Gamma Approximate UCL (use when n>=50)	1.071	95% Gamma Adjusted UCL (use when n<50)	1.089

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.665	SD (KM)	2.474
Variance (KM)	6.12	SE of Mean (KM)	0.378
k hat (KM)	0.0722	k star (KM)	0.0824
nu hat (KM)	6.354	nu star (KM)	7.254
theta hat (KM)	9.206	theta star (KM)	8.064
80% gamma percentile (KM)	0.335	90% gamma percentile (KM)	1.605
95% gamma percentile (KM)	3.87	99% gamma percentile (KM)	11.61

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.25, α)	2.311	Adjusted Chi Square Value (7.25, β)	2.217
95% Gamma Approximate KM-UCL (use when n>=50)	2.086	95% Gamma Adjusted KM-UCL (use when n<50)	2.174

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0928	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.665	Mean in Log Scale	-2.34
SD in Original Scale	2.502	SD in Log Scale	1.88
95% t UCL (assumes normality of ROS data)	1.299	95% Percentile Bootstrap UCL	1.372
95% BCA Bootstrap UCL	1.819	95% Bootstrap t UCL	6.638
95% H-UCL (Log ROS)	1.541		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.456	KM Geo Mean	0.0858
KM SD (logged)	2.076	95% Critical H Value (KM-Log)	3.784
KM Standard Error of Mean (logged)	0.317	95% H-UCL (KM -Log)	2.454
KM SD (logged)	2.076	95% Critical H Value (KM-Log)	3.784
KM Standard Error of Mean (logged)	0.317		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.665	Mean in Log Scale	-2.352
SD in Original Scale	2.502	SD in Log Scale	1.902
95% t UCL (Assumes normality)	1.299	95% H-Stat UCL	1.618

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	2.311

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	42
		Number of Missing Observations	45
Number of Detects	40	Number of Non-Detects	4
Number of Distinct Detects	38	Number of Distinct Non-Detects	4
Minimum Detect	0.0027	Minimum Non-Detect	0.0071
Maximum Detect	35	Maximum Non-Detect	0.008
Variance Detects	30.83	Percent Non-Detects	9.091%
Mean Detects	1.294	SD Detects	5.553
Median Detects	0.2	CV Detects	4.292
Skewness Detects	6.048	Kurtosis Detects	37.38
Mean of Logged Detects	-1.644	SD of Logged Detects	1.608

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.231	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.46	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.176	KM Standard Error of Mean	0.8
KM SD	5.241	95% KM (BCA) UCL	2.725
95% KM (t) UCL	2.522	95% KM (Percentile Bootstrap) UCL	2.703

95% KM (z) UCL	2.493	95% KM Bootstrap t UCL	19.76
90% KM Chebyshev UCL	3.577	95% KM Chebyshev UCL	4.664
97.5% KM Chebyshev UCL	6.173	99% KM Chebyshev UCL	9.138

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.915	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.846	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.302	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.15	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.353	k star (bias corrected MLE)	0.343
Theta hat (MLE)	3.663	Theta star (bias corrected MLE)	3.768
nu hat (MLE)	28.25	nu star (bias corrected)	27.47
Mean (detects)	1.294		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0027	Mean	1.177
Maximum	35	Median	0.16
SD	5.301	CV	4.504
k hat (MLE)	0.327	k star (bias corrected MLE)	0.32
Theta hat (MLE)	3.595	Theta star (bias corrected MLE)	3.675
nu hat (MLE)	28.82	nu star (bias corrected)	28.18
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (28.18, α)	17.07	Adjusted Chi Square Value (28.18, β)	16.78
95% Gamma Approximate UCL (use when n>=50)	1.943	95% Gamma Adjusted UCL (use when n<50)	1.977

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.176	SD (KM)	5.241
Variance (KM)	27.47	SE of Mean (KM)	0.8
k hat (KM)	0.0504	k star (KM)	0.0621
nu hat (KM)	4.433	nu star (KM)	5.464
theta hat (KM)	23.35	theta star (KM)	18.94
80% gamma percentile (KM)	0.312	90% gamma percentile (KM)	2.288
95% gamma percentile (KM)	6.64	99% gamma percentile (KM)	23.38

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.46, α)	1.373	Adjusted Chi Square Value (5.46, β)	1.305
95% Gamma Approximate KM-UCL (use when n>=50)	4.683	95% Gamma Adjusted KM-UCL (use when n<50)	4.925

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.177	Mean in Log Scale	-1.94
SD in Original Scale	5.301	SD in Log Scale	1.801
95% t UCL (assumes normality of ROS data)	2.52	95% Percentile Bootstrap UCL	2.741
95% BCA Bootstrap UCL	3.561	95% Bootstrap t UCL	21.02
95% H-UCL (Log ROS)	1.849		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.032	KM Geo Mean	0.131
KM SD (logged)	1.949	95% Critical H Value (KM-Log)	3.603
KM Standard Error of Mean (logged)	0.298	95% H-UCL (KM -Log)	2.558
KM SD (logged)	1.949	95% Critical H Value (KM-Log)	3.603
KM Standard Error of Mean (logged)	0.298		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.176	Mean in Log Scale	-2.002
SD in Original Scale	5.302	SD in Log Scale	1.914
95% t UCL (Assumes normality)	2.52	95% H-Stat UCL	2.375

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	4.664

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	35
		Number of Missing Observations	45
Number of Detects	39	Number of Non-Detects	5
Number of Distinct Detects	31	Number of Distinct Non-Detects	4
Minimum Detect	0.0046	Minimum Non-Detect	0.0071
Maximum Detect	7.1	Maximum Non-Detect	0.008
Variance Detects	1.358	Percent Non-Detects	11.36%
Mean Detects	0.341	SD Detects	1.165
Median Detects	0.063	CV Detects	3.422
Skewness Detects	5.513	Kurtosis Detects	31.83
Mean of Logged Detects	-2.558	SD of Logged Detects	1.446

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.288	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.939	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.427	Lilliefors GOF Test
5% Lilliefors Critical Value	0.14	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.302	KM Standard Error of Mean	0.166
KM SD	1.088	95% KM (BCA) UCL	0.637
95% KM (t) UCL	0.582	95% KM (Percentile Bootstrap) UCL	0.607
95% KM (z) UCL	0.576	95% KM Bootstrap t UCL	2.612
90% KM Chebyshev UCL	0.801	95% KM Chebyshev UCL	1.027
97.5% KM Chebyshev UCL	1.34	99% KM Chebyshev UCL	1.956

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.807	Anderson-Darling GOF Test
5% A-D Critical Value	0.827	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.243	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.151	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.438	k star (bias corrected MLE)	0.421
Theta hat (MLE)	0.778	Theta star (bias corrected MLE)	0.808
nu hat (MLE)	34.15	nu star (bias corrected)	32.86
Mean (detects)	0.341		

Gamma ROS Statistics using Imputed Non-Detects

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

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0046	Mean	0.303
Maximum	7.1	Median	0.0475
SD	1.101	CV	3.633
k hat (MLE)	0.41	k star (bias corrected MLE)	0.398
Theta hat (MLE)	0.738	Theta star (bias corrected MLE)	0.762
nu hat (MLE)	36.11	nu star (bias corrected)	34.98
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (34.98, α)	22.45	Adjusted Chi Square Value (34.98, β)	22.11
95% Gamma Approximate UCL (use when n>=50)	0.472	95% Gamma Adjusted UCL (use when n<50)	0.479

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.302	SD (KM)	1.088
Variance (KM)	1.184	SE of Mean (KM)	0.166
k hat (KM)	0.0772	k star (KM)	0.0871
nu hat (KM)	6.794	nu star (KM)	7.665
theta hat (KM)	3.916	theta star (KM)	3.472
80% gamma percentile (KM)	0.168	90% gamma percentile (KM)	0.754
95% gamma percentile (KM)	1.762	99% gamma percentile (KM)	5.142

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.66, α)	2.542	Adjusted Chi Square Value (7.66, β)	2.443
)5% Gamma Approximate KM-UCL (use when n>=50)	0.912	95% Gamma Adjusted KM-UCL (use when n<50)	0.949

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.939	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0857	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.302	Mean in Log Scale	-2.893
SD in Original Scale	1.101	SD in Log Scale	1.656
95% t UCL (assumes normality of ROS data)	0.581	95% Percentile Bootstrap UCL	0.608
95% BCA Bootstrap UCL	0.895	95% Bootstrap t UCL	2.568
95% H-UCL (Log ROS)	0.489		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.877	KM Geo Mean	0.0563
KM SD (logged)	1.612	95% Critical H Value (KM-Log)	3.131
KM Standard Error of Mean (logged)	0.246	95% H-UCL (KM -Log)	0.446
KM SD (logged)	1.612	95% Critical H Value (KM-Log)	3.131
KM Standard Error of Mean (logged)	0.246		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.302	Mean in Log Scale	-2.904
SD in Original Scale	1.101	SD in Log Scale	1.673
95% t UCL (Assumes normality)	0.581	95% H-Stat UCL	0.505

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	0.446

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

Chrysene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	40
		Number of Missing Observations	45
Number of Detects	40	Number of Non-Detects	4
Number of Distinct Detects	36	Number of Distinct Non-Detects	4
Minimum Detect	0.0022	Minimum Non-Detect	0.0071
Maximum Detect	32	Maximum Non-Detect	0.008
Variance Detects	25.7	Percent Non-Detects	9.091%
Mean Detects	1.173	SD Detects	5.069
Median Detects	0.175	CV Detects	4.321
Skewness Detects	6.076	Kurtosis Detects	37.66
Mean of Logged Detects	-1.728	SD of Logged Detects	1.587

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.229	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.461	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.067	KM Standard Error of Mean	0.73
KM SD	4.785	95% KM (BCA) UCL	2.563
95% KM (t) UCL	2.295	95% KM (Percentile Bootstrap) UCL	2.461
95% KM (z) UCL	2.268	95% KM Bootstrap t UCL	18.4
90% KM Chebyshev UCL	3.258	95% KM Chebyshev UCL	4.251
97.5% KM Chebyshev UCL	5.629	99% KM Chebyshev UCL	8.335

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.051	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.845	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.307	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.15	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.355	k star (bias corrected MLE)	0.345
Theta hat (MLE)	3.302	Theta star (bias corrected MLE)	3.397
nu hat (MLE)	28.42	nu star (bias corrected)	27.62
Mean (detects)	1.173		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0022	Mean	1.067
Maximum	32	Median	0.165
SD	4.84	CV	4.534
k hat (MLE)	0.33	k star (bias corrected MLE)	0.323
Theta hat (MLE)	3.232	Theta star (bias corrected MLE)	3.305
nu hat (MLE)	29.07	nu star (bias corrected)	28.42
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (28.42, α)	17.25	Adjusted Chi Square Value (28.42, β)	16.96
95% Gamma Approximate UCL (use when n>=50)	1.758	95% Gamma Adjusted UCL (use when n<50)	1.789

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.067	SD (KM)	4.785
Variance (KM)	22.89	SE of Mean (KM)	0.73
k hat (KM)	0.0497	k star (KM)	0.0615
nu hat (KM)	4.374	nu star (KM)	5.409
theta hat (KM)	21.46	theta star (KM)	17.35
80% gamma percentile (KM)	0.275	90% gamma percentile (KM)	2.055
95% gamma percentile (KM)	6.009	99% gamma percentile (KM)	21.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.41, α)	1.346	Adjusted Chi Square Value (5.41, β)	1.279
95% Gamma Approximate KM-UCL (use when n>=50)	4.288	95% Gamma Adjusted KM-UCL (use when n<50)	4.511

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.114	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.067	Mean in Log Scale	-2.02
SD in Original Scale	4.84	SD in Log Scale	1.775
95% t UCL (assumes normality of ROS data)	2.294	95% Percentile Bootstrap UCL	2.497
95% BCA Bootstrap UCL	3.733	95% Bootstrap t UCL	18.2
95% H-UCL (Log ROS)	1.593		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.127	KM Geo Mean	0.119
KM SD (logged)	1.956	95% Critical H Value (KM-Log)	3.612
KM Standard Error of Mean (logged)	0.299	95% H-UCL (KM -Log)	2.368
KM SD (logged)	1.956	95% Critical H Value (KM-Log)	3.612
KM Standard Error of Mean (logged)	0.299		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.067	Mean in Log Scale	-2.079
SD in Original Scale	4.84	SD in Log Scale	1.882
95% t UCL (Assumes normality)	2.293	95% H-Stat UCL	2.012

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	4.251

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

Cobalt

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
		Number of Missing Observations	51
Minimum	1	Mean	3.991
Maximum	7.9	Median	3.8
SD	2.019	Std. Error of Mean	0.609
Coefficient of Variation	0.506	Skewness	0.798

Normal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.094	95% Adjusted-CLT UCL (Chen-1995)	5.149
		95% Modified-t UCL (Johnson-1978)	5.119

Gamma GOF Test

A-D Test Statistic	0.346	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.733	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.195	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.256	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.013	k star (bias corrected MLE)	2.979
Theta hat (MLE)	0.995	Theta star (bias corrected MLE)	1.34
nu hat (MLE)	88.28	nu star (bias corrected)	65.54
MLE Mean (bias corrected)	3.991	MLE Sd (bias corrected)	2.312
		Approximate Chi Square Value (0.05)	47.91
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	45.46

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5.459	95% Adjusted Gamma UCL (use when n<50)	5.753

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.232	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0	Mean of logged Data	1.254
Maximum of Logged Data	2.067	SD of logged Data	0.567

Assuming Lognormal Distribution

95% H-UCL	6.184	90% Chebyshev (MVUE) UCL	6.184
95% Chebyshev (MVUE) UCL	7.15	97.5% Chebyshev (MVUE) UCL	8.491
99% Chebyshev (MVUE) UCL	11.13		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.992	95% Jackknife UCL	5.094
95% Standard Bootstrap UCL	4.95	95% Bootstrap-t UCL	5.542
95% Hall's Bootstrap UCL	6.427	95% Percentile Bootstrap UCL	4.982
95% BCA Bootstrap UCL	5.082		
90% Chebyshev(Mean, Sd) UCL	5.817	95% Chebyshev(Mean, Sd) UCL	6.645
97.5% Chebyshev(Mean, Sd) UCL	7.793	99% Chebyshev(Mean, Sd) UCL	10.05

Suggested UCL to Use

95% Student's-t UCL	5.094

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	39
		Number of Missing Observations	45
Number of Detects	35	Number of Non-Detects	9
Number of Distinct Detects	32	Number of Distinct Non-Detects	7
Minimum Detect	0.0029	Minimum Non-Detect	0.0071
Maximum Detect	2.9	Maximum Non-Detect	0.2
Variance Detects	0.257	Percent Non-Detects	20.45%
Mean Detects	0.158	SD Detects	0.507
Median Detects	0.032	CV Detects	3.199
Skewness Detects	5.074	Kurtosis Detects	27.1
Mean of Logged Detects	-3.338	SD of Logged Detects	1.479

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.315	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.934	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.413	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.148	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.128	KM Standard Error of Mean	0.0687
KM SD	0.449	95% KM (BCA) UCL	0.253
95% KM (t) UCL	0.243	95% KM (Percentile Bootstrap) UCL	0.252
95% KM (z) UCL	0.241	95% KM Bootstrap t UCL	0.953
90% KM Chebyshev UCL	0.334	95% KM Chebyshev UCL	0.428
97.5% KM Chebyshev UCL	0.557	99% KM Chebyshev UCL	0.812

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.383	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.827	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.271	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.159	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.434	k star (bias corrected MLE)	0.416
Theta hat (MLE)	0.365	Theta star (bias corrected MLE)	0.381
nu hat (MLE)	30.41	nu star (bias corrected)	29.13
Mean (detects)	0.158		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	0.128
Maximum	2.9	Median	0.0205
SD	0.454	CV	3.55
k hat (MLE)	0.423	k star (bias corrected MLE)	0.409
Theta hat (MLE)	0.303	Theta star (bias corrected MLE)	0.313
nu hat (MLE)	37.23	nu star (bias corrected)	36.02
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (36.02, α)	23.29	Adjusted Chi Square Value (36.02, β)	22.94
95% Gamma Approximate UCL (use when n>=50)	0.198	95% Gamma Adjusted UCL (use when n<50)	0.201

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.128	SD (KM)	0.449
Variance (KM)	0.202	SE of Mean (KM)	0.0687
k hat (KM)	0.081	k star (KM)	0.0907
nu hat (KM)	7.132	nu star (KM)	7.979
theta hat (KM)	1.579	theta star (KM)	1.411
80% gamma percentile (KM)	0.0763	90% gamma percentile (KM)	0.326
95% gamma percentile (KM)	0.745	99% gamma percentile (KM)	2.133

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.98, α)	2.723	Adjusted Chi Square Value (7.98, β)	2.619
)5% Gamma Approximate KM-UCL (use when n>=50)	0.375	95% Gamma Adjusted KM-UCL (use when n<50)	0.39

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.934	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.113	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.148	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.127	Mean in Log Scale	-3.745
SD in Original Scale	0.455	SD in Log Scale	1.582
95% t UCL (assumes normality of ROS data)	0.243	95% Percentile Bootstrap UCL	0.256
95% BCA Bootstrap UCL	0.324	95% Bootstrap t UCL	0.982
95% H-UCL (Log ROS)	0.174		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.733	KM Geo Mean	0.0239
KM SD (logged)	1.563	95% Critical H Value (KM-Log)	3.065
KM Standard Error of Mean (logged)	0.243	95% H-UCL (KM -Log)	0.169
KM SD (logged)	1.563	95% Critical H Value (KM-Log)	3.065
KM Standard Error of Mean (logged)	0.243		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.13	Mean in Log Scale	-3.668
SD in Original Scale	0.454	SD in Log Scale	1.568
95% t UCL (Assumes normality)	0.245	95% H-Stat UCL	0.182

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.169

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	24	Number of Distinct Observations	11
		Number of Missing Observations	66
Number of Detects	7	Number of Non-Detects	17
Number of Distinct Detects	7	Number of Distinct Non-Detects	4
Minimum Detect	21	Minimum Non-Detect	18
Maximum Detect	280	Maximum Non-Detect	99
Variance Detects	9211	Percent Non-Detects	70.83%
Mean Detects	132.1	SD Detects	95.97
Median Detects	140	CV Detects	0.726
Skewness Detects	0.317	Kurtosis Detects	-1.126
Mean of Logged Detects	4.554	SD of Logged Detects	0.976

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	51.45	KM Standard Error of Mean	15.59
KM SD	70.64	95% KM (BCA) UCL	77.18
95% KM (t) UCL	78.16	95% KM (Percentile Bootstrap) UCL	77.44
95% KM (z) UCL	77.08	95% KM Bootstrap t UCL	88.33
90% KM Chebyshev UCL	98.2	95% KM Chebyshev UCL	119.4
97.5% KM Chebyshev UCL	148.8	99% KM Chebyshev UCL	206.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.283	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.203	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.316	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.663	k star (bias corrected MLE)	1.046
Theta hat (MLE)	79.45	Theta star (bias corrected MLE)	126.4
nu hat (MLE)	23.29	nu star (bias corrected)	14.64
Mean (detects)	132.1		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	38.55
Maximum	280	Median	0.01
SD	78.53	CV	2.037
k hat (MLE)	0.139	k star (bias corrected MLE)	0.149
Theta hat (MLE)	277.1	Theta star (bias corrected MLE)	257.9
nu hat (MLE)	6.677	nu star (bias corrected)	7.175
Adjusted Level of Significance (β)	0.0392		
Approximate Chi Square Value (7.18, α)	2.267	Adjusted Chi Square Value (7.18, β)	2.078
95% Gamma Approximate UCL (use when n>=50)	122	95% Gamma Adjusted UCL (use when n<50)	133.1

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	51.45	SD (KM)	70.64
Variance (KM)	4990	SE of Mean (KM)	15.59
k hat (KM)	0.53	k star (KM)	0.492
nu hat (KM)	25.46	nu star (KM)	23.61
theta hat (KM)	97	theta star (KM)	104.6
80% gamma percentile (KM)	84.43	90% gamma percentile (KM)	139.7
95% gamma percentile (KM)	198.8	99% gamma percentile (KM)	344.4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.61, α)	13.55	Adjusted Chi Square Value (23.61, β)	13.02
95% Gamma Approximate KM-UCL (use when n>=50)	89.63	95% Gamma Adjusted KM-UCL (use when n<50)	93.32

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	42.64	Mean in Log Scale	2.263
SD in Original Scale	76.56	SD in Log Scale	1.813
95% t UCL (assumes normality of ROS data)	69.43	95% Percentile Bootstrap UCL	70.33
95% BCA Bootstrap UCL	75.2	95% Bootstrap t UCL	81.53
95% H-UCL (Log ROS)	207.1		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.38	KM Geo Mean	29.38
KM SD (logged)	0.9	95% Critical H Value (KM-Log)	2.413
KM Standard Error of Mean (logged)	0.199	95% H-UCL (KM -Log)	69.3
KM SD (logged)	0.9	95% Critical H Value (KM-Log)	2.413
KM Standard Error of Mean (logged)	0.199		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	46.9	Mean in Log Scale	2.987
SD in Original Scale	74.77	SD in Log Scale	1.19
95% t UCL (Assumes normality)	73.05	95% H-Stat UCL	80.81

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	78.16

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	37
		Number of Missing Observations	45
Number of Detects	39	Number of Non-Detects	5
Number of Distinct Detects	33	Number of Distinct Non-Detects	4
Minimum Detect	0.0086	Minimum Non-Detect	0.0071
Maximum Detect	7.8	Maximum Non-Detect	0.008
Variance Detects	1.763	Percent Non-Detects	11.36%
Mean Detects	0.436	SD Detects	1.328
Median Detects	0.093	CV Detects	3.047
Skewness Detects	5.028	Kurtosis Detects	26.7
Mean of Logged Detects	-2.198	SD of Logged Detects	1.431

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.325	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.939	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.425	Lilliefors GOF Test
5% Lilliefors Critical Value	0.14	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.387	KM Standard Error of Mean	0.19
KM SD	1.241	95% KM (BCA) UCL	0.789
95% KM (t) UCL	0.706	95% KM (Percentile Bootstrap) UCL	0.718
95% KM (z) UCL	0.699	95% KM Bootstrap t UCL	2.692
90% KM Chebyshev UCL	0.956	95% KM Chebyshev UCL	1.213
97.5% KM Chebyshev UCL	1.571	99% KM Chebyshev UCL	2.273

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.42	Anderson-Darling GOF Test
5% A-D Critical Value	0.82	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.15	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.469	k star (bias corrected MLE)	0.45
Theta hat (MLE)	0.929	Theta star (bias corrected MLE)	0.968
nu hat (MLE)	36.6	nu star (bias corrected)	35.12
Mean (detects)	0.436		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0086	Mean	0.387
Maximum	7.8	Median	0.08
SD	1.255	CV	3.241
k hat (MLE)	0.427	k star (bias corrected MLE)	0.413
Theta hat (MLE)	0.906	Theta star (bias corrected MLE)	0.937
nu hat (MLE)	37.62	nu star (bias corrected)	36.38
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (36.38, α)	23.58	Adjusted Chi Square Value (36.38, β)	23.23
95% Gamma Approximate UCL (use when n>=50)	0.598	95% Gamma Adjusted UCL (use when n<50)	0.607

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.387	SD (KM)	1.241
Variance (KM)	1.541	SE of Mean (KM)	0.19
k hat (KM)	0.0972	k star (KM)	0.106
nu hat (KM)	8.556	nu star (KM)	9.306
theta hat (KM)	3.981	theta star (KM)	3.66
80% gamma percentile (KM)	0.29	90% gamma percentile (KM)	1.053
95% gamma percentile (KM)	2.238	99% gamma percentile (KM)	5.977

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.31, α)	3.513	Adjusted Chi Square Value (9.31, β)	3.393
ı5% Gamma Approximate KM-UCL (use when n>=50)	1.025	95% Gamma Adjusted KM-UCL (use when n<50)	1.062

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.939	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0951	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.387	Mean in Log Scale	-2.56
SD in Original Scale	1.256	SD in Log Scale	1.69
95% t UCL (assumes normality of ROS data)	0.705	95% Percentile Bootstrap UCL	0.742
95% BCA Bootstrap UCL	0.989	95% Bootstrap t UCL	2.346
95% H-UCL (Log ROS)	0.744		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.51	KM Geo Mean	0.0812
KM SD (logged)	1.59	95% Critical H Value (KM-Log)	3.102
KM Standard Error of Mean (logged)	0.243	95% H-UCL (KM -Log)	0.611
KM SD (logged)	1.59	95% Critical H Value (KM-Log)	3.102
KM Standard Error of Mean (logged)	0.243		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.387	Mean in Log Scale	-2.584
SD in Original Scale	1.256	SD in Log Scale	1.732
95% t UCL (Assumes normality)	0.705	95% H-Stat UCL	0.808

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	0.611

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

Manganese

General Statistics

Total Number of Observations	11	Number of Distinct Observations	9
		Number of Missing Observations	51
Minimum	14	Mean	117.9
Maximum	230	Median	110
SD	68.37	Std. Error of Mean	20.61
Coefficient of Variation	0.58	Skewness	0.302

Normal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level

Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	155.3	95% Adjusted-CLT UCL (Chen-1995)	153.8
		95% Modified-t UCL (Johnson-1978)	155.6

Gamma GOF Test

A-D Test Statistic	0.327	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.737	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.182	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.258	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.371	k star (bias corrected MLE)	1.785
Theta hat (MLE)	49.73	Theta star (bias corrected MLE)	66.06
nu hat (MLE)	52.16	nu star (bias corrected)	39.27
MLE Mean (bias corrected)	117.9	MLE Sd (bias corrected)	88.26
		Approximate Chi Square Value (0.05)	25.91
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	24.15

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	178.7	95% Adjusted Gamma UCL (use when n<50)	191.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.221	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.639	Mean of logged Data	4.544
Maximum of Logged Data	5.438	SD of logged Data	0.813

Assuming Lognormal Distribution

95% H-UCL	259.1	90% Chebyshev (MVUE) UCL	223.2
95% Chebyshev (MVUE) UCL	267.2	97.5% Chebyshev (MVUE) UCL	328.2
99% Chebyshev (MVUE) UCL	448		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	151.8	95% Jackknife UCL	155.3
95% Standard Bootstrap UCL	149.8	95% Bootstrap-t UCL	157.5
95% Hall's Bootstrap UCL	156.7	95% Percentile Bootstrap UCL	149
95% BCA Bootstrap UCL	150.5		
90% Chebyshev(Mean, Sd) UCL	179.8	95% Chebyshev(Mean, Sd) UCL	207.8
97.5% Chebyshev(Mean, Sd) UCL	246.6	99% Chebyshev(Mean, Sd) UCL	323

Suggested UCL to Use

95% Student's-t UCL 155.3

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

Naphthalene

General Statistics

Total Number of Observations	44	Number of Distinct Observations	39
		Number of Missing Observations	45
Number of Detects	37	Number of Non-Detects	7
Number of Distinct Detects	33	Number of Distinct Non-Detects	6
Minimum Detect	0.0035	Minimum Non-Detect	0.0071
Maximum Detect	0.68	Maximum Non-Detect	0.2
Variance Detects	0.0175	Percent Non-Detects	15.91%
Mean Detects	0.067	SD Detects	0.132
Median Detects	0.035	CV Detects	1.975
Skewness Detects	3.915	Kurtosis Detects	15.63
Mean of Logged Detects	-3.549	SD of Logged Detects	1.236

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.452	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0577	KM Standard Error of Mean	0.0186
KM SD	0.122	95% KM (BCA) UCL	0.0921
95% KM (t) UCL	0.089	95% KM (Percentile Bootstrap) UCL	0.0883
95% KM (z) UCL	0.0883	95% KM Bootstrap t UCL	0.169
90% KM Chebyshev UCL	0.114	95% KM Chebyshev UCL	0.139
97.5% KM Chebyshev UCL	0.174	99% KM Chebyshev UCL	0.243

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.68	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.792	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.183	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.151	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.713	k star (bias corrected MLE)	0.673
Theta hat (MLE)	0.094	Theta star (bias corrected MLE)	0.0996
nu hat (MLE)	52.73	nu star (bias corrected)	49.79
Mean (detects)	0.067		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0035	Mean	0.0579
Maximum	0.68	Median	0.0225
SD	0.123	CV	2.122
k hat (MLE)	0.696	k star (bias corrected MLE)	0.664
Theta hat (MLE)	0.0832	Theta star (bias corrected MLE)	0.0873
nu hat (MLE)	61.27	nu star (bias corrected)	58.43
Adjusted Level of Significance (β)	0.0445		
Approximate Chi Square Value (58.43, α)	41.86	Adjusted Chi Square Value (58.43, β)	41.38
95% Gamma Approximate UCL (use when n>=50)	0.0809	95% Gamma Adjusted UCL (use when n<50)	0.0818

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0577	SD (KM)	0.122
Variance (KM)	0.0148	SE of Mean (KM)	0.0186
k hat (KM)	0.225	k star (KM)	0.224
nu hat (KM)	19.76	nu star (KM)	19.74
theta hat (KM)	0.257	theta star (KM)	0.257
80% gamma percentile (KM)	0.0803	90% gamma percentile (KM)	0.174
95% gamma percentile (KM)	0.288	99% gamma percentile (KM)	0.596

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.74, α)	10.66	Adjusted Chi Square Value (19.74, β)	10.44
95% Gamma Approximate KM-UCL (use when n>=50)	0.107	95% Gamma Adjusted KM-UCL (use when n<50)	0.109

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.936	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0901	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.144	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0575	Mean in Log Scale	-3.8
SD in Original Scale	0.123	SD in Log Scale	1.29
95% t UCL (assumes normality of ROS data)	0.0887	95% Percentile Bootstrap UCL	0.0899
95% BCA Bootstrap UCL	0.106	95% Bootstrap t UCL	0.168
95% H-UCL (Log ROS)	0.0877		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.814	KM Geo Mean	0.0221
KM SD (logged)	1.303	95% Critical H Value (KM-Log)	2.726
KM Standard Error of Mean (logged)	0.201	95% H-UCL (KM -Log)	0.0886
KM SD (logged)	1.303	95% Critical H Value (KM-Log)	2.726
KM Standard Error of Mean (logged)	0.201		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0591	Mean in Log Scale	-3.798
SD in Original Scale	0.123	SD in Log Scale	1.353
95% t UCL (Assumes normality)	0.0904	95% H-Stat UCL	0.0995

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.0886

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

Nickel

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	51
Minimum	1.7	Mean	9.045
Maximum	31	Median	3.7
SD	9.774	Std. Error of Mean	2.947
Coefficient of Variation	1.081	Skewness	1.48

Normal GOF Test

Shapiro Wilk Test Statistic	0.747	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.308	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	14.39	95% Adjusted-CLT UCL (Chen-1995)	15.3
		95% Modified-t UCL (Johnson-1978)	14.61

Gamma GOF Test

A-D Test Statistic	0.828	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.261	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.196	k star (bias corrected MLE)	0.931
Theta hat (MLE)	7.561	Theta star (bias corrected MLE)	9.719
nu hat (MLE)	26.32	nu star (bias corrected)	20.47
MLE Mean (bias corrected)	9.045	MLE Sd (bias corrected)	9.376
		Approximate Chi Square Value (0.05)	11.2
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	10.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	16.53	95% Adjusted Gamma UCL (use when n<50)	18.34

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.531	Mean of logged Data	1.729
Maximum of Logged Data	3.434	SD of logged Data	0.985

Assuming Lognormal Distribution

95% H-UCL	23.07	90% Chebyshev (MVUE) UCL	16.77
95% Chebyshev (MVUE) UCL	20.45	97.5% Chebyshev (MVUE) UCL	25.57
99% Chebyshev (MVUE) UCL	35.62		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	13.89	95% Jackknife UCL	14.39
95% Standard Bootstrap UCL	13.55	95% Bootstrap-t UCL	17.2
95% Hall's Bootstrap UCL	13.4	95% Percentile Bootstrap UCL	13.75
95% BCA Bootstrap UCL	15.58		
90% Chebyshev(Mean, Sd) UCL	17.89	95% Chebyshev(Mean, Sd) UCL	21.89
97.5% Chebyshev(Mean, Sd) UCL	27.45	99% Chebyshev(Mean, Sd) UCL	38.37

Suggested UCL to Use

95% H-UCL	23.07

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

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	76	Number of Distinct Observations	60
		Number of Missing Observations	15
Number of Detects	56	Number of Non-Detects	20
Number of Distinct Detects	49	Number of Distinct Non-Detects	14
Minimum Detect	9.5000E-4	Minimum Non-Detect	9.1000E-4
Maximum Detect	4.8	Maximum Non-Detect	0.01
Variance Detects	0.919	Percent Non-Detects	26.32%
Mean Detects	0.67	SD Detects	0.959
Median Detects	0.35	CV Detects	1.431
Skewness Detects	2.512	Kurtosis Detects	7.197
Mean of Logged Detects	-1.75	SD of Logged Detects	2.195

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.698	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	1.710E-14	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.118	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.494	KM Standard Error of Mean	0.1
KM SD	0.867	95% KM (BCA) UCL	0.651
95% KM (t) UCL	0.661	95% KM (Percentile Bootstrap) UCL	0.666
95% KM (z) UCL	0.659	95% KM Bootstrap t UCL	0.728
90% KM Chebyshev UCL	0.795	95% KM Chebyshev UCL	0.932
97.5% KM Chebyshev UCL	1.121	99% KM Chebyshev UCL	1.493

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.273	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.821	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.0623	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.126	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.475	k star (bias corrected MLE)	0.461
Theta hat (MLE)	1.412	Theta star (bias corrected MLE)	1.453
nu hat (MLE)	53.15	nu star (bias corrected)	51.64
Mean (detects)	0.67		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.5000E-4	Mean	0.496
Maximum	4.8	Median	0.108
SD	0.872	CV	1.756
k hat (MLE)	0.37	k star (bias corrected MLE)	0.364
Theta hat (MLE)	1.341	Theta star (bias corrected MLE)	1.363
nu hat (MLE)	56.25	nu star (bias corrected)	55.36
Adjusted Level of Significance (β)	0.0468		
Approximate Chi Square Value (55.36, α)	39.26	Adjusted Chi Square Value (55.36, β)	39
95% Gamma Approximate UCL (use when n>=50)	0.7	95% Gamma Adjusted UCL (use when n<50)	0.705

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.494	SD (KM)	0.867
Variance (KM)	0.752	SE of Mean (KM)	0.1
k hat (KM)	0.325	k star (KM)	0.321
nu hat (KM)	49.36	nu star (KM)	48.75
theta hat (KM)	1.522	theta star (KM)	1.541
80% gamma percentile (KM)	0.769	90% gamma percentile (KM)	1.445
95% gamma percentile (KM)	2.212	99% gamma percentile (KM)	4.189

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (48.75, α)	33.72	Adjusted Chi Square Value (48.75, β)	33.48
95% Gamma Approximate KM-UCL (use when n>=50)	0.714	95% Gamma Adjusted KM-UCL (use when n<50)	0.719

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.913	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	4.5126E-4	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.152	Lilliefors GOF Test
5% Lilliefors Critical Value	0.118	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.495	Mean in Log Scale	-2.895
SD in Original Scale	0.873	SD in Log Scale	2.72
95% t UCL (assumes normality of ROS data)	0.661	95% Percentile Bootstrap UCL	0.661
95% BCA Bootstrap UCL	0.699	95% Bootstrap t UCL	0.715
95% H-UCL (Log ROS)	8.858		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.072	KM Geo Mean	0.0463
KM SD (logged)	2.907	95% Critical H Value (KM-Log)	4.645
KM Standard Error of Mean (logged)	0.338	95% H-UCL (KM -Log)	15.09
KM SD (logged)	2.907	95% Critical H Value (KM-Log)	4.645
KM Standard Error of Mean (logged)	0.338		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.494	Mean in Log Scale	-3.013
SD in Original Scale	0.873	SD in Log Scale	2.879
95% t UCL (Assumes normality)	0.661	95% H-Stat UCL	14.33

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL 0.714

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

TCDD TEQ HH

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	46
Minimum	3.6700E-8	Mean	5.5064E-6
Maximum	2.2300E-5	Median	1.7200E-6
SD	7.1809E-6	Std. Error of Mean	1.7952E-6
Coefficient of Variation	N/A	Skewness	1.434

Normal GOF Test

Shapiro Wilk Test Statistic	0.762	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.277	Lilliefors GOF Test
5% Lilliefors Critical Value	0.213	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.6536E-6	95% Adjusted-CLT UCL (Chen-1995)	9.1470E-6
		95% Modified-t UCL (Johnson-1978)	8.7608E-6

Gamma GOF Test

A-D Test Statistic	0.301	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.795	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.132	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.521	k star (bias corrected MLE)	0.465
Theta hat (MLE)	1.0570E-5	Theta star (bias corrected MLE)	1.1843E-5
nu hat (MLE)	16.67	nu star (bias corrected)	14.88
MLE Mean (bias corrected)	5.5064E-6	MLE Sd (bias corrected)	8.0755E-6
		Approximate Chi Square Value (0.05)	7.177
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	6.575

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.1415E-5	95% Adjusted Gamma UCL (use when n<50)	1.2459E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.135	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.213	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.12	Mean of logged Data	-13.32
Maximum of Logged Data	-10.71	SD of logged Data	1.944

Assuming Lognormal Distribution

95% H-UCL	9.6895E-5	90% Chebyshev (MVUE) UCL	2.2447E-5
95% Chebyshev (MVUE) UCL	2.8856E-5	97.5% Chebyshev (MVUE) UCL	3.7751E-5
99% Chebyshev (MVUE) UCL	5.5225E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.4593E-6	95% Jackknife UCL	8.6536E-6
95% Standard Bootstrap UCL	8.3804E-6	95% Bootstrap-t UCL	1.0227E-5
95% Hall's Bootstrap UCL	9.5253E-6	95% Percentile Bootstrap UCL	8.5437E-6
95% BCA Bootstrap UCL	9.2185E-6		
90% Chebyshev(Mean, Sd) UCL	1.0892E-5	95% Chebyshev(Mean, Sd) UCL	1.3332E-5
97.5% Chebyshev(Mean, Sd) UCL	1.6718E-5	99% Chebyshev(Mean, Sd) UCL	2.3369E-5

Suggested UCL to Use

95% Adjusted Gamma UCL	1.2459E-5

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

Thallium

General Statistics

Total Number of Observations	11	Number of Distinct Observations	9
		Number of Missing Observations	51
Number of Detects	7	Number of Non-Detects	4
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.047	Minimum Non-Detect	0.11
Maximum Detect	0.17	Maximum Non-Detect	0.12
Variance Detects	0.0023	Percent Non-Detects	36.36%
Mean Detects	0.105	SD Detects	0.0479
Median Detects	0.085	CV Detects	0.457
Skewness Detects	0.229	Kurtosis Detects	-1.923
Mean of Logged Detects	-2.353	SD of Logged Detects	0.49

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0916	KM Standard Error of Mean	0.0139
KM SD	0.0406	95% KM (BCA) UCL	0.116
95% KM (t) UCL	0.117	95% KM (Percentile Bootstrap) UCL	0.113
95% KM (z) UCL	0.115	95% KM Bootstrap t UCL	0.118
90% KM Chebyshev UCL	0.133	95% KM Chebyshev UCL	0.152
97.5% KM Chebyshev UCL	0.179	99% KM Chebyshev UCL	0.23

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.351	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.71	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.228	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.313	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.261	k star (bias corrected MLE)	3.102
Theta hat (MLE)	0.0199	Theta star (bias corrected MLE)	0.0338
nu hat (MLE)	73.66	nu star (bias corrected)	43.42
Mean (detects)	0.105		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.047	Mean	0.0924
Maximum	0.17	Median	0.082
SD	0.0421	CV	0.455
k hat (MLE)	5.799	k star (bias corrected MLE)	4.278
Theta hat (MLE)	0.0159	Theta star (bias corrected MLE)	0.0216
nu hat (MLE)	127.6	nu star (bias corrected)	94.12
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (94.12, α)	72.75	Adjusted Chi Square Value (94.12, β)	69.69
95% Gamma Approximate UCL (use when n>=50)	0.12	95% Gamma Adjusted UCL (use when n<50)	0.125

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0916	SD (KM)	0.0406
Variance (KM)	0.00165	SE of Mean (KM)	0.0139
k hat (KM)	5.09	k star (KM)	3.763
nu hat (KM)	112	nu star (KM)	82.78
theta hat (KM)	0.018	theta star (KM)	0.0244
80% gamma percentile (KM)	0.127	90% gamma percentile (KM)	0.155
95% gamma percentile (KM)	0.181	99% gamma percentile (KM)	0.235

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (82.78, α)	62.81	Adjusted Chi Square Value (82.78, β)	59.98
)5% Gamma Approximate KM-UCL (use when n>=50)	0.121	95% Gamma Adjusted KM-UCL (use when n<50)	0.126

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0919	Mean in Log Scale	-2.475
SD in Original Scale	0.0421	SD in Log Scale	0.432

95% t UCL (assumes normality of ROS data)	0.115	95% Percentile Bootstrap UCL	0.112
95% BCA Bootstrap UCL	0.117	95% Bootstrap t UCL	0.12
95% H-UCL (Log ROS)	0.123		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.483	KM Geo Mean	0.0835
KM SD (logged)	0.426	95% Critical H Value (KM-Log)	2.084
KM Standard Error of Mean (logged)	0.154	95% H-UCL (KM -Log)	0.121
KM SD (logged)	0.426	95% Critical H Value (KM-Log)	2.084
KM Standard Error of Mean (logged)	0.154		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0872	Mean in Log Scale	-2.544
SD in Original Scale	0.0445	SD in Log Scale	0.463
95% t UCL (Assumes normality)	0.112	95% H-Stat UCL	0.119

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.117

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

Vanadium

General Statistics

Total Number of Observations	11	Number of Distinct Observations	9
		Number of Missing Observations	51
Minimum	11	Mean	19.91
Maximum	30	Median	22
SD	6.949	Std. Error of Mean	2.095
Coefficient of Variation	0.349	Skewness	-0.0573

Normal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	23.71	95% Adjusted-CLT UCL (Chen-1995)	23.32
		95% Modified-t UCL (Johnson-1978)	23.7

Gamma GOF Test

A-D Test Statistic	0.592	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.256	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.321	k star (bias corrected MLE)	6.112
Theta hat (MLE)	2.393	Theta star (bias corrected MLE)	3.257
nu hat (MLE)	183.1	nu star (bias corrected)	134.5
MLE Mean (bias corrected)	19.91	MLE Sd (bias corrected)	8.053
		Approximate Chi Square Value (0.05)	108.7
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	104.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	24.63	95% Adjusted Gamma UCL (use when n<50)	25.52

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.398	Mean of logged Data	2.93
Maximum of Logged Data	3.401	SD of logged Data	0.377

Assuming Lognormal Distribution

95% H-UCL	25.59	90% Chebyshev (MVUE) UCL	26.85
95% Chebyshev (MVUE) UCL	29.97	97.5% Chebyshev (MVUE) UCL	34.3
99% Chebyshev (MVUE) UCL	42.8		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	23.36	95% Jackknife UCL	23.71
95% Standard Bootstrap UCL	23.18	95% Bootstrap-t UCL	23.68
95% Hall's Bootstrap UCL	23	95% Percentile Bootstrap UCL	23.18
95% BCA Bootstrap UCL	23.09		
90% Chebyshev(Mean, Sd) UCL	26.19	95% Chebyshev(Mean, Sd) UCL	29.04
97.5% Chebyshev(Mean, Sd) UCL	32.99	99% Chebyshev(Mean, Sd) UCL	40.76

Suggested UCL to Use

95% Student's-t UCL	23.71

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/28/2018 4:37:58 PM
From File	Pepco Soil Input_a.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	6	Number of Distinct Observations	5
		Number of Missing Observations	33
Minimum	2.2	Mean	3.083
Maximum	4.2	Median	3
SD	0.76	Std. Error of Mean	0.31
Coefficient of Variation	0.247	Skewness	0.422

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.944	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.21	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3.709	95% Adjusted-CLT UCL (Chen-1995)	3.651
		95% Modified-t UCL (Johnson-1978)	3.717

Gamma GOF Test

A-D Test Statistic	0.263	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.697	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.185	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.332	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	19.97	k star (bias corrected MLE)	10.09
Theta hat (MLE)	0.154	Theta star (bias corrected MLE)	0.305
nu hat (MLE)	239.6	nu star (bias corrected)	121.1
MLE Mean (bias corrected)	3.083	MLE Sd (bias corrected)	0.97
		Approximate Chi Square Value (0.05)	96.72
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	88.85

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.862	95% Adjusted Gamma UCL (use when n<50)	4.204

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.17	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.788	Mean of logged Data	1.101
Maximum of Logged Data	1.435	SD of logged Data	0.246

Assuming Lognormal Distribution

95% H-UCL	3.922	90% Chebyshev (MVUE) UCL	4.013
95% Chebyshev (MVUE) UCL	4.434	97.5% Chebyshev (MVUE) UCL	5.018
99% Chebyshev (MVUE) UCL	6.167		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.594	95% Jackknife UCL	3.709
95% Standard Bootstrap UCL	3.549	95% Bootstrap-t UCL	3.921
95% Hall's Bootstrap UCL	4.115	95% Percentile Bootstrap UCL	3.517
95% BCA Bootstrap UCL	3.533		
90% Chebyshev(Mean, Sd) UCL	4.014	95% Chebyshev(Mean, Sd) UCL	4.436
97.5% Chebyshev(Mean, Sd) UCL	5.021	99% Chebyshev(Mean, Sd) UCL	6.171

Suggested UCL to Use

95% Student's-t UCL	3.709

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	115
		Number of Missing Observations	6
Number of Detects	152	Number of Non-Detects	13
Number of Distinct Detects	105	Number of Distinct Non-Detects	11
Minimum Detect	0.0011	Minimum Non-Detect	0.007
Maximum Detect	720	Maximum Non-Detect	0.16
Variance Detects	3771	Percent Non-Detects	7.879%
Mean Detects	11.57	SD Detects	61.41
Median Detects	2.45	CV Detects	5.307
Skewness Detects	10.65	Kurtosis Detects	120.3
Mean of Logged Detects	0.263	SD of Logged Detects	2.504

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.177	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.425	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0723	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	10.66	KM Standard Error of Mean	4.595
KM SD	58.83	95% KM (BCA) UCL	20.53
95% KM (t) UCL	18.26	95% KM (Percentile Bootstrap) UCL	19.57
95% KM (z) UCL	18.22	95% KM Bootstrap t UCL	58.19
90% KM Chebyshev UCL	24.44	95% KM Chebyshev UCL	30.69
97.5% KM Chebyshev UCL	39.35	99% KM Chebyshev UCL	56.38

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.829	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.865	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0824	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.313	k star (bias corrected MLE)	0.312
Theta hat (MLE)	36.93	Theta star (bias corrected MLE)	37.14
nu hat (MLE)	95.25	nu star (bias corrected)	94.71
Mean (detects)	11.57		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0011	Mean	10.66
Maximum	720	Median	2.1
SD	59.01	CV	5.535
k hat (MLE)	0.28	k star (bias corrected MLE)	0.279
Theta hat (MLE)	38.02	Theta star (bias corrected MLE)	38.16
nu hat (MLE)	92.52	nu star (bias corrected)	92.17
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (92.17, α)	71.03	Adjusted Chi Square Value (92.17, β)	70.87
95% Gamma Approximate UCL (use when n>=50)	13.83	95% Gamma Adjusted UCL (use when n<50)	13.86

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	10.66	SD (KM)	58.83
Variance (KM)	3461	SE of Mean (KM)	4.595
k hat (KM)	0.0328	k star (KM)	0.0363
nu hat (KM)	10.83	nu star (KM)	11.97
theta hat (KM)	324.7	theta star (KM)	293.8
80% gamma percentile (KM)	0.362	90% gamma percentile (KM)	9.603
95% gamma percentile (KM)	48.1	99% gamma percentile (KM)	260.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.97, α)	5.208	Adjusted Chi Square Value (11.97, β)	5.169
95% Gamma Approximate KM-UCL (use when n>=50)	24.5	95% Gamma Adjusted KM-UCL (use when n<50)	24.69

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	7.321E-11	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.124	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0723	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	10.66	Mean in Log Scale	-0.0722
SD in Original Scale	59.01	SD in Log Scale	2.666
95% t UCL (assumes normality of ROS data)	18.26	95% Percentile Bootstrap UCL	19.03
95% BCA Bootstrap UCL	23.7	95% Bootstrap t UCL	58.1
95% H-UCL (Log ROS)	74.6		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.215	KM Geo Mean	0.807
KM SD (logged)	2.91	95% Critical H Value (KM-Log)	4.293
KM Standard Error of Mean (logged)	0.229	95% H-UCL (KM -Log)	147.9
KM SD (logged)	2.91	95% Critical H Value (KM-Log)	4.293
KM Standard Error of Mean (logged)	0.229		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10.66	Mean in Log Scale	-0.163
SD in Original Scale	59.01	SD in Log Scale	2.826
95% t UCL (Assumes normality)	18.26	95% H-Stat UCL	116.1

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 30.69

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	112
		Number of Missing Observations	6
Number of Detects	147	Number of Non-Detects	18
Number of Distinct Detects	101	Number of Distinct Non-Detects	13
Minimum Detect	0.0022	Minimum Non-Detect	0.007
Maximum Detect	640	Maximum Non-Detect	0.16
Variance Detects	3043	Percent Non-Detects	10.91%
Mean Detects	10.64	SD Detects	55.16
Median Detects	2.4	CV Detects	5.184
Skewness Detects	10.59	Kurtosis Detects	118.9
Mean of Logged Detects	0.432	SD of Logged Detects	2.174

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.179	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.424	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0735	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	9.48	KM Standard Error of Mean	4.062
KM SD	51.99	95% KM (BCA) UCL	17.58
95% KM (t) UCL	16.2	95% KM (Percentile Bootstrap) UCL	16.86
95% KM (z) UCL	16.16	95% KM Bootstrap t UCL	50.14
90% KM Chebyshev UCL	21.66	95% KM Chebyshev UCL	27.18
97.5% KM Chebyshev UCL	34.84	99% KM Chebyshev UCL	49.89

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.503	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.857	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.153	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0834	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.348	k star (bias corrected MLE)	0.346
Theta hat (MLE)	30.55	Theta star (bias corrected MLE)	30.78
nu hat (MLE)	102.4	nu star (bias corrected)	101.6
Mean (detects)	10.64		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0022	Mean	9.48
Maximum	640	Median	2.1
SD	52.15	CV	5.501
k hat (MLE)	0.293	k star (bias corrected MLE)	0.291
Theta hat (MLE)	32.4	Theta star (bias corrected MLE)	32.54
nu hat (MLE)	96.55	nu star (bias corrected)	96.13
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (96.13, α)	74.52	Adjusted Chi Square Value (96.13, β)	74.35
95% Gamma Approximate UCL (use when n>=50)	12.23	95% Gamma Adjusted UCL (use when n<50)	12.26

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.48	SD (KM)	51.99
Variance (KM)	2703	SE of Mean (KM)	4.062
k hat (KM)	0.0332	k star (KM)	0.0367
nu hat (KM)	10.97	nu star (KM)	12.1
theta hat (KM)	285.2	theta star (KM)	258.5
80% gamma percentile (KM)	0.341	90% gamma percentile (KM)	8.732
95% gamma percentile (KM)	43.09	99% gamma percentile (KM)	230.6

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.10, α)	5.296	Adjusted Chi Square Value (12.10, β)	5.256
95% Gamma Approximate KM-UCL (use when n>=50)	21.67	95% Gamma Adjusted KM-UCL (use when n<50)	21.83

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.945	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.3397E-5	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.121	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0735	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.482	Mean in Log Scale	-0.013
SD in Original Scale	52.15	SD in Log Scale	2.419
95% t UCL (assumes normality of ROS data)	16.2	95% Percentile Bootstrap UCL	16.9
95% BCA Bootstrap UCL	22.66	95% Bootstrap t UCL	51.54
95% H-UCL (Log ROS)	36.98		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.197	KM Geo Mean	0.821
KM SD (logged)	2.73	95% Critical H Value (KM-Log)	4.068
KM Standard Error of Mean (logged)	0.215	95% H-UCL (KM -Log)	81.28
KM SD (logged)	2.73	95% Critical H Value (KM-Log)	4.068
KM Standard Error of Mean (logged)	0.215		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.48	Mean in Log Scale	-0.187
SD in Original Scale	52.15	SD in Log Scale	2.727
95% t UCL (Assumes normality)	16.2	95% H-Stat UCL	81.13

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 27.18

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	120
		Number of Missing Observations	6
Number of Detects	148	Number of Non-Detects	17
Number of Distinct Detects	108	Number of Distinct Non-Detects	12
Minimum Detect	0.0019	Minimum Non-Detect	0.007
Maximum Detect	420	Maximum Non-Detect	0.16
Variance Detects	1479	Percent Non-Detects	10.3%
Mean Detects	10.15	SD Detects	38.46
Median Detects	3.05	CV Detects	3.788
Skewness Detects	9.19	Kurtosis Detects	92.59
Mean of Logged Detects	0.604	SD of Logged Detects	2.196

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.247	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.396	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0732	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	9.106	KM Standard Error of Mean	2.846
KM SD	36.43	95% KM (BCA) UCL	14.37
95% KM (t) UCL	13.81	95% KM (Percentile Bootstrap) UCL	14.37
95% KM (z) UCL	13.79	95% KM Bootstrap t UCL	26.47
90% KM Chebyshev UCL	17.64	95% KM Chebyshev UCL	21.51
97.5% KM Chebyshev UCL	26.88	99% KM Chebyshev UCL	37.42

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.955	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.847	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.121	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0827	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.386	k star (bias corrected MLE)	0.383
Theta hat (MLE)	26.28	Theta star (bias corrected MLE)	26.51
nu hat (MLE)	114.3	nu star (bias corrected)	113.3
Mean (detects)	10.15		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0019	Mean	9.107
Maximum	420	Median	2.3
SD	36.54	CV	4.012
k hat (MLE)	0.319	k star (bias corrected MLE)	0.317
Theta hat (MLE)	28.56	Theta star (bias corrected MLE)	28.72
nu hat (MLE)	105.2	nu star (bias corrected)	104.6
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (104.63, α)	82.03	Adjusted Chi Square Value (104.63, β)	81.85
95% Gamma Approximate UCL (use when n>=50)	11.62	95% Gamma Adjusted UCL (use when n<50)	11.64

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.106	SD (KM)	36.43
Variance (KM)	1327	SE of Mean (KM)	2.846
k hat (KM)	0.0625	k star (KM)	0.0654
nu hat (KM)	20.62	nu star (KM)	21.58
theta hat (KM)	145.7	theta star (KM)	139.3
80% gamma percentile (KM)	2.766	90% gamma percentile (KM)	18.57
95% gamma percentile (KM)	51.88	99% gamma percentile (KM)	176.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (21.58, α)	12.02	Adjusted Chi Square Value (21.58, β)	11.96
95% Gamma Approximate KM-UCL (use when n>=50)	16.34	95% Gamma Adjusted KM-UCL (use when n<50)	16.43

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.938	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	6.3330E-7	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0732	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.109	Mean in Log Scale	0.171
SD in Original Scale	36.54	SD in Log Scale	2.446
95% t UCL (assumes normality of ROS data)	13.81	95% Percentile Bootstrap UCL	14.28
95% BCA Bootstrap UCL	17.15	95% Bootstrap t UCL	26.62
95% H-UCL (Log ROS)	48.05		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.0166	KM Geo Mean	0.983
KM SD (logged)	2.774	95% Critical H Value (KM-Log)	4.122
KM Standard Error of Mean (logged)	0.218	95% H-UCL (KM -Log)	112.5
KM SD (logged)	2.774	95% Critical H Value (KM-Log)	4.122
KM Standard Error of Mean (logged)	0.218		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	9.107	Mean in Log Scale	0.00226
SD in Original Scale	36.54	SD in Log Scale	2.751
95% t UCL (Assumes normality)	13.81	95% H-Stat UCL	106.4

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 21.51

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	113
		Number of Missing Observations	6
Number of Detects	142	Number of Non-Detects	23
Number of Distinct Detects	97	Number of Distinct Non-Detects	18
Minimum Detect	0.0023	Minimum Non-Detect	0.007
Maximum Detect	570	Maximum Non-Detect	1.5
Variance Detects	2371	Percent Non-Detects	13.94%
Mean Detects	7.146	SD Detects	48.69
Median Detects	1.1	CV Detects	6.814
Skewness Detects	11.2	Kurtosis Detects	129.3
Mean of Logged Detects	-0.258	SD of Logged Detects	2.106

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.138	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.442	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0747	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	6.154	KM Standard Error of Mean	3.522
KM SD	45.08	95% KM (BCA) UCL	12.97
95% KM (t) UCL	11.98	95% KM (Percentile Bootstrap) UCL	12.96
95% KM (z) UCL	11.95	95% KM Bootstrap t UCL	68.85
90% KM Chebyshev UCL	16.72	95% KM Chebyshev UCL	21.51
97.5% KM Chebyshev UCL	28.15	99% KM Chebyshev UCL	41.2

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	9.699	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.866	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.206	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0852	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.309	k star (bias corrected MLE)	0.307
Theta hat (MLE)	23.16	Theta star (bias corrected MLE)	23.3
nu hat (MLE)	87.62	nu star (bias corrected)	87.1
Mean (detects)	7.146		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0023	Mean	6.151
Maximum	570	Median	0.85
SD	45.22	CV	7.351
k hat (MLE)	0.263	k star (bias corrected MLE)	0.262
Theta hat (MLE)	23.41	Theta star (bias corrected MLE)	23.47
nu hat (MLE)	86.72	nu star (bias corrected)	86.48
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (86.48, α)	66.04	Adjusted Chi Square Value (86.48, β)	65.89
95% Gamma Approximate UCL (use when n>=50)	8.055	95% Gamma Adjusted UCL (use when n<50)	8.074

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.154	SD (KM)	45.08
Variance (KM)	2032	SE of Mean (KM)	3.522
k hat (KM)	0.0186	k star (KM)	0.0223
nu hat (KM)	6.15	nu star (KM)	7.371
theta hat (KM)	330.2	theta star (KM)	275.5
80% gamma percentile (KM)	0.00722	90% gamma percentile (KM)	1.416
95% gamma percentile (KM)	16.81	99% gamma percentile (KM)	169.4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.37, α)	2.376	Adjusted Chi Square Value (7.37, β)	2.352
)5% Gamma Approximate KM-UCL (use when n>=50)	19.09	95% Gamma Adjusted KM-UCL (use when n<50)	19.29

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.948	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	7.7373E-5	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.103	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0747	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.154	Mean in Log Scale	-0.756
SD in Original Scale	45.22	SD in Log Scale	2.327
95% t UCL (assumes normality of ROS data)	11.98	95% Percentile Bootstrap UCL	12.81
95% BCA Bootstrap UCL	17.88	95% Bootstrap t UCL	68.89
95% H-UCL (Log ROS)	13.49		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.947	KM Geo Mean	0.388
KM SD (logged)	2.637	95% Critical H Value (KM-Log)	3.953
KM Standard Error of Mean (logged)	0.208	95% H-UCL (KM -Log)	28.31
KM SD (logged)	2.637	95% Critical H Value (KM-Log)	3.953
KM Standard Error of Mean (logged)	0.208		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.158	Mean in Log Scale	-0.863
SD in Original Scale	45.22	SD in Log Scale	2.544
95% t UCL (Assumes normality)	11.98	95% H-Stat UCL	23

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 21.51

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

Chrysene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	124
		Number of Missing Observations	6
Number of Detects	151	Number of Non-Detects	14
Number of Distinct Detects	114	Number of Distinct Non-Detects	12
Minimum Detect	0.0013	Minimum Non-Detect	0.007
Maximum Detect	620	Maximum Non-Detect	0.16
Variance Detects	2824	Percent Non-Detects	8.485%
Mean Detects	10.42	SD Detects	53.14
Median Detects	2.4	CV Detects	5.1
Skewness Detects	10.56	Kurtosis Detects	118.5
Mean of Logged Detects	0.291	SD of Logged Detects	2.391

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.183	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.422	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0725	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	9.536	KM Standard Error of Mean	3.964
KM SD	50.75	95% KM (BCA) UCL	17.2
95% KM (t) UCL	16.09	95% KM (Percentile Bootstrap) UCL	16.98
95% KM (z) UCL	16.06	95% KM Bootstrap t UCL	49.11
90% KM Chebyshev UCL	21.43	95% KM Chebyshev UCL	26.81
97.5% KM Chebyshev UCL	34.29	99% KM Chebyshev UCL	48.98

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.655	Anderson-Darling GOF Test
5% A-D Critical Value	0.861	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.14	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0825	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.331	k star (bias corrected MLE)	0.328
Theta hat (MLE)	31.51	Theta star (bias corrected MLE)	31.72
nu hat (MLE)	99.85	nu star (bias corrected)	99.2
Mean (detects)	10.42		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0013	Mean	9.536
Maximum	620	Median	2
SD	50.9	CV	5.338
k hat (MLE)	0.291	k star (bias corrected MLE)	0.29
Theta hat (MLE)	32.75	Theta star (bias corrected MLE)	32.89
nu hat (MLE)	96.09	nu star (bias corrected)	95.68
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (95.68, α)	74.12	Adjusted Chi Square Value (95.68, β)	73.95
95% Gamma Approximate UCL (use when n>=50)	12.31	95% Gamma Adjusted UCL (use when n<50)	12.34

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.536	SD (KM)	50.75
Variance (KM)	2575	SE of Mean (KM)	3.964
k hat (KM)	0.0353	k star (KM)	0.0387
nu hat (KM)	11.65	nu star (KM)	12.77
theta hat (KM)	270.1	theta star (KM)	246.4
80% gamma percentile (KM)	0.448	90% gamma percentile (KM)	9.741
95% gamma percentile (KM)	44.86	99% gamma percentile (KM)	227.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.77, α)	5.74	Adjusted Chi Square Value (12.77, β)	5.698
95% Gamma Approximate KM-UCL (use when n>=50)	21.22	95% Gamma Adjusted KM-UCL (use when n<50)	21.37

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.925	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.2432E-9	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0725	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.537	Mean in Log Scale	-0.0664
SD in Original Scale	50.9	SD in Log Scale	2.573
95% t UCL (assumes normality of ROS data)	16.09	95% Percentile Bootstrap UCL	17.46
95% BCA Bootstrap UCL	22.96	95% Bootstrap t UCL	49.64
95% H-UCL (Log ROS)	55.9		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.217	KM Geo Mean	0.805
KM SD (logged)	2.834	95% Critical H Value (KM-Log)	4.197
KM Standard Error of Mean (logged)	0.223	95% H-UCL (KM -Log)	113
KM SD (logged)	2.834	95% Critical H Value (KM-Log)	4.197
KM Standard Error of Mean (logged)	0.223		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.536	Mean in Log Scale	-0.173
SD in Original Scale	50.9	SD in Log Scale	2.763
95% t UCL (Assumes normality)	16.09	95% H-Stat UCL	92.86

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 26.81

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	33
Minimum	4.6	Mean	8.25
Maximum	13	Median	7.95
SD	3.318	Std. Error of Mean	1.354
Coefficient of Variation	0.402	Skewness	0.363

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	10.98	95% Adjusted-CLT UCL (Chen-1995)	10.69
		95% Modified-t UCL (Johnson-1978)	11.01

Gamma GOF Test

A-D Test Statistic	0.252	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.698	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.333	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.25	k star (bias corrected MLE)	3.736
Theta hat (MLE)	1.138	Theta star (bias corrected MLE)	2.208
nu hat (MLE)	87	nu star (bias corrected)	44.83
MLE Mean (bias corrected)	8.25	MLE Sd (bias corrected)	4.268
		Approximate Chi Square Value (0.05)	30.47
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	26.27

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	12.14	95% Adjusted Gamma UCL (use when n<50)	14.08

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.526	Mean of logged Data	2.04
Maximum of Logged Data	2.565	SD of logged Data	0.417

Assuming Lognormal Distribution

95% H-UCL	13.24	90% Chebyshev (MVUE) UCL	12.47
95% Chebyshev (MVUE) UCL	14.38	97.5% Chebyshev (MVUE) UCL	17.03
99% Chebyshev (MVUE) UCL	22.23		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	10.48	95% Jackknife UCL	10.98
95% Standard Bootstrap UCL	10.27	95% Bootstrap-t UCL	11.43
95% Hall's Bootstrap UCL	11.47	95% Percentile Bootstrap UCL	10.33
95% BCA Bootstrap UCL	10.27		
90% Chebyshev(Mean, Sd) UCL	12.31	95% Chebyshev(Mean, Sd) UCL	14.15
97.5% Chebyshev(Mean, Sd) UCL	16.71	99% Chebyshev(Mean, Sd) UCL	21.73

Suggested UCL to Use

95% Student's-t UCL 10.98

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	117
		Number of Missing Observations	6
Number of Detects	129	Number of Non-Detects	36
Number of Distinct Detects	101	Number of Distinct Non-Detects	26
Minimum Detect	0.0021	Minimum Non-Detect	0.007
Maximum Detect	100	Maximum Non-Detect	1.7
Variance Detects	89.09	Percent Non-Detects	21.82%
Mean Detects	2.283	SD Detects	9.439
Median Detects	0.67	CV Detects	4.135
Skewness Detects	9.278	Kurtosis Detects	92.88
Mean of Logged Detects	-0.754	SD of Logged Detects	1.857

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.224	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.405	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0784	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.799	KM Standard Error of Mean	0.654
KM SD	8.364	95% KM (BCA) UCL	2.989
95% KM (t) UCL	2.881	95% KM (Percentile Bootstrap) UCL	2.959
95% KM (z) UCL	2.875	95% KM Bootstrap t UCL	6.724
90% KM Chebyshev UCL	3.76	95% KM Chebyshev UCL	4.649
97.5% KM Chebyshev UCL	5.882	99% KM Chebyshev UCL	8.304

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.273	Anderson-Darling GOF Test
5% A-D Critical Value	0.84	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.134	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0877	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.414	k star (bias corrected MLE)	0.41
Theta hat (MLE)	5.509	Theta star (bias corrected MLE)	5.569
nu hat (MLE)	106.9	nu star (bias corrected)	105.8
Mean (detects)	2.283		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0021	Mean	1.787
Maximum	100	Median	0.34
SD	8.392	CV	4.696
k hat (MLE)	0.315	k star (bias corrected MLE)	0.313
Theta hat (MLE)	5.679	Theta star (bias corrected MLE)	5.709
nu hat (MLE)	103.8	nu star (bias corrected)	103.3
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (103.28, α)	80.83	Adjusted Chi Square Value (103.28, β)	80.66
95% Gamma Approximate UCL (use when n>=50)	2.283	95% Gamma Adjusted UCL (use when n<50)	2.288

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.799	SD (KM)	8.364
Variance (KM)	69.95	SE of Mean (KM)	0.654
k hat (KM)	0.0463	k star (KM)	0.0495
nu hat (KM)	15.27	nu star (KM)	16.33
theta hat (KM)	38.88	theta star (KM)	36.36
80% gamma percentile (KM)	0.235	90% gamma percentile (KM)	2.709
95% gamma percentile (KM)	9.534	99% gamma percentile (KM)	39.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.33, α)	8.195	Adjusted Chi Square Value (16.33, β)	8.145
)5% Gamma Approximate KM-UCL (use when n>=50)	3.585	95% Gamma Adjusted KM-UCL (use when n<50)	3.608

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.971	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.103	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0877	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0784	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.793	Mean in Log Scale	-1.414
SD in Original Scale	8.39	SD in Log Scale	2.115
95% t UCL (assumes normality of ROS data)	2.874	95% Percentile Bootstrap UCL	3.088
95% BCA Bootstrap UCL	3.625	95% Bootstrap t UCL	6.681
95% H-UCL (Log ROS)	3.94		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.601	KM Geo Mean	0.202
KM SD (logged)	2.425	95% Critical H Value (KM-Log)	3.694
KM Standard Error of Mean (logged)	0.199	95% H-UCL (KM -Log)	7.675
KM SD (logged)	2.425	95% Critical H Value (KM-Log)	3.694
KM Standard Error of Mean (logged)	0.199		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.815	Mean in Log Scale	-1.44
SD in Original Scale	8.386	SD in Log Scale	2.319
95% t UCL (Assumes normality)	2.895	95% H-Stat UCL	6.656

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	7.675

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

-lowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	12	Number of Distinct Observations	8
		Number of Missing Observations	27
Number of Detects	1	Number of Non-Detects	11
Number of Distinct Detects	1	Number of Distinct Non-Detects	7

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV

The data set for variable Diesel Range Organics (C10-C20) was not processed!

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	110
		Number of Missing Observations	6
Number of Detects	147	Number of Non-Detects	18
Number of Distinct Detects	97	Number of Distinct Non-Detects	13
Minimum Detect	0.0021	Minimum Non-Detect	0.007
Maximum Detect	380	Maximum Non-Detect	0.16
Variance Detects	1081	Percent Non-Detects	10.91%
Mean Detects	7.053	SD Detects	32.87
Median Detects	1.9	CV Detects	4.661
Skewness Detects	10.43	Kurtosis Detects	116.1
Mean of Logged Detects	0.153	SD of Logged Detects	2.152

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.197	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.415	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0735	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	6.285	KM Standard Error of Mean	2.422
KM SD	31	95% KM (BCA) UCL	11.21
95% KM (t) UCL	10.29	95% KM (Percentile Bootstrap) UCL	10.86
95% KM (z) UCL	10.27	95% KM Bootstrap t UCL	26.87
90% KM Chebyshev UCL	13.55	95% KM Chebyshev UCL	16.84
97.5% KM Chebyshev UCL	21.41	99% KM Chebyshev UCL	30.38

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.341	Anderson-Darling GOF Test
5% A-D Critical Value	0.851	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.14	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0832	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.37	k star (bias corrected MLE)	0.367
Theta hat (MLE)	19.06	Theta star (bias corrected MLE)	19.21
nu hat (MLE)	108.8	nu star (bias corrected)	107.9
Mean (detects)	7.053		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0021	Mean	6.285
Maximum	380	Median	1.5
SD	31.1	CV	4.948
k hat (MLE)	0.311	k star (bias corrected MLE)	0.309
Theta hat (MLE)	20.21	Theta star (bias corrected MLE)	20.31
nu hat (MLE)	102.6	nu star (bias corrected)	102.1
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (102.11, α)	79.8	Adjusted Chi Square Value (102.11, β)	79.62
95% Gamma Approximate UCL (use when n>=50)	8.043	95% Gamma Adjusted UCL (use when n<50)	8.06

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.285	SD (KM)	31
Variance (KM)	961.1	SE of Mean (KM)	2.422
k hat (KM)	0.0411	k star (KM)	0.0444
nu hat (KM)	13.56	nu star (KM)	14.65
theta hat (KM)	152.9	theta star (KM)	141.6
80% gamma percentile (KM)	0.542	90% gamma percentile (KM)	8.1
95% gamma percentile (KM)	31.83	99% gamma percentile (KM)	143.1

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (14.65, α)	7.018	Adjusted Chi Square Value (14.65, β)	6.971
95% Gamma Approximate KM-UCL (use when n>=50)	13.12	95% Gamma Adjusted KM-UCL (use when n<50)	13.21

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.939	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.3648E-6	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0735	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.287	Mean in Log Scale	-0.271
SD in Original Scale	31.1	SD in Log Scale	2.37
95% t UCL (assumes normality of ROS data)	10.29	95% Percentile Bootstrap UCL	10.79
95% BCA Bootstrap UCL	14.63	95% Bootstrap t UCL	26.22
95% H-UCL (Log ROS)	24.79		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.444	KM Geo Mean	0.642
KM SD (logged)	2.655	95% Critical H Value (KM-Log)	3.976
KM Standard Error of Mean (logged)	0.209	95% H-UCL (KM -Log)	49.72
KM SD (logged)	2.655	95% Critical H Value (KM-Log)	3.976
KM Standard Error of Mean (logged)	0.209		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.285	Mean in Log Scale	-0.436
SD in Original Scale	31.1	SD in Log Scale	2.655
95% t UCL (Assumes normality)	10.29	95% H-Stat UCL	50.03

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 16.84

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

Manganese

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	33
Minimum	67	Mean	204.5
Maximum	400	Median	185
SD	115.7	Std. Error of Mean	47.25
Coefficient of Variation	0.566	Skewness	0.888

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	299.7	95% Adjusted-CLT UCL (Chen-1995)	300.5
		95% Modified-t UCL (Johnson-1978)	302.6

Gamma GOF Test

A-D Test Statistic	0.149	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.7	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.113	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.334	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.627	k star (bias corrected MLE)	1.924
Theta hat (MLE)	56.39	Theta star (bias corrected MLE)	106.3
nu hat (MLE)	43.52	nu star (bias corrected)	23.09
MLE Mean (bias corrected)	204.5	MLE Sd (bias corrected)	147.4
		Approximate Chi Square Value (0.05)	13.16
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	10.56

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	358.8	95% Adjusted Gamma UCL (use when n<50)	447.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.205	Mean of logged Data	5.176
Maximum of Logged Data	5.991	SD of logged Data	0.611

Assuming Lognormal Distribution

95% H-UCL	474.4	90% Chebyshev (MVUE) UCL	360.1
95% Chebyshev (MVUE) UCL	429.8	97.5% Chebyshev (MVUE) UCL	526.6
99% Chebyshev (MVUE) UCL	716.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	282.2	95% Jackknife UCL	299.7
95% Standard Bootstrap UCL	274.4	95% Bootstrap-t UCL	345.7
95% Hall's Bootstrap UCL	832.5	95% Percentile Bootstrap UCL	277.8
95% BCA Bootstrap UCL	287.8		
90% Chebyshev(Mean, Sd) UCL	346.2	95% Chebyshev(Mean, Sd) UCL	410.4
97.5% Chebyshev(Mean, Sd) UCL	499.6	99% Chebyshev(Mean, Sd) UCL	674.6

Suggested UCL to Use

95% Student's-t UCL 299.7

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

Naphthalene

General Statistics

Total Number of Observations	165	Number of Distinct Observations	112
		Number of Missing Observations	6
Number of Detects	105	Number of Non-Detects	60
Number of Distinct Detects	83	Number of Distinct Non-Detects	45
Minimum Detect	0.0013	Minimum Non-Detect	0.007
Maximum Detect	100	Maximum Non-Detect	2.8
Variance Detects	98.32	Percent Non-Detects	36.36%
Mean Detects	1.636	SD Detects	9.916
Median Detects	0.11	CV Detects	6.063
Skewness Detects	9.606	Kurtosis Detects	95.61
Mean of Logged Detects	-2.244	SD of Logged Detects	2.132

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.17	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.435	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0867	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.06	KM Standard Error of Mean	0.619
KM SD	7.909	95% KM (BCA) UCL	2.346
95% KM (t) UCL	2.084	95% KM (Percentile Bootstrap) UCL	2.215
95% KM (z) UCL	2.078	95% KM Bootstrap t UCL	6.882
90% KM Chebyshev UCL	2.916	95% KM Chebyshev UCL	3.757
97.5% KM Chebyshev UCL	4.924	99% KM Chebyshev UCL	7.216

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	9.851	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.889	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.253	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0966	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.258	k star (bias corrected MLE)	0.257
Theta hat (MLE)	6.333	Theta star (bias corrected MLE)	6.358
nu hat (MLE)	54.24	nu star (bias corrected)	54.02
Mean (detects)	1.636		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0013	Mean	1.044
Maximum	100	Median	0.02
SD	7.935	CV	7.598
k hat (MLE)	0.229	k star (bias corrected MLE)	0.229
Theta hat (MLE)	4.561	Theta star (bias corrected MLE)	4.564
nu hat (MLE)	75.56	nu star (bias corrected)	75.52
Adjusted Level of Significance (β)	0.0485		
Approximate Chi Square Value (75.52, α)	56.51	Adjusted Chi Square Value (75.52, β)	56.36
95% Gamma Approximate UCL (use when n>=50)	1.396	95% Gamma Adjusted UCL (use when n<50)	1.399

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.06	SD (KM)	7.909
Variance (KM)	62.56	SE of Mean (KM)	0.619
k hat (KM)	0.018	k star (KM)	0.0217
nu hat (KM)	5.927	nu star (KM)	7.153
theta hat (KM)	59.02	theta star (KM)	48.9
80% gamma percentile (KM)	9.4491E-4	90% gamma percentile (KM)	0.217
95% gamma percentile (KM)	2.769	99% gamma percentile (KM)	29.31

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.15, α)	2.255	Adjusted Chi Square Value (7.15, β)	2.231
)5% Gamma Approximate KM-UCL (use when n>=50)	3.363	95% Gamma Adjusted KM-UCL (use when n<50)	3.399

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.983	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.659	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0523	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0867	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.049	Mean in Log Scale	-3.036
SD in Original Scale	7.935	SD in Log Scale	2.115
95% t UCL (assumes normality of ROS data)	2.071	95% Percentile Bootstrap UCL	2.29
95% BCA Bootstrap UCL	3.063	95% Bootstrap t UCL	6.89
95% H-UCL (Log ROS)	0.779		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.078	KM Geo Mean	0.046
KM SD (logged)	2.269	95% Critical H Value (KM-Log)	3.506
KM Standard Error of Mean (logged)	0.195	95% H-UCL (KM -Log)	1.123
KM SD (logged)	2.269	95% Critical H Value (KM-Log)	3.506
KM Standard Error of Mean (logged)	0.195		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.119	Mean in Log Scale	-2.516
SD in Original Scale	7.928	SD in Log Scale	2.157
95% t UCL (Assumes normality)	2.14	95% H-Stat UCL	1.46

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 1.123

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

Nickel

General Statistics

Total Number of Observations	6	Number of Distinct Observations	5
		Number of Missing Observations	33
Minimum	11	Mean	18.33
Maximum	30	Median	18.5
SD	6.623	Std. Error of Mean	2.704
Coefficient of Variation	0.361	Skewness	1.076

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	23.78	95% Adjusted-CLT UCL (Chen-1995)	24.05
		95% Modified-t UCL (Johnson-1978)	23.98

Gamma GOF Test

A-D Test Statistic	0.348	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.698	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.247	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.332	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.871	k star (bias corrected MLE)	5.047
Theta hat (MLE)	1.857	Theta star (bias corrected MLE)	3.633
nu hat (MLE)	118.5	nu star (bias corrected)	60.56
MLE Mean (bias corrected)	18.33	MLE Sd (bias corrected)	8.161
		Approximate Chi Square Value (0.05)	43.67
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	38.54

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	25.43	95% Adjusted Gamma UCL (use when n<50)	28.81

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.398	Mean of logged Data	2.857
Maximum of Logged Data	3.401	SD of logged Data	0.349

Assuming Lognormal Distribution

95% H-UCL	26.55	90% Chebyshev (MVUE) UCL	26.13
95% Chebyshev (MVUE) UCL	29.68	97.5% Chebyshev (MVUE) UCL	34.6
99% Chebyshev (MVUE) UCL	44.26		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	22.78	95% Jackknife UCL	23.78
95% Standard Bootstrap UCL	22.36	95% Bootstrap-t UCL	24.35
95% Hall's Bootstrap UCL	29.15	95% Percentile Bootstrap UCL	22.5
95% BCA Bootstrap UCL	23.17		
90% Chebyshev(Mean, Sd) UCL	26.45	95% Chebyshev(Mean, Sd) UCL	30.12
97.5% Chebyshev(Mean, Sd) UCL	35.22	99% Chebyshev(Mean, Sd) UCL	45.24

Suggested UCL to Use

95% Student's-t UCL	23.78

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	22	Number of Distinct Observations	20
		Number of Missing Observations	149
Number of Detects	11	Number of Non-Detects	11
Number of Distinct Detects	11	Number of Distinct Non-Detects	9
Minimum Detect	0.017	Minimum Non-Detect	9.8000E-4
Maximum Detect	0.71	Maximum Non-Detect	0.01
Variance Detects	0.0379	Percent Non-Detects	50%
Mean Detects	0.215	SD Detects	0.195
Median Detects	0.18	CV Detects	0.907
Skewness Detects	1.735	Kurtosis Detects	3.941
Mean of Logged Detects	-1.96	SD of Logged Detects	1.07

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.84	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.186	Lilliefors GOF Test
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.108	KM Standard Error of Mean	0.0379
KM SD	0.169	95% KM (BCA) UCL	0.176
95% KM (t) UCL	0.173	95% KM (Percentile Bootstrap) UCL	0.17
95% KM (z) UCL	0.17	95% KM Bootstrap t UCL	0.214
90% KM Chebyshev UCL	0.221	95% KM Chebyshev UCL	0.273
97.5% KM Chebyshev UCL	0.344	99% KM Chebyshev UCL	0.485

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.196	Anderson-Darling GOF Test
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.123	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.261	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.326	k star (bias corrected MLE)	1.025
Theta hat (MLE)	0.162	Theta star (bias corrected MLE)	0.209
nu hat (MLE)	29.18	nu star (bias corrected)	22.56
Mean (detects)	0.215		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.112
Maximum	0.71	Median	0.0135
SD	0.17	CV	1.517
k hat (MLE)	0.568	k star (bias corrected MLE)	0.521
Theta hat (MLE)	0.198	Theta star (bias corrected MLE)	0.216
nu hat (MLE)	24.99	nu star (bias corrected)	22.92
Adjusted Level of Significance (β)	0.0386		
Approximate Chi Square Value (22.92, α)	13.03	Adjusted Chi Square Value (22.92, β)	12.47
95% Gamma Approximate UCL (use when n>=50)	0.198	95% Gamma Adjusted UCL (use when n<50)	0.206

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.108	SD (KM)	0.169
Variance (KM)	0.0287	SE of Mean (KM)	0.0379
k hat (KM)	0.406	k star (KM)	0.381
nu hat (KM)	17.86	nu star (KM)	16.75
theta hat (KM)	0.266	theta star (KM)	0.283
80% gamma percentile (KM)	0.173	90% gamma percentile (KM)	0.307
95% gamma percentile (KM)	0.456	99% gamma percentile (KM)	0.831

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.75, α)	8.497	Adjusted Chi Square Value (16.75, β)	8.06
›5% Gamma Approximate KM-UCL (use when n>=50)	0.213	95% Gamma Adjusted KM-UCL (use when n<50)	0.224

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.112	Mean in Log Scale	-3.358
SD in Original Scale	0.171	SD in Log Scale	1.629
95% t UCL (assumes normality of ROS data)	0.175	95% Percentile Bootstrap UCL	0.178
95% BCA Bootstrap UCL	0.2	95% Bootstrap t UCL	0.217
95% H-UCL (Log ROS)	0.464		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.444	KM Geo Mean	0.0117
KM SD (logged)	2.586	95% Critical H Value (KM-Log)	5.226
KM Standard Error of Mean (logged)	0.578	95% H-UCL (KM -Log)	6.358
KM SD (logged)	2.586	95% Critical H Value (KM-Log)	5.226
KM Standard Error of Mean (logged)	0.578		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.109	Mean in Log Scale	-4.135
SD in Original Scale	0.173	SD in Log Scale	2.419
95% t UCL (Assumes normality)	0.172	95% H-Stat UCL	4.008

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.173

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

TCDD TEQ HH

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	33
Minimum	4.7000E-7	Mean	6.5700E-6
Maximum	1.3700E-5	Median	6.0550E-6
SD	5.4494E-6	Std. Error of Mean	2.7247E-6
Coefficient of Variation	N/A	Skewness	0.554

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2982E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1858E-5
		95% Modified-t UCL (Johnson-1978)	1.3108E-5

Gamma GOF Test

A-D Test Statistic	0.361	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.666	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.311	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.402	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.102	k star (bias corrected MLE)	0.442
Theta hat (MLE)	5.9640E-6	Theta star (bias corrected MLE)	1.4862E-5
nu hat (MLE)	8.813	nu star (bias corrected)	3.537
MLE Mean (bias corrected)	6.5700E-6	MLE Sd (bias corrected)	9.8814E-6
		Approximate Chi Square Value (0.05)	0.548
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.2425E-5	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.853	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.344	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.57	Mean of logged Data	-12.45
Maximum of Logged Data	-11.2	SD of logged Data	1.466

Assuming Lognormal Distribution

95% H-UCL	0.0407	90% Chebyshev (MVUE) UCL	2.2877E-5
95% Chebyshev (MVUE) UCL	2.9650E-5	97.5% Chebyshev (MVUE) UCL	3.9050E-5
99% Chebyshev (MVUE) UCL	5.7515E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1052E-5	95% Jackknife UCL	1.2982E-5
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	1.4744E-5	95% Chebyshev(Mean, Sd) UCL	1.8447E-5
97.5% Chebyshev(Mean, Sd) UCL	2.3586E-5	99% Chebyshev(Mean, Sd) UCL	3.3680E-5

Suggested UCL to Use

95% Student's-t UCL 1.2982E-5

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

Thallium

General Statistics

Total Number of Observations	6	Number of Distinct Observations	5
		Number of Missing Observations	33
Number of Detects	3	Number of Non-Detects	3
Number of Distinct Detects	3	Number of Distinct Non-Detects	3
Minimum Detect	0.071	Minimum Non-Detect	0.1
Maximum Detect	0.13	Maximum Non-Detect	0.12
Variance Detects	8.7033E-4	Percent Non-Detects	50%
Mean Detects	0.1	SD Detects	0.0295
Median Detects	0.1	CV Detects	0.294
Skewness Detects	0.0508	Kurtosis Detects	N/A
Mean of Logged Detects	-2.329	SD of Logged Detects	0.303

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0889	KM Standard Error of Mean	0.0122
KM SD	0.0222	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.114	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.109	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.126	95% KM Chebyshev UCL	0.142
97.5% KM Chebyshev UCL	0.165	99% KM Chebyshev UCL	0.211

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	16.81	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00597	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	100.9	nu star (bias corrected)	N/A
Mean (detects)	0.1		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0705	Mean	0.0887
Maximum	0.13	Median	0.0804
SD	0.0229	CV	0.258
k hat (MLE)	20.49	k star (bias corrected MLE)	10.35
Theta hat (MLE)	0.00433	Theta star (bias corrected MLE)	0.00857
nu hat (MLE)	245.8	nu star (bias corrected)	124.2
Adjusted Level of Significance (β)	0.0122		
Approximate Chi Square Value (124.25, α)	99.51	Adjusted Chi Square Value (124.25, β)	91.51
95% Gamma Approximate UCL (use when n>=50)	0.111	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0889	SD (KM)	0.0222
Variance (KM)	4.9377E-4	SE of Mean (KM)	0.0122
k hat (KM)	16	k star (KM)	8.112
nu hat (KM)	192	nu star (KM)	97.35
theta hat (KM)	0.00555	theta star (KM)	0.011
80% gamma percentile (KM)	0.114	90% gamma percentile (KM)	0.13
95% gamma percentile (KM)	0.146	99% gamma percentile (KM)	0.177

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (97.35, α)	75.59	Adjusted Chi Square Value (97.35, β)	68.69
95% Gamma Approximate KM-UCL (use when n>=50)	0.114	95% Gamma Adjusted KM-UCL (use when n<50)	0.126

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.994	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0887	Mean in Log Scale	-2.448
SD in Original Scale	0.0229	SD in Log Scale	0.235
95% t UCL (assumes normality of ROS data)	0.107	95% Percentile Bootstrap UCL	0.103
95% BCA Bootstrap UCL	0.107	95% Bootstrap t UCL	0.154
95% H-UCL (Log ROS)	0.111		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.449	KM Geo Mean	0.0864
KM SD (logged)	0.235	95% Critical H Value (KM-Log)	2.12
KM Standard Error of Mean (logged)	0.132	95% H-UCL (KM -Log)	0.111
KM SD (logged)	0.235	95% Critical H Value (KM-Log)	2.12
KM Standard Error of Mean (logged)	0.132		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0777	Mean in Log Scale	-2.616
SD in Original Scale	0.0312	SD in Log Scale	0.373
95% t UCL (Assumes normality)	0.103	95% H-Stat UCL	0.116

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.114

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Vanadium

General Statistics			
Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	33
Minimum	16	Mean	24.17
Maximum	36	Median	21.5
SD	7.731	Std. Error of Mean	3.156
Coefficient of Variation	0.32	Skewness	0.792

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test		
Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level
Data appear Normal at 5% Significance Level		

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	30.53	95% Adjusted-CLT UCL (Chen-1995)	30.45
		95% Modified-t UCL (Johnson-1978)	30.7

Gamma GOF Test		
A-D Test Statistic	0.315	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.209	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	12.46	k star (bias corrected MLE)	6.339
Theta hat (MLE)	1.94	Theta star (bias corrected MLE)	3.813
nu hat (MLE)	149.5	nu star (bias corrected)	76.06
MLE Mean (bias corrected)	24.17	MLE Sd (bias corrected)	9.599
		Approximate Chi Square Value (0.05)	56.98
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	51.05

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	32.26	95% Adjusted Gamma UCL (use when n<50)	36.01

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.185	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	2.773	Mean of logged Data	3.144
Maximum of Logged Data	3.584	SD of logged Data	0.309

Assuming Lognormal Distribution			
95% H-UCL	33.17	90% Chebyshev (MVUE) UCL	33.27
95% Chebyshev (MVUE) UCL	37.41	97.5% Chebyshev (MVUE) UCL	43.15
99% Chebyshev (MVUE) UCL	54.42		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	29.36	95% Jackknife UCL	30.53
95% Standard Bootstrap UCL	28.86	95% Bootstrap-t UCL	36.19
95% Hall's Bootstrap UCL	72.21	95% Percentile Bootstrap UCL	29.17
95% BCA Bootstrap UCL	29.67		
90% Chebyshev(Mean, Sd) UCL	33.64	95% Chebyshev(Mean, Sd) UCL	37.92
97.5% Chebyshev(Mean, Sd) UCL	43.88	99% Chebyshev(Mean, Sd) UCL	55.57

Suggested UCL to Use

95% Student's-t UCL 30.53

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 2:19:22 PM
From File	Soil_Substat7.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	18
Minimum	0.65	Mean	6.636
Maximum	33	Median	2.6
SD	11.69	Std. Error of Mean	4.418
Coefficient of Variation	1.762	Skewness	2.586

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.551	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.453	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	15.22	95% Adjusted-CLT UCL (Chen-1995)	18.52
		95% Modified-t UCL (Johnson-1978)	15.94

Gamma GOF Test

A-D Test Statistic	0.821	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.739	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.363	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.323	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.705	k star (bias corrected MLE)	0.498
Theta hat (MLE)	9.413	Theta star (bias corrected MLE)	13.32
nu hat (MLE)	9.87	nu star (bias corrected)	6.973
MLE Mean (bias corrected)	6.636	MLE Sd (bias corrected)	9.402
		Approximate Chi Square Value (0.05)	2.156
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	1.44

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	21.46	95% Adjusted Gamma UCL (use when n<50)	32.13

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.9	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.263	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.431	Mean of logged Data	1.036
Maximum of Logged Data	3.497	SD of logged Data	1.258

Assuming Lognormal Distribution

95% H-UCL	61.23	90% Chebyshev (MVUE) UCL	12.79
95% Chebyshev (MVUE) UCL	16.18	97.5% Chebyshev (MVUE) UCL	20.9
99% Chebyshev (MVUE) UCL	30.16		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	13.9	95% Jackknife UCL	15.22
95% Standard Bootstrap UCL	13.32	95% Bootstrap-t UCL	61.84
95% Hall's Bootstrap UCL	55.51	95% Percentile Bootstrap UCL	15.15
95% BCA Bootstrap UCL	19.34		
90% Chebyshev(Mean, Sd) UCL	19.89	95% Chebyshev(Mean, Sd) UCL	25.89
97.5% Chebyshev(Mean, Sd) UCL	34.23	99% Chebyshev(Mean, Sd) UCL	50.59

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	25.89

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.009	Minimum Non-Detect	0.0073
Maximum Detect	1.8	Maximum Non-Detect	0.036
Variance Detects	0.517	Percent Non-Detects	50%
Mean Detects	0.335	SD Detects	0.719
Median Detects	0.038	CV Detects	2.147
Skewness Detects	2.434	Kurtosis Detects	5.94
Mean of Logged Detects	-2.904	SD of Logged Detects	1.946

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.541	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.456	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.171	KM Standard Error of Mean	0.156
KM SD	0.492	95% KM (BCA) UCL	0.467
95% KM (t) UCL	0.451	95% KM (Percentile Bootstrap) UCL	0.464
95% KM (z) UCL	0.427	95% KM Bootstrap t UCL	4.473
90% KM Chebyshev UCL	0.638	95% KM Chebyshev UCL	0.849
97.5% KM Chebyshev UCL	1.143	99% KM Chebyshev UCL	1.719

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.793	Anderson-Darling GOF Test
5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.333	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.354	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.368	k star (bias corrected MLE)	0.295
Theta hat (MLE)	0.909	Theta star (bias corrected MLE)	1.134
nu hat (MLE)	4.42	nu star (bias corrected)	3.544
Mean (detects)	0.335		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.009	Mean	0.172
Maximum	1.8	Median	0.01
SD	0.513	CV	2.978
k hat (MLE)	0.339	k star (bias corrected MLE)	0.309
Theta hat (MLE)	0.509	Theta star (bias corrected MLE)	0.557
nu hat (MLE)	8.125	nu star (bias corrected)	7.427
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (7.43, α)	2.408	Adjusted Chi Square Value (7.43, β)	1.995
95% Gamma Approximate UCL (use when n>=50)	0.532	95% Gamma Adjusted UCL (use when n<50)	0.642

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.171	SD (KM)	0.492
Variance (KM)	0.242	SE of Mean (KM)	0.156
k hat (KM)	0.121	k star (KM)	0.146
nu hat (KM)	2.909	nu star (KM)	3.515
theta hat (KM)	1.413	theta star (KM)	1.169
80% gamma percentile (KM)	0.183	90% gamma percentile (KM)	0.506
95% gamma percentile (KM)	0.947	99% gamma percentile (KM)	2.233

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.52, α)	0.54	Adjusted Chi Square Value (3.52, β)	0.396
95% Gamma Approximate KM-UCL (use when n>=50)	1.115	95% Gamma Adjusted KM-UCL (use when n<50)	1.522

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.168	Mean in Log Scale	-5.26
SD in Original Scale	0.515	SD in Log Scale	2.813
95% t UCL (assumes normality of ROS data)	0.435	95% Percentile Bootstrap UCL	0.458
95% BCA Bootstrap UCL	0.616	95% Bootstrap t UCL	5.111
95% H-UCL (Log ROS)	84.69		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.893	KM Geo Mean	0.0204
KM SD (logged)	1.603	95% Critical H Value (KM-Log)	4.11
KM Standard Error of Mean (logged)	0.508	95% H-UCL (KM -Log)	0.536
KM SD (logged)	1.603	95% Critical H Value (KM-Log)	4.11
KM Standard Error of Mean (logged)	0.508		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.171	Mean in Log Scale	-4.108
SD in Original Scale	0.514	SD in Log Scale	1.867
95% t UCL (Assumes normality)	0.437	95% H-Stat UCL	1.302

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	4.473	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.522

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	11
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.0079	Minimum Non-Detect	0.0073
Maximum Detect	1.4	Maximum Non-Detect	0.036
Variance Detects	0.31	Percent Non-Detects	50%
Mean Detects	0.264	SD Detects	0.557
Median Detects	0.0405	CV Detects	2.111
Skewness Detects	2.436	Kurtosis Detects	5.948
Mean of Logged Detects	-2.975	SD of Logged Detects	1.833

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.541	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.463	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.136	KM Standard Error of Mean	0.121
KM SD	0.382	95% KM (BCA) UCL	0.37
95% KM (t) UCL	0.353	95% KM (Percentile Bootstrap) UCL	0.362
95% KM (z) UCL	0.335	95% KM Bootstrap t UCL	2.66
90% KM Chebyshev UCL	0.498	95% KM Chebyshev UCL	0.662
97.5% KM Chebyshev UCL	0.89	99% KM Chebyshev UCL	1.337

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.792	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.751	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.365	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.353	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.4	k star (bias corrected MLE)	0.311
Theta hat (MLE)	0.659	Theta star (bias corrected MLE)	0.848
nu hat (MLE)	4.805	nu star (bias corrected)	3.736
Mean (detects)	0.264		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0079	Mean	0.137
Maximum	1.4	Median	0.01
SD	0.398	CV	2.908
k hat (MLE)	0.37	k star (bias corrected MLE)	0.333
Theta hat (MLE)	0.37	Theta star (bias corrected MLE)	0.412
nu hat (MLE)	8.875	nu star (bias corrected)	7.99
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (7.99, α)	2.729	Adjusted Chi Square Value (7.99, β)	2.282
95% Gamma Approximate UCL (use when n>=50)	0.401	95% Gamma Adjusted UCL (use when n<50)	0.48

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.136	SD (KM)	0.382
Variance (KM)	0.146	SE of Mean (KM)	0.121
k hat (KM)	0.127	k star (KM)	0.151
nu hat (KM)	3.041	nu star (KM)	3.614

theta hat (KM)	1.073	theta star (KM)	0.903
80% gamma percentile (KM)	0.148	90% gamma percentile (KM)	0.403
95% gamma percentile (KM)	0.747	99% gamma percentile (KM)	1.746

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.61, α)	0.575	Adjusted Chi Square Value (3.61, β)	0.423
95% Gamma Approximate KM-UCL (use when n>=50)	0.854	95% Gamma Adjusted KM-UCL (use when n<50)	1.16

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.132	Mean in Log Scale	-5.116
SD in Original Scale	0.4	SD in Log Scale	2.582
95% t UCL (assumes normality of ROS data)	0.34	95% Percentile Bootstrap UCL	0.361
95% BCA Bootstrap UCL	0.479	95% Bootstrap t UCL	3.052
95% H-UCL (Log ROS)	21.85		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.926	KM Geo Mean	0.0197
KM SD (logged)	1.524	95% Critical H Value (KM-Log)	3.946
KM Standard Error of Mean (logged)	0.484	95% H-UCL (KM -Log)	0.386
KM SD (logged)	1.524	95% Critical H Value (KM-Log)	3.946
KM Standard Error of Mean (logged)	0.484		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.135	Mean in Log Scale	-4.143
SD in Original Scale	0.399	SD in Log Scale	1.789
95% t UCL (Assumes normality)	0.342	95% H-Stat UCL	0.893

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	0.89	99% KM (Chebyshev) UCL	1.337

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Number of Detects	7	Number of Non-Detects	5
Number of Distinct Detects	7	Number of Distinct Non-Detects	5
Minimum Detect	0.004	Minimum Non-Detect	0.0074
Maximum Detect	3.2	Maximum Non-Detect	0.036
Variance Detects	1.412	Percent Non-Detects	41.67%
Mean Detects	0.509	SD Detects	1.188
Median Detects	0.046	CV Detects	2.334
Skewness Detects	2.628	Kurtosis Detects	6.927
Mean of Logged Detects	-2.846	SD of Logged Detects	2.186

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.5	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.46	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.299	KM Standard Error of Mean	0.273
KM SD	0.876	95% KM (BCA) UCL	0.827
95% KM (t) UCL	0.79	95% KM (Percentile Bootstrap) UCL	0.824
95% KM (z) UCL	0.748	95% KM Bootstrap t UCL	10.71
90% KM Chebyshev UCL	1.119	95% KM Chebyshev UCL	1.49
97.5% KM Chebyshev UCL	2.006	99% KM Chebyshev UCL	3.018

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.76	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.782	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.295	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.334	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.315	k star (bias corrected MLE)	0.275
Theta hat (MLE)	1.616	Theta star (bias corrected MLE)	1.849
nu hat (MLE)	4.411	nu star (bias corrected)	3.854
Mean (detects)	0.509		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.004	Mean	0.301
Maximum	3.2	Median	0.011
SD	0.915	CV	3.037
k hat (MLE)	0.291	k star (bias corrected MLE)	0.274
Theta hat (MLE)	1.034	Theta star (bias corrected MLE)	1.099
nu hat (MLE)	6.99	nu star (bias corrected)	6.576
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (6.58, α)	1.941	Adjusted Chi Square Value (6.58, β)	1.582
95% Gamma Approximate UCL (use when n>=50)	1.02	95% Gamma Adjusted UCL (use when n<50)	1.252

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.299	SD (KM)	0.876
Variance (KM)	0.768	SE of Mean (KM)	0.273
k hat (KM)	0.116	k star (KM)	0.143
nu hat (KM)	2.792	nu star (KM)	3.428
theta hat (KM)	2.569	theta star (KM)	2.093
80% gamma percentile (KM)	0.312	90% gamma percentile (KM)	0.88
95% gamma percentile (KM)	1.661	99% gamma percentile (KM)	3.95

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.43, α)	0.51	Adjusted Chi Square Value (3.43, β)	0.372
5% Gamma Approximate KM-UCL (use when n>=50)	2.011	95% Gamma Adjusted KM-UCL (use when n<50)	2.756

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.298	Mean in Log Scale	-4.245
SD in Original Scale	0.916	SD in Log Scale	2.375
95% t UCL (assumes normality of ROS data)	0.773	95% Percentile Bootstrap UCL	0.815
95% BCA Bootstrap UCL	1.088	95% Bootstrap t UCL	10.76
95% H-UCL (Log ROS)	15.19		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.929	KM Geo Mean	0.0197
KM SD (logged)	2.018	95% Critical H Value (KM-Log)	5.002
KM Standard Error of Mean (logged)	0.632	95% H-UCL (KM -Log)	3.161
KM SD (logged)	2.018	95% Critical H Value (KM-Log)	5.002
KM Standard Error of Mean (logged)	0.632		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.3	Mean in Log Scale	-3.848
SD in Original Scale	0.915	SD in Log Scale	2.077
95% t UCL (Assumes normality)	0.774	95% H-Stat UCL	4.584

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	10.71	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.756

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	11
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.0047	Minimum Non-Detect	0.0073
Maximum Detect	1.7	Maximum Non-Detect	0.036
Variance Detects	0.469	Percent Non-Detects	50%
Mean Detects	0.302	SD Detects	0.685
Median Detects	0.0235	CV Detects	2.265
Skewness Detects	2.445	Kurtosis Detects	5.984
Mean of Logged Detects	-3.386	SD of Logged Detects	2.124

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.521	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.474	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.154	KM Standard Error of Mean	0.147
KM SD	0.466	95% KM (BCA) UCL	0.437
95% KM (t) UCL	0.419	95% KM (Percentile Bootstrap) UCL	0.433
95% KM (z) UCL	0.397	95% KM Bootstrap t UCL	6.863
90% KM Chebyshev UCL	0.597	95% KM Chebyshev UCL	0.797
97.5% KM Chebyshev UCL	1.075	99% KM Chebyshev UCL	1.621

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.893	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.384	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.356	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.313	k star (bias corrected MLE)	0.267
Theta hat (MLE)	0.967	Theta star (bias corrected MLE)	1.13
nu hat (MLE)	3.753	nu star (bias corrected)	3.21
Mean (detects)	0.302		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0047	Mean	0.156
Maximum	1.7	Median	0.01
SD	0.486	CV	3.114
k hat (MLE)	0.319	k star (bias corrected MLE)	0.295
Theta hat (MLE)	0.489	Theta star (bias corrected MLE)	0.53
nu hat (MLE)	7.66	nu star (bias corrected)	7.078
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (7.08, α)	2.214	Adjusted Chi Square Value (7.08, β)	1.822
95% Gamma Approximate UCL (use when n>=50)	0.499	95% Gamma Adjusted UCL (use when n<50)	0.607

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.154	SD (KM)	0.466
Variance (KM)	0.217	SE of Mean (KM)	0.147
k hat (KM)	0.109	k star (KM)	0.137
nu hat (KM)	2.62	nu star (KM)	3.298
theta hat (KM)	1.411	theta star (KM)	1.121
80% gamma percentile (KM)	0.155	90% gamma percentile (KM)	0.45
95% gamma percentile (KM)	0.862	99% gamma percentile (KM)	2.078

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.30, α)	0.466	Adjusted Chi Square Value (3.30, β)	0.338
)5% Gamma Approximate KM-UCL (use when n>=50)	1.091	95% Gamma Adjusted KM-UCL (use when n<50)	1.503

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.153	Mean in Log Scale	-4.633
SD in Original Scale	0.488	SD in Log Scale	1.956
95% t UCL (assumes normality of ROS data)	0.405	95% Percentile Bootstrap UCL	0.43
95% BCA Bootstrap UCL	0.578	95% Bootstrap t UCL	8.115
95% H-UCL (Log ROS)	1.162		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.309	KM Geo Mean	0.0134
KM SD (logged)	1.669	95% Critical H Value (KM-Log)	4.25
KM Standard Error of Mean (logged)	0.533	95% H-UCL (KM -Log)	0.46

KM SD (logged)	1.669	95% Critical H Value (KM-Log)	4.25
KM Standard Error of Mean (logged)	0.533		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.154	Mean in Log Scale	-4.349
SD in Original Scale	0.487	SD in Log Scale	1.802
95% t UCL (Assumes normality)	0.407	95% H-Stat UCL	0.768

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL 1.621

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

Chrysene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.0098	Minimum Non-Detect	0.0073
Maximum Detect	3.2	Maximum Non-Detect	0.036
Variance Detects	1.64	Percent Non-Detects	50%
Mean Detects	0.591	SD Detects	1.281
Median Detects	0.049	CV Detects	2.168
Skewness Detects	2.43	Kurtosis Detects	5.921
Mean of Logged Detects	-2.54	SD of Logged Detects	2.117

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.544	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.447	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.299	KM Standard Error of Mean	0.277
KM SD	0.877	95% KM (BCA) UCL	0.821
95% KM (t) UCL	0.797	95% KM (Percentile Bootstrap) UCL	0.821
95% KM (z) UCL	0.755	95% KM Bootstrap t UCL	14.37
90% KM Chebyshev UCL	1.131	95% KM Chebyshev UCL	1.508
97.5% KM Chebyshev UCL	2.03	99% KM Chebyshev UCL	3.057

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.721	Anderson-Darling GOF Test
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.302	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.355	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.336	k star (bias corrected MLE)	0.279
Theta hat (MLE)	1.757	Theta star (bias corrected MLE)	2.116
nu hat (MLE)	4.034	nu star (bias corrected)	3.35
Mean (detects)	0.591		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0098	Mean	0.3
Maximum	3.2	Median	0.01
SD	0.915	CV	3.047
k hat (MLE)	0.292	k star (bias corrected MLE)	0.275
Theta hat (MLE)	1.028	Theta star (bias corrected MLE)	1.093
nu hat (MLE)	7.013	nu star (bias corrected)	6.593
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (6.59, α)	1.95	Adjusted Chi Square Value (6.59, β)	1.59
95% Gamma Approximate UCL (use when n>=50)	1.015	95% Gamma Adjusted UCL (use when n<50)	1.246

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.299	SD (KM)	0.877
Variance (KM)	0.768	SE of Mean (KM)	0.277
k hat (KM)	0.117	k star (KM)	0.143
nu hat (KM)	2.8	nu star (KM)	3.433
theta hat (KM)	2.566	theta star (KM)	2.093
80% gamma percentile (KM)	0.313	90% gamma percentile (KM)	0.881
95% gamma percentile (KM)	1.662	99% gamma percentile (KM)	3.952

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.43, α)	0.511	Adjusted Chi Square Value (3.43, β)	0.373
95% Gamma Approximate KM-UCL (use when n>=50)	2.009	95% Gamma Adjusted KM-UCL (use when n<50)	2.753

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.909	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.206	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.296	Mean in Log Scale	-5.121
SD in Original Scale	0.917	SD in Log Scale	3.078
95% t UCL (assumes normality of ROS data)	0.771	95% Percentile Bootstrap UCL	0.81
95% BCA Bootstrap UCL	1.099	95% Bootstrap t UCL	13.59
95% H-UCL (Log ROS)	634.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.703	KM Geo Mean	0.0247
KM SD (logged)	1.803	95% Critical H Value (KM-Log)	4.535
KM Standard Error of Mean (logged)	0.572	95% H-UCL (KM -Log)	1.472
KM SD (logged)	1.803	95% Critical H Value (KM-Log)	4.535
KM Standard Error of Mean (logged)	0.572		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.298	Mean in Log Scale	-3.926
SD in Original Scale	0.916	SD in Log Scale	2.077
95% t UCL (Assumes normality)	0.773	95% H-Stat UCL	4.245

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	14.37	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.753

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	7	Number of Distinct Observations	6
		Number of Missing Observations	18
Minimum	1.8	Mean	3.786
Maximum	4.7	Median	4
SD	1.051	Std. Error of Mean	0.397
Coefficient of Variation	0.278	Skewness	-1.266

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.861	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.209	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4.558	95% Adjusted-CLT UCL (Chen-1995)	4.236
		95% Modified-t UCL (Johnson-1978)	4.526

Gamma GOF Test

A-D Test Statistic	0.606	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.708	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.222	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.312	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	11.63	k star (bias corrected MLE)	6.743
Theta hat (MLE)	0.325	Theta star (bias corrected MLE)	0.561
nu hat (MLE)	162.9	nu star (bias corrected)	94.4
MLE Mean (bias corrected)	3.786	MLE Sd (bias corrected)	1.458
		Approximate Chi Square Value (0.05)	73
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	67.33

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.896	95% Adjusted Gamma UCL (use when n<50)	5.308

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.794	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.803	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.238	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.588	Mean of logged Data	1.288
Maximum of Logged Data	1.548	SD of logged Data	0.343

Assuming Lognormal Distribution

95% H-UCL	5.276	90% Chebyshev (MVUE) UCL	5.296
95% Chebyshev (MVUE) UCL	5.969	97.5% Chebyshev (MVUE) UCL	6.903
99% Chebyshev (MVUE) UCL	8.738		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.439	95% Jackknife UCL	4.558
95% Standard Bootstrap UCL	4.374	95% Bootstrap-t UCL	4.381

95% Hall's Bootstrap UCL	4.26	95% Percentile Bootstrap UCL	4.343
95% BCA Bootstrap UCL	4.271		
90% Chebyshev(Mean, Sd) UCL	4.978	95% Chebyshev(Mean, Sd) UCL	5.517
97.5% Chebyshev(Mean, Sd) UCL	6.267	99% Chebyshev(Mean, Sd) UCL	7.738

Suggested UCL to Use

95% Student's-t UCL 4.558

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

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.002	Minimum Non-Detect	0.0073
Maximum Detect	0.4	Maximum Non-Detect	0.036
Variance Detects	0.0253	Percent Non-Detects	50%
Mean Detects	0.0764	SD Detects	0.159
Median Detects	0.0095	CV Detects	2.083
Skewness Detects	2.418	Kurtosis Detects	5.873
Mean of Logged Detects	-4.339	SD of Logged Detects	1.997

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.558	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.436	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0404	KM Standard Error of Mean	0.0344
KM SD	0.109	95% KM (BCA) UCL	0.105
95% KM (t) UCL	0.102	95% KM (Percentile Bootstrap) UCL	0.105
95% KM (z) UCL	0.097	95% KM Bootstrap t UCL	0.972
90% KM Chebyshev UCL	0.144	95% KM Chebyshev UCL	0.19
97.5% KM Chebyshev UCL	0.255	99% KM Chebyshev UCL	0.383

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.665	Anderson-Darling GOF Test
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.285	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.354	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.376	k star (bias corrected MLE)	0.299
Theta hat (MLE)	0.203	Theta star (bias corrected MLE)	0.255
nu hat (MLE)	4.515	nu star (bias corrected)	3.591
Mean (detects)	0.0764		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.002	Mean	0.0432
Maximum	0.4	Median	0.01

SD	0.113	CV	2.61
k hat (MLE)	0.481	k star (bias corrected MLE)	0.416
Theta hat (MLE)	0.0898	Theta star (bias corrected MLE)	0.104
nu hat (MLE)	11.54	nu star (bias corrected)	9.985
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (9.99, α)	3.933	Adjusted Chi Square Value (9.99, β)	3.373
95% Gamma Approximate UCL (use when n>=50)	0.11	95% Gamma Adjusted UCL (use when n<50)	0.128

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0404	SD (KM)	0.109
Variance (KM)	0.0118	SE of Mean (KM)	0.0344
k hat (KM)	0.137	k star (KM)	0.159
nu hat (KM)	3.3	nu star (KM)	3.808
theta hat (KM)	0.294	theta star (KM)	0.254
80% gamma percentile (KM)	0.0459	90% gamma percentile (KM)	0.121
95% gamma percentile (KM)	0.22	99% gamma percentile (KM)	0.504

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.81, α)	0.647	Adjusted Chi Square Value (3.81, β)	0.481
95% Gamma Approximate KM-UCL (use when n>=50)	0.237	95% Gamma Adjusted KM-UCL (use when n<50)	0.32

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0398	Mean in Log Scale	-5.036
SD in Original Scale	0.114	SD in Log Scale	1.536
95% t UCL (assumes normality of ROS data)	0.0988	95% Percentile Bootstrap UCL	0.104
95% BCA Bootstrap UCL	0.138	95% Bootstrap t UCL	1.478
95% H-UCL (Log ROS)	0.133		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.028	KM Geo Mean	0.00655
KM SD (logged)	1.537	95% Critical H Value (KM-Log)	3.972
KM Standard Error of Mean (logged)	0.538	95% H-UCL (KM -Log)	0.134
KM SD (logged)	1.537	95% Critical H Value (KM-Log)	3.972
KM Standard Error of Mean (logged)	0.538		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0413	Mean in Log Scale	-4.825
SD in Original Scale	0.113	SD in Log Scale	1.501
95% t UCL (Assumes normality)	0.1	95% H-Stat UCL	0.145

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.972	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.32

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	6

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV

The data set for variable Diesel Range Organics (C10-C20) was not processed!

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.0061	Minimum Non-Detect	0.0073
Maximum Detect	1.3	Maximum Non-Detect	0.036
Variance Detects	0.268	Percent Non-Detects	50%
Mean Detects	0.245	SD Detects	0.518
Median Detects	0.034	CV Detects	2.115
Skewness Detects	2.432	Kurtosis Detects	5.931
Mean of Logged Detects	-3.143	SD of Logged Detects	1.93

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.546	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.455	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.126	KM Standard Error of Mean	0.112
KM SD	0.355	95% KM (BCA) UCL	0.344
95% KM (t) UCL	0.327	95% KM (Percentile Bootstrap) UCL	0.338
95% KM (z) UCL	0.31	95% KM Bootstrap t UCL	3.319
90% KM Chebyshev UCL	0.462	95% KM Chebyshev UCL	0.615
97.5% KM Chebyshev UCL	0.826	99% KM Chebyshev UCL	1.242

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.717	Anderson-Darling GOF Test
5% A-D Critical Value	0.754	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.331	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.353	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.382	k star (bias corrected MLE)	0.302
Theta hat (MLE)	0.641	Theta star (bias corrected MLE)	0.81
nu hat (MLE)	4.584	nu star (bias corrected)	3.625
Mean (detects)	0.245		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0061	Mean	0.127
Maximum	1.3	Median	0.01
SD	0.37	CV	2.904
k hat (MLE)	0.368	k star (bias corrected MLE)	0.331
Theta hat (MLE)	0.346	Theta star (bias corrected MLE)	0.385
nu hat (MLE)	8.827	nu star (bias corrected)	7.953
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (7.95, α)	2.708	Adjusted Chi Square Value (7.95, β)	2.264
95% Gamma Approximate UCL (use when n>=50)	0.374	95% Gamma Adjusted UCL (use when n<50)	0.448

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.126	SD (KM)	0.355
Variance (KM)	0.126	SE of Mean (KM)	0.112
k hat (KM)	0.125	k star (KM)	0.15
nu hat (KM)	3.01	nu star (KM)	3.591
theta hat (KM)	1.002	theta star (KM)	0.84
80% gamma percentile (KM)	0.137	90% gamma percentile (KM)	0.372
95% gamma percentile (KM)	0.692	99% gamma percentile (KM)	1.62

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.59, α)	0.567	Adjusted Chi Square Value (3.59, β)	0.417
ı5% Gamma Approximate KM-UCL (use when n>=50)	0.796	95% Gamma Adjusted KM-UCL (use when n<50)	1.083

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.124	Mean in Log Scale	-4.509
SD in Original Scale	0.371	SD in Log Scale	1.938
95% t UCL (assumes normality of ROS data)	0.316	95% Percentile Bootstrap UCL	0.336
95% BCA Bootstrap UCL	0.445	95% Bootstrap t UCL	3.398
95% H-UCL (Log ROS)	1.211		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.104	KM Geo Mean	0.0165
KM SD (logged)	1.579	95% Critical H Value (KM-Log)	4.059
KM Standard Error of Mean (logged)	0.501	95% H-UCL (KM -Log)	0.396
KM SD (logged)	1.579	95% Critical H Value (KM-Log)	4.059
KM Standard Error of Mean (logged)	0.501		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.126	Mean in Log Scale	-4.227
SD in Original Scale	0.371	SD in Log Scale	1.778
95% t UCL (Assumes normality)	0.318	95% H-Stat UCL	0.782

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	3.319	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.083

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

Manganese

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	18
Minimum	32	Mean	133.7
Maximum	370	Median	120
SD	115.3	Std. Error of Mean	43.6
Coefficient of Variation	0.863	Skewness	1.677

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.828	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	218.4	95% Adjusted-CLT UCL (Chen-1995)	235
		95% Modified-t UCL (Johnson-1978)	223

Gamma GOF Test

A-D Test Statistic	0.282	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.168	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.316	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.768	k star (bias corrected MLE)	1.105
Theta hat (MLE)	75.65	Theta star (bias corrected MLE)	121
nu hat (MLE)	24.75	nu star (bias corrected)	15.47
MLE Mean (bias corrected)	133.7	MLE Sd (bias corrected)	127.2
		Approximate Chi Square Value (0.05)	7.592
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	6.004

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	272.5	95% Adjusted Gamma UCL (use when n<50)	344.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.168	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.466	Mean of logged Data	4.587
Maximum of Logged Data	5.914	SD of logged Data	0.869

Assuming Lognormal Distribution

95% H-UCL	468.1	90% Chebyshev (MVUE) UCL	267.1
95% Chebyshev (MVUE) UCL	327.3	97.5% Chebyshev (MVUE) UCL	410.9
99% Chebyshev (MVUE) UCL	575.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	205.4	95% Jackknife UCL	218.4
95% Standard Bootstrap UCL	199.6	95% Bootstrap-t UCL	275
95% Hall's Bootstrap UCL	526.9	95% Percentile Bootstrap UCL	206.1
95% BCA Bootstrap UCL	227		
90% Chebyshev(Mean, Sd) UCL	264.5	95% Chebyshev(Mean, Sd) UCL	323.8
97.5% Chebyshev(Mean, Sd) UCL	406	99% Chebyshev(Mean, Sd) UCL	567.5

Suggested UCL to Use

95% Student's-t UCL	218.4

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

Naphthalene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	13
Number of Detects	4	Number of Non-Detects	8
Number of Distinct Detects	4	Number of Distinct Non-Detects	8
Minimum Detect	0.0038	Minimum Non-Detect	0.0073
Maximum Detect	0.067	Maximum Non-Detect	0.036
Variance Detects	0.00104	Percent Non-Detects	66.67%
Mean Detects	0.0325	SD Detects	0.0323
Median Detects	0.0296	CV Detects	0.995
Skewness Detects	0.156	Kurtosis Detects	-5.06
Mean of Logged Detects	-4.078	SD of Logged Detects	1.468

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0141	KM Standard Error of Mean	0.00695
KM SD	0.0207	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0266	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0256	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.035	95% KM Chebyshev UCL	0.0444
97.5% KM Chebyshev UCL	0.0575	99% KM Chebyshev UCL	0.0833

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.496	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.668	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.306	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.403	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.898	k star (bias corrected MLE)	0.391
Theta hat (MLE)	0.0361	Theta star (bias corrected MLE)	0.083
nu hat (MLE)	7.187	nu star (bias corrected)	3.13
Mean (detects)	0.0325		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0038	Mean	0.0175
Maximum	0.067	Median	0.01
SD	0.0202	CV	1.154
k hat (MLE)	1.448	k star (bias corrected MLE)	1.142
Theta hat (MLE)	0.0121	Theta star (bias corrected MLE)	0.0153
nu hat (MLE)	34.75	nu star (bias corrected)	27.4
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (27.40, α)	16.46	Adjusted Chi Square Value (27.40, β)	15.18
95% Gamma Approximate UCL (use when n>=50)	0.0291	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0141	SD (KM)	0.0207
Variance (KM)	4.3017E-4	SE of Mean (KM)	0.00695
k hat (KM)	0.464	k star (KM)	0.403
nu hat (KM)	11.13	nu star (KM)	9.682
theta hat (KM)	0.0305	theta star (KM)	0.035
80% gamma percentile (KM)	0.0228	90% gamma percentile (KM)	0.0398
95% gamma percentile (KM)	0.0585	99% gamma percentile (KM)	0.105

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.68, α)	3.744	Adjusted Chi Square Value (9.68, β)	3.201
95% Gamma Approximate KM-UCL (use when n>=50)	0.0365	95% Gamma Adjusted KM-UCL (use when n<50)	0.0427

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0144	Mean in Log Scale	-4.848
SD in Original Scale	0.0215	SD in Log Scale	0.955
95% t UCL (assumes normality of ROS data)	0.0255	95% Percentile Bootstrap UCL	0.0246
95% BCA Bootstrap UCL	0.0287	95% Bootstrap t UCL	0.397
95% H-UCL (Log ROS)	0.028		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.917	KM Geo Mean	0.00732
KM SD (logged)	0.963	95% Critical H Value (KM-Log)	2.849
KM Standard Error of Mean (logged)	0.352	95% H-UCL (KM -Log)	0.0266
KM SD (logged)	0.963	95% Critical H Value (KM-Log)	2.849
KM Standard Error of Mean (logged)	0.352		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0146	Mean in Log Scale	-4.928
SD in Original Scale	0.0218	SD in Log Scale	1.081
95% t UCL (Assumes normality)	0.0259	95% H-Stat UCL	0.0353

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0266

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

Nickel

General Statistics

Total Number of Observations	7	Number of Distinct Observations	6
		Number of Missing Observations	18
Minimum	1.3	Mean	7.557
Maximum	14	Median	7
SD	5.113	Std. Error of Mean	1.933
Coefficient of Variation	0.677	Skewness	0.0717

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	11.31	95% Adjusted-CLT UCL (Chen-1995)	10.79
		95% Modified-t UCL (Johnson-1978)	11.32

Gamma GOF Test

A-D Test Statistic	0.395	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.716	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.252	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.315	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.935	k star (bias corrected MLE)	1.201
Theta hat (MLE)	3.905	Theta star (bias corrected MLE)	6.292
nu hat (MLE)	27.09	nu star (bias corrected)	16.81
MLE Mean (bias corrected)	7.557	MLE Sd (bias corrected)	6.896
		Approximate Chi Square Value (0.05)	8.539
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	6.836

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	14.88	95% Adjusted Gamma UCL (use when n<50)	18.59

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.262	Mean of logged Data	1.742
Maximum of Logged Data	2.639	SD of logged Data	0.891

Assuming Lognormal Distribution

95% H-UCL	29.23	90% Chebyshev (MVUE) UCL	15.97
95% Chebyshev (MVUE) UCL	19.62	97.5% Chebyshev (MVUE) UCL	24.68
99% Chebyshev (MVUE) UCL	34.63		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	10.74	95% Jackknife UCL	11.31
95% Standard Bootstrap UCL	10.5	95% Bootstrap-t UCL	11.48
95% Hall's Bootstrap UCL	9.908	95% Percentile Bootstrap UCL	10.61
95% BCA Bootstrap UCL	10.57		
90% Chebyshev(Mean, Sd) UCL	13.36	95% Chebyshev(Mean, Sd) UCL	15.98
97.5% Chebyshev(Mean, Sd) UCL	19.63	99% Chebyshev(Mean, Sd) UCL	26.79

Suggested UCL to Use

95% Student's-t UCL	11.31

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	25	Number of Distinct Observations	21
Number of Detects	13	Number of Non-Detects	12
Number of Distinct Detects	13	Number of Distinct Non-Detects	9
Minimum Detect	0.0011	Minimum Non-Detect	9.2000E-4
Maximum Detect	5.1	Maximum Non-Detect	0.0053
Variance Detects	1.957	Percent Non-Detects	48%
Mean Detects	0.463	SD Detects	1.399
Median Detects	0.022	CV Detects	3.023
Skewness Detects	3.557	Kurtosis Detects	12.74
Mean of Logged Detects	-3.58	SD of Logged Detects	2.417

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.372	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.435	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.241	KM Standard Error of Mean	0.207
KM SD	0.996	95% KM (BCA) UCL	0.653
95% KM (t) UCL	0.596	95% KM (Percentile Bootstrap) UCL	0.639
95% KM (z) UCL	0.582	95% KM Bootstrap t UCL	4.569
90% KM Chebyshev UCL	0.863	95% KM Chebyshev UCL	1.145
97.5% KM Chebyshev UCL	1.536	99% KM Chebyshev UCL	2.305

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.262	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.851	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.254	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.259	)etected data appear Gamma Distributed at 5% Significance Leve

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.252	k star (bias corrected MLE)	0.245
Theta hat (MLE)	1.833	Theta star (bias corrected MLE)	1.885
nu hat (MLE)	6.563	nu star (bias corrected)	6.381
Mean (detects)	0.463		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0011	Mean	0.245
Maximum	5.1	Median	0.01
SD	1.016	CV	4.138
k hat (MLE)	0.264	k star (bias corrected MLE)	0.259
Theta hat (MLE)	0.93	Theta star (bias corrected MLE)	0.948
nu hat (MLE)	13.2	nu star (bias corrected)	12.95
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (12.95, α)	5.857	Adjusted Chi Square Value (12.95, β)	5.534
95% Gamma Approximate UCL (use when n>=50)	0.543	95% Gamma Adjusted UCL (use when n<50)	0.574

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.241	SD (KM)	0.996
Variance (KM)	0.992	SE of Mean (KM)	0.207
k hat (KM)	0.0586	k star (KM)	0.0782
nu hat (KM)	2.93	nu star (KM)	3.912
theta hat (KM)	4.115	theta star (KM)	3.082
80% gamma percentile (KM)	0.11	90% gamma percentile (KM)	0.564
95% gamma percentile (KM)	1.401	99% gamma percentile (KM)	4.316

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.91, α)	0.687	Adjusted Chi Square Value (3.91, β)	0.604
5% Gamma Approximate KM-UCL (use when n>=50)	1.373	95% Gamma Adjusted KM-UCL (use when n<50)	1.561

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

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.241	Mean in Log Scale	-6.405
SD in Original Scale	1.017	SD in Log Scale	3.536
95% t UCL (assumes normality of ROS data)	0.589	95% Percentile Bootstrap UCL	0.633
95% BCA Bootstrap UCL	0.877	95% Bootstrap t UCL	4.605
95% H-UCL (Log ROS)	98.62		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.168	KM Geo Mean	0.00569
KM SD (logged)	2.361	95% Critical H Value (KM-Log)	4.569
KM Standard Error of Mean (logged)	0.494	95% H-UCL (KM -Log)	0.836
KM SD (logged)	2.361	95% Critical H Value (KM-Log)	4.569
KM Standard Error of Mean (logged)	0.494		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.241	Mean in Log Scale	-5.135
SD in Original Scale	1.017	SD in Log Scale	2.443
95% t UCL (Assumes normality)	0.589	95% H-Stat UCL	1.217

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.561

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

TCDD TEQ HH

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	21
Minimum	3.6200E-7	Mean	2.3660E-6
Maximum	4.3700E-6	Median	2.3660E-6

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 TCDD TEQ HH 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.

Thallium

General Statistics

Total Number of Observations	7	Number of Distinct Observations	5
		Number of Missing Observations	18
Number of Detects	3	Number of Non-Detects	4
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.02	Minimum Non-Detect	0.1
Maximum Detect	0.25	Maximum Non-Detect	0.11
Variance Detects	0.0158	Percent Non-Detects	57.14%
Mean Detects	0.106	SD Detects	0.126
Median Detects	0.047	CV Detects	1.19
Skewness Detects	1.643	Kurtosis Detects	N/A
Mean of Logged Detects	-2.785	SD of Logged Detects	1.285

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.837	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.346	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.0644	KM Standard Error of Mean	0.0365
KM SD	0.0768	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.135	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.124	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.174	95% KM Chebyshev UCL	0.223
97.5% KM Chebyshev UCL	0.292	99% KM Chebyshev UCL	0.427

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.065	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0992	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	6.392	nu star (bias corrected)	N/A
Mean (detects)	0.106		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.0675
Maximum	0.25	Median	0.032
SD	0.0837	CV	1.24
k hat (MLE)	1.143	k star (bias corrected MLE)	0.748
Theta hat (MLE)	0.059	Theta star (bias corrected MLE)	0.0901
nu hat (MLE)	16	nu star (bias corrected)	10.48
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (10.48, α)	4.242	Adjusted Chi Square Value (10.48, β)	3.131
95% Gamma Approximate UCL (use when n>=50)	0.167	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0644	SD (KM)	0.0768
Variance (KM)	0.0059	SE of Mean (KM)	0.0365

k hat (KM)	0.704	k star (KM)	0.498
nu hat (KM)	9.857	nu star (KM)	6.966
theta hat (KM)	0.0915	theta star (KM)	0.129
80% gamma percentile (KM)	0.106	90% gamma percentile (KM)	0.174
95% gamma percentile (KM)	0.248	99% gamma percentile (KM)	0.429

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.97, α)	2.152	Adjusted Chi Square Value (6.97, β)	1.437
ı5% Gamma Approximate KM-UCL (use when n>=50)	0.209	95% Gamma Adjusted KM-UCL (use when n<50)	0.312

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.966	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.251	Lilliefors GOF Test
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0652	Mean in Log Scale	-3.182
SD in Original Scale	0.083	SD in Log Scale	0.929
95% t UCL (assumes normality of ROS data)	0.126	95% Percentile Bootstrap UCL	0.125
95% BCA Bootstrap UCL	0.132	95% Bootstrap t UCL	0.326
95% H-UCL (Log ROS)	0.241		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.185	KM Geo Mean	0.0414
KM SD (logged)	0.834	95% Critical H Value (KM-Log)	3.244
KM Standard Error of Mean (logged)	0.465	95% H-UCL (KM -Log)	0.177
KM SD (logged)	0.834	95% Critical H Value (KM-Log)	3.244
KM Standard Error of Mean (logged)	0.465		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.076	Mean in Log Scale	-2.865
SD in Original Scale	0.0777	SD in Log Scale	0.746
95% t UCL (Assumes normality)	0.133	95% H-Stat UCL	0.189

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.135

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

Vanadium

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	18
Minimum	3.4	Mean	16.01
Maximum	32	Median	12
SD	9.742	Std. Error of Mean	3.682
Coefficient of Variation	0.608	Skewness	0.53

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.95	Shapiro Wilk GOF Test

5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level		
Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**		
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level		

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	23.17	95% Adjusted-CLT UCL (Chen-1995)	22.86
		95% Modified-t UCL (Johnson-1978)	23.29

Gamma GOF Test

A-D Test Statistic	0.251	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.713	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.175	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.314	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.673	k star (bias corrected MLE)	1.623
Theta hat (MLE)	5.991	Theta star (bias corrected MLE)	9.869
nu hat (MLE)	37.42	nu star (bias corrected)	22.72
MLE Mean (bias corrected)	16.01	MLE Sd (bias corrected)	12.57
		Approximate Chi Square Value (0.05)	12.88
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	10.71

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	28.25	95% Adjusted Gamma UCL (use when n<50)	33.97

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.224	Mean of logged Data	2.575
Maximum of Logged Data	3.466	SD of logged Data	0.74

Assuming Lognormal Distribution

95% H-UCL	42.75	90% Chebyshev (MVUE) UCL	30.43
95% Chebyshev (MVUE) UCL	36.74	97.5% Chebyshev (MVUE) UCL	45.5
99% Chebyshev (MVUE) UCL	62.71		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	22.07	95% Jackknife UCL	23.17
95% Standard Bootstrap UCL	21.68	95% Bootstrap-t UCL	24.91
95% Hall's Bootstrap UCL	23.87	95% Percentile Bootstrap UCL	21.81
95% BCA Bootstrap UCL	22.67		
90% Chebyshev(Mean, Sd) UCL	27.06	95% Chebyshev(Mean, Sd) UCL	32.06
97.5% Chebyshev(Mean, Sd) UCL	39.01	99% Chebyshev(Mean, Sd) UCL	52.65

Suggested UCL to Use

95% Student's-t UCL	23.17

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 2:37:51 PM
From File	Soil_TransformShop.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	54
Minimum	0.81	Mean	3.403
Maximum	7.7	Median	1.7
SD	3.748	Std. Error of Mean	2.164
Coefficient of Variation	1.101	Skewness	1.623

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.721	95% Adjusted-CLT UCL (Chen-1995)	9.128
		95% Modified-t UCL (Johnson-1978)	10.06

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	1.283	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.652	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	7.7	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.255	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.211	Mean of logged Data	0.787
Maximum of Logged Data	2.041	SD of logged Data	1.148

Assuming Lognormal Distribution

95% H-UCL	812074	90% Chebyshev (MVUE) UCL	8.901
95% Chebyshev (MVUE) UCL	11.45	97.5% Chebyshev (MVUE) UCL	14.99
99% Chebyshev (MVUE) UCL	21.94		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.962	95% Jackknife UCL	9.721
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	9.894	95% Chebyshev(Mean, Sd) UCL	12.83
97.5% Chebyshev(Mean, Sd) UCL	16.92	99% Chebyshev(Mean, Sd) UCL	24.93

Suggested UCL to Use

95% Student's-t UCL	9.721

Recommended UCL exceeds the maximum observation

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	77
		Number of Missing Observations	67
Number of Detects	79	Number of Non-Detects	20
Number of Distinct Detects	65	Number of Distinct Non-Detects	13
Minimum Detect	0.0033	Minimum Non-Detect	0.0069
Maximum Detect	23	Maximum Non-Detect	3.8
Variance Detects	17.14	Percent Non-Detects	20.2%
Mean Detects	2.741	SD Detects	4.139
Median Detects	1.1	CV Detects	1.51
Skewness Detects	2.861	Kurtosis Detects	9.499
Mean of Logged Detects	-0.141	SD of Logged Detects	1.96

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.653	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.254	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	2.225	KM Standard Error of Mean	0.387
KM SD	3.822	95% KM (BCA) UCL	2.923
95% KM (t) UCL	2.868	95% KM (Percentile Bootstrap) UCL	2.887
95% KM (z) UCL	2.862	95% KM Bootstrap t UCL	3.109
90% KM Chebyshev UCL	3.386	95% KM Chebyshev UCL	3.912
97.5% KM Chebyshev UCL	4.642	99% KM Chebyshev UCL	6.076

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.41	Anderson-Darling GOF Test
5% A-D Critical Value	0.814	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0645	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.106	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.545	k star (bias corrected MLE)	0.533
Theta hat (MLE)	5.025	Theta star (bias corrected MLE)	5.141
nu hat (MLE)	86.17	nu star (bias corrected)	84.23
Mean (detects)	2.741		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0033	Mean	2.2
Maximum	23	Median	0.77
SD	3.849	CV	1.75
k hat (MLE)	0.373	k star (bias corrected MLE)	0.368
Theta hat (MLE)	5.897	Theta star (bias corrected MLE)	5.97
nu hat (MLE)	73.86	nu star (bias corrected)	72.96
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (72.96, α)	54.29	Adjusted Chi Square Value (72.96, β)	54.05
95% Gamma Approximate UCL (use when n>=50)	2.956	95% Gamma Adjusted UCL (use when n<50)	2.969

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.225	SD (KM)	3.822
Variance (KM)	14.61	SE of Mean (KM)	0.387
k hat (KM)	0.339	k star (KM)	0.335
nu hat (KM)	67.1	nu star (KM)	66.4
theta hat (KM)	6.565	theta star (KM)	6.635
80% gamma percentile (KM)	3.496	90% gamma percentile (KM)	6.466
95% gamma percentile (KM)	9.814	99% gamma percentile (KM)	18.4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (66.40, α)	48.65	Adjusted Chi Square Value (66.40, β)	48.43
95% Gamma Approximate KM-UCL (use when n>=50)	3.037	95% Gamma Adjusted KM-UCL (use when n<50)	3.051

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.909	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	5.1525E-6	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.206	Mean in Log Scale	-0.74
SD in Original Scale	3.845	SD in Log Scale	2.177
95% t UCL (assumes normality of ROS data)	2.847	95% Percentile Bootstrap UCL	2.884
95% BCA Bootstrap UCL	3.099	95% Bootstrap t UCL	3.091
95% H-UCL (Log ROS)	11.37		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.023	KM Geo Mean	0.36
KM SD (logged)	2.639	95% Critical H Value (KM-Log)	4.266
KM Standard Error of Mean (logged)	0.274	95% H-UCL (KM -Log)	36.5
KM SD (logged)	2.639	95% Critical H Value (KM-Log)	4.266
KM Standard Error of Mean (logged)	0.274		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.263	Mean in Log Scale	-0.837
SD in Original Scale	3.826	SD in Log Scale	2.501
95% t UCL (Assumes normality)	2.901	95% H-Stat UCL	27.71

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	3.037

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	71
		Number of Missing Observations	67
Number of Detects	77	Number of Non-Detects	22
Number of Distinct Detects	61	Number of Distinct Non-Detects	14
Minimum Detect	0.0029	Minimum Non-Detect	0.0069
Maximum Detect	18	Maximum Non-Detect	3.8
Variance Detects	11.08	Percent Non-Detects	22.22%
Mean Detects	2.358	SD Detects	3.329
Median Detects	1.1	CV Detects	1.412
Skewness Detects	2.709	Kurtosis Detects	8.359
Mean of Logged Detects	-0.14	SD of Logged Detects	1.81

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.674	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.101	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.873	KM Standard Error of Mean	0.311
KM SD	3.064	95% KM (BCA) UCL	2.397
95% KM (t) UCL	2.388	95% KM (Percentile Bootstrap) UCL	2.409
95% KM (z) UCL	2.383	95% KM Bootstrap t UCL	2.534
90% KM Chebyshev UCL	2.804	95% KM Chebyshev UCL	3.226
97.5% KM Chebyshev UCL	3.812	99% KM Chebyshev UCL	4.963

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.435	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.806	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.0666	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.107	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.617	k star (bias corrected MLE)	0.601
Theta hat (MLE)	3.822	Theta star (bias corrected MLE)	3.92
nu hat (MLE)	94.99	nu star (bias corrected)	92.63
Mean (detects)	2.358		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	1.848
Maximum	18	Median	0.72
SD	3.087	CV	1.67
k hat (MLE)	0.394	k star (bias corrected MLE)	0.388
Theta hat (MLE)	4.695	Theta star (bias corrected MLE)	4.758
nu hat (MLE)	77.94	nu star (bias corrected)	76.91
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (76.91, α)	57.71	Adjusted Chi Square Value (76.91, β)	57.46
95% Gamma Approximate UCL (use when n>=50)	2.463	95% Gamma Adjusted UCL (use when n<50)	2.473

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.873	SD (KM)	3.064
Variance (KM)	9.389	SE of Mean (KM)	0.311
k hat (KM)	0.373	k star (KM)	0.369
nu hat (KM)	73.95	nu star (KM)	73.04
theta hat (KM)	5.014	theta star (KM)	5.076
80% gamma percentile (KM)	2.99	90% gamma percentile (KM)	5.363
95% gamma percentile (KM)	7.999	99% gamma percentile (KM)	14.69

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (73.04, α)	54.36	Adjusted Chi Square Value (73.04, β)	54.12
95% Gamma Approximate KM-UCL (use when n>=50)	2.516	95% Gamma Adjusted KM-UCL (use when n<50)	2.527

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.907	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	4.5766E-6	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.101	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.856	Mean in Log Scale	-0.766
SD in Original Scale	3.081	SD in Log Scale	2.039
95% t UCL (assumes normality of ROS data)	2.37	95% Percentile Bootstrap UCL	2.394
95% BCA Bootstrap UCL	2.532	95% Bootstrap t UCL	2.5
95% H-UCL (Log ROS)	7.599		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.13	KM Geo Mean	0.323
KM SD (logged)	2.627	95% Critical H Value (KM-Log)	4.249
KM Standard Error of Mean (logged)	0.275	95% H-UCL (KM -Log)	31.45
KM SD (logged)	2.627	95% Critical H Value (KM-Log)	4.249
KM Standard Error of Mean (logged)	0.275		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.911	Mean in Log Scale	-0.907
SD in Original Scale	3.064	SD in Log Scale	2.441
95% t UCL (Assumes normality)	2.423	95% H-Stat UCL	21.31

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL 2.516

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	74
		Number of Missing Observations	67
Number of Detects	79	Number of Non-Detects	20
Number of Distinct Detects	65	Number of Distinct Non-Detects	13
Minimum Detect	0.0038	Minimum Non-Detect	0.0069
Maximum Detect	23	Maximum Non-Detect	3.8
Variance Detects	17.6	Percent Non-Detects	20.2%
Mean Detects	3.004	SD Detects	4.195
Median Detects	1.4	CV Detects	1.397
Skewness Detects	2.597	Kurtosis Detects	7.819
Mean of Logged Detects	0.0559	SD of Logged Detects	1.887

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.689	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	2.436	KM Standard Error of Mean	0.395
KM SD	3.898	95% KM (BCA) UCL	3.127
95% KM (t) UCL	3.091	95% KM (Percentile Bootstrap) UCL	3.109
95% KM (z) UCL	3.085	95% KM Bootstrap t UCL	3.292
90% KM Chebyshev UCL	3.62	95% KM Chebyshev UCL	4.157
97.5% KM Chebyshev UCL	4.901	99% KM Chebyshev UCL	6.364

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.419	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.809	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.0722	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.106	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.593	k star (bias corrected MLE)	0.579
Theta hat (MLE)	5.067	Theta star (bias corrected MLE)	5.19
nu hat (MLE)	93.67	nu star (bias corrected)	91.45
Mean (detects)	3.004		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0038	Mean	2.41
Maximum	23	Median	0.95
SD	3.928	CV	1.63
k hat (MLE)	0.387	k star (bias corrected MLE)	0.382
Theta hat (MLE)	6.234	Theta star (bias corrected MLE)	6.315
nu hat (MLE)	76.55	nu star (bias corrected)	75.56
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (75.56, α)	56.54	Adjusted Chi Square Value (75.56, β)	56.3
95% Gamma Approximate UCL (use when n>=50)	3.221	95% Gamma Adjusted UCL (use when n<50)	3.235

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.436	SD (KM)	3.898
Variance (KM)	15.2	SE of Mean (KM)	0.395
k hat (KM)	0.39	k star (KM)	0.385
nu hat (KM)	77.31	nu star (KM)	76.3
theta hat (KM)	6.239	theta star (KM)	6.321
80% gamma percentile (KM)	3.913	90% gamma percentile (KM)	6.925
95% gamma percentile (KM)	10.25	99% gamma percentile (KM)	18.65

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (76.30, α)	57.18	Adjusted Chi Square Value (76.30, β)	56.94
)5% Gamma Approximate KM-UCL (use when n>=50)	3.25	95% Gamma Adjusted KM-UCL (use when n<50)	3.264

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.896	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	3.7079E-7	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.419	Mean in Log Scale	-0.528
SD in Original Scale	3.922	SD in Log Scale	2.099
95% t UCL (assumes normality of ROS data)	3.073	95% Percentile Bootstrap UCL	3.11
95% BCA Bootstrap UCL	3.203	95% Bootstrap t UCL	3.245
95% H-UCL (Log ROS)	11.31		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.836	KM Geo Mean	0.434
KM SD (logged)	2.6	95% Critical H Value (KM-Log)	4.212
KM Standard Error of Mean (logged)	0.271	95% H-UCL (KM -Log)	38.47

KM SD (logged)	2.6	95% Critical H Value (KM-Log)	4.212
KM Standard Error of Mean (logged)	0.271		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.473	Mean in Log Scale	-0.68
SD in Original Scale	3.901	SD in Log Scale	2.502
95% t UCL (Assumes normality)	3.124	95% H-Stat UCL	32.54

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL 3.25

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	74
		Number of Missing Observations	67
Number of Detects	74	Number of Non-Detects	25
Number of Distinct Detects	60	Number of Distinct Non-Detects	15
Minimum Detect	0.0041	Minimum Non-Detect	0.0069
Maximum Detect	8.2	Maximum Non-Detect	5.9
Variance Detects	2.568	Percent Non-Detects	25.25%
Mean Detects	1.175	SD Detects	1.602
Median Detects	0.58	CV Detects	1.364
Skewness Detects	2.482	Kurtosis Detects	6.573
Mean of Logged Detects	-0.719	SD of Logged Detects	1.571

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.688	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.251	Lilliefors GOF Test
5% Lilliefors Critical Value	0.103	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.918	KM Standard Error of Mean	0.149
KM SD	1.462	95% KM (BCA) UCL	1.176
95% KM (t) UCL	1.165	95% KM (Percentile Bootstrap) UCL	1.178
95% KM (z) UCL	1.163	95% KM Bootstrap t UCL	1.216
90% KM Chebyshev UCL	1.365	95% KM Chebyshev UCL	1.568
97.5% KM Chebyshev UCL	1.849	99% KM Chebyshev UCL	2.402

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.518	Anderson-Darling GOF Test
5% A-D Critical Value	0.799	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.106	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.108	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.688	k star (bias corrected MLE)	0.67
Theta hat (MLE)	1.707	Theta star (bias corrected MLE)	1.755
nu hat (MLE)	101.9	nu star (bias corrected)	99.1
Mean (detects)	1.175		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0041	Mean	0.898
Maximum	8.2	Median	0.35
SD	1.466	CV	1.633
k hat (MLE)	0.454	k star (bias corrected MLE)	0.447
Theta hat (MLE)	1.977	Theta star (bias corrected MLE)	2.008
nu hat (MLE)	89.9	nu star (bias corrected)	88.51
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (88.51, α)	67.82	Adjusted Chi Square Value (88.51, β)	67.55
95% Gamma Approximate UCL (use when n>=50)	1.171	95% Gamma Adjusted UCL (use when n<50)	1.176

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.918	SD (KM)	1.462
Variance (KM)	2.137	SE of Mean (KM)	0.149
k hat (KM)	0.394	k star (KM)	0.389
nu hat (KM)	78.03	nu star (KM)	77
theta hat (KM)	2.329	theta star (KM)	2.36
80% gamma percentile (KM)	1.476	90% gamma percentile (KM)	2.605
95% gamma percentile (KM)	3.85	99% gamma percentile (KM)	6.992

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (77.00, α)	57.78	Adjusted Chi Square Value (77.00, β)	57.54
)5% Gamma Approximate KM-UCL (use when n>=50)	1.223	95% Gamma Adjusted KM-UCL (use when n<50)	1.228

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.95	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.014	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0836	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.103	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.9	Mean in Log Scale	-1.316
SD in Original Scale	1.464	SD in Log Scale	1.787
95% t UCL (assumes normality of ROS data)	1.144	95% Percentile Bootstrap UCL	1.158
95% BCA Bootstrap UCL	1.186	95% Bootstrap t UCL	1.215
95% H-UCL (Log ROS)	2.334		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.612	KM Geo Mean	0.199
KM SD (logged)	2.264	95% Critical H Value (KM-Log)	3.761
KM Standard Error of Mean (logged)	0.239	95% H-UCL (KM -Log)	6.117
KM SD (logged)	2.264	95% Critical H Value (KM-Log)	3.761
KM Standard Error of Mean (logged)	0.239		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.99	Mean in Log Scale	-1.427
SD in Original Scale	1.474	SD in Log Scale	2.245
95% t UCL (Assumes normality)	1.236	95% H-Stat UCL	6.97

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	1.223

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

-lowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	74
		Number of Missing Observations	67
Number of Detects	79	Number of Non-Detects	20
Number of Distinct Detects	65	Number of Distinct Non-Detects	13
Minimum Detect	0.0029	Minimum Non-Detect	0.0069
Maximum Detect	20	Maximum Non-Detect	3.8
Variance Detects	13.58	Percent Non-Detects	20.2%
Mean Detects	2.527	SD Detects	3.685
Median Detects	1	CV Detects	1.458
Skewness Detects	2.734	Kurtosis Detects	8.595
Mean of Logged Detects	-0.17	SD of Logged Detects	1.923

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.668	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	2.054	KM Standard Error of Mean	0.345
KM SD	3.411	95% KM (BCA) UCL	2.554
95% KM (t) UCL	2.628	95% KM (Percentile Bootstrap) UCL	2.66
95% KM (z) UCL	2.622	95% KM Bootstrap t UCL	2.858
90% KM Chebyshev UCL	3.09	95% KM Chebyshev UCL	3.56
97.5% KM Chebyshev UCL	4.212	99% KM Chebyshev UCL	5.492

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.406	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.812	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.066	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.106	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.568	k star (bias corrected MLE)	0.555
Theta hat (MLE)	4.449	Theta star (bias corrected MLE)	4.554
nu hat (MLE)	89.74	nu star (bias corrected)	87.66
Mean (detects)	2.527		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	2.03
Maximum	20	Median	0.79
SD	3.436	CV	1.693
k hat (MLE)	0.387	k star (bias corrected MLE)	0.382
Theta hat (MLE)	5.243	Theta star (bias corrected MLE)	5.312
nu hat (MLE)	76.65	nu star (bias corrected)	75.66
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (75.66, α)	56.62	Adjusted Chi Square Value (75.66, β)	56.38
95% Gamma Approximate UCL (use when n>=50)	2.712	95% Gamma Adjusted UCL (use when n<50)	2.724

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.054	SD (KM)	3.411
Variance (KM)	11.63	SE of Mean (KM)	0.345
k hat (KM)	0.363	k star (KM)	0.358
nu hat (KM)	71.8	nu star (KM)	70.96
theta hat (KM)	5.664	theta star (KM)	5.731
80% gamma percentile (KM)	3.265	90% gamma percentile (KM)	5.909
95% gamma percentile (KM)	8.861	99% gamma percentile (KM)	16.37

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (70.96, α)	52.57	Adjusted Chi Square Value (70.96, β)	52.33
95% Gamma Approximate KM-UCL (use when n>=50)	2.773	95% Gamma Adjusted KM-UCL (use when n<50)	2.785

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.903	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	1.6105E-6	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0998	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.036	Mean in Log Scale	-0.751
SD in Original Scale	3.431	SD in Log Scale	2.13
95% t UCL (assumes normality of ROS data)	2.608	95% Percentile Bootstrap UCL	2.626
95% BCA Bootstrap UCL	2.825	95% Bootstrap t UCL	2.818
95% H-UCL (Log ROS)	9.855		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.048	KM Geo Mean	0.351
KM SD (logged)	2.616	95% Critical H Value (KM-Log)	4.235
KM Standard Error of Mean (logged)	0.272	95% H-UCL (KM -Log)	32.89
KM SD (logged)	2.616	95% Critical H Value (KM-Log)	4.235
KM Standard Error of Mean (logged)	0.272		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.092	Mean in Log Scale	-0.86
SD in Original Scale	3.413	SD in Log Scale	2.472
95% t UCL (Assumes normality)	2.662	95% H-Stat UCL	24.63

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	2.773

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

Cobalt

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	54
Minimum	1.2	Mean	3.467
Maximum	6.5	Median	2.7
SD	2.732	Std. Error of Mean	1.577
Coefficient of Variation	0.788	Skewness	1.163

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.072	95% Adjusted-CLT UCL (Chen-1995)	7.193
		95% Modified-t UCL (Johnson-1978)	8.249

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	2.352	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.474	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	14.11	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.178	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.182	Mean of logged Data	1.016
Maximum of Logged Data	1.872	SD of logged Data	0.845

Assuming Lognormal Distribution

95% H-UCL	2854	90% Chebyshev (MVUE) UCL	8.118
95% Chebyshev (MVUE) UCL	10.23	97.5% Chebyshev (MVUE) UCL	13.16
99% Chebyshev (MVUE) UCL	18.91		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.061	95% Jackknife UCL	8.072
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	8.198	95% Chebyshev(Mean, Sd) UCL	10.34
97.5% Chebyshev(Mean, Sd) UCL	13.32	99% Chebyshev(Mean, Sd) UCL	19.16

Suggested UCL to Use

95% Student's-t UCL	8.072

Recommended UCL exceeds the maximum observation

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	67
		Number of Missing Observations	67
Number of Detects	68	Number of Non-Detects	31
Number of Distinct Detects	51	Number of Distinct Non-Detects	20
Minimum Detect	0.0062	Minimum Non-Detect	0.0069
Maximum Detect	4.2	Maximum Non-Detect	3.9
Variance Detects	0.579	Percent Non-Detects	31.31%
Mean Detects	0.574	SD Detects	0.761

Median Detects	0.31	CV Detects	1.326
Skewness Detects	2.786	Kurtosis Detects	9.228
Mean of Logged Detects	-1.255	SD of Logged Detects	1.296

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.678	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.425	KM Standard Error of Mean	0.0702
KM SD	0.681	95% KM (BCA) UCL	0.549
95% KM (t) UCL	0.542	95% KM (Percentile Bootstrap) UCL	0.54
95% KM (z) UCL	0.54	95% KM Bootstrap t UCL	0.58
90% KM Chebyshev UCL	0.636	95% KM Chebyshev UCL	0.731
97.5% KM Chebyshev UCL	0.863	99% KM Chebyshev UCL	1.123

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.809	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.788	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.111	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.112	)etected data appear Gamma Distributed at 5% Significance Leve

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.842	k star (bias corrected MLE)	0.815
Theta hat (MLE)	0.682	Theta star (bias corrected MLE)	0.705
nu hat (MLE)	114.5	nu star (bias corrected)	110.8
Mean (detects)	0.574		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0062	Mean	0.408
Maximum	4.2	Median	0.18
SD	0.678	CV	1.662
k hat (MLE)	0.508	k star (bias corrected MLE)	0.499
Theta hat (MLE)	0.804	Theta star (bias corrected MLE)	0.818
nu hat (MLE)	100.5	nu star (bias corrected)	98.8
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (98.80, α)	76.87	Adjusted Chi Square Value (98.80, β)	76.58
95% Gamma Approximate UCL (use when n>=50)	0.524	95% Gamma Adjusted UCL (use when n<50)	0.526

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.425	SD (KM)	0.681
Variance (KM)	0.463	SE of Mean (KM)	0.0702
k hat (KM)	0.39	k star (KM)	0.385
nu hat (KM)	77.22	nu star (KM)	76.21
theta hat (KM)	1.09	theta star (KM)	1.104
80% gamma percentile (KM)	0.683	90% gamma percentile (KM)	1.209
95% gamma percentile (KM)	1.789	99% gamma percentile (KM)	3.256

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (76.21, α)	57.1	Adjusted Chi Square Value (76.21, β)	56.86
)5% Gamma Approximate KM-UCL (use when n>=50)	0.567	95% Gamma Adjusted KM-UCL (use when n<50)	0.57

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.975	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.435	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0811	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.413	Mean in Log Scale	-1.882
SD in Original Scale	0.675	SD in Log Scale	1.51
95% t UCL (assumes normality of ROS data)	0.526	95% Percentile Bootstrap UCL	0.535
95% BCA Bootstrap UCL	0.565	95% Bootstrap t UCL	0.568
95% H-UCL (Log ROS)	0.731		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.142	KM Geo Mean	0.117
KM SD (logged)	1.922	95% Critical H Value (KM-Log)	3.317
KM Standard Error of Mean (logged)	0.206	95% H-UCL (KM -Log)	1.419
KM SD (logged)	1.922	95% Critical H Value (KM-Log)	3.317
KM Standard Error of Mean (logged)	0.206		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.502	Mean in Log Scale	-1.925
SD in Original Scale	0.727	SD in Log Scale	1.989
95% t UCL (Assumes normality)	0.623	95% H-Stat UCL	2.088

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	0.567

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	12	Number of Distinct Observations	8
		Number of Missing Observations	69
Number of Detects	3	Number of Non-Detects	9
Number of Distinct Detects	3	Number of Distinct Non-Detects	6
Minimum Detect	10	Minimum Non-Detect	18
Maximum Detect	80	Maximum Non-Detect	190
Variance Detects	1450	Percent Non-Detects	75%
Mean Detects	36.33	SD Detects	38.08
Median Detects	19	CV Detects	1.048
Skewness Detects	1.624	Kurtosis Detects	N/A
Mean of Logged Detects	3.21	SD of Logged Detects	1.065

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	18.62	KM Standard Error of Mean	8.12
KM SD	20.74	95% KM (BCA) UCL	N/A
95% KM (t) UCL	33.2	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	31.98	95% KM Bootstrap t UCL	N/A

90% KM Chebyshev UCL	42.98	95% KM Chebyshev UCL	54.02
97.5% KM Chebyshev UCL	69.33	99% KM Chebyshev UCL	99.42

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.449	k star (bias corrected MLE)	N/A
Theta hat (MLE)	25.07	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	8.696	nu star (bias corrected)	N/A
Mean (detects)	36.33		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	14.17
Maximum	80	Median	8.427
SD	21.78	CV	1.537
k hat (MLE)	0.434	k star (bias corrected MLE)	0.381
Theta hat (MLE)	32.64	Theta star (bias corrected MLE)	37.17
nu hat (MLE)	10.42	nu star (bias corrected)	9.146
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (9.15, α)	3.416	Adjusted Chi Square Value (9.15, β)	2.902
95% Gamma Approximate UCL (use when n>=50)	37.94	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	18.62	SD (KM)	20.74
Variance (KM)	430.3	SE of Mean (KM)	8.12
k hat (KM)	0.806	k star (KM)	0.66
nu hat (KM)	19.34	nu star (KM)	15.84
theta hat (KM)	23.11	theta star (KM)	28.22
80% gamma percentile (KM)	30.66	90% gamma percentile (KM)	47.39
95% gamma percentile (KM)	64.74	99% gamma percentile (KM)	106.4

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.84, α)	7.847	Adjusted Chi Square Value (15.84, β)	7.005
95% Gamma Approximate KM-UCL (use when n>=50)	37.58	95% Gamma Adjusted KM-UCL (use when n<50)	42.1

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	17.13	Mean in Log Scale	2.537
SD in Original Scale	20.23	SD in Log Scale	0.686
95% t UCL (assumes normality of ROS data)	27.62	95% Percentile Bootstrap UCL	28.49
95% BCA Bootstrap UCL	35.39	95% Bootstrap t UCL	58.3
95% H-UCL (Log ROS)	26.26		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.626	KM Geo Mean	13.82
KM SD (logged)	0.634	95% Critical H Value (KM-Log)	2.318
KM Standard Error of Mean (logged)	0.26	95% H-UCL (KM -Log)	26.31
KM SD (logged)	0.634	95% Critical H Value (KM-Log)	2.318
KM Standard Error of Mean (logged)	0.26		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	26.33	Mean in Log Scale	2.826
SD in Original Scale	30.34	SD in Log Scale	0.889
95% t UCL (Assumes normality)	42.06	95% H-Stat UCL	51.95

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	33.2

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	77
		Number of Missing Observations	67
Number of Detects	79	Number of Non-Detects	20
Number of Distinct Detects	66	Number of Distinct Non-Detects	13
Minimum Detect	0.005	Minimum Non-Detect	0.0069
Maximum Detect	13	Maximum Non-Detect	3.8
Variance Detects	5.191	Percent Non-Detects	20.2%
Mean Detects	1.688	SD Detects	2.278
Median Detects	0.83	CV Detects	1.35
Skewness Detects	2.58	Kurtosis Detects	8.178
Mean of Logged Detects	-0.426	SD of Logged Detects	1.737

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.704	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.381	KM Standard Error of Mean	0.215
KM SD	2.121	95% KM (BCA) UCL	1.753
95% KM (t) UCL	1.739	95% KM (Percentile Bootstrap) UCL	1.749
95% KM (z) UCL	1.735	95% KM Bootstrap t UCL	1.819
90% KM Chebyshev UCL	2.027	95% KM Chebyshev UCL	2.319
97.5% KM Chebyshev UCL	2.725	99% KM Chebyshev UCL	3.523

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.425	Anderson-Darling GOF Test
5% A-D Critical Value	0.804	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0736	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.105	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.644	k star (bias corrected MLE)	0.628
Theta hat (MLE)	2.62	Theta star (bias corrected MLE)	2.687
nu hat (MLE)	101.8	nu star (bias corrected)	99.25
Mean (detects)	1.688		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.005	Mean	1.363
Maximum	13	Median	0.56
SD	2.136	CV	1.567
k hat (MLE)	0.441	k star (bias corrected MLE)	0.434
Theta hat (MLE)	3.091	Theta star (bias corrected MLE)	3.138

nu hat (MLE)	87.31	nu star (bias corrected)	85.99
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (85.99, α)	65.62	Adjusted Chi Square Value (85.99, β)	65.36
95% Gamma Approximate UCL (use when n>=50)	1.786	95% Gamma Adjusted UCL (use when n<50)	1.793

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.381	SD (KM)	2.121
Variance (KM)	4.501	SE of Mean (KM)	0.215
k hat (KM)	0.424	k star (KM)	0.418
nu hat (KM)	83.96	nu star (KM)	82.75
theta hat (KM)	3.258	theta star (KM)	3.305
80% gamma percentile (KM)	2.24	90% gamma percentile (KM)	3.871
95% gamma percentile (KM)	5.653	99% gamma percentile (KM)	10.11

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (82.75, α)	62.79	Adjusted Chi Square Value (82.75, β)	62.53
95% Gamma Approximate KM-UCL (use when n>=50)	1.821	95% Gamma Adjusted KM-UCL (use when n<50)	1.828

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.909	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	4.9010E-6	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0998	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.367	Mean in Log Scale	-0.93
SD in Original Scale	2.132	SD in Log Scale	1.906
95% t UCL (assumes normality of ROS data)	1.723	95% Percentile Bootstrap UCL	1.72
95% BCA Bootstrap UCL	1.801	95% Bootstrap t UCL	1.823
95% H-UCL (Log ROS)	4.576		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.184	KM Geo Mean	0.306
KM SD (logged)	2.323	95% Critical H Value (KM-Log)	3.838
KM Standard Error of Mean (logged)	0.242	95% H-UCL (KM -Log)	11.17
KM SD (logged)	2.323	95% Critical H Value (KM-Log)	3.838
KM Standard Error of Mean (logged)	0.242		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.423	Mean in Log Scale	-1.064
SD in Original Scale	2.121	SD in Log Scale	2.301
95% t UCL (Assumes normality)	1.777	95% H-Stat UCL	11.8

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL 1.821

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

Manganese

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	54
Minimum	9.9	Mean	156.6
Maximum	260	Median	200
SD	130.6	Std. Error of Mean	75.38
Coefficient of Variation	0.834	Skewness	-1.33

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	376.8	95% Adjusted-CLT UCL (Chen-1995)	218.8
		95% Modified-t UCL (Johnson-1978)	367.1

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	0.875	k star (bias corrected MLE)	N/A
Theta hat (MLE)	178.9	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.253	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.359	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.293	Mean of logged Data	4.384
Maximum of Logged Data	5.561	SD of logged Data	1.816

Assuming Lognormal Distribution

95% H-UCL	7.139E+15	90% Chebyshev (MVUE) UCL	646.5
95% Chebyshev (MVUE) UCL	850.7	97.5% Chebyshev (MVUE) UCL	1134
99% Chebyshev (MVUE) UCL	1691		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	280.6	95% Jackknife UCL	376.8
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	382.8	95% Chebyshev(Mean, Sd) UCL	485.2
97.5% Chebyshev(Mean, Sd) UCL	627.4	99% Chebyshev(Mean, Sd) UCL	906.7

Suggested UCL to Use

95% Student's-t UCL	376.8

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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

Naphthalene

General Statistics

Total Number of Observations	99	Number of Distinct Observations	67
		Number of Missing Observations	67
Number of Detects	47	Number of Non-Detects	52
Number of Distinct Detects	38	Number of Distinct Non-Detects	34
Minimum Detect	0.0029	Minimum Non-Detect	0.0069
Maximum Detect	1.1	Maximum Non-Detect	5.9
Variance Detects	0.0593	Percent Non-Detects	52.53%
Mean Detects	0.168	SD Detects	0.244
Median Detects	0.09	CV Detects	1.453
Skewness Detects	2.736	Kurtosis Detects	7.187
Mean of Logged Detects	-2.487	SD of Logged Detects	1.228

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.606	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.946	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.128	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0991	KM Standard Error of Mean	0.0203
KM SD	0.19	95% KM (BCA) UCL	0.137
95% KM (t) UCL	0.133	95% KM (Percentile Bootstrap) UCL	0.135
95% KM (z) UCL	0.133	95% KM Bootstrap t UCL	0.15
90% KM Chebyshev UCL	0.16	95% KM Chebyshev UCL	0.188
97.5% KM Chebyshev UCL	0.226	99% KM Chebyshev UCL	0.301

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.391	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.786	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.164	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.134	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.841	k star (bias corrected MLE)	0.802
Theta hat (MLE)	0.199	Theta star (bias corrected MLE)	0.209
nu hat (MLE)	79.06	nu star (bias corrected)	75.34
Mean (detects)	0.168		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	0.0892
Maximum	1.1	Median	0.02
SD	0.184	CV	2.062
k hat (MLE)	0.584	k star (bias corrected MLE)	0.573
Theta hat (MLE)	0.153	Theta star (bias corrected MLE)	0.156
nu hat (MLE)	115.6	nu star (bias corrected)	113.4
Adjusted Level of Significance (β)	0.0476		
Approximate Chi Square Value (113.40, α)	89.81	Adjusted Chi Square Value (113.40, β)	89.51
95% Gamma Approximate UCL (use when n>=50)	0.113	95% Gamma Adjusted UCL (use when n<50)	0.113

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0991	SD (KM)	0.19
Variance (KM)	0.0359	SE of Mean (KM)	0.0203

k hat (KM)	0.273	k star (KM)	0.272
nu hat (KM)	54.09	nu star (KM)	53.79
theta hat (KM)	0.363	theta star (KM)	0.365
80% gamma percentile (KM)	0.148	90% gamma percentile (KM)	0.295
95% gamma percentile (KM)	0.468	99% gamma percentile (KM)	0.921

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (53.79, α)	37.94	Adjusted Chi Square Value (53.79, β)	37.74
95% Gamma Approximate KM-UCL (use when n>=50)	0.14	95% Gamma Adjusted KM-UCL (use when n<50)	0.141

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.973	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.946	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0865	Lilliefors GOF Test
5% Lilliefors Critical Value	0.128	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0909	Mean in Log Scale	-3.365
SD in Original Scale	0.183	SD in Log Scale	1.324
95% t UCL (assumes normality of ROS data)	0.121	95% Percentile Bootstrap UCL	0.122
95% BCA Bootstrap UCL	0.129	95% Bootstrap t UCL	0.135
95% H-UCL (Log ROS)	0.118		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.552	KM Geo Mean	0.0287
KM SD (logged)	1.675	95% Critical H Value (KM-Log)	3.008
KM Standard Error of Mean (logged)	0.212	95% H-UCL (KM -Log)	0.194
KM SD (logged)	1.675	95% Critical H Value (KM-Log)	3.008
KM Standard Error of Mean (logged)	0.212		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.242	Mean in Log Scale	-2.786
SD in Original Scale	0.484	SD in Log Scale	1.79
95% t UCL (Assumes normality)	0.323	95% H-Stat UCL	0.541

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 0.194

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

Nickel

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	54
Minimum	2.8	Mean	13.93
Maximum	23	Median	16
SD	10.26	Std. Error of Mean	5.922
Coefficient of Variation	0.736	Skewness	-0.87

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.97	Shapiro Wilk GOF Test

5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	31.23	95% Adjusted-CLT UCL (Chen-1995)	20.5
		95% Modified-t UCL (Johnson-1978)	30.73

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	1.702	k star (bias corrected MLE)	N/A
Theta hat (MLE)	8.188	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	10.21	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.325	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.03	Mean of logged Data	2.313
Maximum of Logged Data	3.135	SD of logged Data	1.126

Assuming Lognormal Distribution

95% H-UCL	2298411	90% Chebyshev (MVUE) UCL	40
95% Chebyshev (MVUE) UCL	51.4	97.5% Chebyshev (MVUE) UCL	67.21
99% Chebyshev (MVUE) UCL	98.28		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	23.67	95% Jackknife UCL	31.23
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	31.7	95% Chebyshev(Mean, Sd) UCL	39.75
97.5% Chebyshev(Mean, Sd) UCL	50.92	99% Chebyshev(Mean, Sd) UCL	72.86

Suggested UCL to Use

95% Student's-t UCL	31.23

Recommended UCL exceeds the maximum observation

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

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	136	Number of Distinct Observations	116
		Number of Missing Observations	31
Number of Detects	125	Number of Non-Detects	11
Number of Distinct Detects	110	Number of Distinct Non-Detects	8
Minimum Detect	0.0015	Minimum Non-Detect	0.001
Maximum Detect	8800	Maximum Non-Detect	0.057
Variance Detects	620071	Percent Non-Detects	8.088%
Mean Detects	81.15	SD Detects	787.4
Median Detects	0.34	CV Detects	9.703
Skewness Detects	11.12	Kurtosis Detects	124.1
Mean of Logged Detects	-0.753	SD of Logged Detects	2.884

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.105	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.473	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0796	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	74.59	KM Standard Error of Mean	64.76
KM SD	752.2	95% KM (BCA) UCL	206.5
95% KM (t) UCL	181.8	95% KM (Percentile Bootstrap) UCL	203.1
95% KM (z) UCL	181.1	95% KM Bootstrap t UCL	2749
90% KM Chebyshev UCL	268.9	95% KM Chebyshev UCL	356.9
97.5% KM Chebyshev UCL	479	99% KM Chebyshev UCL	719

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	17.65	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.968	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.275	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0938	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.149	k star (bias corrected MLE)	0.151
Theta hat (MLE)	543.3	Theta star (bias corrected MLE)	537
nu hat (MLE)	37.34	nu star (bias corrected)	37.78
Mean (detects)	81.15		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0015	Mean	74.59
Maximum	8800	Median	0.26
SD	755	CV	10.12
k hat (MLE)	0.144	k star (bias corrected MLE)	0.146
Theta hat (MLE)	518.6	Theta star (bias corrected MLE)	512.4
nu hat (MLE)	39.12	nu star (bias corrected)	39.59
Adjusted Level of Significance (β)	0.0482		
Approximate Chi Square Value (39.59, α)	26.18	Adjusted Chi Square Value (39.59, β)	26.06
95% Gamma Approximate UCL (use when n>=50)	112.8	95% Gamma Adjusted UCL (use when n<50)	113.3

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	74.59	SD (KM)	752.2
Variance (KM)	565849	SE of Mean (KM)	64.76
k hat (KM)	0.00983	k star (KM)	0.0145
nu hat (KM)	2.674	nu star (KM)	3.949
theta hat (KM)	7586	theta star (KM)	5138
80% gamma percentile (KM)	6.1618E-4	90% gamma percentile (KM)	2.058
95% gamma percentile (KM)	86.69	99% gamma percentile (KM)	2109

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.95, α)	0.702	Adjusted Chi Square Value (3.95, β)	0.688
95% Gamma Approximate KM-UCL (use when n>=50)	419.8	95% Gamma Adjusted KM-UCL (use when n<50)	428.2

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.977	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.297	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0817	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0796	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	74.59	Mean in Log Scale	-1.19
SD in Original Scale	755	SD in Log Scale	3.16
95% t UCL (assumes normality of ROS data)	181.8	95% Percentile Bootstrap UCL	202.2
95% BCA Bootstrap UCL	273.9	95% Bootstrap t UCL	2874
95% H-UCL (Log ROS)	162.9		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.152	KM Geo Mean	0.316
KM SD (logged)	3.083	95% Critical H Value (KM-Log)	4.641
KM Standard Error of Mean (logged)	0.266	95% H-UCL (KM -Log)	125.5
KM SD (logged)	3.083	95% Critical H Value (KM-Log)	4.641
KM Standard Error of Mean (logged)	0.266		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	74.59	Mean in Log Scale	-1.115
SD in Original Scale	755	SD in Log Scale	3.047
95% t UCL (Assumes normality)	181.8	95% H-Stat UCL	113.4

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 125.5

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

Thallium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	54
Number of Detects	2	Number of Non-Detects	1
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.085	Minimum Non-Detect	0.11
Maximum Detect	0.17	Maximum Non-Detect	0.11
Variance Detects	0.00361	Percent Non-Detects	33.33%
Mean Detects	0.128	SD Detects	0.0601
Median Detects	0.128	CV Detects	0.471
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.119	SD of Logged Detects	0.49

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.113	KM Standard Error of Mean	0.0327
KM SD	0.0401	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.209	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.167	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.211	95% KM Chebyshev UCL	0.256
97.5% KM Chebyshev UCL	0.318	99% KM Chebyshev UCL	0.439

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	8.653	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0147	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	34.61	nu star (bias corrected)	N/A
Mean (detects)	0.128		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.113	SD (KM)	0.0401
Variance (KM)	0.00161	SE of Mean (KM)	0.0327
k hat (KM)	8	k star (KM)	N/A
nu hat (KM)	48	nu star (KM)	N/A
theta hat (KM)	0.0142	theta star (KM)	N/A
80% gamma percentile (KM)	N/A	90% gamma percentile (KM)	N/A
95% gamma percentile (KM)	N/A	99% gamma percentile (KM)	N/A

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00136
Approximate Chi Square Value (N/A, α)	N/A	Adjusted Chi Square Value (N/A, β)	N/A
)5% Gamma Approximate KM-UCL (use when n>=50)	N/A	95% Gamma Adjusted KM-UCL (use when n<50)	N/A

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.113	Mean in Log Scale	-2.234
SD in Original Scale	0.0491	SD in Log Scale	0.4
95% t UCL (assumes normality of ROS data)	0.196	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	0.509		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.234	KM Geo Mean	0.107
KM SD (logged)	0.327	95% Critical H Value (KM-Log)	4.377
KM Standard Error of Mean (logged)	0.267	95% H-UCL (KM -Log)	0.311
KM SD (logged)	0.327	95% Critical H Value (KM-Log)	4.377
KM Standard Error of Mean (logged)	0.267		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.103	Mean in Log Scale	-2.379
SD in Original Scale	0.0597	SD in Log Scale	0.569
95% t UCL (Assumes normality)	0.204	95% H-Stat UCL	2.138

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.209	KM H-UCL	0.311
95% KM (BCA) UCL	N/A		

Warning: One or more Recommended UCL(s) not available!

Warning: Recommended UCL exceeds the maximum observation

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

Vanadium

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	54
Minimum	9.7	Mean	16.57
Maximum	23	Median	17
SD	6.661	Std. Error of Mean	3.845
Coefficient of Variation	0.402	Skewness	-0.292

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.997	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	27.8	95% Adjusted-CLT UCL (Chen-1995)	22.2
		95% Modified-t UCL (Johnson-1978)	27.69

Gamma GOF Test

Not Enough Data to Perform GOF Test

Gamma Statistics

k hat (MLE)	8.435	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.964	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	50.61	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.272	Mean of logged Data	2.747
Maximum of Logged Data	3.135	SD of logged Data	0.438

Assuming Lognormal Distribution

95% H-UCL	99.93	90% Chebyshev (MVUE) UCL	28.92
95% Chebyshev (MVUE) UCL	34.49	97.5% Chebyshev (MVUE) UCL	42.23
99% Chebyshev (MVUE) UCL	57.44		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	22.89	95% Jackknife UCL	27.8
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	28.1	95% Chebyshev(Mean, Sd) UCL	33.33
97.5% Chebyshev(Mean, Sd) UCL	40.58	99% Chebyshev(Mean, Sd) UCL	54.83

Suggested UCL to Use

95% Student's-t UCL	27.8

Recommended UCL exceeds the maximum observation

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/29/2018 2:52:12 PM
From File	Soil-VehicleRefuel.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	10
Minimum	1.6	Mean	2.48
Maximum	3.7	Median	2.4
SD	0.853	Std. Error of Mean	0.381
Coefficient of Variation	0.344	Skewness	0.601

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.949	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.187	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3.293	95% Adjusted-CLT UCL (Chen-1995)	3.217
		95% Modified-t UCL (Johnson-1978)	3.31

Gamma GOF Test

A-D Test Statistic	0.23	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.679	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.215	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.358	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.8	k star (bias corrected MLE)	4.454
Theta hat (MLE)	0.23	Theta star (bias corrected MLE)	0.557
nu hat (MLE)	108	nu star (bias corrected)	44.54
MLE Mean (bias corrected)	2.48	MLE Sd (bias corrected)	1.175
		Approximate Chi Square Value (0.05)	30.24
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	25.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.654	95% Adjusted Gamma UCL (use when n<50)	4.384

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.188	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.47	Mean of logged Data	0.861
Maximum of Logged Data	1.308	SD of logged Data	0.343

Assuming Lognormal Distribution

95% H-UCL	3.852	90% Chebyshev (MVUE) UCL	3.614
95% Chebyshev (MVUE) UCL	4.127	97.5% Chebyshev (MVUE) UCL	4.841
99% Chebyshev (MVUE) UCL	6.242		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.107	95% Jackknife UCL	3.293
95% Standard Bootstrap UCL	3.037	95% Bootstrap-t UCL	3.57
95% Hall's Bootstrap UCL	3.042	95% Percentile Bootstrap UCL	3.12
95% BCA Bootstrap UCL	3.06		
90% Chebyshev(Mean, Sd) UCL	3.624	95% Chebyshev(Mean, Sd) UCL	4.142
97.5% Chebyshev(Mean, Sd) UCL	4.861	99% Chebyshev(Mean, Sd) UCL	6.274

Suggested UCL to Use

95% Student's-t UCL	3.293

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

Benzo(a)anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	16	Number of Non-Detects	3
Number of Distinct Detects	15	Number of Distinct Non-Detects	3
Minimum Detect	0.0015	Minimum Non-Detect	0.007
Maximum Detect	2.6	Maximum Non-Detect	0.0073
Variance Detects	0.463	Percent Non-Detects	15.79%
Mean Detects	0.443	SD Detects	0.68
Median Detects	0.19	CV Detects	1.537
Skewness Detects	2.488	Kurtosis Detects	6.723
Mean of Logged Detects	-2.055	SD of Logged Detects	2.026

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.666	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.293	Lilliefors GOF Test
5% Lilliefors Critical Value	0.213	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.373	KM Standard Error of Mean	0.148
KM SD	0.625	95% KM (BCA) UCL	0.655
95% KM (t) UCL	0.63	95% KM (Percentile Bootstrap) UCL	0.632
95% KM (z) UCL	0.617	95% KM Bootstrap t UCL	0.92
90% KM Chebyshev UCL	0.818	95% KM Chebyshev UCL	1.019
97.5% KM Chebyshev UCL	1.299	99% KM Chebyshev UCL	1.848

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.22	Anderson-Darling GOF Test
5% A-D Critical Value	0.795	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.134	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.511	k star (bias corrected MLE)	0.456
Theta hat (MLE)	0.867	Theta star (bias corrected MLE)	0.97
nu hat (MLE)	16.34	nu star (bias corrected)	14.61
Mean (detects)	0.443		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0015	Mean	0.374
Maximum	2.6	Median	0.15
SD	0.642	CV	1.715
k hat (MLE)	0.439	k star (bias corrected MLE)	0.405
Theta hat (MLE)	0.852	Theta star (bias corrected MLE)	0.924
nu hat (MLE)	16.7	nu star (bias corrected)	15.39
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (15.39, α)	7.537	Adjusted Chi Square Value (15.39, β)	7.059
95% Gamma Approximate UCL (use when n>=50)	0.765	95% Gamma Adjusted UCL (use when n<50)	0.816

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.373	SD (KM)	0.625
Variance (KM)	0.391	SE of Mean (KM)	0.148
k hat (KM)	0.356	k star (KM)	0.335
nu hat (KM)	13.54	nu star (KM)	12.73
theta hat (KM)	1.048	theta star (KM)	1.114
80% gamma percentile (KM)	0.586	90% gamma percentile (KM)	1.085
95% gamma percentile (KM)	1.647	99% gamma percentile (KM)	3.088

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.73, α)	5.714	Adjusted Chi Square Value (12.73, β)	5.307
95% Gamma Approximate KM-UCL (use when n>=50)	0.832	95% Gamma Adjusted KM-UCL (use when n<50)	0.896

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.373	Mean in Log Scale	-2.574
SD in Original Scale	0.642	SD in Log Scale	2.222
95% t UCL (assumes normality of ROS data)	0.629	95% Percentile Bootstrap UCL	0.634
95% BCA Bootstrap UCL	0.717	95% Bootstrap t UCL	0.915
95% H-UCL (Log ROS)	10.27		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.661	KM Geo Mean	0.0699
KM SD (logged)	2.292	95% Critical H Value (KM-Log)	4.775
KM Standard Error of Mean (logged)	0.551	95% H-UCL (KM -Log)	12.77
KM SD (logged)	2.292	95% Critical H Value (KM-Log)	4.775
KM Standard Error of Mean (logged)	0.551		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.373	Mean in Log Scale	-2.62
SD in Original Scale	0.642	SD in Log Scale	2.284
95% t UCL (Assumes normality)	0.629	95% H-Stat UCL	12.81

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.896

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	14	Number of Non-Detects	5
Number of Distinct Detects	13	Number of Distinct Non-Detects	5
Minimum Detect	0.009	Minimum Non-Detect	0.007
Maximum Detect	1.4	Maximum Non-Detect	0.0091
Variance Detects	0.264	Percent Non-Detects	26.32%
Mean Detects	0.443	SD Detects	0.514
Median Detects	0.195	CV Detects	1.161
Skewness Detects	1.166	Kurtosis Detects	-0.207
Mean of Logged Detects	-1.731	SD of Logged Detects	1.665

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.772	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.328	KM Standard Error of Mean	0.111
KM SD	0.466	95% KM (BCA) UCL	0.518
95% KM (t) UCL	0.521	95% KM (Percentile Bootstrap) UCL	0.518
95% KM (z) UCL	0.511	95% KM Bootstrap t UCL	0.583
90% KM Chebyshev UCL	0.661	95% KM Chebyshev UCL	0.812
97.5% KM Chebyshev UCL	1.021	99% KM Chebyshev UCL	1.433

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.335	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.778	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.14	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.239	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.664	k star (bias corrected MLE)	0.57
Theta hat (MLE)	0.666	Theta star (bias corrected MLE)	0.777
nu hat (MLE)	18.6	nu star (bias corrected)	15.95
Mean (detects)	0.443		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.009	Mean	0.329
Maximum	1.4	Median	0.066
SD	0.479	CV	1.455
k hat (MLE)	0.467	k star (bias corrected MLE)	0.428
Theta hat (MLE)	0.704	Theta star (bias corrected MLE)	0.768
nu hat (MLE)	17.74	nu star (bias corrected)	16.27
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (16.27, α)	8.154	Adjusted Chi Square Value (16.27, β)	7.655
95% Gamma Approximate UCL (use when n>=50)	0.656	95% Gamma Adjusted UCL (use when n<50)	0.699

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.328	SD (KM)	0.466
Variance (KM)	0.217	SE of Mean (KM)	0.111
k hat (KM)	0.495	k star (KM)	0.452
nu hat (KM)	18.81	nu star (KM)	17.17
theta hat (KM)	0.663	theta star (KM)	0.726
80% gamma percentile (KM)	0.536	90% gamma percentile (KM)	0.906
95% gamma percentile (KM)	1.306	99% gamma percentile (KM)	2.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.17, α)	8.794	Adjusted Chi Square Value (17.17, β)	8.272
95% Gamma Approximate KM-UCL (use when n>=50)	0.64	95% Gamma Adjusted KM-UCL (use when n<50)	0.681

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.327	Mean in Log Scale	-2.711
SD in Original Scale	0.48	SD in Log Scale	2.201
95% t UCL (assumes normality of ROS data)	0.518	95% Percentile Bootstrap UCL	0.532
95% BCA Bootstrap UCL	0.566	95% Bootstrap t UCL	0.589
95% H-UCL (Log ROS)	8.195		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.579	KM Geo Mean	0.0759
KM SD (logged)	1.977	95% Critical H Value (KM-Log)	4.21
KM Standard Error of Mean (logged)	0.471	95% H-UCL (KM -Log)	3.809
KM SD (logged)	1.977	95% Critical H Value (KM-Log)	4.21
KM Standard Error of Mean (logged)	0.471		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.327	Mean in Log Scale	-2.742
SD in Original Scale	0.48	SD in Log Scale	2.241
95% t UCL (Assumes normality)	0.518	95% H-Stat UCL	9.428

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.681

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

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
		Number of Missing Observations	1
Number of Detects	15	Number of Non-Detects	4
Number of Distinct Detects	15	Number of Distinct Non-Detects	4
Minimum Detect	0.011	Minimum Non-Detect	0.007
Maximum Detect	2.3	Maximum Non-Detect	0.0091
Variance Detects	0.597	Percent Non-Detects	21.05%
Mean Detects	0.555	SD Detects	0.773
Median Detects	0.21	CV Detects	1.391
Skewness Detects	1.647	Kurtosis Detects	1.581
Mean of Logged Detects	-1.665	SD of Logged Detects	1.688

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.713	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.286	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.44	KM Standard Error of Mean	0.166
KM SD	0.7	95% KM (BCA) UCL	0.753
95% KM (t) UCL	0.728	95% KM (Percentile Bootstrap) UCL	0.729
95% KM (z) UCL	0.713	95% KM Bootstrap t UCL	0.98
90% KM Chebyshev UCL	0.939	95% KM Chebyshev UCL	1.164
97.5% KM Chebyshev UCL	1.478	99% KM Chebyshev UCL	2.094

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.41	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.787	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.159	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.233	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.577	k star (bias corrected MLE)	0.506
Theta hat (MLE)	0.963	Theta star (bias corrected MLE)	1.098
nu hat (MLE)	17.31	nu star (bias corrected)	15.18
Mean (detects)	0.555		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.441
Maximum	2.3	Median	0.099
SD	0.719	CV	1.631
k hat (MLE)	0.442	k star (bias corrected MLE)	0.407
Theta hat (MLE)	0.996	Theta star (bias corrected MLE)	1.081
nu hat (MLE)	16.8	nu star (bias corrected)	15.48
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (15.48, α)	7.599	Adjusted Chi Square Value (15.48, β)	7.119
95% Gamma Approximate UCL (use when n>=50)	0.898	95% Gamma Adjusted UCL (use when n<50)	0.958

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.44	SD (KM)	0.7
Variance (KM)	0.49	SE of Mean (KM)	0.166
k hat (KM)	0.395	k star (KM)	0.368
nu hat (KM)	15.02	nu star (KM)	13.98
theta hat (KM)	1.113	theta star (KM)	1.196
80% gamma percentile (KM)	0.702	90% gamma percentile (KM)	1.261
95% gamma percentile (KM)	1.881	99% gamma percentile (KM)	3.457

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.98, α)	6.557	Adjusted Chi Square Value (13.98, β)	6.117
)5% Gamma Approximate KM-UCL (use when n>=50)	0.938	95% Gamma Adjusted KM-UCL (use when n<50)	1.006

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0893	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.439	Mean in Log Scale	-2.485
SD in Original Scale	0.72	SD in Log Scale	2.208
95% t UCL (assumes normality of ROS data)	0.726	95% Percentile Bootstrap UCL	0.739
95% BCA Bootstrap UCL	0.779	95% Bootstrap t UCL	1.021
95% H-UCL (Log ROS)	10.58		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.359	KM Geo Mean	0.0945
KM SD (logged)	1.977	95% Critical H Value (KM-Log)	4.209
KM Standard Error of Mean (logged)	0.469	95% H-UCL (KM -Log)	4.736

KM SD (logged)	1.977	95% Critical H Value (KM-Log)	4.209
KM Standard Error of Mean (logged)	0.469		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.439	Mean in Log Scale	-2.488
SD in Original Scale	0.72	SD in Log Scale	2.213
95% t UCL (Assumes normality)	0.726	95% H-Stat UCL	10.77

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) 1.006

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

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
		Number of Missing Observations	1
Number of Detects	14	Number of Non-Detects	5
Number of Distinct Detects	14	Number of Distinct Non-Detects	5
Minimum Detect	0.0031	Minimum Non-Detect	0.007
Maximum Detect	0.61	Maximum Non-Detect	0.014
Variance Detects	0.0397	Percent Non-Detects	26.32%
Mean Detects	0.17	SD Detects	0.199
Median Detects	0.089	CV Detects	1.173
Skewness Detects	1.455	Kurtosis Detects	1.133
Mean of Logged Detects	-2.655	SD of Logged Detects	1.66

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.126	KM Standard Error of Mean	0.043
KM SD	0.18	95% KM (BCA) UCL	0.203
95% KM (t) UCL	0.201	95% KM (Percentile Bootstrap) UCL	0.198
95% KM (z) UCL	0.197	95% KM Bootstrap t UCL	0.252
90% KM Chebyshev UCL	0.255	95% KM Chebyshev UCL	0.313
97.5% KM Chebyshev UCL	0.394	99% KM Chebyshev UCL	0.553

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.203	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.776	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.0949	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.239	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.687	k star (bias corrected MLE)	0.587
Theta hat (MLE)	0.247	Theta star (bias corrected MLE)	0.289
nu hat (MLE)	19.23	nu star (bias corrected)	16.44
Mean (detects)	0.17		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0031	Mean	0.128
Maximum	0.61	Median	0.033
SD	0.184	CV	1.441
k hat (MLE)	0.562	k star (bias corrected MLE)	0.508
Theta hat (MLE)	0.228	Theta star (bias corrected MLE)	0.252
nu hat (MLE)	21.34	nu star (bias corrected)	19.31
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (19.31, α)	10.34	Adjusted Chi Square Value (19.31, β)	9.771
95% Gamma Approximate UCL (use when n>=50)	0.239	95% Gamma Adjusted UCL (use when n<50)	0.253

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.126	SD (KM)	0.18
Variance (KM)	0.0326	SE of Mean (KM)	0.043
k hat (KM)	0.488	k star (KM)	0.446
nu hat (KM)	18.54	nu star (KM)	16.94
theta hat (KM)	0.258	theta star (KM)	0.283
80% gamma percentile (KM)	0.206	90% gamma percentile (KM)	0.349
95% gamma percentile (KM)	0.504	99% gamma percentile (KM)	0.89

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.94, α)	8.633	Adjusted Chi Square Value (16.94, β)	8.117
95% Gamma Approximate KM-UCL (use when n>=50)	0.247	95% Gamma Adjusted KM-UCL (use when n<50)	0.263

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.126	Mean in Log Scale	-3.355
SD in Original Scale	0.185	SD in Log Scale	1.854
95% t UCL (assumes normality of ROS data)	0.2	95% Percentile Bootstrap UCL	0.2
95% BCA Bootstrap UCL	0.219	95% Bootstrap t UCL	0.269
95% H-UCL (Log ROS)	1.114		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.464	KM Geo Mean	0.0313
KM SD (logged)	1.929	95% Critical H Value (KM-Log)	4.124
KM Standard Error of Mean (logged)	0.459	95% H-UCL (KM -Log)	1.31
KM SD (logged)	1.929	95% Critical H Value (KM-Log)	4.124
KM Standard Error of Mean (logged)	0.459		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.126	Mean in Log Scale	-3.39
SD in Original Scale	0.185	SD in Log Scale	1.899
95% t UCL (Assumes normality)	0.2	95% H-Stat UCL	1.267

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.263

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

Iowever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	16	Number of Non-Detects	3
Number of Distinct Detects	16	Number of Distinct Non-Detects	3
Minimum Detect	0.0011	Minimum Non-Detect	0.007
Maximum Detect	2.5	Maximum Non-Detect	0.0073
Variance Detects	0.435	Percent Non-Detects	15.79%
Mean Detects	0.464	SD Detects	0.659
Median Detects	0.2	CV Detects	1.421
Skewness Detects	2.279	Kurtosis Detects	5.742
Mean of Logged Detects	-1.983	SD of Logged Detects	2.069

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.213	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.391	KM Standard Error of Mean	0.144
KM SD	0.61	95% KM (BCA) UCL	0.647
95% KM (t) UCL	0.642	95% KM (Percentile Bootstrap) UCL	0.643
95% KM (z) UCL	0.629	95% KM Bootstrap t UCL	0.819
90% KM Chebyshev UCL	0.825	95% KM Chebyshev UCL	1.021
97.5% KM Chebyshev UCL	1.293	99% KM Chebyshev UCL	1.829

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.125	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.795	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.0856	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.227	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.52	k star (bias corrected MLE)	0.464
Theta hat (MLE)	0.894	Theta star (bias corrected MLE)	1.001
nu hat (MLE)	16.62	nu star (bias corrected)	14.84
Mean (detects)	0.464		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0011	Mean	0.392
Maximum	2.5	Median	0.14
SD	0.626	CV	1.594
k hat (MLE)	0.443	k star (bias corrected MLE)	0.408
Theta hat (MLE)	0.886	Theta star (bias corrected MLE)	0.962
nu hat (MLE)	16.83	nu star (bias corrected)	15.51
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (15.51, α)	7.615	Adjusted Chi Square Value (15.51, β)	7.135
95% Gamma Approximate UCL (use when n>=50)	0.799	95% Gamma Adjusted UCL (use when n<50)	0.853

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.391	SD (KM)	0.61
Variance (KM)	0.372	SE of Mean (KM)	0.144
k hat (KM)	0.412	k star (KM)	0.382
nu hat (KM)	15.64	nu star (KM)	14.5
theta hat (KM)	0.95	theta star (KM)	1.025
80% gamma percentile (KM)	0.628	90% gamma percentile (KM)	1.114
95% gamma percentile (KM)	1.652	99% gamma percentile (KM)	3.011

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (14.50, α)	6.917	Adjusted Chi Square Value (14.50, β)	6.462
95% Gamma Approximate KM-UCL (use when n>=50)	0.82	95% Gamma Adjusted KM-UCL (use when n<50)	0.878

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.938	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	Lilliefors GOF Test
5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.391	Mean in Log Scale	-2.58
SD in Original Scale	0.626	SD in Log Scale	2.362
95% t UCL (assumes normality of ROS data)	0.641	95% Percentile Bootstrap UCL	0.637
95% BCA Bootstrap UCL	0.731	95% Bootstrap t UCL	0.875
95% H-UCL (Log ROS)	18.91		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.721	KM Geo Mean	0.0658
KM SD (logged)	2.515	95% Critical H Value (KM-Log)	5.181
KM Standard Error of Mean (logged)	0.598	95% H-UCL (KM -Log)	33.56
KM SD (logged)	2.515	95% Critical H Value (KM-Log)	5.181
KM Standard Error of Mean (logged)	0.598		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.391	Mean in Log Scale	-2.559
SD in Original Scale	0.626	SD in Log Scale	2.332
95% t UCL (Assumes normality)	0.641	95% H-Stat UCL	16.81

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.878

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

Cobalt

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	10
Minimum	2.6	Mean	5.52
Maximum	7.3	Median	6.8
SD	2.095	Std. Error of Mean	0.937
Coefficient of Variation	0.379	Skewness	-0.818

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.833	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.329	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	7.517	95% Adjusted-CLT UCL (Chen-1995)	6.694
		95% Modified-t UCL (Johnson-1978)	7.46

Gamma GOF Test

A-D Test Statistic	0.572	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.68	)etected data appear Gamma Distributed at 5% Significance Leve	
K-S Test Statistic	0.357	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.358	)etected data appear Gamma Distributed at 5% Significance Leve	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.035	k star (bias corrected MLE)	2.947
Theta hat (MLE)	0.785	Theta star (bias corrected MLE)	1.873
nu hat (MLE)	70.35	nu star (bias corrected)	29.47
MLE Mean (bias corrected)	5.52	MLE Sd (bias corrected)	3.215
		Approximate Chi Square Value (0.05)	18.08
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	14.32

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.999	95% Adjusted Gamma UCL (use when n<50)	11.36

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.333	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.956	Mean of logged Data	1.636
Maximum of Logged Data	1.988	SD of logged Data	0.452

Assuming Lognormal Distribution

95% H-UCL	10.69	90% Chebyshev (MVUE) UCL	8.908
95% Chebyshev (MVUE) UCL	10.42	97.5% Chebyshev (MVUE) UCL	12.53
99% Chebyshev (MVUE) UCL	16.66		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	7.061	95% Jackknife UCL	7.517
95% Standard Bootstrap UCL	6.881	95% Bootstrap-t UCL	7.31
95% Hall's Bootstrap UCL	6.367	95% Percentile Bootstrap UCL	6.96
95% BCA Bootstrap UCL	6.56		
90% Chebyshev(Mean, Sd) UCL	8.33	95% Chebyshev(Mean, Sd) UCL	9.603
97.5% Chebyshev(Mean, Sd) UCL	11.37	99% Chebyshev(Mean, Sd) UCL	14.84

Suggested UCL to Use

95% Student's-t UCL	7.517

Recommended UCL exceeds the maximum observation

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

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

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	11	Number of Non-Detects	8
Number of Distinct Detects	10	Number of Distinct Non-Detects	8
Minimum Detect	0.0081	Minimum Non-Detect	0.007
Maximum Detect	0.31	Maximum Non-Detect	0.19
Variance Detects	0.0153	Percent Non-Detects	42.11%
Mean Detects	0.119	SD Detects	0.124
Median Detects	0.068	CV Detects	1.04
Skewness Detects	0.9	Kurtosis Detects	-1.023
Mean of Logged Detects	-2.801	SD of Logged Detects	1.346

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.787	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.224	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.0731	KM Standard Error of Mean	0.0254
KM SD	0.105	95% KM (BCA) UCL	0.115
95% KM (t) UCL	0.117	95% KM (Percentile Bootstrap) UCL	0.116
95% KM (z) UCL	0.115	95% KM Bootstrap t UCL	0.137
90% KM Chebyshev UCL	0.149	95% KM Chebyshev UCL	0.184
97.5% KM Chebyshev UCL	0.232	99% KM Chebyshev UCL	0.326

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.402	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.178	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.264	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.872	k star (bias corrected MLE)	0.695
Theta hat (MLE)	0.136	Theta star (bias corrected MLE)	0.171
nu hat (MLE)	19.19	nu star (bias corrected)	15.29
Mean (detects)	0.119		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0081	Mean	0.0731
Maximum	0.31	Median	0.01
SD	0.108	CV	1.471
k hat (MLE)	0.647	k star (bias corrected MLE)	0.58
Theta hat (MLE)	0.113	Theta star (bias corrected MLE)	0.126
nu hat (MLE)	24.57	nu star (bias corrected)	22.03
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (22.03, α)	12.36	Adjusted Chi Square Value (22.03, β)	11.73
95% Gamma Approximate UCL (use when n>=50)	0.13	95% Gamma Adjusted UCL (use when n<50)	0.137

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0731	SD (KM)	0.105
Variance (KM)	0.0111	SE of Mean (KM)	0.0254
k hat (KM)	0.483	k star (KM)	0.442
nu hat (KM)	18.35	nu star (KM)	16.79
theta hat (KM)	0.151	theta star (KM)	0.165
80% gamma percentile (KM)	0.119	90% gamma percentile (KM)	0.203
95% gamma percentile (KM)	0.293	99% gamma percentile (KM)	0.519

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.79, α)	8.519	Adjusted Chi Square Value (16.79, β)	8.007
95% Gamma Approximate KM-UCL (use when n>=50)	0.144	95% Gamma Adjusted KM-UCL (use when n<50)	0.153

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.15	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0705	Mean in Log Scale	-4.024
SD in Original Scale	0.109	SD in Log Scale	1.808
95% t UCL (assumes normality of ROS data)	0.114	95% Percentile Bootstrap UCL	0.112
95% BCA Bootstrap UCL	0.12	95% Bootstrap t UCL	0.13
95% H-UCL (Log ROS)	0.486		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.666	KM Geo Mean	0.0256
KM SD (logged)	1.439	95% Critical H Value (KM-Log)	3.287
KM Standard Error of Mean (logged)	0.351	95% H-UCL (KM -Log)	0.22
KM SD (logged)	1.439	95% Critical H Value (KM-Log)	3.287
KM Standard Error of Mean (logged)	0.351		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0753	Mean in Log Scale	-3.8
SD in Original Scale	0.108	SD in Log Scale	1.721
95% t UCL (Assumes normality)	0.118	95% H-Stat UCL	0.453

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.117

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	12	Number of Distinct Observations	8
		Number of Missing Observations	4
Number of Detects	5	Number of Non-Detects	7
Number of Distinct Detects	5	Number of Distinct Non-Detects	3
Minimum Detect	12	Minimum Non-Detect	18
Maximum Detect	380	Maximum Non-Detect	20
Variance Detects	33549	Percent Non-Detects	58.33%
Mean Detects	150.8	SD Detects	183.2
Median Detects	27	CV Detects	1.215
Skewness Detects	0.665	Kurtosis Detects	-2.974
Mean of Logged Detects	4.039	SD of Logged Detects	1.684

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.754	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.35	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	70.71	KM Standard Error of Mean	40.53
KM SD	125.6	95% KM (BCA) UCL	150.3
95% KM (t) UCL	143.5	95% KM (Percentile Bootstrap) UCL	133.7
95% KM (z) UCL	137.4	95% KM Bootstrap t UCL	1285
90% KM Chebyshev UCL	192.3	95% KM Chebyshev UCL	247.4
97.5% KM Chebyshev UCL	323.8	99% KM Chebyshev UCL	474

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.642	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.704	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.329	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.369	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.628	k star (bias corrected MLE)	0.385
Theta hat (MLE)	239.9	Theta star (bias corrected MLE)	392
nu hat (MLE)	6.285	nu star (bias corrected)	3.847
Mean (detects)	150.8		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	69.05
Maximum	380	Median	13.5
SD	132.9	CV	1.925
k hat (MLE)	0.19	k star (bias corrected MLE)	0.198
Theta hat (MLE)	363	Theta star (bias corrected MLE)	348.4
nu hat (MLE)	4.565	nu star (bias corrected)	4.757
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (4.76, α)	1.042	Adjusted Chi Square Value (4.76, β)	0.805
95% Gamma Approximate UCL (use when n>=50)	315.3	95% Gamma Adjusted UCL (use when n<50)	407.9

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	70.71	SD (KM)	125.6
Variance (KM)	15766	SE of Mean (KM)	40.53
k hat (KM)	0.317	k star (KM)	0.293
nu hat (KM)	7.611	nu star (KM)	7.041
theta hat (KM)	223	theta star (KM)	241
80% gamma percentile (KM)	107.8	90% gamma percentile (KM)	209.1
95% gamma percentile (KM)	325.8	99% gamma percentile (KM)	629.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.04, α)	2.193	Adjusted Chi Square Value (7.04, β)	1.804
)5% Gamma Approximate KM-UCL (use when n>=50)	227	95% Gamma Adjusted KM-UCL (use when n<50)	275.9

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.812	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	71.93	Mean in Log Scale	3.152
SD in Original Scale	130.8	SD in Log Scale	1.402
95% t UCL (assumes normality of ROS data)	139.7	95% Percentile Bootstrap UCL	132.4
95% BCA Bootstrap UCL	154.5	95% Bootstrap t UCL	867.2
95% H-UCL (Log ROS)	297.4		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.198	KM Geo Mean	24.48
KM SD (logged)	1.208	95% Critical H Value (KM-Log)	3.306
KM Standard Error of Mean (logged)	0.394	95% H-UCL (KM -Log)	169.2
KM SD (logged)	1.208	95% Critical H Value (KM-Log)	3.306
KM Standard Error of Mean (logged)	0.394		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	68.21	Mean in Log Scale	2.978
SD in Original Scale	132.3	SD in Log Scale	1.382
95% t UCL (Assumes normality)	136.8	95% H-Stat UCL	234

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	1285	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	275.9

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

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	1
Number of Detects	14	Number of Non-Detects	5
Number of Distinct Detects	13	Number of Distinct Non-Detects	5
Minimum Detect	0.0065	Minimum Non-Detect	0.007
Maximum Detect	1	Maximum Non-Detect	0.0091
Variance Detects	0.118	Percent Non-Detects	26.32%
Mean Detects	0.285	SD Detects	0.344
Median Detects	0.115	CV Detects	1.209
Skewness Detects	1.287	Kurtosis Detects	0.225
Mean of Logged Detects	-2.198	SD of Logged Detects	1.66

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.772	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.255	Lilliefors GOF Test
5% Lilliefors Critical Value	0.226	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.211	KM Standard Error of Mean	0.0738
KM SD	0.31	95% KM (BCA) UCL	0.333
95% KM (t) UCL	0.339	95% KM (Percentile Bootstrap) UCL	0.33
95% KM (z) UCL	0.333	95% KM Bootstrap t UCL	0.4
90% KM Chebyshev UCL	0.433	95% KM Chebyshev UCL	0.533
97.5% KM Chebyshev UCL	0.672	99% KM Chebyshev UCL	0.945

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.313	Anderson-Darling GOF Test
5% A-D Critical Value	0.78	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.14	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.649	k star (bias corrected MLE)	0.557
Theta hat (MLE)	0.439	Theta star (bias corrected MLE)	0.511
nu hat (MLE)	18.16	nu star (bias corrected)	15.6
Mean (detects)	0.285		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0065	Mean	0.212
Maximum	1	Median	0.054
SD	0.318	CV	1.496
k hat (MLE)	0.496	k star (bias corrected MLE)	0.453
Theta hat (MLE)	0.428	Theta star (bias corrected MLE)	0.469
nu hat (MLE)	18.85	nu star (bias corrected)	17.2
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (17.20, α)	8.818	Adjusted Chi Square Value (17.20, β)	8.296
95% Gamma Approximate UCL (use when n>=50)	0.414	95% Gamma Adjusted UCL (use when n<50)	0.44

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.211	SD (KM)	0.31
Variance (KM)	0.096	SE of Mean (KM)	0.0738
k hat (KM)	0.466	k star (KM)	0.427
nu hat (KM)	17.7	nu star (KM)	16.24
theta hat (KM)	0.454	theta star (KM)	0.495
80% gamma percentile (KM)	0.344	90% gamma percentile (KM)	0.59
95% gamma percentile (KM)	0.859	99% gamma percentile (KM)	1.529

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.24, α)	8.133	Adjusted Chi Square Value (16.24, β)	7.635
5% Gamma Approximate KM-UCL (use when n>=50)	0.422	95% Gamma Adjusted KM-UCL (use when n<50)	0.45

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.936	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.141	Lilliefors GOF Test
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.212	Mean in Log Scale	-2.897
SD in Original Scale	0.318	SD in Log Scale	1.853
95% t UCL (assumes normality of ROS data)	0.338	95% Percentile Bootstrap UCL	0.335
95% BCA Bootstrap UCL	0.358	95% Bootstrap t UCL	0.394
95% H-UCL (Log ROS)	1.756		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.943	KM Geo Mean	0.0527
KM SD (logged)	1.854	95% Critical H Value (KM-Log)	3.993
KM Standard Error of Mean (logged)	0.441	95% H-UCL (KM -Log)	1.684
KM SD (logged)	1.854	95% Critical H Value (KM-Log)	3.993
KM Standard Error of Mean (logged)	0.441		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.211	Mean in Log Scale	-3.086
SD in Original Scale	0.319	SD in Log Scale	2.079
95% t UCL (Assumes normality)	0.338	95% H-Stat UCL	3.409

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.45

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Manganese

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	10
Minimum	65	Mean	141
Maximum	200	Median	140
SD	49.04	Std. Error of Mean	21.93
Coefficient of Variation	0.348	Skewness	-0.801

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.929	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.292	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	187.8	95% Adjusted-CLT UCL (Chen-1995)	168.7
		95% Modified-t UCL (Johnson-1978)	186.4

Gamma GOF Test

A-D Test Statistic	0.465	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.68	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.339	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.358	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.16	k star (bias corrected MLE)	3.397
Theta hat (MLE)	17.28	Theta star (bias corrected MLE)	41.51
nu hat (MLE)	81.6	nu star (bias corrected)	33.97
MLE Mean (bias corrected)	141	MLE Sd (bias corrected)	76.5
		Approximate Chi Square Value (0.05)	21.64
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	17.47

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	221.3	95% Adjusted Gamma UCL (use when n<50)	274.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.845	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.352	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.343	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.174	Mean of logged Data	4.886
Maximum of Logged Data	5.298	SD of logged Data	0.424

Assuming Lognormal Distribution

95% H-UCL	257.7	90% Chebyshev (MVUE) UCL	222.5
95% Chebyshev (MVUE) UCL	258.9	97.5% Chebyshev (MVUE) UCL	309.4
99% Chebyshev (MVUE) UCL	408.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	177.1	95% Jackknife UCL	187.8
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	206.8	95% Chebyshev(Mean, Sd) UCL	236.6
97.5% Chebyshev(Mean, Sd) UCL	278	99% Chebyshev(Mean, Sd) UCL	359.2

Suggested UCL to Use

95% Student's-t UCL 187.8

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

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

Naphthalene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
		Number of Missing Observations	1
Number of Detects	12	Number of Non-Detects	7
Number of Distinct Detects	12	Number of Distinct Non-Detects	7
Minimum Detect	9.1000E-4	Minimum Non-Detect	0.007
Maximum Detect	0.63	Maximum Non-Detect	0.037
Variance Detects	0.0396	Percent Non-Detects	36.84%
Mean Detects	0.111	SD Detects	0.199
Median Detects	0.0265	CV Detects	1.79
Skewness Detects	2.202	Kurtosis Detects	4.145
Mean of Logged Detects	-3.733	SD of Logged Detects	1.998

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.61	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.356	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0718	KM Standard Error of Mean	0.0383
KM SD	0.16	95% KM (BCA) UCL	0.144
95% KM (t) UCL	0.138	95% KM (Percentile Bootstrap) UCL	0.14
95% KM (z) UCL	0.135	95% KM Bootstrap t UCL	0.446
90% KM Chebyshev UCL	0.187	95% KM Chebyshev UCL	0.239
97.5% KM Chebyshev UCL	0.311	99% KM Chebyshev UCL	0.453

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.527	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.8	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.261	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.424	k star (bias corrected MLE)	0.374
Theta hat (MLE)	0.262	Theta star (bias corrected MLE)	0.297
nu hat (MLE)	10.19	nu star (bias corrected)	8.974
Mean (detects)	0.111		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	9.1000E-4	Mean	0.0739
Maximum	0.63	Median	0.01
SD	0.163	CV	2.212
k hat (MLE)	0.446	k star (bias corrected MLE)	0.411
Theta hat (MLE)	0.165	Theta star (bias corrected MLE)	0.18
nu hat (MLE)	16.96	nu star (bias corrected)	15.62
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (15.62, α)	7.693	Adjusted Chi Square Value (15.62, β)	7.21
95% Gamma Approximate UCL (use when n>=50)	0.15	95% Gamma Adjusted UCL (use when n<50)	0.16

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0718	SD (KM)	0.16
Variance (KM)	0.0256	SE of Mean (KM)	0.0383
k hat (KM)	0.202	k star (KM)	0.205
nu hat (KM)	7.662	nu star (KM)	7.786
theta hat (KM)	0.356	theta star (KM)	0.35
80% gamma percentile (KM)	0.0958	90% gamma percentile (KM)	0.217
95% gamma percentile (KM)	0.368	99% gamma percentile (KM)	0.78

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.79, α)	2.612	Adjusted Chi Square Value (7.79, β)	2.357
)5% Gamma Approximate KM-UCL (use when n>=50)	0.214	95% Gamma Adjusted KM-UCL (use when n<50)	0.237

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0714	Mean in Log Scale	-4.462
SD in Original Scale	0.164	SD in Log Scale	1.851
95% t UCL (assumes normality of ROS data)	0.137	95% Percentile Bootstrap UCL	0.139
95% BCA Bootstrap UCL	0.17	95% Bootstrap t UCL	0.428
95% H-UCL (Log ROS)	0.365		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.492	KM Geo Mean	0.0112
KM SD (logged)	1.881	95% Critical H Value (KM-Log)	4.041
KM Standard Error of Mean (logged)	0.479	95% H-UCL (KM -Log)	0.395
KM SD (logged)	1.881	95% Critical H Value (KM-Log)	4.041
KM Standard Error of Mean (logged)	0.479		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.073	Mean in Log Scale	-4.258
SD in Original Scale	0.164	SD in Log Scale	1.773
95% t UCL (Assumes normality)	0.138	95% H-Stat UCL	0.34

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.237

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

Nickel

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	10
Minimum	3.4	Mean	6.34
Maximum	12	Median	4.1
SD	3.818	Std. Error of Mean	1.708
Coefficient of Variation	0.602	Skewness	1.015

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.822	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.321	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9.98	95% Adjusted-CLT UCL (Chen-1995)	9.977
		95% Modified-t UCL (Johnson-1978)	10.11

Gamma GOF Test

A-D Test Statistic	0.538	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.681	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.332	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.359	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.824	k star (bias corrected MLE)	1.663
Theta hat (MLE)	1.658	Theta star (bias corrected MLE)	3.812
nu hat (MLE)	38.24	nu star (bias corrected)	16.63
MLE Mean (bias corrected)	6.34	MLE Sd (bias corrected)	4.916
		Approximate Chi Square Value (0.05)	8.409
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	6.026

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	12.54	95% Adjusted Gamma UCL (use when n<50)	17.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.224	Mean of logged Data	1.71
Maximum of Logged Data	2.485	SD of logged Data	0.571

Assuming Lognormal Distribution

95% H-UCL	16.17	90% Chebyshev (MVUE) UCL	11.05
95% Chebyshev (MVUE) UCL	13.2	97.5% Chebyshev (MVUE) UCL	16.19
99% Chebyshev (MVUE) UCL	22.07		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	9.149	95% Jackknife UCL	9.98
95% Standard Bootstrap UCL	8.887	95% Bootstrap-t UCL	35.37

95% Hall's Bootstrap UCL	32.7	95% Percentile Bootstrap UCL	8.96
95% BCA Bootstrap UCL	9.06		
90% Chebyshev(Mean, Sd) UCL	11.46	95% Chebyshev(Mean, Sd) UCL	13.78
97.5% Chebyshev(Mean, Sd) UCL	17	99% Chebyshev(Mean, Sd) UCL	23.33

Suggested UCL to Use

95% Student's-t UCL 9.98

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

PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	19	Number of Distinct Observations	15
		Number of Missing Observations	1
Number of Detects	10	Number of Non-Detects	9
Number of Distinct Detects	9	Number of Distinct Non-Detects	7
Minimum Detect	0.0019	Minimum Non-Detect	9.0000E-4
Maximum Detect	0.14	Maximum Non-Detect	0.0093
Variance Detects	0.00282	Percent Non-Detects	47.37%
Mean Detects	0.0429	SD Detects	0.0531
Median Detects	0.00875	CV Detects	1.237
Skewness Detects	0.936	Kurtosis Detects	-0.812
Mean of Logged Detects	-4.26	SD of Logged Detects	1.739

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.779	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.337	Lilliefors GOF Test
5% Lilliefors Critical Value	0.262	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0232	KM Standard Error of Mean	0.0102
KM SD	0.0421	95% KM (BCA) UCL	0.0405
95% KM (t) UCL	0.0408	95% KM (Percentile Bootstrap) UCL	0.0408
95% KM (z) UCL	0.0399	95% KM Bootstrap t UCL	0.0492
90% KM Chebyshev UCL	0.0537	95% KM Chebyshev UCL	0.0675
97.5% KM Chebyshev UCL	0.0867	99% KM Chebyshev UCL	0.124

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.711	Anderson-Darling GOF Test
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.27	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.561	k star (bias corrected MLE)	0.46
Theta hat (MLE)	0.0765	Theta star (bias corrected MLE)	0.0934
nu hat (MLE)	11.23	nu star (bias corrected)	9.193
Mean (detects)	0.0429		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0019	Mean	0.0273
Maximum	0.14	Median	0.01
SD	0.0412	CV	1.507
k hat (MLE)	0.73	k star (bias corrected MLE)	0.649
Theta hat (MLE)	0.0375	Theta star (bias corrected MLE)	0.0421

nu hat (MLE)	27.72	nu star (bias corrected)	24.68
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (24.68, α)	14.37	Adjusted Chi Square Value (24.68, β)	13.68
95% Gamma Approximate UCL (use when n>=50)	0.0469	95% Gamma Adjusted UCL (use when n<50)	0.0493

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0232	SD (KM)	0.0421
Variance (KM)	0.00177	SE of Mean (KM)	0.0102
k hat (KM)	0.303	k star (KM)	0.29
nu hat (KM)	11.52	nu star (KM)	11.03
theta hat (KM)	0.0764	theta star (KM)	0.0798
80% gamma percentile (KM)	0.0352	90% gamma percentile (KM)	0.0686
95% gamma percentile (KM)	0.107	99% gamma percentile (KM)	0.208

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.03, α)	4.596	Adjusted Chi Square Value (11.03, β)	4.238
95% Gamma Approximate KM-UCL (use when n>=50)	0.0556	95% Gamma Adjusted KM-UCL (use when n<50)	0.0603

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.867	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0228	Mean in Log Scale	-6.084
SD in Original Scale	0.0434	SD in Log Scale	2.39
95% t UCL (assumes normality of ROS data)	0.0401	95% Percentile Bootstrap UCL	0.0389
95% BCA Bootstrap UCL	0.0456	95% Bootstrap t UCL	0.0487
95% H-UCL (Log ROS)	0.645		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.482	KM Geo Mean	0.00416
KM SD (logged)	1.781	95% Critical H Value (KM-Log)	3.865
KM Standard Error of Mean (logged)	0.436	95% H-UCL (KM -Log)	0.103
KM SD (logged)	1.781	95% Critical H Value (KM-Log)	3.865
KM Standard Error of Mean (logged)	0.436		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0233	Mean in Log Scale	-5.486
SD in Original Scale	0.0431	SD in Log Scale	1.911
95% t UCL (Assumes normality)	0.0405	95% H-Stat UCL	0.163

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.0603

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

Thallium

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	10
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.042	Minimum Non-Detect	0.11
Maximum Detect	0.15	Maximum Non-Detect	0.11
Variance Detects	0.00259	Percent Non-Detects	20%
Mean Detects	0.118	SD Detects	0.0509
Median Detects	0.14	CV Detects	0.431
Skewness Detects	-1.948	Kurtosis Detects	3.841
Mean of Logged Detects	-2.25	SD of Logged Detects	0.614

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.709	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.417	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.103	KM Standard Error of Mean	0.0257
KM SD	0.0498	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.158	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.145	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.18	95% KM Chebyshev UCL	0.215
97.5% KM Chebyshev UCL	0.263	99% KM Chebyshev UCL	0.359

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.84	Anderson-Darling GOF Test
5% A-D Critical Value	0.659	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.452	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.396	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.593	k star (bias corrected MLE)	1.315
Theta hat (MLE)	0.0257	Theta star (bias corrected MLE)	0.0897
nu hat (MLE)	36.75	nu star (bias corrected)	10.52
Mean (detects)	0.118		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.042	Mean	0.107
Maximum	0.15	Median	0.14
SD	0.0507	CV	0.475
k hat (MLE)	4.342	k star (bias corrected MLE)	1.87
Theta hat (MLE)	0.0246	Theta star (bias corrected MLE)	0.0571
nu hat (MLE)	43.42	nu star (bias corrected)	18.7
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (18.70, α)	9.899	Adjusted Chi Square Value (18.70, β)	7.268
95% Gamma Approximate UCL (use when n>=50)	0.202	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.103	SD (KM)	0.0498
Variance (KM)	0.00248	SE of Mean (KM)	0.0257

k hat (KM)	4.265	k star (KM)	1.839
nu hat (KM)	42.65	nu star (KM)	18.39
theta hat (KM)	0.0241	theta star (KM)	0.0559
80% gamma percentile (KM)	0.155	90% gamma percentile (KM)	0.204
95% gamma percentile (KM)	0.25	99% gamma percentile (KM)	0.354

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (18.39, α)	9.676	Adjusted Chi Square Value (18.39, β)	7.081
)5% Gamma Approximate KM-UCL (use when n>=50)	0.195	95% Gamma Adjusted KM-UCL (use when n<50)	0.267

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.676	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.428	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.104	Mean in Log Scale	-2.397
SD in Original Scale	0.0534	SD in Log Scale	0.626
95% t UCL (assumes normality of ROS data)	0.155	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	0.318		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.434	KM Geo Mean	0.0877
KM SD (logged)	0.602	95% Critical H Value (KM-Log)	3.293
KM Standard Error of Mean (logged)	0.311	95% H-UCL (KM -Log)	0.283
KM SD (logged)	0.602	95% Critical H Value (KM-Log)	3.293
KM Standard Error of Mean (logged)	0.311		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.105	Mean in Log Scale	-2.38
SD in Original Scale	0.0523	SD in Log Scale	0.606
95% t UCL (Assumes normality)	0.155	95% H-Stat UCL	0.303

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 0.215

Warning: Recommended UCL exceeds the maximum observation

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

Vanadium

General Statistics

Total Number of Observations	5	Number of Distinct Observations	4
		Number of Missing Observations	10
Minimum	13	Mean	21.8
Maximum	29	Median	26
SD	7.259	Std. Error of Mean	3.247
Coefficient of Variation	0.333	Skewness	-0.517

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	28.72	95% Adjusted-CLT UCL (Chen-1995)	26.34
		95% Modified-t UCL (Johnson-1978)	28.6

Gamma GOF Test

A-D Test Statistic	0.587	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.679	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.351	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.358	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.04	k star (bias corrected MLE)	4.15
Theta hat (MLE)	2.171	Theta star (bias corrected MLE)	5.252
nu hat (MLE)	100.4	nu star (bias corrected)	41.5
MLE Mean (bias corrected)	21.8	MLE Sd (bias corrected)	10.7
		Approximate Chi Square Value (0.05)	27.74
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	22.94

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	32.62	95% Adjusted Gamma UCL (use when n<50)	39.44

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.565	Mean of logged Data	3.031
Maximum of Logged Data	3.367	SD of logged Data	0.367

Assuming Lognormal Distribution

95% H-UCL	35.46	90% Chebyshev (MVUE) UCL	32.56
95% Chebyshev (MVUE) UCL	37.41	97.5% Chebyshev (MVUE) UCL	44.14
99% Chebyshev (MVUE) UCL	57.35		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	27.14	95% Jackknife UCL	28.72
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	31.54	95% Chebyshev(Mean, Sd) UCL	35.95
97.5% Chebyshev(Mean, Sd) UCL	42.07	99% Chebyshev(Mean, Sd) UCL	54.1

Suggested UCL to Use

95% Student's-t UCL	28.72

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

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:20:37 PM
From File	gw epcs_d.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (open lot)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	20
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (open lot) was not processed!

RA17_GW_VOCs|Chloroform (open lot)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	17
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.22	Minimum Non-Detect	1
Maximum Detect	1.2	Maximum Non-Detect	1
Variance Detects	0.296	Percent Non-Detects	85%
Mean Detects	0.573	SD Detects	0.544
Median Detects	0.3	CV Detects	0.949
Skewness Detects	1.69	Kurtosis Detects	N/A
Mean of Logged Detects	-0.845	SD of Logged Detects	0.903

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.811	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.359	Lilliefors GOF Test
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.307	KM Standard Error of Mean	0.065
KM SD	0.209	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.419	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.414	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.502	95% KM Chebyshev UCL	0.591
97.5% KM Chebyshev UCL	0.713	99% KM Chebyshev UCL	0.954

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.88	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.305	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	11.28	nu star (bias corrected)	N/A
Mean (detects)	0.573		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.34
Maximum	1.2	Median	0.278
SD	0.292	CV	0.859
k hat (MLE)	1.223	k star (bias corrected MLE)	1.073
Theta hat (MLE)	0.278	Theta star (bias corrected MLE)	0.317
nu hat (MLE)	48.92	nu star (bias corrected)	42.91
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (42.91, α)	28.89	Adjusted Chi Square Value (42.91, β)	27.98
95% Gamma Approximate UCL (use when n>=50)	0.505	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.307	SD (KM)	0.209
Variance (KM)	0.0435	SE of Mean (KM)	0.065
k hat (KM)	2.167	k star (KM)	1.875
nu hat (KM)	86.68	nu star (KM)	75.01
theta hat (KM)	0.142	theta star (KM)	0.164
80% gamma percentile (KM)	0.463	90% gamma percentile (KM)	0.606
95% gamma percentile (KM)	0.743	99% gamma percentile (KM)	1.048

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (75.01, α)	56.07	Adjusted Chi Square Value (75.01, β)	54.77
95% Gamma Approximate KM-UCL (use when n>=50)	0.411	95% Gamma Adjusted KM-UCL (use when n<50)	0.42

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.321	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.343	Mean in Log Scale	-1.272
SD in Original Scale	0.256	SD in Log Scale	0.638
95% t UCL (assumes normality of ROS data)	0.442	95% Percentile Bootstrap UCL	0.439
95% BCA Bootstrap UCL	0.471	95% Bootstrap t UCL	0.495
95% H-UCL (Log ROS)	0.471		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.282	KM Geo Mean	0.277
KM SD (logged)	0.368	95% Critical H Value (KM-Log)	1.903
KM Standard Error of Mean (logged)	0.157	95% H-UCL (KM -Log)	0.349
KM SD (logged)	0.368	95% Critical H Value (KM-Log)	1.903
KM Standard Error of Mean (logged)	0.157		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.511	Mean in Log Scale	-0.716
SD in Original Scale	0.179	SD in Log Scale	0.298
95% t UCL (Assumes normality)	0.58	95% H-Stat UCL	0.58

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.419

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (open lot)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	11
Number of Detects	11	Number of Non-Detects	9
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.28	Minimum Non-Detect	1
Maximum Detect	3.9	Maximum Non-Detect	1
Variance Detects	1.178	Percent Non-Detects	45%
Mean Detects	0.994	SD Detects	1.085
Median Detects	0.53	CV Detects	1.092
Skewness Detects	2.256	Kurtosis Detects	5.448
Mean of Logged Detects	-0.39	SD of Logged Detects	0.856

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.691	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.323	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.756	KM Standard Error of Mean	0.196
KM SD	0.819	95% KM (BCA) UCL	1.111
95% KM (t) UCL	1.095	95% KM (Percentile Bootstrap) UCL	1.083
95% KM (z) UCL	1.079	95% KM Bootstrap t UCL	1.479
90% KM Chebyshev UCL	1.345	95% KM Chebyshev UCL	1.611
97.5% KM Chebyshev UCL	1.981	99% KM Chebyshev UCL	2.708

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.727	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.254	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.26	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.446	k star (bias corrected MLE)	1.112
Theta hat (MLE)	0.687	Theta star (bias corrected MLE)	0.893
nu hat (MLE)	31.82	nu star (bias corrected)	24.47
Mean (detects)	0.994		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.77
Maximum	3.9	Median	0.52
SD	0.876	CV	1.138
k hat (MLE)	0.9	k star (bias corrected MLE)	0.798
Theta hat (MLE)	0.856	Theta star (bias corrected MLE)	0.965
nu hat (MLE)	36	nu star (bias corrected)	31.94
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (31.94, α)	20.02	Adjusted Chi Square Value (31.94, β)	19.28
95% Gamma Approximate UCL (use when n>=50)	1.228	95% Gamma Adjusted UCL (use when n<50)	1.276

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.756	SD (KM)	0.819
Variance (KM)	0.671	SE of Mean (KM)	0.196
k hat (KM)	0.852	k star (KM)	0.758
nu hat (KM)	34.1	nu star (KM)	30.32
theta hat (KM)	0.887	theta star (KM)	0.998
80% gamma percentile (KM)	1.239	90% gamma percentile (KM)	1.863
95% gamma percentile (KM)	2.502	99% gamma percentile (KM)	4.016

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (30.32, α)	18.74	Adjusted Chi Square Value (30.32, β)	18.02
95% Gamma Approximate KM-UCL (use when n>=50)	1.223	95% Gamma Adjusted KM-UCL (use when n<50)	1.272

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.782	Mean in Log Scale	-0.566
SD in Original Scale	0.842	SD in Log Scale	0.749
95% t UCL (assumes normality of ROS data)	1.108	95% Percentile Bootstrap UCL	1.112
95% BCA Bootstrap UCL	1.268	95% Bootstrap t UCL	1.497
95% H-UCL (Log ROS)	1.115		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.589	KM Geo Mean	0.555
KM SD (logged)	0.69	95% Critical H Value (KM-Log)	2.225
KM Standard Error of Mean (logged)	0.183	95% H-UCL (KM -Log)	1.002
KM SD (logged)	0.69	95% Critical H Value (KM-Log)	2.225
KM Standard Error of Mean (logged)	0.183		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.772	Mean in Log Scale	-0.527
SD in Original Scale	0.827	SD in Log Scale	0.64
95% t UCL (Assumes normality)	1.091	95% H-Stat UCL	0.996

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	1.272	95% GROS Adjusted Gamma UCL	1.276

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

RA17_GW_VOCs|Tetrachloroethylene (open lot)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	13
Number of Detects	13	Number of Non-Detects	7
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.24	Minimum Non-Detect	1
Maximum Detect	30	Maximum Non-Detect	1
Variance Detects	77.13	Percent Non-Detects	35%
Mean Detects	5.597	SD Detects	8.782
Median Detects	2.2	CV Detects	1.569
Skewness Detects	2.267	Kurtosis Detects	4.938
Mean of Logged Detects	0.617	SD of Logged Detects	1.648

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.66	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.296	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	3.768	KM Standard Error of Mean	1.687
KM SD	7.246	95% KM (BCA) UCL	6.698
95% KM (t) UCL	6.685	95% KM (Percentile Bootstrap) UCL	6.695
95% KM (z) UCL	6.543	95% KM Bootstrap t UCL	12.73
90% KM Chebyshev UCL	8.829	95% KM Chebyshev UCL	11.12
97.5% KM Chebyshev UCL	14.3	99% KM Chebyshev UCL	20.55

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.5	Anderson-Darling GOF Test
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.161	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.249	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.564	k star (bias corrected MLE)	0.485
Theta hat (MLE)	9.917	Theta star (bias corrected MLE)	11.53
nu hat (MLE)	14.67	nu star (bias corrected)	12.62
Mean (detects)	5.597		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.672
Maximum	30	Median	0.467
SD	7.482	CV	2.038
k hat (MLE)	0.299	k star (bias corrected MLE)	0.288
Theta hat (MLE)	12.27	Theta star (bias corrected MLE)	12.76
nu hat (MLE)	11.97	nu star (bias corrected)	11.51
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (11.51, α)	4.905	Adjusted Chi Square Value (11.51, β)	4.568
95% Gamma Approximate UCL (use when n>=50)	8.615	95% Gamma Adjusted UCL (use when n<50)	9.251

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.768	SD (KM)	7.246
Variance (KM)	52.51	SE of Mean (KM)	1.687
k hat (KM)	0.27	k star (KM)	0.263
nu hat (KM)	10.82	nu star (KM)	10.53
theta hat (KM)	13.93	theta star (KM)	14.32
80% gamma percentile (KM)	5.569	90% gamma percentile (KM)	11.26
95% gamma percentile (KM)	17.96	99% gamma percentile (KM)	35.65

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (10.53, α)	4.275	Adjusted Chi Square Value (10.53, β)	3.964
95% Gamma Approximate KM-UCL (use when n>=50)	9.281	95% Gamma Adjusted KM-UCL (use when n<50)	10.01

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.925	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.165	Lilliefors GOF Test
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.805	Mean in Log Scale	0.0264
SD in Original Scale	7.418	SD in Log Scale	1.639
95% t UCL (assumes normality of ROS data)	6.674	95% Percentile Bootstrap UCL	6.604
95% BCA Bootstrap UCL	8.073	95% Bootstrap t UCL	13.24
95% H-UCL (Log ROS)	15.59		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.012	KM Geo Mean	1.012
KM SD (logged)	1.544	95% Critical H Value (KM-Log)	3.5
KM Standard Error of Mean (logged)	0.372	95% H-UCL (KM -Log)	11.5
KM SD (logged)	1.544	95% Critical H Value (KM-Log)	3.5
KM Standard Error of Mean (logged)	0.372		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.813	Mean in Log Scale	0.159
SD in Original Scale	7.412	SD in Log Scale	1.458
95% t UCL (Assumes normality)	6.679	95% H-Stat UCL	10.42

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	10.01

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

RA17_GW_VOCs|Trichloroethene (open lot)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	14
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.22	Minimum Non-Detect	1
Maximum Detect	5.9	Maximum Non-Detect	1
Variance Detects	5.189	Percent Non-Detects	70%
Mean Detects	1.863	SD Detects	2.278
Median Detects	0.815	CV Detects	1.222
Skewness Detects	1.425	Kurtosis Detects	1.226
Mean of Logged Detects	-0.118	SD of Logged Detects	1.387

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.764	KM Standard Error of Mean	0.334
KM SD	1.35	95% KM (BCA) UCL	1.49
95% KM (t) UCL	1.342	95% KM (Percentile Bootstrap) UCL	1.405
95% KM (z) UCL	1.314	95% KM Bootstrap t UCL	2.776
90% KM Chebyshev UCL	1.766	95% KM Chebyshev UCL	2.22
97.5% KM Chebyshev UCL	2.85	99% KM Chebyshev UCL	4.087

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.397	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.72	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.244	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.802	k star (bias corrected MLE)	0.512
Theta hat (MLE)	2.325	Theta star (bias corrected MLE)	3.64
nu hat (MLE)	9.618	nu star (bias corrected)	6.143
Mean (detects)	1.863		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.831
Maximum	5.9	Median	0.241
SD	1.434	CV	1.725
k hat (MLE)	0.393	k star (bias corrected MLE)	0.367
Theta hat (MLE)	2.117	Theta star (bias corrected MLE)	2.264
nu hat (MLE)	15.71	nu star (bias corrected)	14.69
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (14.69, α)	7.044	Adjusted Chi Square Value (14.69, β)	6.628
95% Gamma Approximate UCL (use when n>=50)	1.733	95% Gamma Adjusted UCL (use when n<50)	1.842

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.764	SD (KM)	1.35
Variance (KM)	1.821	SE of Mean (KM)	0.334
k hat (KM)	0.321	k star (KM)	0.306
nu hat (KM)	12.83	nu star (KM)	12.24
theta hat (KM)	2.383	theta star (KM)	2.498
80% gamma percentile (KM)	1.178	90% gamma percentile (KM)	2.249
95% gamma percentile (KM)	3.474	99% gamma percentile (KM)	6.651

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.24, α)	5.385	Adjusted Chi Square Value (12.24, β)	5.029
95% Gamma Approximate KM-UCL (use when n>=50)	1.737	95% Gamma Adjusted KM-UCL (use when n<50)	1.86

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.839	Mean in Log Scale	-0.924
SD in Original Scale	1.383	SD in Log Scale	1.181
95% t UCL (assumes normality of ROS data)	1.374	95% Percentile Bootstrap UCL	1.393
95% BCA Bootstrap UCL	1.598	95% Bootstrap t UCL	2.615
95% H-UCL (Log ROS)	1.754		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.929	KM Geo Mean	0.395
KM SD (logged)	0.91	95% Critical H Value (KM-Log)	2.506
KM Standard Error of Mean (logged)	0.268	95% H-UCL (KM -Log)	1.009
KM SD (logged)	0.91	95% Critical H Value (KM-Log)	2.506
KM Standard Error of Mean (logged)	0.268		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.909	Mean in Log Scale	-0.521
SD in Original Scale	1.333	SD in Log Scale	0.761
95% t UCL (Assumes normality)	1.424	95% H-Stat UCL	1.188

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.342

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:16:39 PM
From File	gw epcs_i.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (warehouse)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	2
		Number of Missing Observations	1
Number of Detects	1	Number of Non-Detects	19
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (warehouse) was not processed!

RA17_GW_VOCs|Chloroform (warehouse)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	8
		Number of Missing Observations	1
Number of Detects	7	Number of Non-Detects	13
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.28	Minimum Non-Detect	1
Maximum Detect	2.1	Maximum Non-Detect	1
Variance Detects	0.33	Percent Non-Detects	65%
Mean Detects	1.193	SD Detects	0.575
Median Detects	1.2	CV Detects	0.482
Skewness Detects	-0.0649	Kurtosis Detects	0.655
Mean of Logged Detects	0.0325	SD of Logged Detects	0.652

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.759	KM Standard Error of Mean	0.176
KM SD	0.489	95% KM (BCA) UCL	1.165
95% KM (t) UCL	1.063	95% KM (Percentile Bootstrap) UCL	1.14
95% KM (z) UCL	1.049	95% KM Bootstrap t UCL	1.157
90% KM Chebyshev UCL	1.287	95% KM Chebyshev UCL	1.527
97.5% KM Chebyshev UCL	1.859	99% KM Chebyshev UCL	2.512

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.342	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.711	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.224	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.633	k star (bias corrected MLE)	2.171
Theta hat (MLE)	0.328	Theta star (bias corrected MLE)	0.549
nu hat (MLE)	50.86	nu star (bias corrected)	30.4
Mean (detects)	1.193		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.722
Maximum	2.1	Median	0.646
SD	0.534	CV	0.74
k hat (MLE)	1.346	k star (bias corrected MLE)	1.177
Theta hat (MLE)	0.536	Theta star (bias corrected MLE)	0.613
nu hat (MLE)	53.84	nu star (bias corrected)	47.1
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (47.10, α)	32.35	Adjusted Chi Square Value (47.10, β)	31.38
95% Gamma Approximate UCL (use when n>=50)	1.051	95% Gamma Adjusted UCL (use when n<50)	1.084

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.759	SD (KM)	0.489
Variance (KM)	0.24	SE of Mean (KM)	0.176
k hat (KM)	2.403	k star (KM)	2.076
nu hat (KM)	96.14	nu star (KM)	83.05
theta hat (KM)	0.316	theta star (KM)	0.365
80% gamma percentile (KM)	1.131	90% gamma percentile (KM)	1.463
95% gamma percentile (KM)	1.779	99% gamma percentile (KM)	2.478

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (83.05, α)	63.05	Adjusted Chi Square Value (83.05, β)	61.67
95% Gamma Approximate KM-UCL (use when n>=50)	0.999	95% Gamma Adjusted KM-UCL (use when n<50)	1.022

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.726	Mean in Log Scale	-0.54
SD in Original Scale	0.506	SD in Log Scale	0.687
95% t UCL (assumes normality of ROS data)	0.922	95% Percentile Bootstrap UCL	0.909
95% BCA Bootstrap UCL	0.961	95% Bootstrap t UCL	0.989
95% H-UCL (Log ROS)	1.047		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.487	KM Geo Mean	0.614
KM SD (logged)	0.663	95% Critical H Value (KM-Log)	2.193
KM Standard Error of Mean (logged)	0.314	95% H-UCL (KM -Log)	1.068
KM SD (logged)	0.663	95% Critical H Value (KM-Log)	2.193
KM Standard Error of Mean (logged)	0.314		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.743	Mean in Log Scale	-0.439
SD in Original Scale	0.468	SD in Log Scale	0.51
95% t UCL (Assumes normality)	0.924	95% H-Stat UCL	0.931

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.063

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (warehouse)

General Statistics

Total Number of Observations	20	Number of Distinct Observations	9
		Number of Missing Observations	1
Number of Detects	8	Number of Non-Detects	12
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.47	Minimum Non-Detect	1
Maximum Detect	3.1	Maximum Non-Detect	1
Variance Detects	0.795	Percent Non-Detects	60%
Mean Detects	1.294	SD Detects	0.892
Median Detects	0.87	CV Detects	0.689
Skewness Detects	1.387	Kurtosis Detects	1.42
Mean of Logged Detects	0.0741	SD of Logged Detects	0.631

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.956	KM Standard Error of Mean	0.155
KM SD	0.608	95% KM (BCA) UCL	1.239
95% KM (t) UCL	1.223	95% KM (Percentile Bootstrap) UCL	1.229
95% KM (z) UCL	1.21	95% KM Bootstrap t UCL	1.373
90% KM Chebyshev UCL	1.42	95% KM Chebyshev UCL	1.631
97.5% KM Chebyshev UCL	1.923	99% KM Chebyshev UCL	2.497

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.426	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.235	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.296	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.882	k star (bias corrected MLE)	1.885
Theta hat (MLE)	0.449	Theta star (bias corrected MLE)	0.687
nu hat (MLE)	46.11	nu star (bias corrected)	30.15
Mean (detects)	1.294		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0951	Mean	0.965
Maximum	3.1	Median	0.776
SD	0.691	CV	0.716
k hat (MLE)	2.193	k star (bias corrected MLE)	1.897
Theta hat (MLE)	0.44	Theta star (bias corrected MLE)	0.509
nu hat (MLE)	87.71	nu star (bias corrected)	75.89
Adjusted Level of Significance (β)	0.038		
Approximate Chi Square Value (75.89, α)	56.83	Adjusted Chi Square Value (75.89, β)	55.52
95% Gamma Approximate UCL (use when n>=50)	1.289	95% Gamma Adjusted UCL (use when n<50)	1.319

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.956	SD (KM)	0.608
Variance (KM)	0.369	SE of Mean (KM)	0.155
k hat (KM)	2.471	k star (KM)	2.134
nu hat (KM)	98.84	nu star (KM)	85.35
theta hat (KM)	0.387	theta star (KM)	0.448
80% gamma percentile (KM)	1.42	90% gamma percentile (KM)	1.83
95% gamma percentile (KM)	2.221	99% gamma percentile (KM)	3.083

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.35, α)	65.06	Adjusted Chi Square Value (85.35, β)	63.66
95% Gamma Approximate KM-UCL (use when n>=50)	1.254	95% Gamma Adjusted KM-UCL (use when n<50)	1.281

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.988	Mean in Log Scale	-0.164
SD in Original Scale	0.645	SD in Log Scale	0.539
95% t UCL (assumes normality of ROS data)	1.237	95% Percentile Bootstrap UCL	1.254
95% BCA Bootstrap UCL	1.307	95% Bootstrap t UCL	1.399
95% H-UCL (Log ROS)	1.266		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.175	KM Geo Mean	0.84
KM SD (logged)	0.462	95% Critical H Value (KM-Log)	1.983
KM Standard Error of Mean (logged)	0.136	95% H-UCL (KM -Log)	1.153
KM SD (logged)	0.462	95% Critical H Value (KM-Log)	1.983
KM Standard Error of Mean (logged)	0.136		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.818	Mean in Log Scale	-0.386
SD in Original Scale	0.672	SD in Log Scale	0.544
95% t UCL (Assumes normality)	1.078	95% H-Stat UCL	1.019

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.223

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

RA17_GW_VOCs|Tetrachloroethylene (warehouse)

General Statistics

Total Number of Observations	21	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	16
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.18	Minimum Non-Detect	1
Maximum Detect	15	Maximum Non-Detect	1
Variance Detects	38.87	Percent Non-Detects	76.19%
Mean Detects	3.964	SD Detects	6.235
Median Detects	2	CV Detects	1.573
Skewness Detects	2.12	Kurtosis Detects	4.587
Mean of Logged Detects	0.331	SD of Logged Detects	1.696

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.679	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.411	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.18	KM Standard Error of Mean	0.77
KM SD	3.137	95% KM (BCA) UCL	2.92
95% KM (t) UCL	2.508	95% KM (Percentile Bootstrap) UCL	2.594
95% KM (z) UCL	2.446	95% KM Bootstrap t UCL	5.693
90% KM Chebyshev UCL	3.489	95% KM Chebyshev UCL	4.535
97.5% KM Chebyshev UCL	5.987	99% KM Chebyshev UCL	8.839

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.37	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.706	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.284	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.37	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.592	k star (bias corrected MLE)	0.37
Theta hat (MLE)	6.7	Theta star (bias corrected MLE)	10.71
nu hat (MLE)	5.917	nu star (bias corrected)	3.7
Mean (detects)	3.964		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.247
Maximum	15	Median	0.01
SD	3.269	CV	2.621
k hat (MLE)	0.267	k star (bias corrected MLE)	0.26
Theta hat (MLE)	4.676	Theta star (bias corrected MLE)	4.79
nu hat (MLE)	11.2	nu star (bias corrected)	10.93
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (10.93, α)	4.533	Adjusted Chi Square Value (10.93, β)	4.219
95% Gamma Approximate UCL (use when n>=50)	3.007	95% Gamma Adjusted UCL (use when n<50)	3.231

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.18	SD (KM)	3.137
Variance (KM)	9.84	SE of Mean (KM)	0.77
k hat (KM)	0.142	k star (KM)	0.153
nu hat (KM)	5.943	nu star (KM)	6.428
theta hat (KM)	8.339	theta star (KM)	7.71
80% gamma percentile (KM)	1.306	90% gamma percentile (KM)	3.508
95% gamma percentile (KM)	6.469	99% gamma percentile (KM)	15.03

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.43, α)	1.862	Adjusted Chi Square Value (6.43, β)	1.68
95% Gamma Approximate KM-UCL (use when n>=50)	4.073	95% Gamma Adjusted KM-UCL (use when n<50)	4.515

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.268	Mean in Log Scale	-0.991
SD in Original Scale	3.209	SD in Log Scale	1.484
95% t UCL (assumes normality of ROS data)	2.476	95% Percentile Bootstrap UCL	2.595
95% BCA Bootstrap UCL	3.424	95% Bootstrap t UCL	6.795
95% H-UCL (Log ROS)	3.319		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.887	KM Geo Mean	0.412
KM SD (logged)	1.079	95% Critical H Value (KM-Log)	2.673
KM Standard Error of Mean (logged)	0.388	95% H-UCL (KM -Log)	1.404
KM SD (logged)	1.079	95% Critical H Value (KM-Log)	2.673
KM Standard Error of Mean (logged)	0.388		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.325	Mean in Log Scale	-0.449
SD in Original Scale	3.172	SD in Log Scale	0.88
95% t UCL (Assumes normality)	2.519	95% H-Stat UCL	1.509

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) 4.515

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

RA17_GW_VOCs|Trichloroethene (warehouse)

General Statistics

Total Number of Observations	21	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	18
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.23	Minimum Non-Detect	1
Maximum Detect	2.3	Maximum Non-Detect	1
Variance Detects	1.109	Percent Non-Detects	85.71%
Mean Detects	1.153	SD Detects	1.053
Median Detects	0.93	CV Detects	0.913
Skewness Detects	0.912	Kurtosis Detects	N/A
Mean of Logged Detects	-0.236	SD of Logged Detects	1.16

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.662	KM Standard Error of Mean	0.305
KM SD	0.501	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.188	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.163	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.576	95% KM Chebyshev UCL	1.991
97.5% KM Chebyshev UCL	2.566	99% KM Chebyshev UCL	3.695

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.463	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.788	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	8.779	nu star (bias corrected)	N/A
Mean (detects)	1.153		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0767	Mean	0.699
Maximum	2.3	Median	0.571
SD	0.546	CV	0.781
k hat (MLE)	1.763	k star (bias corrected MLE)	1.543
Theta hat (MLE)	0.397	Theta star (bias corrected MLE)	0.453
nu hat (MLE)	74.04	nu star (bias corrected)	64.8
Adjusted Level of Significance (β)	0.0383		
Approximate Chi Square Value (64.80, α)	47.28	Adjusted Chi Square Value (64.80, β)	46.13
95% Gamma Approximate UCL (use when n>=50)	0.959	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.662	SD (KM)	0.501
Variance (KM)	0.251	SE of Mean (KM)	0.305
k hat (KM)	1.747	k star (KM)	1.529
nu hat (KM)	73.36	nu star (KM)	64.21
theta hat (KM)	0.379	theta star (KM)	0.433
80% gamma percentile (KM)	1.022	90% gamma percentile (KM)	1.373
95% gamma percentile (KM)	1.713	99% gamma percentile (KM)	2.481

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (64.21, α)	46.78	Adjusted Chi Square Value (64.21, β)	45.63
95% Gamma Approximate KM-UCL (use when n>=50)	0.909	95% Gamma Adjusted KM-UCL (use when n<50)	0.931

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.985	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.623	Mean in Log Scale	-0.769
SD in Original Scale	0.525	SD in Log Scale	0.793
95% t UCL (assumes normality of ROS data)	0.82	95% Percentile Bootstrap UCL	0.834
95% BCA Bootstrap UCL	0.867	95% Bootstrap t UCL	0.902
95% H-UCL (Log ROS)	0.953		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.695	KM Geo Mean	0.499
KM SD (logged)	0.763	95% Critical H Value (KM-Log)	2.262
KM Standard Error of Mean (logged)	0.583	95% H-UCL (KM -Log)	0.982
KM SD (logged)	0.763	95% Critical H Value (KM-Log)	2.262
KM Standard Error of Mean (logged)	0.583		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.593	Mean in Log Scale	-0.628
SD in Original Scale	0.407	SD in Log Scale	0.402
95% t UCL (Assumes normality)	0.747	95% H-Stat UCL	0.687

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.188

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:20:02 PM
From File	gw epcs_e.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (salvage)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	8
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (salvage) was not processed!

RA17_GW_VOCs|Chloroform (salvage)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	8
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Chloroform (salvage) was not processed!

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (salvage)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.25	Mean	1.564
Maximum	4.9	Median	0.35
SD	1.888	Std. Error of Mean	0.668
Coefficient of Variation	1.208	Skewness	1.133

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.74	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.358	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.829	95% Adjusted-CLT UCL (Chen-1995)	2.948
		95% Modified-t UCL (Johnson-1978)	2.873

Gamma GOF Test

A-D Test Statistic	0.993	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.743	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.356	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.303	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.806	k star (bias corrected MLE)	0.587
Theta hat (MLE)	1.94	Theta star (bias corrected MLE)	2.663
nu hat (MLE)	12.9	nu star (bias corrected)	9.396
MLE Mean (bias corrected)	1.564	MLE Sd (bias corrected)	2.041
		Approximate Chi Square Value (0.05)	3.568
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	2.72

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.118	95% Adjusted Gamma UCL (use when n<50)	5.401

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.318	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.386	Mean of logged Data	-0.288
Maximum of Logged Data	1.589	SD of logged Data	1.296

Assuming Lognormal Distribution

95% H-UCL	13.51	90% Chebyshev (MVUE) UCL	3.559
95% Chebyshev (MVUE) UCL	4.499	97.5% Chebyshev (MVUE) UCL	5.803
99% Chebyshev (MVUE) UCL	8.364		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	2.662	95% Jackknife UCL	2.829
95% Standard Bootstrap UCL	2.578	95% Bootstrap-t UCL	4.436
95% Hall's Bootstrap UCL	2.973	95% Percentile Bootstrap UCL	2.594
95% BCA Bootstrap UCL	2.908		
90% Chebyshev(Mean, Sd) UCL	3.567	95% Chebyshev(Mean, Sd) UCL	4.474
97.5% Chebyshev(Mean, Sd) UCL	5.733	99% Chebyshev(Mean, Sd) UCL	8.207

Suggested UCL to Use

95% Hall's Bootstrap UCL	2.973

In Case Bootstrap t and/or Hall's Bootstrap yields an unreasonably large UCL value, use 97.5% or 99% Chebyshev (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.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RA17_GW_VOCs|Tetrachloroethylene (salvage)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	6
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.21	Minimum Non-Detect	1
Maximum Detect	0.27	Maximum Non-Detect	1
Variance Detects	0.0018	Percent Non-Detects	75%
Mean Detects	0.24	SD Detects	0.0424
Median Detects	0.24	CV Detects	0.177
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.435	SD of Logged Detects	0.178

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.24	KM Standard Error of Mean	0.03
KM SD	0.03	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.297	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.289	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.33	95% KM Chebyshev UCL	0.371
97.5% KM Chebyshev UCL	0.427	99% KM Chebyshev UCL	0.538

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	63.66	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00377	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	254.7	nu star (bias corrected)	N/A
Mean (detects)	0.24		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.24	SD (KM)	0.03
Variance (KM)	9.0000E-4	SE of Mean (KM)	0.03
k hat (KM)	64	k star (KM)	40.08
nu hat (KM)	1024	nu star (KM)	641.3
theta hat (KM)	0.00375	theta star (KM)	0.00599
80% gamma percentile (KM)	0.271	90% gamma percentile (KM)	0.29
95% gamma percentile (KM)	0.306	99% gamma percentile (KM)	0.337

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0195
Approximate Chi Square Value (641.33, α)	583.6	Adjusted Chi Square Value (641.33, β)	569.6
95% Gamma Approximate KM-UCL (use when n>=50)	0.264	95% Gamma Adjusted KM-UCL (use when n<50)	0.27

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.242	Mean in Log Scale	-1.435
SD in Original Scale	0.0489	SD in Log Scale	0.202
95% t UCL (assumes normality of ROS data)	0.275	95% Percentile Bootstrap UCL	0.27
95% BCA Bootstrap UCL	0.271	95% Bootstrap t UCL	0.277
95% H-UCL (Log ROS)	0.282		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.435	KM Geo Mean	0.238
KM SD (logged)	0.126	95% Critical H Value (KM-Log)	1.871
KM Standard Error of Mean (logged)	0.126	95% H-UCL (KM -Log)	0.262
KM SD (logged)	0.126	95% Critical H Value (KM-Log)	1.871
KM Standard Error of Mean (logged)	0.126		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.435	Mean in Log Scale	-0.879
SD in Original Scale	0.121	SD in Log Scale	0.35
95% t UCL (Assumes normality)	0.516	95% H-Stat UCL	0.585

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.297	KM H-UCL	0.262
95% KM (BCA) UCL	N/A		

Warning: One or more Recommended UCL(s) not available!

Warning: Recommended UCL exceeds the maximum observation

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

RA17_GW_VOCs|Trichloroethene (salvage)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	8
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Trichloroethene (salvage) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:22:55 PM
From File	gw epcs_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (maintenance)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	2
		Number of Missing Observations	2
Number of Detects	1	Number of Non-Detects	12
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (maintenance) was not processed!

RA17_GW_VOCs|Chloroform (maintenance)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	4	Number of Non-Detects	9
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.26	Minimum Non-Detect	1
Maximum Detect	15	Maximum Non-Detect	1
Variance Detects	52.93	Percent Non-Detects	69.23%
Mean Detects	4.09	SD Detects	7.275
Median Detects	0.55	CV Detects	1.779
Skewness Detects	1.997	Kurtosis Detects	3.989
Mean of Logged Detects	0.0291	SD of Logged Detects	1.827

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.651	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.431	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.572	KM Standard Error of Mean	1.246
KM SD	3.88	95% KM (BCA) UCL	N/A
95% KM (t) UCL	3.792	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	3.621	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	5.309	95% KM Chebyshev UCL	7.002
97.5% KM Chebyshev UCL	9.352	99% KM Chebyshev UCL	13.97

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.677	Anderson-Darling GOF Test
5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.417	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.412	Detected Data Not Gamma Distributed at 5% Significance Level

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.466	k star (bias corrected MLE)	0.283
Theta hat (MLE)	8.784	Theta star (bias corrected MLE)	14.45
nu hat (MLE)	3.725	nu star (bias corrected)	2.265
Mean (detects)	4.09		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.163
Maximum	15	Median	0.43
SD	4.199	CV	1.941
k hat (MLE)	0.326	k star (bias corrected MLE)	0.302
Theta hat (MLE)	6.637	Theta star (bias corrected MLE)	7.163
nu hat (MLE)	8.475	nu star (bias corrected)	7.853
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (7.85, α)	2.65	Adjusted Chi Square Value (7.85, β)	2.239
95% Gamma Approximate UCL (use when n>=50)	6.411	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.572	SD (KM)	3.88
Variance (KM)	15.05	SE of Mean (KM)	1.246
k hat (KM)	0.164	k star (KM)	0.178
nu hat (KM)	4.27	nu star (KM)	4.618
theta hat (KM)	9.573	theta star (KM)	8.852
80% gamma percentile (KM)	1.935	90% gamma percentile (KM)	4.738
95% gamma percentile (KM)	8.344	99% gamma percentile (KM)	18.47

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.62, α)	0.98	Adjusted Chi Square Value (4.62, β)	0.767
95% Gamma Approximate KM-UCL (use when n>=50)	7.409	95% Gamma Adjusted KM-UCL (use when n<50)	9.463

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.826	Mean in Log Scale	-0.525
SD in Original Scale	4.027	SD in Log Scale	1.404
95% t UCL (assumes normality of ROS data)	3.817	95% Percentile Bootstrap UCL	3.968
95% BCA Bootstrap UCL	5.302	95% Bootstrap t UCL	14.4
95% H-UCL (Log ROS)	6.795		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.589	KM Geo Mean	0.555
KM SD (logged)	1.022	95% Critical H Value (KM-Log)	2.886
KM Standard Error of Mean (logged)	0.387	95% H-UCL (KM -Log)	2.19
KM SD (logged)	1.022	95% Critical H Value (KM-Log)	2.886
KM Standard Error of Mean (logged)	0.387		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.605	Mean in Log Scale	-0.471
SD in Original Scale	4.026	SD in Log Scale	0.977
95% t UCL (Assumes normality)	3.595	95% H-Stat UCL	2.224

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	9.463

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (maintenance)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	2
Number of Detects	10	Number of Non-Detects	3
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.21	Minimum Non-Detect	1
Maximum Detect	48	Maximum Non-Detect	1
Variance Detects	296.6	Percent Non-Detects	23.08%
Mean Detects	11.22	SD Detects	17.22
Median Detects	2.5	CV Detects	1.534
Skewness Detects	1.64	Kurtosis Detects	1.464
Mean of Logged Detects	0.944	SD of Logged Detects	2.022

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.7	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	8.717	KM Standard Error of Mean	4.398
KM SD	15.04	95% KM (BCA) UCL	15.48
95% KM (t) UCL	16.56	95% KM (Percentile Bootstrap) UCL	16.56
95% KM (z) UCL	15.95	95% KM Bootstrap t UCL	34.38
90% KM Chebyshev UCL	21.91	95% KM Chebyshev UCL	27.89
97.5% KM Chebyshev UCL	36.18	99% KM Chebyshev UCL	52.48

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.475	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.788	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.192	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.283	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.44	k star (bias corrected MLE)	0.374
Theta hat (MLE)	25.53	Theta star (bias corrected MLE)	29.98
nu hat (MLE)	8.793	nu star (bias corrected)	7.489
Mean (detects)	11.22		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	8.636
Maximum	48	Median	0.55
SD	15.7	CV	1.818
k hat (MLE)	0.28	k star (bias corrected MLE)	0.267
Theta hat (MLE)	30.87	Theta star (bias corrected MLE)	32.4
nu hat (MLE)	7.275	nu star (bias corrected)	6.929
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (6.93, α)	2.132	Adjusted Chi Square Value (6.93, β)	1.774
95% Gamma Approximate UCL (use when n>=50)	28.07	95% Gamma Adjusted UCL (use when n<50)	33.74

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	8.717	SD (KM)	15.04
Variance (KM)	226.3	SE of Mean (KM)	4.398
k hat (KM)	0.336	k star (KM)	0.31
nu hat (KM)	8.731	nu star (KM)	8.049
theta hat (KM)	25.96	theta star (KM)	28.16
80% gamma percentile (KM)	13.47	90% gamma percentile (KM)	25.61
95% gamma percentile (KM)	39.47	99% gamma percentile (KM)	75.36

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.05, α)	2.764	Adjusted Chi Square Value (8.05, β)	2.342
95% Gamma Approximate KM-UCL (use when n>=50)	25.39	95% Gamma Adjusted KM-UCL (use when n<50)	29.96

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	8.744	Mean in Log Scale	0.49
SD in Original Scale	15.64	SD in Log Scale	1.992
95% t UCL (assumes normality of ROS data)	16.48	95% Percentile Bootstrap UCL	15.9
95% BCA Bootstrap UCL	18.76	95% Bootstrap t UCL	34.21
95% H-UCL (Log ROS)	186.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.474	KM Geo Mean	1.606
KM SD (logged)	1.898	95% Critical H Value (KM-Log)	4.553
KM Standard Error of Mean (logged)	0.559	95% H-UCL (KM -Log)	117.8
KM SD (logged)	1.898	95% Critical H Value (KM-Log)	4.553
KM Standard Error of Mean (logged)	0.559		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	8.749	Mean in Log Scale	0.566
SD in Original Scale	15.64	SD in Log Scale	1.893
95% t UCL (Assumes normality)	16.48	95% H-Stat UCL	126.3

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	34.38	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	29.96

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

RA17_GW_VOCs|Tetrachloroethylene (maintenance)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	8
Number of Detects	8	Number of Non-Detects	7
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.3	Minimum Non-Detect	1
Maximum Detect	24	Maximum Non-Detect	1
Variance Detects	68.13	Percent Non-Detects	46.67%
Mean Detects	3.944	SD Detects	8.254
Median Detects	0.5	CV Detects	2.093
Skewness Detects	2.645	Kurtosis Detects	7.121
Mean of Logged Detects	-0.056	SD of Logged Detects	1.592

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.528	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.403	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	2.309	KM Standard Error of Mean	1.63
KM SD	5.904	95% KM (BCA) UCL	5.221
95% KM (t) UCL	5.181	95% KM (Percentile Bootstrap) UCL	5.416
95% KM (z) UCL	4.991	95% KM Bootstrap t UCL	59.67
90% KM Chebyshev UCL	7.2	95% KM Chebyshev UCL	9.415
97.5% KM Chebyshev UCL	12.49	99% KM Chebyshev UCL	18.53

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.276	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.771	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.398	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.311	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.452	k star (bias corrected MLE)	0.366
Theta hat (MLE)	8.727	Theta star (bias corrected MLE)	10.78
nu hat (MLE)	7.23	nu star (bias corrected)	5.852
Mean (detects)	3.944		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.581
Maximum	24	Median	0.44
SD	6.131	CV	2.375
k hat (MLE)	0.325	k star (bias corrected MLE)	0.304
Theta hat (MLE)	7.951	Theta star (bias corrected MLE)	8.487
nu hat (MLE)	9.738	nu star (bias corrected)	9.124
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (9.12, α)	3.402	Adjusted Chi Square Value (9.12, β)	2.985
95% Gamma Approximate UCL (use when n>=50)	6.922	95% Gamma Adjusted UCL (use when n<50)	7.89

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.309	SD (KM)	5.904
Variance (KM)	34.85	SE of Mean (KM)	1.63
k hat (KM)	0.153	k star (KM)	0.167
nu hat (KM)	4.591	nu star (KM)	5.006
theta hat (KM)	15.09	theta star (KM)	13.84
80% gamma percentile (KM)	2.726	90% gamma percentile (KM)	6.93
95% gamma percentile (KM)	12.43	99% gamma percentile (KM)	28.07

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.01, α)	1.155	Adjusted Chi Square Value (5.01, β)	0.946
95% Gamma Approximate KM-UCL (use when n>=50)	10.01	95% Gamma Adjusted KM-UCL (use when n<50)	12.21

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.441	Mean in Log Scale	-0.353
SD in Original Scale	6.083	SD in Log Scale	1.338
95% t UCL (assumes normality of ROS data)	5.208	95% Percentile Bootstrap UCL	5.377
95% BCA Bootstrap UCL	7.182	95% Bootstrap t UCL	29.77
95% H-UCL (Log ROS)	5.63		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.435	KM Geo Mean	0.647
KM SD (logged)	1.181	95% Critical H Value (KM-Log)	3.043
KM Standard Error of Mean (logged)	0.338	95% H-UCL (KM -Log)	3.393
KM SD (logged)	1.181	95% Critical H Value (KM-Log)	3.043
KM Standard Error of Mean (logged)	0.338		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.337	Mean in Log Scale	-0.353
SD in Original Scale	6.101	SD in Log Scale	1.173
95% t UCL (Assumes normality)	5.111	95% H-Stat UCL	3.61

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

975% KM (Chebyshev) UCL 12.49

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

RA17_GW_VOCs|Trichloroethene (maintenance)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	13
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.19	Minimum Non-Detect	1
Maximum Detect	0.58	Maximum Non-Detect	1
Variance Detects	0.0761	Percent Non-Detects	86.67%
Mean Detects	0.385	SD Detects	0.276
Median Detects	0.385	CV Detects	0.716
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.103	SD of Logged Detects	0.789

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

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.385	KM Standard Error of Mean	0.195
KM SD	0.195	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.728	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.706	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.97	95% KM Chebyshev UCL	1.235
97.5% KM Chebyshev UCL	1.603	99% KM Chebyshev UCL	2.325

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.531	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.109	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	14.13	nu star (bias corrected)	N/A
Mean (detects)	0.385		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.385	SD (KM)	0.195
Variance (KM)	0.038	SE of Mean (KM)	0.195
k hat (KM)	3.898	k star (KM)	3.163
nu hat (KM)	116.9	nu star (KM)	94.89
theta hat (KM)	0.0988	theta star (KM)	0.122
80% gamma percentile (KM)	0.546	90% gamma percentile (KM)	0.675
95% gamma percentile (KM)	0.796	99% gamma percentile (KM)	1.057

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (94.89, α)	73.42	Adjusted Chi Square Value (94.89, β)	71.1
95% Gamma Approximate KM-UCL (use when n>=50)	0.498	95% Gamma Adjusted KM-UCL (use when n<50)	0.514

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.539	Mean in Log Scale	-1.103
SD in Original Scale	0.581	SD in Log Scale	1.049
95% t UCL (assumes normality of ROS data)	0.804	95% Percentile Bootstrap UCL	0.797
95% BCA Bootstrap UCL	0.893	95% Bootstrap t UCL	1.018
95% H-UCL (Log ROS)	1.268		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.103	KM Geo Mean	0.332
KM SD (logged)	0.558	95% Critical H Value (KM-Log)	2.132
KM Standard Error of Mean (logged)	0.558	95% H-UCL (KM -Log)	0.533
KM SD (logged)	0.558	95% Critical H Value (KM-Log)	2.132
KM Standard Error of Mean (logged)	0.558		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.485	Mean in Log Scale	-0.748
SD in Original Scale	0.0841	SD in Log Scale	0.255
95% t UCL (Assumes normality)	0.523	95% H-Stat UCL	0.555

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 1.235

Warning: Recommended UCL exceeds the maximum observation

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.19/6/2018 1:15:25 PM
From File	GW_Offices_input.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane

General Statistics

Total Number of Observations	7	Number of Distinct Observations	1
		Number of Missing Observations	20
Number of Detects	0	Number of Non-Detects	7
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane was not processed!

RA17_GW_VOCs|Chloroform

General Statistics

Total Number of Observations	7	Number of Distinct Observations	3
		Number of Missing Observations	20
Number of Detects	2	Number of Non-Detects	5
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.32	Minimum Non-Detect	1
Maximum Detect	1.3	Maximum Non-Detect	1
Variance Detects	0.48	Percent Non-Detects	71.43%
Mean Detects	0.81	SD Detects	0.693
Median Detects	0.81	CV Detects	0.856
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.439	SD of Logged Detects	0.991

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.46	KM Standard Error of Mean	0.183
KM SD	0.343	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.816	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.762	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.01	95% KM Chebyshev UCL	1.259
97.5% KM Chebyshev UCL	1.605	99% KM Chebyshev UCL	2.284

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.348	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.345	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	9.392	nu star (bias corrected)	N/A
Mean (detects)	0.81		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.46	SD (KM)	0.343
Variance (KM)	0.118	SE of Mean (KM)	0.183
k hat (KM)	1.799	k star (KM)	1.123
nu hat (KM)	25.19	nu star (KM)	15.73
theta hat (KM)	0.256	theta star (KM)	0.409
80% gamma percentile (KM)	0.733	90% gamma percentile (KM)	1.029
95% gamma percentile (KM)	1.323	99% gamma percentile (KM)	1.999

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0158
Approximate Chi Square Value (15.73, α)	7.771	Adjusted Chi Square Value (15.73, β)	6.16
)5% Gamma Approximate KM-UCL (use when n>=50)	0.931	95% Gamma Adjusted KM-UCL (use when n<50)	1.174

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.48	Mean in Log Scale	-0.96
SD in Original Scale	0.39	SD in Log Scale	0.697
95% t UCL (assumes normality of ROS data)	0.766	95% Percentile Bootstrap UCL	0.716
95% BCA Bootstrap UCL	0.821	95% Bootstrap t UCL	1.231
95% H-UCL (Log ROS)	1.114		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.939	KM Geo Mean	0.391
KM SD (logged)	0.491	95% Critical H Value (KM-Log)	2.443
KM Standard Error of Mean (logged)	0.262	95% H-UCL (KM -Log)	0.719
KM SD (logged)	0.491	95% Critical H Value (KM-Log)	2.443
KM Standard Error of Mean (logged)	0.262		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.589	Mean in Log Scale	-0.62
SD in Original Scale	0.321	SD in Log Scale	0.423
95% t UCL (Assumes normality)	0.824	95% H-Stat UCL	0.877

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 1.259

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

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	6
		Number of Missing Observations	20
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.21	Minimum Non-Detect	1
Maximum Detect	5	Maximum Non-Detect	1
Variance Detects	4.021	Percent Non-Detects	28.57%
Mean Detects	1.43	SD Detects	2.005
Median Detects	0.65	CV Detects	1.402
Skewness Detects	2.182	Kurtosis Detects	4.821
Mean of Logged Detects	-0.254	SD of Logged Detects	1.151

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.643	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.44	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	1.175	KM Standard Error of Mean	0.666
KM SD	1.572	95% KM (BCA) UCL	2.453
95% KM (t) UCL	2.47	95% KM (Percentile Bootstrap) UCL	2.44
95% KM (z) UCL	2.271	95% KM Bootstrap t UCL	15.26
90% KM Chebyshev UCL	3.174	95% KM Chebyshev UCL	4.08
97.5% KM Chebyshev UCL	5.337	99% KM Chebyshev UCL	7.806

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.682	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.693	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.399	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.365	Detected Data Not Gamma Distributed at 5% Significance Level

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.95	k star (bias corrected MLE)	0.513
Theta hat (MLE)	1.506	Theta star (bias corrected MLE)	2.786
nu hat (MLE)	9.497	nu star (bias corrected)	5.132
Mean (detects)	1.43		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0772	Mean	1.185
Maximum	5	Median	0.65
SD	1.714	CV	1.446
k hat (MLE)	0.834	k star (bias corrected MLE)	0.572
Theta hat (MLE)	1.42	Theta star (bias corrected MLE)	2.072
nu hat (MLE)	11.68	nu star (bias corrected)	8.007
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (8.01, α)	2.739	Adjusted Chi Square Value (8.01, β)	1.9
95% Gamma Approximate UCL (use when n>=50)	3.464	95% Gamma Adjusted UCL (use when n<50)	4.994

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.175	SD (KM)	1.572
Variance (KM)	2.471	SE of Mean (KM)	0.666
k hat (KM)	0.559	k star (KM)	0.415
nu hat (KM)	7.823	nu star (KM)	5.803
theta hat (KM)	2.103	theta star (KM)	2.835
80% gamma percentile (KM)	1.904	90% gamma percentile (KM)	3.298
95% gamma percentile (KM)	4.822	99% gamma percentile (KM)	8.641

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.80, α)	1.54	Adjusted Chi Square Value (5.80, β)	0.972
95% Gamma Approximate KM-UCL (use when n>=50)	4.427	95% Gamma Adjusted KM-UCL (use when n<50)	7.014

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.188	Mean in Log Scale	-0.363
SD in Original Scale	1.694	SD in Log Scale	0.993
95% t UCL (assumes normality of ROS data)	2.432	95% Percentile Bootstrap UCL	1.986
95% BCA Bootstrap UCL	2.53	95% Bootstrap t UCL	7.536
95% H-UCL (Log ROS)	5.053		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.387	KM Geo Mean	0.679
KM SD (logged)	0.933	95% Critical H Value (KM-Log)	3.511
KM Standard Error of Mean (logged)	0.417	95% H-UCL (KM -Log)	3.998
KM SD (logged)	0.933	95% Critical H Value (KM-Log)	3.511
KM Standard Error of Mean (logged)	0.417		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.164	Mean in Log Scale	-0.379
SD in Original Scale	1.699	SD in Log Scale	0.964
95% t UCL (Assumes normality)	2.412	95% H-Stat UCL	4.489

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	15.26	d KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	7.014

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RA17_GW_VOCs|Tetrachloroethylene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	19
Number of Detects	19	Number of Non-Detects	8
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	0.96	Minimum Non-Detect	1
Maximum Detect	470	Maximum Non-Detect	1
Variance Detects	18809	Percent Non-Detects	29.63%
Mean Detects	158	SD Detects	137.1
Median Detects	140	CV Detects	0.868
Skewness Detects	0.608	Kurtosis Detects	-0.367
Mean of Logged Detects	4.092	SD of Logged Detects	2.06

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.924	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.126	Lilliefors GOF Test
5% Lilliefors Critical Value	0.197	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	111.5	KM Standard Error of Mean	26.29
KM SD	133	95% KM (BCA) UCL	154.3
95% KM (t) UCL	156.3	95% KM (Percentile Bootstrap) UCL	156
95% KM (z) UCL	154.7	95% KM Bootstrap t UCL	162.6
90% KM Chebyshev UCL	190.4	95% KM Chebyshev UCL	226.1
97.5% KM Chebyshev UCL	275.7	99% KM Chebyshev UCL	373.1

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.909	Anderson-Darling GOF Test
5% A-D Critical Value	0.79	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.208	)etected data appear Gamma Distributed at 5% Significance Leve

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.632	k star (bias corrected MLE)	0.567
Theta hat (MLE)	250.2	Theta star (bias corrected MLE)	278.7
nu hat (MLE)	24	nu star (bias corrected)	21.54
Mean (detects)	158		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	114.8
Maximum	470	Median	53
SD	132.9	CV	1.158
k hat (MLE)	0.445	k star (bias corrected MLE)	0.42
Theta hat (MLE)	257.9	Theta star (bias corrected MLE)	273.1
nu hat (MLE)	24.04	nu star (bias corrected)	22.7
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (22.70, α)	12.86	Adjusted Chi Square Value (22.70, β)	12.39
95% Gamma Approximate UCL (use when n>=50)	202.5	95% Gamma Adjusted UCL (use when n<50)	210.3

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	111.5	SD (KM)	133
Variance (KM)	17681	SE of Mean (KM)	26.29
k hat (KM)	0.703	k star (KM)	0.65
nu hat (KM)	37.96	nu star (KM)	35.07
theta hat (KM)	158.6	theta star (KM)	171.6
80% gamma percentile (KM)	183.6	90% gamma percentile (KM)	284.8
95% gamma percentile (KM)	389.8	99% gamma percentile (KM)	642.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (35.07, α)	22.52	Adjusted Chi Square Value (35.07, β)	21.88
95% Gamma Approximate KM-UCL (use when n>=50)	173.6	95% Gamma Adjusted KM-UCL (use when n<50)	178.7

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.798	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.197	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	112.1	Mean in Log Scale	3.072
SD in Original Scale	135	SD in Log Scale	2.413
95% t UCL (assumes normality of ROS data)	156.4	95% Percentile Bootstrap UCL	156.3
95% BCA Bootstrap UCL	161.8	95% Bootstrap t UCL	164.1
95% H-UCL (Log ROS)	3725		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.872	KM Geo Mean	17.67
KM SD (logged)	2.523	95% Critical H Value (KM-Log)	4.92
KM Standard Error of Mean (logged)	0.499	95% H-UCL (KM -Log)	4855
KM SD (logged)	2.523	95% Critical H Value (KM-Log)	4.92
KM Standard Error of Mean (logged)	0.499		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	111.3	Mean in Log Scale	2.674
SD in Original Scale	135.6	SD in Log Scale	2.81
95% t UCL (Assumes normality)	155.9	95% H-Stat UCL	14844

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 156.3

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

RA17_GW_VOCs|Trichloroethene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	14
Number of Detects	15	Number of Non-Detects	12
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.94	Minimum Non-Detect	1
Maximum Detect	41	Maximum Non-Detect	1
Variance Detects	112.2	Percent Non-Detects	44.44%
Mean Detects	15.88	SD Detects	10.59
Median Detects	14	CV Detects	0.667
Skewness Detects	0.763	Kurtosis Detects	0.765
Mean of Logged Detects	2.459	SD of Logged Detects	0.959

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.95	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.133	Lilliefors GOF Test
5% Lilliefors Critical Value	0.22	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	9.238	KM Standard Error of Mean	2.12
KM SD	10.64	95% KM (BCA) UCL	12.68
95% KM (t) UCL	12.85	95% KM (Percentile Bootstrap) UCL	12.48
95% KM (z) UCL	12.72	95% KM Bootstrap t UCL	13.62
90% KM Chebyshev UCL	15.6	95% KM Chebyshev UCL	18.48
97.5% KM Chebyshev UCL	22.48	99% KM Chebyshev UCL	30.33

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.295	Anderson-Darling GOF Test
5% A-D Critical Value	0.75	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.136	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.225	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.785	k star (bias corrected MLE)	1.473
Theta hat (MLE)	8.892	Theta star (bias corrected MLE)	10.78
nu hat (MLE)	53.56	nu star (bias corrected)	44.18
Mean (detects)	15.88		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	9.224
Maximum	41	Median	4.1
SD	10.9	CV	1.181
k hat (MLE)	0.343	k star (bias corrected MLE)	0.33
Theta hat (MLE)	26.89	Theta star (bias corrected MLE)	27.98
nu hat (MLE)	18.53	nu star (bias corrected)	17.8
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (17.80, α)	9.247	Adjusted Chi Square Value (17.80, β)	8.853
95% Gamma Approximate UCL (use when n>=50)	17.76	95% Gamma Adjusted UCL (use when n<50)	18.55

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.238	SD (KM)	10.64
Variance (KM)	113.2	SE of Mean (KM)	2.12
k hat (KM)	0.754	k star (KM)	0.695
nu hat (KM)	40.69	nu star (KM)	37.51
theta hat (KM)	12.26	theta star (KM)	13.3
80% gamma percentile (KM)	15.19	90% gamma percentile (KM)	23.23
95% gamma percentile (KM)	31.53	99% gamma percentile (KM)	51.36

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (37.51, α)	24.48	Adjusted Chi Square Value (37.51, β)	23.81
)5% Gamma Approximate KM-UCL (use when n>=50)	14.15	95% Gamma Adjusted KM-UCL (use when n<50)	14.55

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.89	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.177	Lilliefors GOF Test
5% Lilliefors Critical Value	0.22	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.652	Mean in Log Scale	1.553
SD in Original Scale	10.55	SD in Log Scale	1.336
95% t UCL (assumes normality of ROS data)	13.11	95% Percentile Bootstrap UCL	13.02
95% BCA Bootstrap UCL	13.38	95% Bootstrap t UCL	13.53
95% H-UCL (Log ROS)	25.24		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.339	KM Geo Mean	3.814
KM SD (logged)	1.431	95% Critical H Value (KM-Log)	3.131
KM Standard Error of Mean (logged)	0.285	95% H-UCL (KM -Log)	25.54
KM SD (logged)	1.431	95% Critical H Value (KM-Log)	3.131
KM Standard Error of Mean (logged)	0.285		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	9.042	Mean in Log Scale	1.058
SD in Original Scale	11	SD in Log Scale	1.745
95% t UCL (Assumes normality)	12.65	95% H-Stat UCL	45.57

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 12.85

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

RA17_GW_VOCs|Vinyl Chloride

General Statistics

Total Number of Observations	27	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	26
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
ested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV

The data set for variable RA17_GW_VOCs|Vinyl Chloride was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:19:15 PM
From File	gw epcs_f.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (substation #7)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	8
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (substation #7) was not processed!

RA17_GW_VOCs|Chloroform (substation #7)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	8
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Chloroform (substation #7) was not processed!

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (substation #7)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	3
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.33	Minimum Non-Detect	1
Maximum Detect	21	Maximum Non-Detect	1
Variance Detects	66.26	Percent Non-Detects	37.5%
Mean Detects	9.586	SD Detects	8.14
Median Detects	8.3	CV Detects	0.849
Skewness Detects	0.487	Kurtosis Detects	-0.746
Mean of Logged Detects	1.63	SD of Logged Detects	1.642

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.975	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.163	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	6.115	KM Standard Error of Mean	2.883
KM SD	7.294	95% KM (BCA) UCL	10.79
95% KM (t) UCL	11.58	95% KM (Percentile Bootstrap) UCL	10.58
95% KM (z) UCL	10.86	95% KM Bootstrap t UCL	12.93
90% KM Chebyshev UCL	14.77	95% KM Chebyshev UCL	18.68
97.5% KM Chebyshev UCL	24.12	99% KM Chebyshev UCL	34.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.274	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.693	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.365	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.924	k star (bias corrected MLE)	0.503
Theta hat (MLE)	10.37	Theta star (bias corrected MLE)	19.05
nu hat (MLE)	9.244	nu star (bias corrected)	5.031
Mean (detects)	9.586		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.132
Maximum	21	Median	2.702
SD	7.791	CV	1.271
k hat (MLE)	0.348	k star (bias corrected MLE)	0.301
Theta hat (MLE)	17.62	Theta star (bias corrected MLE)	20.38
nu hat (MLE)	5.569	nu star (bias corrected)	4.814
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (4.81, α)	1.067	Adjusted Chi Square Value (4.81, β)	0.691
95% Gamma Approximate UCL (use when n>=50)	27.66	95% Gamma Adjusted UCL (use when n<50)	42.7

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.115	SD (KM)	7.294
Variance (KM)	53.21	SE of Mean (KM)	2.883
k hat (KM)	0.703	k star (KM)	0.523
nu hat (KM)	11.24	nu star (KM)	8.361
theta hat (KM)	8.701	theta star (KM)	11.7
80% gamma percentile (KM)	10.06	90% gamma percentile (KM)	16.39
95% gamma percentile (KM)	23.12	99% gamma percentile (KM)	39.61

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.36, α)	2.946	Adjusted Chi Square Value (8.36, β)	2.196
95% Gamma Approximate KM-UCL (use when n>=50)	17.36	95% Gamma Adjusted KM-UCL (use when n<50)	23.29

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.185	Mean in Log Scale	0.676
SD in Original Scale	7.742	SD in Log Scale	1.874
95% t UCL (assumes normality of ROS data)	11.37	95% Percentile Bootstrap UCL	10.56
95% BCA Bootstrap UCL	12.05	95% Bootstrap t UCL	16.09
95% H-UCL (Log ROS)	682.1		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.603	KM Geo Mean	1.828
KM SD (logged)	1.762	95% Critical H Value (KM-Log)	5.467
KM Standard Error of Mean (logged)	0.697	95% H-UCL (KM -Log)	329.4
KM SD (logged)	1.762	95% Critical H Value (KM-Log)	5.467
KM Standard Error of Mean (logged)	0.697		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.179	Mean in Log Scale	0.759
SD in Original Scale	7.744	SD in Log Scale	1.728
95% t UCL (Assumes normality)	11.37	95% H-Stat UCL	317.3

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 11.58

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

RA17_GW_VOCs|Tetrachloroethylene (substation #7)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	5
Number of Detects	4	Number of Non-Detects	4
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.24	Minimum Non-Detect	1
Maximum Detect	0.96	Maximum Non-Detect	1
Variance Detects	0.0971	Percent Non-Detects	50%
Mean Detects	0.685	SD Detects	0.312
Median Detects	0.77	CV Detects	0.455
Skewness Detects	-1.438	Kurtosis Detects	2.473
Mean of Logged Detects	-0.498	SD of Logged Detects	0.629

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.685	KM Standard Error of Mean	0.156
KM SD	0.27	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.98	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.941	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.152	95% KM Chebyshev UCL	1.364
97.5% KM Chebyshev UCL	1.658	99% KM Chebyshev UCL	2.235

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.538	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.366	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.326	k star (bias corrected MLE)	1.248
Theta hat (MLE)	0.158	Theta star (bias corrected MLE)	0.549
nu hat (MLE)	34.61	nu star (bias corrected)	9.986
Mean (detects)	0.685		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.24	Mean	0.685
Maximum	1.035	Median	0.746
SD	0.275	CV	0.401
k hat (MLE)	5.501	k star (bias corrected MLE)	3.521
Theta hat (MLE)	0.125	Theta star (bias corrected MLE)	0.195
nu hat (MLE)	88.01	nu star (bias corrected)	56.34
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (56.34, α)	40.09	Adjusted Chi Square Value (56.34, β)	36.65
95% Gamma Approximate UCL (use when n>=50)	0.963	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.685	SD (KM)	0.27
Variance (KM)	0.0728	SE of Mean (KM)	0.156
k hat (KM)	6.443	k star (KM)	4.11
nu hat (KM)	103.1	nu star (KM)	65.77
theta hat (KM)	0.106	theta star (KM)	0.167
80% gamma percentile (KM)	0.941	90% gamma percentile (KM)	1.138
95% gamma percentile (KM)	1.318	99% gamma percentile (KM)	1.703

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (65.77, α)	48.1	Adjusted Chi Square Value (65.77, β)	44.31
95% Gamma Approximate KM-UCL (use when n>=50)	0.936	95% Gamma Adjusted KM-UCL (use when n<50)	1.017

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.792	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.682	Mean in Log Scale	-0.498
SD in Original Scale	0.315	SD in Log Scale	0.549
95% t UCL (assumes normality of ROS data)	0.893	95% Percentile Bootstrap UCL	0.853
95% BCA Bootstrap UCL	0.851	95% Bootstrap t UCL	0.896
95% H-UCL (Log ROS)	1.172		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.498	KM Geo Mean	0.608
KM SD (logged)	0.545	95% Critical H Value (KM-Log)	2.433
KM Standard Error of Mean (logged)	0.315	95% H-UCL (KM -Log)	1.163
KM SD (logged)	0.545	95% Critical H Value (KM-Log)	2.433
KM Standard Error of Mean (logged)	0.315		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.593	Mean in Log Scale	-0.596
SD in Original Scale	0.227	SD in Log Scale	0.425
95% t UCL (Assumes normality)	0.744	95% H-Stat UCL	0.863

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.98

Warning: Recommended UCL exceeds the maximum observation

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

RA17_GW_VOCs|Trichloroethene (substation #7)

General Statistics

Total Number of Observations	8	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	7
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Trichloroethene (substation #7) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:18:32 PM
From File	gw epcs_g.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (transformer shop)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	5
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (transformer shop) was not processed!

RA17_GW_VOCs|Chloroform (transformer shop)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	4
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Chloroform (transformer shop) was not processed!

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (transformer shop)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	5
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (transformer shop) was not processed!

RA17_GW_VOCs|Tetrachloroethylene (transformer shop)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	4
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Tetrachloroethylene (transformer shop) was not processed!

RA17_GW_VOCs|Trichloroethene (transformer shop)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	5
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Trichloroethene (transformer shop) was not processed!

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.18/31/2018 1:17:44 PM
From File	gw epcs_h.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA17_GW_VOCs|Bromodichloromethane (vehicle refueling)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	6
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Bromodichloromethane (vehicle refueling) was not processed!

RA17_GW_VOCs|Chloroform (vehicle refueling)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	5
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Chloroform (vehicle refueling) was not processed!

RA17_GW_VOCs|Methyl tert-Butyl Ether (MTBE) (vehicle refueling)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	4
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	1.6	Maximum Non-Detect	1
Variance Detects	0.08	Percent Non-Detects	66.67%
Mean Detects	1.4	SD Detects	0.283
Median Detects	1.4	CV Detects	0.202
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.326	SD of Logged Detects	0.203

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	1.133	KM Standard Error of Mean	0.128
KM SD	0.221	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.391	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.343	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.516	95% KM Chebyshev UCL	1.69
97.5% KM Chebyshev UCL	1.931	99% KM Chebyshev UCL	2.404

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	48.66	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0288	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	194.7	nu star (bias corrected)	N/A
Mean (detects)	1.4		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.133	SD (KM)	0.221
Variance (KM)	0.0489	SE of Mean (KM)	0.128
k hat (KM)	26.27	k star (KM)	13.25
nu hat (KM)	315.3	nu star (KM)	159
theta hat (KM)	0.0431	theta star (KM)	0.0856
80% gamma percentile (KM)	1.384	90% gamma percentile (KM)	1.546
95% gamma percentile (KM)	1.689	99% gamma percentile (KM)	1.98

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0122
Approximate Chi Square Value (158.97, α)	130.8	Adjusted Chi Square Value (158.97, β)	121.6
95% Gamma Approximate KM-UCL (use when n>=50)	1.377	95% Gamma Adjusted KM-UCL (use when n<50)	1.482

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.847	Mean in Log Scale	-0.292
SD in Original Scale	0.468	SD in Log Scale	0.548
95% t UCL (assumes normality of ROS data)	1.231	95% Percentile Bootstrap UCL	1.147
95% BCA Bootstrap UCL	1.169	95% Bootstrap t UCL	1.664
95% H-UCL (Log ROS)	1.704		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.109	KM Geo Mean	1.115
KM SD (logged)	0.175	95% Critical H Value (KM-Log)	2.034
KM Standard Error of Mean (logged)	0.101	95% H-UCL (KM -Log)	1.327
KM SD (logged)	0.175	95% Critical H Value (KM-Log)	2.034
KM Standard Error of Mean (logged)	0.101		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.8	Mean in Log Scale	-0.353
SD in Original Scale	0.482	SD in Log Scale	0.534
95% t UCL (Assumes normality)	1.196	95% H-Stat UCL	1.552

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.391	KM H-UCL	1.327
95% KM (BCA) UCL	N/A		

Warning: One or more Recommended UCL(s) not available!

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

RA17_GW_VOCs|Tetrachloroethylene (vehicle refueling)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	5
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Tetrachloroethylene (vehicle refueling) was not processed!

RA17_GW_VOCs|Trichloroethene (vehicle refueling)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	6
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable RA17_GW_VOCs|Trichloroethene (vehicle refueling) was not processed!

Fringe Surface Sediment ProUCL Output UCL Statistics

for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.17/23/2018 4:10:41 PM
From File	HH Sediment ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA18_SE_DioxinFurans|TCDD TEQ HH

General Statistics

Total Number of Observations	24	Number of Distinct Observations	24
		Number of Missing Observations	48
Minimum	7.1200E-7	Mean	7.2530E-5
Maximum	7.0700E-4	Median	1.3000E-5
SD	1.5748E-4	Std. Error of Mean	3.2146E-5
Coefficient of Variation	N/A	Skewness	3.4

Normal GOF Test

Shapiro Wilk Test Statistic	0.479	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.381	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.2762E-4	95% Adjusted-CLT UCL (Chen-1995)	1.4924E-4
		95% Modified-t UCL (Johnson-1978)	1.3134E-4

Gamma GOF Test

A-D Test Statistic	1.687	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.807	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.222	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.188	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.496	k star (bias corrected MLE)	0.462
Theta hat (MLE)	1.4608E-4	Theta star (bias corrected MLE)	1.5692E-4
nu hat (MLE)	23.83	nu star (bias corrected)	22.19
MLE Mean (bias corrected)	7.2530E-5	MLE Sd (bias corrected)	1.0668E-4
		Approximate Chi Square Value (0.05)	12.48
Adjusted Level of Significance	0.0392	Adjusted Chi Square Value	11.97

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.2896E-4	95% Adjusted Gamma UCL (use when n<50)	1.3447E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.177	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.16	Mean of logged Data	-10.81
Maximum of Logged Data	-7.254	SD of logged Data	1.583

Assuming Lognormal Distribution

95% H-UCL	2.1678E-4	90% Chebyshev (MVUE) UCL	1.3986E-4
95% Chebyshev (MVUE) UCL	1.7443E-4	97.5% Chebyshev (MVUE) UCL	2.2242E-4
99% Chebyshev (MVUE) UCL	3.1668E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.2541E-4	95% Jackknife UCL	1.2762E-4
95% Standard Bootstrap UCL	1.2596E-4	95% Bootstrap-t UCL	2.3521E-4
95% Hall's Bootstrap UCL	2.9573E-4	95% Percentile Bootstrap UCL	1.2470E-4
95% BCA Bootstrap UCL	1.5696E-4		
90% Chebyshev(Mean, Sd) UCL	1.6897E-4	95% Chebyshev(Mean, Sd) UCL	2.1265E-4
97.5% Chebyshev(Mean, Sd) UCL	2.7328E-4	99% Chebyshev(Mean, Sd) UCL	3.9238E-4

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 2.1265E-4

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

RA18_SE_Metals|Aluminum

General Statistics

Total Number of Observations	41	Number of Distinct Observations	27
		Number of Missing Observations	31
Minimum	2400	Mean	8066
Maximum	15500	Median	7500
SD	3244	Std. Error of Mean	506.7
Coefficient of Variation	0.402	Skewness	0.576

Normal GOF Test

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8919	95% Adjusted-CLT UCL (Chen-1995)	8948
		95% Modified-t UCL (Johnson-1978)	8927

Gamma GOF Test

A-D Test Statistic	0.335	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.103	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.264	k star (bias corrected MLE)	5.822
Theta hat (MLE)	1288	Theta star (bias corrected MLE)	1385
nu hat (MLE)	513.6	nu star (bias corrected)	477.4
MLE Mean (bias corrected)	8066	MLE Sd (bias corrected)	3343
		Approximate Chi Square Value (0.05)	427.7
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	426

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9002	95% Adjusted Gamma UCL (use when n<50)	9039

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0928	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	7.783	Mean of logged Data	8.913
Maximum of Logged Data	9.649	SD of logged Data	0.42

Assuming Lognormal Distribution

95% H-UCL	9170	90% Chebyshev (MVUE) UCL	9742
95% Chebyshev (MVUE) UCL	10488	97.5% Chebyshev (MVUE) UCL	11523
99% Chebyshev (MVUE) UCL	13556		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8899	95% Jackknife UCL	8919
95% Standard Bootstrap UCL	8888	95% Bootstrap-t UCL	8929
95% Hall's Bootstrap UCL	8959	95% Percentile Bootstrap UCL	8890
95% BCA Bootstrap UCL	8890		
90% Chebyshev(Mean, Sd) UCL	9586	95% Chebyshev(Mean, Sd) UCL	10274
97.5% Chebyshev(Mean, Sd) UCL	11230	99% Chebyshev(Mean, Sd) UCL	13107

Suggested UCL to Use

95% Student's-t UCL 8919

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RA18_SE_Metals|Antimony

General Statistics

Total Number of Observations	41	Number of Distinct Observations	31
		Number of Missing Observations	31
Minimum	0.27	Mean	1.931
Maximum	43	Median	0.68
SD	6.603	Std. Error of Mean	1.031
Coefficient of Variation	3.419	Skewness	6.316

Normal GOF Test

Shapiro Wilk Test Statistic	0.222	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.668	95% Adjusted-CLT UCL (Chen-1995)	4.714
		95% Modified-t UCL (Johnson-1978)	3.837

Gamma GOF Test

A-D Test Statistic	6.14	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.793	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.294	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.144	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.711	k star (bias corrected MLE)	0.676
Theta hat (MLE)	2.714	Theta star (bias corrected MLE)	2.858
nu hat (MLE)	58.34	nu star (bias corrected)	55.4
MLE Mean (bias corrected)	1.931	MLE Sd (bias corrected)	2.349
		Approximate Chi Square Value (0.05)	39.3
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	38.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.723	95% Adjusted Gamma UCL (use when n<50)	2.757

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.309	Mean of logged Data	-0.189
Maximum of Logged Data	3.761	SD of logged Data	0.866

Assuming Lognormal Distribution

95% H-UCL	1.629	90% Chebyshev (MVUE) UCL	1.734
95% Chebyshev (MVUE) UCL	1.981	97.5% Chebyshev (MVUE) UCL	2.324
99% Chebyshev (MVUE) UCL	2.998		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.627	95% Jackknife UCL	3.668
95% Standard Bootstrap UCL	3.629	95% Bootstrap-t UCL	17.11
95% Hall's Bootstrap UCL	10.06	95% Percentile Bootstrap UCL	3.982
95% BCA Bootstrap UCL	6.062		
90% Chebyshev(Mean, Sd) UCL	5.025	95% Chebyshev(Mean, Sd) UCL	6.426
97.5% Chebyshev(Mean, Sd) UCL	8.371	99% Chebyshev(Mean, Sd) UCL	12.19

Suggested UCL to Use

95% H-UCL	1.629

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

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

RA18_SE_Metals|Arsenic

General Statistics

Total Number of Observations	41	Number of Distinct Observations	32
		Number of Missing Observations	31
Minimum	1.9	Mean	5.559
Maximum	17	Median	4.55
SD	3.717	Std. Error of Mean	0.58
Coefficient of Variation	0.669	Skewness	1.831

Normal GOF Test

Shapiro Wilk Test Statistic	0.79	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.536	95% Adjusted-CLT UCL (Chen-1995)	6.691
		95% Modified-t UCL (Johnson-1978)	6.564

Gamma GOF Test

A-D Test Statistic	0.851	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.139	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	3.097	k star (bias corrected MLE)	2.887
Theta hat (MLE)	1.795	Theta star (bias corrected MLE)	1.925
nu hat (MLE)	254	nu star (bias corrected)	236.7
MLE Mean (bias corrected)	5.559	MLE Sd (bias corrected)	3.271
		Approximate Chi Square Value (0.05)	202.1
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	200.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	6.511	95% Adjusted Gamma UCL (use when n<50)	6.548

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0788	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.642	Mean of logged Data	1.545
Maximum of Logged Data	2.833	SD of logged Data	0.568

Assuming Lognormal Distribution

95% H-UCL	6.562	90% Chebyshev (MVUE) UCL	7.034
95% Chebyshev (MVUE) UCL	7.735	97.5% Chebyshev (MVUE) UCL	8.709
99% Chebyshev (MVUE) UCL	10.62		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.513	95% Jackknife UCL	6.536
95% Standard Bootstrap UCL	6.472	95% Bootstrap-t UCL	6.825
95% Hall's Bootstrap UCL	6.72	95% Percentile Bootstrap UCL	6.568
95% BCA Bootstrap UCL	6.734		
90% Chebyshev(Mean, Sd) UCL	7.3	95% Chebyshev(Mean, Sd) UCL	8.089
97.5% Chebyshev(Mean, Sd) UCL	9.183	99% Chebyshev(Mean, Sd) UCL	11.33

Suggested UCL to Use

95% Adjusted Gamma UCL	6.548

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

RA18_SE_Metals|Chromium

General Statistics

Total Number of Observations	41	Number of Distinct Observations	27
		Number of Missing Observations	31
Minimum	18	Mean	38.23
Maximum	80	Median	36
SD	14.53	Std. Error of Mean	2.269
Coefficient of Variation	0.38	Skewness	1.168

Normal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	42.05	95% Adjusted-CLT UCL (Chen-1995)	42.41
		95% Modified-t UCL (Johnson-1978)	42.12

Gamma GOF Test

A-D Test Statistic	0.555	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.114	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.005	k star (bias corrected MLE)	7.436
Theta hat (MLE)	4.776	Theta star (bias corrected MLE)	5.142
nu hat (MLE)	656.4	nu star (bias corrected)	609.7
MLE Mean (bias corrected)	38.23	MLE Sd (bias corrected)	14.02
		Approximate Chi Square Value (0.05)	553.5
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	551.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	42.12	95% Adjusted Gamma UCL (use when n<50)	42.27

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0979	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.89	Mean of logged Data	3.58
Maximum of Logged Data	4.382	SD of logged Data	0.356

Assuming Lognormal Distribution

95% H-UCL	42.31	90% Chebyshev (MVUE) UCL	44.69

95% Chebyshev (MVUE) UCL	47.65	97.5% Chebyshev (MVUE) UCL	51.75
99% Chebyshev (MVUE) UCL	59.82		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	41.96	95% Jackknife UCL	42.05
95% Standard Bootstrap UCL	41.88	95% Bootstrap-t UCL	42.66
95% Hall's Bootstrap UCL	42.58	95% Percentile Bootstrap UCL	42.11
95% BCA Bootstrap UCL	41.84		
90% Chebyshev(Mean, Sd) UCL	45.04	95% Chebyshev(Mean, Sd) UCL	48.12
97.5% Chebyshev(Mean, Sd) UCL	52.4	99% Chebyshev(Mean, Sd) UCL	60.8

Suggested UCL to Use

95% Student's-t UCL	42.05

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RA18_SE_Metals|Cobalt

General Statistics

Total Number of Observations	41	Number of Distinct Observations	24
		Number of Missing Observations	31
Minimum	4.9	Mean	15.07
Maximum	32	Median	15
SD	5.246	Std. Error of Mean	0.819
Coefficient of Variation	0.348	Skewness	0.717

Normal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.0879	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	16.45	95% Adjusted-CLT UCL (Chen-1995)	16.51
		95% Modified-t UCL (Johnson-1978)	16.46

Gamma GOF Test

A-D Test Statistic	0.285	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.102	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.217	k star (bias corrected MLE)	7.632
Theta hat (MLE)	1.833	Theta star (bias corrected MLE)	1.974
nu hat (MLE)	673.8	nu star (bias corrected)	625.9
MLE Mean (bias corrected)	15.07	MLE Sd (bias corrected)	5.453
		Approximate Chi Square Value (0.05)	568.8
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	566.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	16.58	95% Adjusted Gamma UCL (use when n<50)	16.63

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.589	Mean of logged Data	2.65
Maximum of Logged Data	3.466	SD of logged Data	0.368

Assuming Lognormal Distribution

95% H-UCL	16.84	90% Chebyshev (MVUE) UCL	17.8
95% Chebyshev (MVUE) UCL	19.02	97.5% Chebyshev (MVUE) UCL	20.7
99% Chebyshev (MVUE) UCL	24.01		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	16.41	95% Jackknife UCL	16.45
95% Standard Bootstrap UCL	16.39	95% Bootstrap-t UCL	16.6
95% Hall's Bootstrap UCL	16.66	95% Percentile Bootstrap UCL	16.39
95% BCA Bootstrap UCL	16.46		
90% Chebyshev(Mean, Sd) UCL	17.52	95% Chebyshev(Mean, Sd) UCL	18.64
97.5% Chebyshev(Mean, Sd) UCL	20.18	99% Chebyshev(Mean, Sd) UCL	23.22

Suggested UCL to Use

95% Student's-t UCL	16.45

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

RA18_SE_Metals|Manganese

General Statistics

Total Number of Observations	41	Number of Distinct Observations	24
		Number of Missing Observations	31
Minimum	86	Mean	210
Maximum	430	Median	200
SD	85.49	Std. Error of Mean	13.35
Coefficient of Variation	0.407	Skewness	0.97

Normal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	232.4	95% Adjusted-CLT UCL (Chen-1995)	234.1
		95% Modified-t UCL (Johnson-1978)	232.8

Gamma GOF Test

A-D Test Statistic	0.454	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.112	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.138	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.728	k star (bias corrected MLE)	6.252
Theta hat (MLE)	31.21	Theta star (bias corrected MLE)	33.58
nu hat (MLE)	551.7	nu star (bias corrected)	512.6
MLE Mean (bias corrected)	210	MLE Sd (bias corrected)	83.97
		Approximate Chi Square Value (0.05)	461.1
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	459.4

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	233.4	95% Adjusted Gamma UCL (use when n<50)	234.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0915	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.454	Mean of logged Data	5.271
Maximum of Logged Data	6.064	SD of logged Data	0.394

Assuming Lognormal Distribution

95% H-UCL	235.6	90% Chebyshev (MVUE) UCL	249.7
95% Chebyshev (MVUE) UCL	267.8	97.5% Chebyshev (MVUE) UCL	292.9
99% Chebyshev (MVUE) UCL	342.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	231.9	95% Jackknife UCL	232.4
95% Standard Bootstrap UCL	231.4	95% Bootstrap-t UCL	234.9
95% Hall's Bootstrap UCL	235.8	95% Percentile Bootstrap UCL	231.5
95% BCA Bootstrap UCL	234.2		
90% Chebyshev(Mean, Sd) UCL	250	95% Chebyshev(Mean, Sd) UCL	268.2
97.5% Chebyshev(Mean, Sd) UCL	293.3	99% Chebyshev(Mean, Sd) UCL	342.8

Suggested UCL to Use

95% Adjusted Gamma UCL	234.3

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

RA18_SE_Metals|Nickel

General Statistics

Total Number of Observations	41	Number of Distinct Observations	32
		Number of Missing Observations	31
Minimum	15	Mean	50.72
Maximum	160	Median	38
SD	34.86	Std. Error of Mean	5.445
Coefficient of Variation	0.687	Skewness	1.681

Normal GOF Test

Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	59.89	95% Adjusted-CLT UCL (Chen-1995)	61.2
		95% Modified-t UCL (Johnson-1978)	60.13

Gamma GOF Test

A-D Test Statistic	0.969	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.117	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.139	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	2.872	k star (bias corrected MLE)	2.678
Theta hat (MLE)	17.66	Theta star (bias corrected MLE)	18.94
nu hat (MLE)	235.5	nu star (bias corrected)	219.6
MLE Mean (bias corrected)	50.72	MLE Sd (bias corrected)	30.99
		Approximate Chi Square Value (0.05)	186.3
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	185.2

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	59.78	95% Adjusted Gamma UCL (use when n<50)	60.15

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.103	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.708	Mean of logged Data	3.742
Maximum of Logged Data	5.075	SD of logged Data	0.591

Assuming Lognormal Distribution

95% H-UCL	60.39	90% Chebyshev (MVUE) UCL	64.78
95% Chebyshev (MVUE) UCL	71.47	97.5% Chebyshev (MVUE) UCL	80.76
99% Chebyshev (MVUE) UCL	99.01		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	59.68	95% Jackknife UCL	59.89
95% Standard Bootstrap UCL	59.49	95% Bootstrap-t UCL	61.69
95% Hall's Bootstrap UCL	61.37	95% Percentile Bootstrap UCL	59.87
95% BCA Bootstrap UCL	61.07		
90% Chebyshev(Mean, Sd) UCL	67.05	95% Chebyshev(Mean, Sd) UCL	74.45
97.5% Chebyshev(Mean, Sd) UCL	84.72	99% Chebyshev(Mean, Sd) UCL	104.9

Suggested UCL to Use

95% Adjusted Gamma UCL	60.15

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

RA18_SE_Metals|Thallium

General Statistics

Total Number of Observations	41	Number of Distinct Observations	22
		Number of Missing Observations	31
Minimum	0.037	Mean	0.21
Maximum	0.63	Median	0.18
SD	0.104	Std. Error of Mean	0.0163
Coefficient of Variation	0.498	Skewness	2.359

Normal GOF Test

Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.237	95% Adjusted-CLT UCL (Chen-1995)	0.243
		95% Modified-t UCL (Johnson-1978)	0.238

Gamma GOF Test

A-D Test Statistic	1.374	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.143	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.327	k star (bias corrected MLE)	4.954
Theta hat (MLE)	0.0394	Theta star (bias corrected MLE)	0.0424
nu hat (MLE)	436.8	nu star (bias corrected)	406.2
MLE Mean (bias corrected)	0.21	MLE Sd (bias corrected)	0.0943
		Approximate Chi Square Value (0.05)	360.5
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	358.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.236	95% Adjusted Gamma UCL (use when n<50)	0.237

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.297	Mean of logged Data	-1.658
Maximum of Logged Data	-0.462	SD of logged Data	0.447

Assuming Lognormal Distribution

95% H-UCL	0.24	90% Chebyshev (MVUE) UCL	0.256
95% Chebyshev (MVUE) UCL	0.276	97.5% Chebyshev (MVUE) UCL	0.305
99% Chebyshev (MVUE) UCL	0.361		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.237	95% Jackknife UCL	0.237
95% Standard Bootstrap UCL	0.237	95% Bootstrap-t UCL	0.248
95% Hall's Bootstrap UCL	0.266	95% Percentile Bootstrap UCL	0.238
95% BCA Bootstrap UCL	0.243		
90% Chebyshev(Mean, Sd) UCL	0.259	95% Chebyshev(Mean, Sd) UCL	0.281
97.5% Chebyshev(Mean, Sd) UCL	0.312	99% Chebyshev(Mean, Sd) UCL	0.372

Suggested UCL to Use

95% Student's-t UCL	0.237	or 95% Modified-t UCL	0.238

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

RA18_SE_Metals|Vanadium

General Statistics

Total Number of Observations	41	Number of Distinct Observations	33
		Number of Missing Observations	31
Minimum	21	Mean	87.32
Maximum	440	Median	48
SD	90.6	Std. Error of Mean	14.15
Coefficient of Variation	1.038	Skewness	2.374

Normal GOF Test

Shapiro Wilk Test Statistic	0.709	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	111.1	95% Adjusted-CLT UCL (Chen-1995)	116.2
		95% Modified-t UCL (Johnson-1978)	112

Gamma GOF Test

A-D Test Statistic	1.651	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.766	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.14	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.506	k star (bias corrected MLE)	1.412
Theta hat (MLE)	57.98	Theta star (bias corrected MLE)	61.83
nu hat (MLE)	123.5	nu star (bias corrected)	115.8
MLE Mean (bias corrected)	87.32	MLE Sd (bias corrected)	73.48
		Approximate Chi Square Value (0.05)	91.95
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	91.18

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	110	95% Adjusted Gamma UCL (use when n<50)	110.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.16	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.045	Mean of logged Data	4.102
Maximum of Logged Data	6.087	SD of logged Data	0.818

Assuming Lognormal Distribution

95% H-UCL	111.8	90% Chebyshev (MVUE) UCL	119.5
95% Chebyshev (MVUE) UCL	135.7	97.5% Chebyshev (MVUE) UCL	158.3
99% Chebyshev (MVUE) UCL	202.5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	110.6	95% Jackknife UCL	111.1
95% Standard Bootstrap UCL	110.4	95% Bootstrap-t UCL	118.4
95% Hall's Bootstrap UCL	126.6	95% Percentile Bootstrap UCL	111.4
95% BCA Bootstrap UCL	117		
90% Chebyshev(Mean, Sd) UCL	129.8	95% Chebyshev(Mean, Sd) UCL	149
97.5% Chebyshev(Mean, Sd) UCL	175.7	99% Chebyshev(Mean, Sd) UCL	228.1

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	149

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

RA18_SE_PestPCBs|PCB, Total Aroclors (AECOM Calc)

General Statistics

Total Number of Observations	41	Number of Distinct Observations	38
		Number of Missing Observations	31
Minimum	0.022	Mean	0.447
Maximum	1.9	Median	0.26
SD	0.457	Std. Error of Mean	0.0713
Coefficient of Variation	1.022	Skewness	1.699

Normal GOF Test

Shapiro Wilk Test Statistic	0.801	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.137	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.567	95% Adjusted-CLT UCL (Chen-1995)	0.584
		95% Modified-t UCL (Johnson-1978)	0.57

Gamma GOF Test

A-D Test Statistic	0.52	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.776	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.119	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.142	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.1	k star (bias corrected MLE)	1.035
Theta hat (MLE)	0.406	Theta star (bias corrected MLE)	0.432
nu hat (MLE)	90.16	nu star (bias corrected)	84.9
MLE Mean (bias corrected)	0.447	MLE Sd (bias corrected)	0.439
		Approximate Chi Square Value (0.05)	64.66
Adjusted Level of Significance	0.0441	Adjusted Chi Square Value	64.02

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.587	95% Adjusted Gamma UCL (use when n<50)	0.593

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.941	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.107	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.137	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.817	Mean of logged Data	-1.325
Maximum of Logged Data	0.642	SD of logged Data	1.096

Assuming Lognormal Distribution

95% H-UCL	0.742	90% Chebyshev (MVUE) UCL	0.765
95% Chebyshev (MVUE) UCL	0.896	97.5% Chebyshev (MVUE) UCL	1.079
99% Chebyshev (MVUE) UCL	1.438		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.564	95% Jackknife UCL	0.567
95% Standard Bootstrap UCL	0.561	95% Bootstrap-t UCL	0.602
95% Hall's Bootstrap UCL	0.595	95% Percentile Bootstrap UCL	0.569
95% BCA Bootstrap UCL	0.578		
90% Chebyshev(Mean, Sd) UCL	0.661	95% Chebyshev(Mean, Sd) UCL	0.758
97.5% Chebyshev(Mean, Sd) UCL	0.892	99% Chebyshev(Mean, Sd) UCL	1.156

Suggested UCL to Use

95% Adjusted Gamma UCL	0.593

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

RA18_SE_Petroleum|Diesel Range Organics (C10-C20)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
		Number of Missing Observations	59
Minimum	48	Mean	91.09
Maximum	220	Median	87
SD	47.9	Std. Error of Mean	14.44
Coefficient of Variation	0.526	Skewness	2.139

Normal GOF Test

Shapiro Wilk Test Statistic	0.763	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	117.3	95% Adjusted-CLT UCL (Chen-1995)	124.8
		95% Modified-t UCL (Johnson-1978)	118.8

Gamma GOF Test

A-D Test Statistic	0.516	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.256	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.33	k star (bias corrected MLE)	3.937
Theta hat (MLE)	17.09	Theta star (bias corrected MLE)	23.14
nu hat (MLE)	117.3	nu star (bias corrected)	86.61
MLE Mean (bias corrected)	91.09	MLE Sd (bias corrected)	45.91
		Approximate Chi Square Value (0.05)	66.15
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	63.25

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	119.3	95% Adjusted Gamma UCL (use when n<50)	124.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.85	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.251	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.871	Mean of logged Data	4.415
Maximum of Logged Data	5.394	SD of logged Data	0.44

Assuming Lognormal Distribution

95% H-UCL	122	90% Chebyshev (MVUE) UCL	126.7
95% Chebyshev (MVUE) UCL	143.3	97.5% Chebyshev (MVUE) UCL	166.2
99% Chebyshev (MVUE) UCL	211.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	114.8	95% Jackknife UCL	117.3
95% Standard Bootstrap UCL	114.3	95% Bootstrap-t UCL	135
95% Hall's Bootstrap UCL	221.6	95% Percentile Bootstrap UCL	114.5
95% BCA Bootstrap UCL	125.7		
90% Chebyshev(Mean, Sd) UCL	134.4	95% Chebyshev(Mean, Sd) UCL	154
97.5% Chebyshev(Mean, Sd) UCL	181.3	99% Chebyshev(Mean, Sd) UCL	234.8

Suggested UCL to Use

95% Adjusted Gamma UCL	124.7

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

RA18_SE_SVOCs|Benzo(a)anthracene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	25
		Number of Missing Observations	40
Minimum	0.16	Mean	0.59
Maximum	2.3	Median	0.49
SD	0.376	Std. Error of Mean	0.0665
Coefficient of Variation	0.638	Skewness	3.201

Normal GOF Test

Shapiro Wilk Test Statistic	0.696	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.702	95% Adjusted-CLT UCL (Chen-1995)	0.739
		95% Modified-t UCL (Johnson-1978)	0.709

Gamma GOF Test

A-D Test Statistic	1.034	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov Gamma GOF Test**

5% K-S Critical Value	0.156	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.907	k star (bias corrected MLE)	3.562
Theta hat (MLE)	0.151	Theta star (bias corrected MLE)	0.166
nu hat (MLE)	250.1	nu star (bias corrected)	228
MLE Mean (bias corrected)	0.59	MLE Sd (bias corrected)	0.312
		Approximate Chi Square Value (0.05)	194
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	192.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.693	95% Adjusted Gamma UCL (use when n<50)	0.699

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.152	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.833	Mean of logged Data	-0.662
Maximum of Logged Data	0.833	SD of logged Data	0.507

Assuming Lognormal Distribution

95% H-UCL	0.7	90% Chebyshev (MVUE) UCL	0.748
95% Chebyshev (MVUE) UCL	0.823	97.5% Chebyshev (MVUE) UCL	0.926
99% Chebyshev (MVUE) UCL	1.128		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.699	95% Jackknife UCL	0.702
95% Standard Bootstrap UCL	0.695	95% Bootstrap-t UCL	0.772
95% Hall's Bootstrap UCL	1.218	95% Percentile Bootstrap UCL	0.706
95% BCA Bootstrap UCL	0.741		
90% Chebyshev(Mean, Sd) UCL	0.789	95% Chebyshev(Mean, Sd) UCL	0.88
97.5% Chebyshev(Mean, Sd) UCL	1.005	99% Chebyshev(Mean, Sd) UCL	1.251

Suggested UCL to Use

95% H-UCL	0.7

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

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.

RA18_SE_SVOCs|Benzo(a)pyrene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
		Number of Missing Observations	40
Minimum	0.16	Mean	0.65
Maximum	2	Median	0.58
SD	0.338	Std. Error of Mean	0.0597
Coefficient of Variation	0.519	Skewness	2.099

Normal GOF Test

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.752	95% Adjusted-CLT UCL (Chen-1995)	0.772
		95% Modified-t UCL (Johnson-1978)	0.755

Gamma GOF Test

A-D Test Statistic	0.678	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.134	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.156	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.464	k star (bias corrected MLE)	4.066
Theta hat (MLE)	0.146	Theta star (bias corrected MLE)	0.16
nu hat (MLE)	285.7	nu star (bias corrected)	260.2
MLE Mean (bias corrected)	0.65	MLE Sd (bias corrected)	0.322
		Approximate Chi Square Value (0.05)	223.9
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	222.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.756	95% Adjusted Gamma UCL (use when n<50)	0.762

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.165	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.833	Mean of logged Data	-0.546
Maximum of Logged Data	0.693	SD of logged Data	0.501

Assuming Lognormal Distribution

95% H-UCL	0.781	90% Chebyshev (MVUE) UCL	0.835
95% Chebyshev (MVUE) UCL	0.918	97.5% Chebyshev (MVUE) UCL	1.032
99% Chebyshev (MVUE) UCL	1.256		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.749	95% Jackknife UCL	0.752
95% Standard Bootstrap UCL	0.746	95% Bootstrap-t UCL	0.782
95% Hall's Bootstrap UCL	0.846	95% Percentile Bootstrap UCL	0.751
95% BCA Bootstrap UCL	0.778		
90% Chebyshev(Mean, Sd) UCL	0.829	95% Chebyshev(Mean, Sd) UCL	0.911
97.5% Chebyshev(Mean, Sd) UCL	1.023	99% Chebyshev(Mean, Sd) UCL	1.244

Suggested UCL to Use

95% Adjusted Gamma UCL	0.762

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

RA18_SE_SVOCs|Benzo(b)fluoranthene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	20
		Number of Missing Observations	40
Minimum	0.29	Mean	0.968
Maximum	2.6	Median	0.88
SD	0.449	Std. Error of Mean	0.0795
Coefficient of Variation	0.464	Skewness	1.627

Normal GOF Test

Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.103	95% Adjusted-CLT UCL (Chen-1995)	1.123
		95% Modified-t UCL (Johnson-1978)	1.106

Gamma GOF Test

A-D Test Statistic	0.608	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.12	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.156	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.276	k star (bias corrected MLE)	4.802
Theta hat (MLE)	0.183	Theta star (bias corrected MLE)	0.202
nu hat (MLE)	337.7	nu star (bias corrected)	307.3
MLE Mean (bias corrected)	0.968	MLE Sd (bias corrected)	0.442
		Approximate Chi Square Value (0.05)	267.7
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	265.7

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.111	95% Adjusted Gamma UCL (use when n<50)	1.119

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.238	Mean of logged Data	-0.13
Maximum of Logged Data	0.956	SD of logged Data	0.459

Assuming Lognormal Distribution

95% H-UCL	1.141	90% Chebyshev (MVUE) UCL	1.217
95% Chebyshev (MVUE) UCL	1.329	97.5% Chebyshev (MVUE) UCL	1.483
99% Chebyshev (MVUE) UCL	1.786		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.099	95% Jackknife UCL	1.103
95% Standard Bootstrap UCL	1.095	95% Bootstrap-t UCL	1.135
95% Hall's Bootstrap UCL	1.175	95% Percentile Bootstrap UCL	1.099
95% BCA Bootstrap UCL	1.114		
90% Chebyshev(Mean, Sd) UCL	1.206	95% Chebyshev(Mean, Sd) UCL	1.314
97.5% Chebyshev(Mean, Sd) UCL	1.464	99% Chebyshev(Mean, Sd) UCL	1.758

Suggested UCL to Use

95% Adjusted Gamma UCL	1.119

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

RA18_SE_SVOCs|Benzo(k)fluoranthene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	26
		Number of Missing Observations	40
Minimum	0.096	Mean	0.355
Maximum	0.96	Median	0.32
SD	0.175	Std. Error of Mean	0.031
Coefficient of Variation	0.495	Skewness	1.271

Normal GOF Test

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.407	95% Adjusted-CLT UCL (Chen-1995)	0.413
		95% Modified-t UCL (Johnson-1978)	0.408

Gamma GOF Test

A-D Test Statistic	0.344	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0962	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.156	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.293	k star (bias corrected MLE)	3.911
Theta hat (MLE)	0.0826	Theta star (bias corrected MLE)	0.0907
nu hat (MLE)	274.7	nu star (bias corrected)	250.3
MLE Mean (bias corrected)	0.355	MLE Sd (bias corrected)	0.179
		Approximate Chi Square Value (0.05)	214.7
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	212.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.413	95% Adjusted Gamma UCL (use when n<50)	0.417

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.126	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.343	Mean of logged Data	-1.158
Maximum of Logged Data	-0.0408	SD of logged Data	0.52

Assuming Lognormal Distribution

95% H-UCL	0.431	90% Chebyshev (MVUE) UCL	0.462
95% Chebyshev (MVUE) UCL	0.508	97.5% Chebyshev (MVUE) UCL	0.574
99% Chebyshev (MVUE) UCL	0.701		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.406	95% Jackknife UCL	0.407
95% Standard Bootstrap UCL	0.405	95% Bootstrap-t UCL	0.418
95% Hall's Bootstrap UCL	0.427	95% Percentile Bootstrap UCL	0.404
95% BCA Bootstrap UCL	0.411		
90% Chebyshev(Mean, Sd) UCL	0.448	95% Chebyshev(Mean, Sd) UCL	0.49
97.5% Chebyshev(Mean, Sd) UCL	0.548	99% Chebyshev(Mean, Sd) UCL	0.663

Suggested UCL to Use

95% Student's-t UCL 0.407

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

RA18_SE_SVOCs|Chrysene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	28
		Number of Missing Observations	40
Minimum	0.27	Mean	0.876
Maximum	2.4	Median	0.82
SD	0.403	Std. Error of Mean	0.0712
Coefficient of Variation	0.46	Skewness	1.754

Normal GOF Test

Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.997	95% Adjusted-CLT UCL (Chen-1995)	1.017
		95% Modified-t UCL (Johnson-1978)	1.001

Gamma GOF Test

A-D Test Statistic	0.427	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.105	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.156	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.5	k star (bias corrected MLE)	5.005
Theta hat (MLE)	0.159	Theta star (bias corrected MLE)	0.175
nu hat (MLE)	352	nu star (bias corrected)	320.3

MLE Mean (bias corrected)	0.876	MLE Sd (bias corrected)	0.392
		Approximate Chi Square Value (0.05)	279.9
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	277.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.003	95% Adjusted Gamma UCL (use when n<50)	1.01

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.106	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.309	Mean of logged Data	-0.226
Maximum of Logged Data	0.875	SD of logged Data	0.446

Assuming Lognormal Distribution

95% H-UCL	1.026	90% Chebyshev (MVUE) UCL	1.094
95% Chebyshev (MVUE) UCL	1.192	97.5% Chebyshev (MVUE) UCL	1.327
99% Chebyshev (MVUE) UCL	1.593		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.993	95% Jackknife UCL	0.997
95% Standard Bootstrap UCL	0.994	95% Bootstrap-t UCL	1.027
95% Hall's Bootstrap UCL	1.085	95% Percentile Bootstrap UCL	0.993
95% BCA Bootstrap UCL	1.015		
90% Chebyshev(Mean, Sd) UCL	1.09	95% Chebyshev(Mean, Sd) UCL	1.187
97.5% Chebyshev(Mean, Sd) UCL	1.321	99% Chebyshev(Mean, Sd) UCL	1.585

Suggested UCL to Use

95% Adjusted Gamma UCL	1.01

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

RA18_SE_SVOCs|Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	30
		Number of Missing Observations	40
Minimum	0.12	Mean	0.567
Maximum	1.4	Median	0.53
SD	0.295	Std. Error of Mean	0.0521
Coefficient of Variation	0.52	Skewness	0.835

Normal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.655	95% Adjusted-CLT UCL (Chen-1995)	0.66
		95% Modified-t UCL (Johnson-1978)	0.656

Gamma GOF Test

A-D Test Statistic	0.301	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0961	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.156	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics

k hat (MLE)	3.628	k star (bias corrected MLE)	3.308
Theta hat (MLE)	0.156	Theta star (bias corrected MLE)	0.171
nu hat (MLE)	232.2	nu star (bias corrected)	211.7
MLE Mean (bias corrected)	0.567	MLE Sd (bias corrected)	0.311
		Approximate Chi Square Value (0.05)	179.1
Adjusted Level of Significance	0.0416	Adjusted Chi Square Value	177.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.67	95% Adjusted Gamma UCL (use when n<50)	0.676

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.93	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.154	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics

Minimum of Logged Data	-2.12	Mean of logged Data	-0.712
Maximum of Logged Data	0.336	SD of logged Data	0.577

Assuming Lognormal Distribution

95% H-UCL	0.712	90% Chebyshev (MVUE) UCL	0.762
95% Chebyshev (MVUE) UCL	0.847	97.5% Chebyshev (MVUE) UCL	0.964
99% Chebyshev (MVUE) UCL	1.194		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.652	95% Jackknife UCL	0.655
95% Standard Bootstrap UCL	0.652	95% Bootstrap-t UCL	0.663
95% Hall's Bootstrap UCL	0.662	95% Percentile Bootstrap UCL	0.65
95% BCA Bootstrap UCL	0.658		
90% Chebyshev(Mean, Sd) UCL	0.723	95% Chebyshev(Mean, Sd) UCL	0.794
97.5% Chebyshev(Mean, Sd) UCL	0.892	99% Chebyshev(Mean, Sd) UCL	1.085

Suggested UCL to Use

95% Student's-t UCL	0.655

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/23/2018 4:14:13 PM
From File	HH Sediment ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA18_SE_SVOCs|Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	32	Number of Distinct Observations	22
		Number of Missing Observations	40
Number of Detects	30	Number of Non-Detects	2
Number of Distinct Detects	21	Number of Distinct Non-Detects	2
Minimum Detect	0.04	Minimum Non-Detect	0.037
Maximum Detect	0.47	Maximum Non-Detect	0.13
Variance Detects	0.00717	Percent Non-Detects	6.25%
Mean Detects	0.154	SD Detects	0.0847
Median Detects	0.145	CV Detects	0.551
Skewness Detects	1.818	Kurtosis Detects	5.685
Mean of Logged Detects	-2.008	SD of Logged Detects	0.538

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.865	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.927	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.17	Lilliefors GOF Test
5% Lilliefors Critical Value	0.159	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.148	KM Standard Error of Mean	0.0152
KM SD	0.0842	95% KM (BCA) UCL	0.175
95% KM (t) UCL	0.173	95% KM (Percentile Bootstrap) UCL	0.174
95% KM (z) UCL	0.173	95% KM Bootstrap t UCL	0.179
90% KM Chebyshev UCL	0.193	95% KM Chebyshev UCL	0.214
97.5% KM Chebyshev UCL	0.242	99% KM Chebyshev UCL	0.299

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.309	Anderson-Darling GOF Test
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.101	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.161	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.876	k star (bias corrected MLE)	3.51
Theta hat (MLE)	0.0396	Theta star (bias corrected MLE)	0.0438
nu hat (MLE)	232.5	nu star (bias corrected)	210.6
Mean (detects)	0.154		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0129	Mean	0.147
Maximum	0.47	Median	0.14
SD	0.0867	CV	0.591
k hat (MLE)	2.924	k star (bias corrected MLE)	2.67
Theta hat (MLE)	0.0502	Theta star (bias corrected MLE)	0.0549
nu hat (MLE)	187.1	nu star (bias corrected)	170.9
Adjusted Level of Significance (β)	0.0416		
Approximate Chi Square Value (170.91, α)	141.7	Adjusted Chi Square Value (170.91, β)	140.3

95% Gamma Approximate UCL (use when n>=50)	0.177	95% Gamma Adjusted UCL (use when n<50)	0.179

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.148	SD (KM)	0.0842
Variance (KM)	0.00709	SE of Mean (KM)	0.0152
k hat (KM)	3.072	k star (KM)	2.805
nu hat (KM)	196.6	nu star (KM)	179.5
theta hat (KM)	0.048	theta star (KM)	0.0526
80% gamma percentile (KM)	0.212	90% gamma percentile (KM)	0.266
95% gamma percentile (KM)	0.316	99% gamma percentile (KM)	0.425

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (179.49, α)	149.5	Adjusted Chi Square Value (179.49, β)	148
95% Gamma Approximate KM-UCL (use when n>=50)	0.177	95% Gamma Adjusted KM-UCL (use when n<50)	0.179

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.927	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.159	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.148	Mean in Log Scale	-2.067
SD in Original Scale	0.0855	SD in Log Scale	0.578
95% t UCL (assumes normality of ROS data)	0.173	95% Percentile Bootstrap UCL	0.173
95% BCA Bootstrap UCL	0.176	95% Bootstrap t UCL	0.179
95% H-UCL (Log ROS)	0.184		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.067	KM Geo Mean	0.127
KM SD (logged)	0.572	95% Critical H Value (KM-Log)	1.99
KM Standard Error of Mean (logged)	0.104	95% H-UCL (KM -Log)	0.183
KM SD (logged)	0.572	95% Critical H Value (KM-Log)	1.99
KM Standard Error of Mean (logged)	0.104		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.147	Mean in Log Scale	-2.093
SD in Original Scale	0.0866	SD in Log Scale	0.638
95% t UCL (Assumes normality)	0.173	95% H-Stat UCL	0.191

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.179	95% GROS Adjusted Gamma UCL	0.179

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
e/Time of Computation	ProUCL 5.17/27/2018 3:48:17 PM
From File	ProUCL SE HH Cyanide.xls
Full Precision	OFF
Confidence Coefficient	95%
f Bootstrap Operations	2000

RA18_SE_Other|Cyanide

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	117
Number of Detects	11	Number of Non-Detects	2
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	180	Minimum Non-Detect	140
Maximum Detect	4900	Maximum Non-Detect	170
Variance Detects	1863155	Percent Non-Detects	15.38%
Mean Detects	1010	SD Detects	1365
Median Detects	550	CV Detects	1.351
Skewness Detects	2.76	Kurtosis Detects	8.018
Mean of Logged Detects	6.43	SD of Logged Detects	0.931

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.601	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.352	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	876.2	KM Standard Error of Mean	360
KM SD	1238	95% KM (BCA) UCL	1550
95% KM (t) UCL	1518	95% KM (Percentile Bootstrap) UCL	1549
95% KM (z) UCL	1468	95% KM Bootstrap t UCL	3403
90% KM Chebyshev UCL	1956	95% KM Chebyshev UCL	2445
97.5% KM Chebyshev UCL	3124	99% KM Chebyshev UCL	4458

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.785	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.748	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.244	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.262	etected data appear Gamma Distributed at 5% Significance Leve

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

Gamma Statistics on Detected Data Only

k hat (MLE)	1.163	k star (bias corrected MLE)	0.907
Theta hat (MLE)	868.3	Theta star (bias corrected MLE)	1114
nu hat (MLE)	25.59	nu star (bias corrected)	19.94
Mean (detects)	1010		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
ROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-2
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	854.6
Maximum	4900	Median	480
SD	1302	CV	1.524
k hat (MLE)	0.335	k star (bias corrected MLE)	0.309
Theta hat (MLE)	2548	Theta star (bias corrected MLE)	2763
nu hat (MLE)	8.722	nu star (bias corrected)	8.042
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (8.04, α)	2.76	Adjusted Chi Square Value (8.04, β)	2.338
nma Approximate UCL (use when n>=50)	2491	95% Gamma Adjusted UCL (use when n<50)	2940

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	876.2	SD (KM)	1238
Variance (KM)	1531728	SE of Mean (KM)	360
k hat (KM)	0.501	k star (KM)	0.437
nu hat (KM)	13.03	nu star (KM)	11.36
theta hat (KM)	1748	theta star (KM)	2006
80% gamma percentile (KM)	1427	90% gamma percentile (KM)	2435
95% gamma percentile (KM)	3530	99% gamma percentile (KM)	6260

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.36, α)	4.806	Adjusted Chi Square Value (11.36, β)	4.215
Approximate KM-UCL (use when n>=50)	2070	95% Gamma Adjusted KM-UCL (use when n<50)	2360

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	865.4	Mean in Log Scale	6.095
SD in Original Scale	1295	SD in Log Scale	1.18
% t UCL (assumes normality of ROS data)	1506	95% Percentile Bootstrap UCL	1500
95% BCA Bootstrap UCL	1816	95% Bootstrap t UCL	3250
95% H-UCL (Log ROS)	2616		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	6.201	KM Geo Mean	493.2
KM SD (logged)	0.977	95% Critical H Value (KM-Log)	2.809
KM Standard Error of Mean (logged)	0.284	95% H-UCL (KM -Log)	1756
KM SD (logged)	0.977	95% Critical H Value (KM-Log)	2.809
KM Standard Error of Mean (logged)	0.284		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	866.5	Mean in Log Scale	6.109
SD in Original Scale	1294	SD in Log Scale	1.156
95% t UCL (Assumes normality)	1506	95% H-Stat UCL	2491

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	3403	I KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2360

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
'hen applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUC

:: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% U
Recommendations are based upon data size, data distribution, and skewness.
›se recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (200
/er, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statis

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.1 1/22/2018 2:20:52 PM
From File	Surface Water_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

RA_SW_Metals|Arsenic

	General Statistics		
Total Number of Observations	10	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.48	Mean	0.779
Maximum	1.2	Median	0.715
SD	0.246	Std. Error of Mean	0.0777
Coefficient of Variation	0.315	Skewness	1.005
	Normal GOF Test		
Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level	
	Data appear Normal at 5% Significance Level		
	Assuming Normal Distribution		
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.921	95% Adjusted-CLT UCL (Chen-1995)	0.933
		95% Modified-t UCL (Johnson-1978)	0.926
	Gamma GOF Test		
A-D Test Statistic	0.462	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.175	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level	
	Detected data appear Gamma Distributed at 5% Significance Level		
	Gamma Statistics		
k hat (MLE)	12.31	k star (bias corrected MLE)	8.682
Theta hat (MLE)	0.0633	Theta star (bias corrected MLE)	0.0897
nu hat (MLE)	246.1	nu star (bias corrected)	173.6
MLE Mean (bias corrected)	0.779	MLE Sd (bias corrected)	0.264
		Approximate Chi Square Value (0.05)	144.2
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	139.5
	Assuming Gamma Distribution		
95% Approximate Gamma UCL (use when n>=50))	0.938	95% Adjusted Gamma UCL (use when n<50)	0.97
	Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Lognormal at 5% Significance Level	
	Data appear Lognormal at 5% Significance Level		
	Lognormal Statistics		
Minimum of Logged Data	-0.734	Mean of logged Data	-0.291
Maximum of Logged Data	0.182	SD of logged Data	0.297
	Assuming Lognormal Distribution		
95% H-UCL	0.95	90% Chebyshev (MVUE) UCL	0.999
95% Chebyshev (MVUE) UCL	1.099	97.5% Chebyshev (MVUE) UCL	1.237
99% Chebyshev (MVUE) UCL	1.51		
	Nonparametric Distribution Free UCL Statistics		
	Data appear to follow a Discernible Distribution at 5% Significance Level		
	Nonparametric Distribution Free UCLs		
95% CLT UCL	0.907	95% Jackknife UCL	0.921
95% Standard Bootstrap UCL	0.896	95% Bootstrap-t UCL	1.009
95% Hall's Bootstrap UCL	1.178	95% Percentile Bootstrap UCL	0.904
95% BCA Bootstrap UCL	0.931		
90% Chebyshev(Mean, Sd) UCL	1.012	95% Chebyshev(Mean, Sd) UCL	1.118
97.5% Chebyshev(Mean, Sd) UCL	1.264	99% Chebyshev(Mean, Sd) UCL	1.552
	Suggested UCL to Use		
95% Student's-t UCL	0.921		

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

RA_SW_Metals|Cobalt

General Statistics			
Total Number of Observations	10	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.8	Mean	0.983
Maximum	1.1	Median	0.975
SD	0.0983	Std. Error of Mean	0.0311
Coefficient of Variation	0.1	Skewness	-0.334
Normal GOF Test			
Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.04	95% Adjusted-CLT UCL (Chen-1995)	1.031
		95% Modified-t UCL (Johnson-1978)	1.039
Gamma GOF Test			
A-D Test Statistic	0.377	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.189	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	108.1	k star (bias corrected MLE)	75.71
Theta hat (MLE)	0.0091	Theta star (bias corrected MLE)	0.013
nu hat (MLE)	2161	nu star (bias corrected)	1514
MLE Mean (bias corrected)	0.983	MLE Sd (bias corrected)	0.113
		Approximate Chi Square Value (0.05)	1425
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	1410
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	1.045	95% Adjusted Gamma UCL (use when n<50)	1.056
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.223	Mean of logged Data	-0.0218
Maximum of Logged Data	0.0953	SD of logged Data	0.102
Assuming Lognormal Distribution			
95% H-UCL	1.046	90% Chebyshev (MVUE) UCL	1.079
95% Chebyshev (MVUE) UCL	1.122	97.5% Chebyshev (MVUE) UCL	1.182
99% Chebyshev (MVUE) UCL	1.3		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.034	95% Jackknife UCL	1.04
95% Standard Bootstrap UCL	1.032	95% Bootstrap-t UCL	1.038
95% Hall's Bootstrap UCL	1.034	95% Percentile Bootstrap UCL	1.031
95% BCA Bootstrap UCL	1.028		
90% Chebyshev(Mean, Sd) UCL	1.076	95% Chebyshev(Mean, Sd) UCL	1.119
97.5% Chebyshev(Mean, Sd) UCL	1.177	99% Chebyshev(Mean, Sd) UCL	1.292
Suggested UCL to Use			
95% Student's-t UCL	1.04		

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

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

RA_SW_Metals|Manganese

General Statistics			
Total Number of Observations	10	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	120	Mean	140
Maximum	170	Median	140
SD	13.33	Std. Error of Mean	4.216
Coefficient of Variation	0.0952	Skewness	1.055
Normal GOF Test			
Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	147.7	95% Adjusted-CLT UCL (Chen-1995)	148.4
		95% Modified-t UCL (Johnson-1978)	148
Gamma GOF Test			
A-D Test Statistic	0.651	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.288	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.266	Data Not Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	127.7	k star (bias corrected MLE)	89.43
Theta hat (MLE)	1.097	Theta star (bias corrected MLE)	1.565
nu hat (MLE)	2553	nu star (bias corrected)	1789
MLE Mean (bias corrected)	140	MLE Sd (bias corrected)	14.8
		Approximate Chi Square Value (0.05)	1691
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	1675
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	148	95% Adjusted Gamma UCL (use when n<50)	149.5
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.283	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.262	Data Not Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.787	Mean of logged Data	4.938
Maximum of Logged Data	5.136	SD of logged Data	0.0925
Assuming Lognormal Distribution			
95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	152.3
95% Chebyshev (MVUE) UCL	157.9	97.5% Chebyshev (MVUE) UCL	165.6
99% Chebyshev (MVUE) UCL	180.8		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	146.9	95% Jackknife UCL	147.7
95% Standard Bootstrap UCL	146.7	95% Bootstrap-t UCL	149.8
95% Hall's Bootstrap UCL	167.4	95% Percentile Bootstrap UCL	147
95% BCA Bootstrap UCL	146		
90% Chebyshev(Mean, Sd) UCL	152.6	95% Chebyshev(Mean, Sd) UCL	158.4
97.5% Chebyshev(Mean, Sd) UCL	166.3	99% Chebyshev(Mean, Sd) UCL	182
Suggested UCL to Use			
95% Student's-t UCL	147.7		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.17/30/2018 2:48:16 PM
From File	Tissue LA UA NTA_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

4,4'-DDD

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	0.95	Mean	10.83
Maximum	33.2	Median	3.775
SD	13.31	Std. Error of Mean	5.434
Coefficient of Variation	1.229	Skewness	1.27

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.776	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	21.78	95% Adjusted-CLT UCL (Chen-1995)	22.78
		95% Modified-t UCL (Johnson-1978)	22.25

Gamma GOF Test

A-D Test Statistic	0.456	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.72	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.305	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.799	k star (bias corrected MLE)	0.511
Theta hat (MLE)	13.55	Theta star (bias corrected MLE)	21.2
nu hat (MLE)	9.592	nu star (bias corrected)	6.13
MLE Mean (bias corrected)	10.83	MLE Sd (bias corrected)	15.15
		Approximate Chi Square Value (0.05)	1.706
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	0.997

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	38.9	95% Adjusted Gamma UCL (use when n<50)	66.57

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.233	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.0513	Mean of logged Data	1.64
Maximum of Logged Data	3.503	SD of logged Data	1.377

Assuming Lognormal Distribution

95% H-UCL	378.7	90% Chebyshev (MVUE) UCL	27.55
95% Chebyshev (MVUE) UCL	35.24	97.5% Chebyshev (MVUE) UCL	45.92
99% Chebyshev (MVUE) UCL	66.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	19.77	95% Jackknife UCL	21.78
95% Standard Bootstrap UCL	18.84	95% Bootstrap-t UCL	96.8
95% Hall's Bootstrap UCL	112.9	95% Percentile Bootstrap UCL	19.53
95% BCA Bootstrap UCL	21.51		
90% Chebyshev(Mean, Sd) UCL	27.13	95% Chebyshev(Mean, Sd) UCL	34.52
97.5% Chebyshev(Mean, Sd) UCL	44.76	99% Chebyshev(Mean, Sd) UCL	64.9

Suggested UCL to Use

95% Adjusted Gamma UCL	66.57

Recommended UCL exceeds the maximum observation

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

4,4'-DDE

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	2.96	Mean	36.33
Maximum	100.7	Median	23.9
SD	36.3	Std. Error of Mean	14.82
Coefficient of Variation	0.999	Skewness	1.319

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.872	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.235	Lilliefors GOF Test
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	66.19	95% Adjusted-CLT UCL (Chen-1995)	69.23
		95% Modified-t UCL (Johnson-1978)	67.52

Gamma GOF Test

A-D Test Statistic	0.211	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.207	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.088	k star (bias corrected MLE)	0.655
Theta hat (MLE)	33.39	Theta star (bias corrected MLE)	55.45
nu hat (MLE)	13.06	nu star (bias corrected)	7.861
MLE Mean (bias corrected)	36.33	MLE Sd (bias corrected)	44.88
		Approximate Chi Square Value (0.05)	2.655
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	1.693

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	107.6	95% Adjusted Gamma UCL (use when n<50)	168.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.085	Mean of logged Data	3.067
Maximum of Logged Data	4.612	SD of logged Data	1.248

Assuming Lognormal Distribution

95% H-UCL	756.7	90% Chebyshev (MVUE) UCL	96.79
95% Chebyshev (MVUE) UCL	122.9	97.5% Chebyshev (MVUE) UCL	159.2
99% Chebyshev (MVUE) UCL	230.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	60.7	95% Jackknife UCL	66.19
95% Standard Bootstrap UCL	57.57	95% Bootstrap-t UCL	108.9
95% Hall's Bootstrap UCL	175	95% Percentile Bootstrap UCL	61.93
95% BCA Bootstrap UCL	63.68		
90% Chebyshev(Mean, Sd) UCL	80.79	95% Chebyshev(Mean, Sd) UCL	100.9
97.5% Chebyshev(Mean, Sd) UCL	128.9	99% Chebyshev(Mean, Sd) UCL	183.8

Suggested UCL to Use

95% Student's-t UCL	66.19

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

Mercury

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	11
Minimum	0.025	Mean	0.072
Maximum	0.11	Median	0.0765
SD	0.0313	Std. Error of Mean	0.0128
Coefficient of Variation	0.435	Skewness	-0.458

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0977	95% Adjusted-CLT UCL (Chen-1995)	0.0905
		95% Modified-t UCL (Johnson-1978)	0.0973

Gamma GOF Test

A-D Test Statistic	0.29	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.902	k star (bias corrected MLE)	2.562
Theta hat (MLE)	0.0147	Theta star (bias corrected MLE)	0.0281
nu hat (MLE)	58.82	nu star (bias corrected)	30.74
MLE Mean (bias corrected)	0.072	MLE Sd (bias corrected)	0.045
		Approximate Chi Square Value (0.05)	19.08
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	15.85

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.116	95% Adjusted Gamma UCL (use when n<50)	0.14

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.689	Mean of logged Data	-2.737
Maximum of Logged Data	-2.207	SD of logged Data	0.545

Assuming Lognormal Distribution

95% H-UCL	0.147	90% Chebyshev (MVUE) UCL	0.122
95% Chebyshev (MVUE) UCL	0.144	97.5% Chebyshev (MVUE) UCL	0.175
99% Chebyshev (MVUE) UCL	0.235		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.093	95% Jackknife UCL	0.0977
95% Standard Bootstrap UCL	0.0904	95% Bootstrap-t UCL	0.0956
95% Hall's Bootstrap UCL	0.0891	95% Percentile Bootstrap UCL	0.091
95% BCA Bootstrap UCL	0.0897		
90% Chebyshev(Mean, Sd) UCL	0.11	95% Chebyshev(Mean, Sd) UCL	0.128
97.5% Chebyshev(Mean, Sd) UCL	0.152	99% Chebyshev(Mean, Sd) UCL	0.199

Suggested UCL to Use

95% Student's-t UCL	0.0977

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

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

alpha-Chlordane

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	0.957	Mean	18.91
Maximum	52.7	Median	8.5
SD	20.82	Std. Error of Mean	8.5
Coefficient of Variation	1.101	Skewness	1.133

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.813	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.352	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data Not Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	36.04	95% Adjusted-CLT UCL (Chen-1995)	37.1
		95% Modified-t UCL (Johnson-1978)	36.7

Gamma GOF Test

A-D Test Statistic	0.346	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.267	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.342	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.872	k star (bias corrected MLE)	0.547
Theta hat (MLE)	21.69	Theta star (bias corrected MLE)	34.57
nu hat (MLE)	10.46	nu star (bias corrected)	6.564
MLE Mean (bias corrected)	18.91	MLE Sd (bias corrected)	25.57
		Approximate Chi Square Value (0.05)	1.935
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	1.16

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	64.17	95% Adjusted Gamma UCL (use when n<50)	107

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.044	Mean of logged Data	2.267
Maximum of Logged Data	3.965	SD of logged Data	1.433

Assuming Lognormal Distribution

95% H-UCL	1002	90% Chebyshev (MVUE) UCL	55.62
95% Chebyshev (MVUE) UCL	71.37	97.5% Chebyshev (MVUE) UCL	93.21
99% Chebyshev (MVUE) UCL	136.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	32.89	95% Jackknife UCL	36.04

95% Standard Bootstrap UCL	31.72	95% Bootstrap-t UCL	102
95% Hall's Bootstrap UCL	220.1	95% Percentile Bootstrap UCL	32.55
95% BCA Bootstrap UCL	34.12		
90% Chebyshev(Mean, Sd) UCL	44.41	95% Chebyshev(Mean, Sd) UCL	55.96
97.5% Chebyshev(Mean, Sd) UCL	71.99	99% Chebyshev(Mean, Sd) UCL	103.5

Suggested UCL to Use

95% Student's-t UCL 36.04

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

DIELDRIN

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	0.753	Mean	6.212
Maximum	17.8	Median	2.04
SD	7.434	Std. Error of Mean	3.035
Coefficient of Variation	1.197	Skewness	1.083

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use

guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.761	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	12.33	95% Adjusted-CLT UCL (Chen-1995)	12.64
		95% Modified-t UCL (Johnson-1978)	12.55

Gamma GOF Test

A-D Test Statistic	0.588	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.271	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.832	k star (bias corrected MLE)	0.527
Theta hat (MLE)	7.47	Theta star (bias corrected MLE)	11.79
nu hat (MLE)	9.979	nu star (bias corrected)	6.323
MLE Mean (bias corrected)	6.212	MLE Sd (bias corrected)	8.558
		Approximate Chi Square Value (0.05)	1.807
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	1.068

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	21.74	95% Adjusted Gamma UCL (use when n<50)	36.76

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors Lognormal GOF Test**

5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.284	Mean of logged Data	1.116
Maximum of Logged Data	2.879	SD of logged Data	1.325

Assuming Lognormal Distribution

95% H-UCL	165.5	90% Chebyshev (MVUE) UCL	15.24
95% Chebyshev (MVUE) UCL	19.44	97.5% Chebyshev (MVUE) UCL	25.27
99% Chebyshev (MVUE) UCL	36.72		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	11.2	95% Jackknife UCL	12.33
95% Standard Bootstrap UCL	10.69	95% Bootstrap-t UCL	45.82
95% Hall's Bootstrap UCL	73.78	95% Percentile Bootstrap UCL	11.07
95% BCA Bootstrap UCL	11.56		
90% Chebyshev(Mean, Sd) UCL	15.32	95% Chebyshev(Mean, Sd) UCL	19.44
97.5% Chebyshev(Mean, Sd) UCL	25.17	99% Chebyshev(Mean, Sd) UCL	36.41

Suggested UCL to Use

95% Adjusted Gamma UCL	36.76

Recommended UCL exceeds the maximum observation

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

HEPTACHLOR EPOXIDE

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	0.192	Mean	2.351
Maximum	5.36	Median	1.95
SD	2.329	Std. Error of Mean	0.951
Coefficient of Variation	0.991	Skewness	0.276

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.282	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.267	95% Adjusted-CLT UCL (Chen-1995)	4.029
		95% Modified-t UCL (Johnson-1978)	4.284

Gamma GOF Test

A-D Test Statistic	0.569	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.769	k star (bias corrected MLE)	0.496
Theta hat (MLE)	3.057	Theta star (bias corrected MLE)	4.743
nu hat (MLE)	9.227	nu star (bias corrected)	5.947
MLE Mean (bias corrected)	2.351	MLE Sd (bias corrected)	3.339
		Approximate Chi Square Value (0.05)	1.613
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	0.931

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.668	95% Adjusted Gamma UCL (use when n<50)	15.01

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.265	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.65	Mean of logged Data	0.0788
Maximum of Logged Data	1.679	SD of logged Data	1.568

Assuming Lognormal Distribution

95% H-UCL	271.8	90% Chebyshev (MVUE) UCL	7.495
95% Chebyshev (MVUE) UCL	9.674	97.5% Chebyshev (MVUE) UCL	12.7
99% Chebyshev (MVUE) UCL	18.64		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.915	95% Jackknife UCL	4.267
95% Standard Bootstrap UCL	3.768	95% Bootstrap-t UCL	5.132
95% Hall's Bootstrap UCL	3.541	95% Percentile Bootstrap UCL	3.866
95% BCA Bootstrap UCL	3.716		
90% Chebyshev(Mean, Sd) UCL	5.203	95% Chebyshev(Mean, Sd) UCL	6.495
97.5% Chebyshev(Mean, Sd) UCL	8.289	99% Chebyshev(Mean, Sd) UCL	11.81

Suggested UCL to Use

95% Student's-t UCL	4.267

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

Total PCBs (Congeners)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	41.11	Mean	316.7
Maximum	645.2	Median	278.3
SD	256.7	Std. Error of Mean	104.8
Coefficient of Variation	0.811	Skewness	0.211

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	527.9	95% Adjusted-CLT UCL (Chen-1995)	498.7
		95% Modified-t UCL (Johnson-1978)	529.4

Gamma GOF Test

A-D Test Statistic	0.437	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.251	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.338	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.361	k star (bias corrected MLE)	0.791
Theta hat (MLE)	232.8	Theta star (bias corrected MLE)	400.2
nu hat (MLE)	16.33	nu star (bias corrected)	9.497
MLE Mean (bias corrected)	316.7	MLE Sd (bias corrected)	356
		Approximate Chi Square Value (0.05)	3.63
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	2.448

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	828.6	95% Adjusted Gamma UCL (use when n<50)	1229

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.247	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.716	Mean of logged Data	5.347
Maximum of Logged Data	6.47	SD of logged Data	1.1

Assuming Lognormal Distribution

95% H-UCL	3479	90% Chebyshev (MVUE) UCL	780.4
95% Chebyshev (MVUE) UCL	981.2	97.5% Chebyshev (MVUE) UCL	1260
99% Chebyshev (MVUE) UCL	1808		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	489.1	95% Jackknife UCL	527.9
95% Standard Bootstrap UCL	474.6	95% Bootstrap-t UCL	525.3
95% Hall's Bootstrap UCL	426.4	95% Percentile Bootstrap UCL	488.2
95% BCA Bootstrap UCL	471.8		
90% Chebyshev(Mean, Sd) UCL	631.1	95% Chebyshev(Mean, Sd) UCL	773.5
97.5% Chebyshev(Mean, Sd) UCL	971.2	99% Chebyshev(Mean, Sd) UCL	1359

Suggested UCL to Use

95% Student's-t UCL 527.9

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

trans-NONACHLOR

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	0.165	Mean	19.68
Maximum	80.2	Median	7.34
SD	30.54	Std. Error of Mean	12.47
Coefficient of Variation	1.552	Skewness	2.157

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.694	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	44.81	95% Adjusted-CLT UCL (Chen-1995)	51.92
		95% Modified-t UCL (Johnson-1978)	46.64

Gamma GOF Test

A-D Test Statistic	0.215	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.198	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.349	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.502	k star (bias corrected MLE)	0.362
Theta hat (MLE)	39.24	Theta star (bias corrected MLE)	54.39
nu hat (MLE)	6.019	nu star (bias corrected)	4.343
MLE Mean (bias corrected)	19.68	MLE Sd (bias corrected)	32.72
		Approximate Chi Square Value (0.05)	0.862
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	0.435

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	99.21	95% Adjusted Gamma UCL (use when n<50)	196.4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.802	Mean of logged Data	1.714
Maximum of Logged Data	4.385	SD of logged Data	2.123

Assuming Lognormal Distribution

95% H-UCL	121275	90% Chebyshev (MVUE) UCL	83.98
95% Chebyshev (MVUE) UCL	110.2	97.5% Chebyshev (MVUE) UCL	146.7
99% Chebyshev (MVUE) UCL	218.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	40.19	95% Jackknife UCL	44.81
95% Standard Bootstrap UCL	38.61	95% Bootstrap-t UCL	152.9
95% Hall's Bootstrap UCL	158.3	95% Percentile Bootstrap UCL	42.45
95% BCA Bootstrap UCL	46.19		
90% Chebyshev(Mean, Sd) UCL	57.09	95% Chebyshev(Mean, Sd) UCL	74.04
97.5% Chebyshev(Mean, Sd) UCL	97.56	99% Chebyshev(Mean, Sd) UCL	143.8

Suggested UCL to Use

95% Student's-t UCL	44.81

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

PCB-TEQ (Mammal)

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Minimum	1.1781E-4	Mean	0.00815
Maximum	0.018	Median	0.00835
SD	0.00716	Std. Error of Mean	0.00292
Coefficient of Variation	0.878	Skewness	0.106

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.014	95% Adjusted-CLT UCL (Chen-1995)	0.0131
		95% Modified-t UCL (Johnson-1978)	0.0141

Gamma GOF Test

A-D Test Statistic	0.575	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.307	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.346	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.604	k star (bias corrected MLE)	0.413
Theta hat (MLE)	0.0135	Theta star (bias corrected MLE)	0.0197
nu hat (MLE)	7.246	nu star (bias corrected)	4.956
MLE Mean (bias corrected)	0.00815	MLE Sd (bias corrected)	0.0127
		Approximate Chi Square Value (0.05)	1.132
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	0.606

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0357	95% Adjusted Gamma UCL (use when n<50)	0.0666

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.803	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.046	Mean of logged Data	-5.832
Maximum of Logged Data	-4.019	SD of logged Data	2.152

Assuming Lognormal Distribution

95% H-UCL	84.49	90% Chebyshev (MVUE) UCL	0.0463
95% Chebyshev (MVUE) UCL	0.0608	97.5% Chebyshev (MVUE) UCL	0.081
99% Chebyshev (MVUE) UCL	0.121		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.013	95% Jackknife UCL	0.014
95% Standard Bootstrap UCL	0.0125	95% Bootstrap-t UCL	0.0138
95% Hall's Bootstrap UCL	0.0133	95% Percentile Bootstrap UCL	0.0125
95% BCA Bootstrap UCL	0.0125		
90% Chebyshev(Mean, Sd) UCL	0.0169	95% Chebyshev(Mean, Sd) UCL	0.0209
97.5% Chebyshev(Mean, Sd) UCL	0.0264	99% Chebyshev(Mean, Sd) UCL	0.0372

Suggested UCL to Use

95% Student's-t UCL	0.014

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/30/2018 4:58:06 PM
From File	Tissue LA UA NTA_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	6	Number of Distinct Observations	5
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	5
Number of Distinct Detects	1	Number of Distinct Non-Detects	4

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Arsenic was not processed!

ALDRIN

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Number of Detects	4	Number of Non-Detects	2
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.073	Minimum Non-Detect	0.0472
Maximum Detect	0.617	Maximum Non-Detect	0.1
Variance Detects	0.0651	Percent Non-Detects	33.33%
Mean Detects	0.277	SD Detects	0.255
Median Detects	0.209	CV Detects	0.922
Skewness Detects	0.982	Kurtosis Detects	-0.602
Mean of Logged Detects	-1.659	SD of Logged Detects	1.029

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.204	KM Standard Error of Mean	0.0981
KM SD	0.208	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.402	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.365	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.498	95% KM Chebyshev UCL	0.631
97.5% KM Chebyshev UCL	0.816	99% KM Chebyshev UCL	1.18

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.375	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.663	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.307	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.4	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.482	k star (bias corrected MLE)	0.537
Theta hat (MLE)	0.187	Theta star (bias corrected MLE)	0.515
nu hat (MLE)	11.86	nu star (bias corrected)	4.297
Mean (detects)	0.277		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.188
Maximum	0.617	Median	0.081
SD	0.241	CV	1.282
k hat (MLE)	0.633	k star (bias corrected MLE)	0.428
Theta hat (MLE)	0.297	Theta star (bias corrected MLE)	0.439
nu hat (MLE)	7.596	nu star (bias corrected)	5.131
Adjusted Level of Significance (β)	0.0122		
Approximate Chi Square Value (5.13, α)	1.213	Adjusted Chi Square Value (5.13, β)	0.659
95% Gamma Approximate UCL (use when n>=50)	0.794	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.204	SD (KM)	0.208
Variance (KM)	0.0432	SE of Mean (KM)	0.0981
k hat (KM)	0.963	k star (KM)	0.593
nu hat (KM)	11.56	nu star (KM)	7.112
theta hat (KM)	0.212	theta star (KM)	0.344
80% gamma percentile (KM)	0.336	90% gamma percentile (KM)	0.532
95% gamma percentile (KM)	0.737	99% gamma percentile (KM)	1.234

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.11, α)	2.232	Adjusted Chi Square Value (7.11, β)	1.377
95% Gamma Approximate KM-UCL (use when n>=50)	0.65	95% Gamma Adjusted KM-UCL (use when n<50)	1.054

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.196	Mean in Log Scale	-2.266
SD in Original Scale	0.234	SD in Log Scale	1.286
95% t UCL (assumes normality of ROS data)	0.389	95% Percentile Bootstrap UCL	0.342
95% BCA Bootstrap UCL	0.384	95% Bootstrap t UCL	1.366
95% H-UCL (Log ROS)	4.501		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.064	KM Geo Mean	0.127
KM SD (logged)	0.938	95% Critical H Value (KM-Log)	3.898
KM Standard Error of Mean (logged)	0.446	95% H-UCL (KM -Log)	1.012
KM SD (logged)	0.938	95% Critical H Value (KM-Log)	3.898
KM Standard Error of Mean (logged)	0.446		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.197	Mean in Log Scale	-2.229
SD in Original Scale	0.233	SD in Log Scale	1.214
95% t UCL (Assumes normality)	0.389	95% H-Stat UCL	3.159

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.402

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

cis-NONACHLOR

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Number of Detects	5	Number of Non-Detects	1
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	1.09	Minimum Non-Detect	0.05
Maximum Detect	26	Maximum Non-Detect	0.05
Variance Detects	108.2	Percent Non-Detects	16.67%
Mean Detects	8.542	SD Detects	10.4
Median Detects	2.94	CV Detects	1.218
Skewness Detects	1.667	Kurtosis Detects	2.51
Mean of Logged Detects	1.524	SD of Logged Detects	1.261

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.788	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.305	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	7.127	KM Standard Error of Mean	4.137
KM SD	9.063	95% KM (BCA) UCL	13.98
95% KM (t) UCL	15.46	95% KM (Percentile Bootstrap) UCL	13.85
95% KM (z) UCL	13.93	95% KM Bootstrap t UCL	52.69
90% KM Chebyshev UCL	19.54	95% KM Chebyshev UCL	25.16
97.5% KM Chebyshev UCL	32.96	99% KM Chebyshev UCL	48.29

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.353	Anderson-Darling GOF Test
5% A-D Critical Value	0.693	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.295	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.365	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.937	k star (bias corrected MLE)	0.508
Theta hat (MLE)	9.113	Theta star (bias corrected MLE)	16.81
nu hat (MLE)	9.373	nu star (bias corrected)	5.083
Mean (detects)	8.542		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	7.12
Maximum	26	Median	2.66
SD	9.934	CV	1.395
k hat (MLE)	0.443	k star (bias corrected MLE)	0.333
Theta hat (MLE)	16.06	Theta star (bias corrected MLE)	21.4
nu hat (MLE)	5.32	nu star (bias corrected)	3.993
Adjusted Level of Significance (β)	0.0122		
Approximate Chi Square Value (3.99, α)	0.719	Adjusted Chi Square Value (3.99, β)	0.35
95% Gamma Approximate UCL (use when n>=50)	39.54	95% Gamma Adjusted UCL (use when n<50)	81.15

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	7.127	SD (KM)	9.063
Variance (KM)	82.14	SE of Mean (KM)	4.137
k hat (KM)	0.618	k star (KM)	0.42
nu hat (KM)	7.42	nu star (KM)	5.043
theta hat (KM)	11.53	theta star (KM)	16.96
80% gamma percentile (KM)	11.56	90% gamma percentile (KM)	19.95
95% gamma percentile (KM)	29.11	99% gamma percentile (KM)	52.01

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.04, α)	1.172	Adjusted Chi Square Value (5.04, β)	0.632
95% Gamma Approximate KM-UCL (use when n>=50)	30.66	95% Gamma Adjusted KM-UCL (use when n<50)	56.85

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	7.148	Mean in Log Scale	0.98
SD in Original Scale	9.91	SD in Log Scale	1.746
95% t UCL (assumes normality of ROS data)	15.3	95% Percentile Bootstrap UCL	14
95% BCA Bootstrap UCL	15.51	95% Bootstrap t UCL	58.01
95% H-UCL (Log ROS)	2417		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.771	KM Geo Mean	2.162
KM SD (logged)	1.974	95% Critical H Value (KM-Log)	7.606
KM Standard Error of Mean (logged)	0.901	95% H-UCL (KM -Log)	12516
KM SD (logged)	1.974	95% Critical H Value (KM-Log)	7.606
KM Standard Error of Mean (logged)	0.901		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.123	Mean in Log Scale	0.656
SD in Original Scale	9.932	SD in Log Scale	2.409
95% t UCL (Assumes normality)	15.29	95% H-Stat UCL	710356

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	15.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chlordane, gamma

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Number of Detects	5	Number of Non-Detects	1
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.146	Minimum Non-Detect	0.05
Maximum Detect	26.1	Maximum Non-Detect	0.05
Variance Detects	181.3	Percent Non-Detects	16.67%
Mean Detects	10.88	SD Detects	13.47
Median Detects	2.18	CV Detects	1.238
Skewness Detects	0.598	Kurtosis Detects	-3.296
Mean of Logged Detects	1.037	SD of Logged Detects	2.235

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.736	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	9.072	KM Standard Error of Mean	5.345
KM SD	11.71	95% KM (BCA) UCL	17.29
95% KM (t) UCL	19.84	95% KM (Percentile Bootstrap) UCL	17.41
95% KM (z) UCL	17.86	95% KM Bootstrap t UCL	112.2
90% KM Chebyshev UCL	25.11	95% KM Chebyshev UCL	32.37
97.5% KM Chebyshev UCL	42.45	99% KM Chebyshev UCL	62.26

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.438	Anderson-Darling GOF Test
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.27	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.373	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.474	k star (bias corrected MLE)	0.323
Theta hat (MLE)	22.92	Theta star (bias corrected MLE)	33.66
nu hat (MLE)	4.745	nu star (bias corrected)	3.231
Mean (detects)	10.88		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	9.065
Maximum	26.1	Median	1.518
SD	12.83	CV	1.416
k hat (MLE)	0.323	k star (bias corrected MLE)	0.273
Theta hat (MLE)	28.05	Theta star (bias corrected MLE)	33.24
nu hat (MLE)	3.878	nu star (bias corrected)	3.272
Adjusted Level of Significance (β)	0.0122		
Approximate Chi Square Value (3.27, α)	0.458	Adjusted Chi Square Value (3.27, β)	0.208
95% Gamma Approximate UCL (use when n>=50)	64.84	95% Gamma Adjusted UCL (use when n<50)	142.6

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.072	SD (KM)	11.71
Variance (KM)	137.2	SE of Mean (KM)	5.345
k hat (KM)	0.6	k star (KM)	0.411
nu hat (KM)	7.201	nu star (KM)	4.934
theta hat (KM)	15.12	theta star (KM)	22.07
80% gamma percentile (KM)	14.69	90% gamma percentile (KM)	25.5
95% gamma percentile (KM)	37.34	99% gamma percentile (KM)	67.02

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.93, α)	1.122	Adjusted Chi Square Value (4.93, β)	0.599
95% Gamma Approximate KM-UCL (use when n>=50)	39.9	95% Gamma Adjusted KM-UCL (use when n<50)	74.69

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.065	Mean in Log Scale	0.099
SD in Original Scale	12.83	SD in Log Scale	3.046
95% t UCL (assumes normality of ROS data)	19.62	95% Percentile Bootstrap UCL	17.38
95% BCA Bootstrap UCL	17.62	95% Bootstrap t UCL	119.2
95% H-UCL (Log ROS)	7.956E+8		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.365	KM Geo Mean	1.44
KM SD (logged)	2.364	95% Critical H Value (KM-Log)	9.043
KM Standard Error of Mean (logged)	1.079	95% H-UCL (KM -Log)	334609
KM SD (logged)	2.364	95% Critical H Value (KM-Log)	9.043
KM Standard Error of Mean (logged)	1.079		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	9.068	Mean in Log Scale	0.249
SD in Original Scale	12.83	SD in Log Scale	2.778
95% t UCL (Assumes normality)	19.62	95% H-Stat UCL	31044169

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 19.84

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

MIREX

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Number of Detects	4	Number of Non-Detects	2
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.077	Minimum Non-Detect	0.0472
Maximum Detect	0.496	Maximum Non-Detect	0.0478
Variance Detects	0.0447	Percent Non-Detects	33.33%
Mean Detects	0.294	SD Detects	0.212
Median Detects	0.302	CV Detects	0.719
Skewness Detects	-0.0681	Kurtosis Detects	-5.227
Mean of Logged Detects	-1.488	SD of Logged Detects	0.9

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.212	KM Standard Error of Mean	0.0894
KM SD	0.19	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.392	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.359	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.48	95% KM Chebyshev UCL	0.601
97.5% KM Chebyshev UCL	0.77	99% KM Chebyshev UCL	1.101

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.42	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.661	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.314	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.398	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.04	k star (bias corrected MLE)	0.677
Theta hat (MLE)	0.144	Theta star (bias corrected MLE)	0.435
nu hat (MLE)	16.32	nu star (bias corrected)	5.414
Mean (detects)	0.294		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.2
Maximum	0.496	Median	0.114
SD	0.22	CV	1.103
k hat (MLE)	0.665	k star (bias corrected MLE)	0.444
Theta hat (MLE)	0.3	Theta star (bias corrected MLE)	0.45
nu hat (MLE)	7.982	nu star (bias corrected)	5.324
Adjusted Level of Significance (β)	0.0122		
Approximate Chi Square Value (5.32, α)	1.305	Adjusted Chi Square Value (5.32, β)	0.72
95% Gamma Approximate UCL (use when n>=50)	0.814	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.212	SD (KM)	0.19
Variance (KM)	0.0359	SE of Mean (KM)	0.0894
k hat (KM)	1.25	k star (KM)	0.736
nu hat (KM)	14.99	nu star (KM)	8.831
theta hat (KM)	0.17	theta star (KM)	0.288
80% gamma percentile (KM)	0.348	90% gamma percentile (KM)	0.526
95% gamma percentile (KM)	0.708	99% gamma percentile (KM)	1.143

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.83, α)	3.225	Adjusted Chi Square Value (8.83, β)	2.131
95% Gamma Approximate KM-UCL (use when n>=50)	0.58	95% Gamma Adjusted KM-UCL (use when n<50)	0.878

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.203	Mean in Log Scale	-2.279
SD in Original Scale	0.216	SD in Log Scale	1.411
95% t UCL (assumes normality of ROS data)	0.381	95% Percentile Bootstrap UCL	0.345
95% BCA Bootstrap UCL	0.355	95% Bootstrap t UCL	0.685
95% H-UCL (Log ROS)	9.229		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.01	KM Geo Mean	0.134
KM SD (logged)	0.975	95% Critical H Value (KM-Log)	4.03
KM Standard Error of Mean (logged)	0.459	95% H-UCL (KM -Log)	1.248
KM SD (logged)	0.975	95% Critical H Value (KM-Log)	4.03
KM Standard Error of Mean (logged)	0.459		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.204	Mean in Log Scale	-2.239
SD in Original Scale	0.215	SD in Log Scale	1.356
95% t UCL (Assumes normality)	0.381	95% H-Stat UCL	6.918

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.392

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

OXYCHLORDANE

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	12
Number of Detects	5	Number of Non-Detects	1
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.374	Minimum Non-Detect	0.05
Maximum Detect	14.3	Maximum Non-Detect	0.05
Variance Detects	34.22	Percent Non-Detects	16.67%
Mean Detects	4.204	SD Detects	5.85
Median Detects	1.28	CV Detects	1.392
Skewness Detects	1.889	Kurtosis Detects	3.541
Mean of Logged Detects	0.626	SD of Logged Detects	1.443

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.746	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.294	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	3.512	KM Standard Error of Mean	2.292
KM SD	5.021	95% KM (BCA) UCL	7.404
95% KM (t) UCL	8.13	95% KM (Percentile Bootstrap) UCL	7.434
95% KM (z) UCL	7.282	95% KM Bootstrap t UCL	35.51
90% KM Chebyshev UCL	10.39	95% KM Chebyshev UCL	13.5
97.5% KM Chebyshev UCL	17.82	99% KM Chebyshev UCL	26.32

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.345	Anderson-Darling GOF Test
5% A-D Critical Value	0.699	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.27	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.367	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.74	k star (bias corrected MLE)	0.429
Theta hat (MLE)	5.682	Theta star (bias corrected MLE)	9.793
nu hat (MLE)	7.399	nu star (bias corrected)	4.293
Mean (detects)	4.204		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	3.505
Maximum	14.3	Median	1.029
SD	5.506	CV	1.571
k hat (MLE)	0.433	k star (bias corrected MLE)	0.328
Theta hat (MLE)	8.095	Theta star (bias corrected MLE)	10.7
nu hat (MLE)	5.196	nu star (bias corrected)	3.931
Adjusted Level of Significance (β)	0.0122		
Approximate Chi Square Value (3.93, α)	0.695	Adjusted Chi Square Value (3.93, β)	0.336
95% Gamma Approximate UCL (use when n>=50)	19.83	95% Gamma Adjusted UCL (use when n<50)	40.97

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.512	SD (KM)	5.021
Variance (KM)	25.21	SE of Mean (KM)	2.292
k hat (KM)	0.489	k star (KM)	0.356
nu hat (KM)	5.87	nu star (KM)	4.268
theta hat (KM)	7.18	theta star (KM)	9.874
80% gamma percentile (KM)	5.576	90% gamma percentile (KM)	10.12
95% gamma percentile (KM)	15.19	99% gamma percentile (KM)	28.11

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.27, α)	0.83	Adjusted Chi Square Value (4.27, β)	0.416
95% Gamma Approximate KM-UCL (use when n>=50)	18.05	95% Gamma Adjusted KM-UCL (use when n<50)	36

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.511	Mean in Log Scale	-0.0018
SD in Original Scale	5.501	SD in Log Scale	2.007
95% t UCL (assumes normality of ROS data)	8.036	95% Percentile Bootstrap UCL	7.539
95% BCA Bootstrap UCL	8.208	95% Bootstrap t UCL	36.37
95% H-UCL (Log ROS)	7684		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.022	KM Geo Mean	1.022
KM SD (logged)	1.792	95% Critical H Value (KM-Log)	6.938
KM Standard Error of Mean (logged)	0.818	95% H-UCL (KM -Log)	1321
KM SD (logged)	1.792	95% Critical H Value (KM-Log)	6.938
KM Standard Error of Mean (logged)	0.818		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.508	Mean in Log Scale	-0.0935
SD in Original Scale	5.504	SD in Log Scale	2.184
95% t UCL (Assumes normality)	8.035	95% H-Stat UCL	35314

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 8.13

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/31/2018 10:45:20 AM
From File	Tissue LA UA NTA_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

ALDRIN

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.056	Minimum Non-Detect	0.0494
Maximum Detect	0.382	Maximum Non-Detect	0.0502
Variance Detects	0.0279	Percent Non-Detects	28.57%
Mean Detects	0.184	SD Detects	0.167
Median Detects	0.069	CV Detects	0.908
Skewness Detects	0.625	Kurtosis Detects	-3.214
Mean of Logged Detects	-2.069	SD of Logged Detects	0.975

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.735	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.146	KM Standard Error of Mean	0.0592
KM SD	0.14	95% KM (BCA) UCL	0.237
95% KM (t) UCL	0.261	95% KM (Percentile Bootstrap) UCL	0.235
95% KM (z) UCL	0.243	95% KM Bootstrap t UCL	1.722
90% KM Chebyshev UCL	0.323	95% KM Chebyshev UCL	0.404
97.5% KM Chebyshev UCL	0.515	99% KM Chebyshev UCL	0.735

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.775	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.687	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.367	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.362	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.473	k star (bias corrected MLE)	0.723
Theta hat (MLE)	0.125	Theta star (bias corrected MLE)	0.255
nu hat (MLE)	14.73	nu star (bias corrected)	7.225
Mean (detects)	0.184		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.134
Maximum	0.382	Median	0.062
SD	0.161	CV	1.196
k hat (MLE)	0.76	k star (bias corrected MLE)	0.53
Theta hat (MLE)	0.177	Theta star (bias corrected MLE)	0.254
nu hat (MLE)	10.64	nu star (bias corrected)	7.415
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (7.42, α)	2.401	Adjusted Chi Square Value (7.42, β)	1.632
95% Gamma Approximate UCL (use when n>=50)	0.415	95% Gamma Adjusted UCL (use when n<50)	0.61

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.146	SD (KM)	0.14
Variance (KM)	0.0196	SE of Mean (KM)	0.0592
k hat (KM)	1.079	k star (KM)	0.712
nu hat (KM)	15.1	nu star (KM)	9.963
theta hat (KM)	0.135	theta star (KM)	0.205
80% gamma percentile (KM)	0.239	90% gamma percentile (KM)	0.364
95% gamma percentile (KM)	0.492	99% gamma percentile (KM)	0.799

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.96, α)	3.918	Adjusted Chi Square Value (9.96, β)	2.861
95% Gamma Approximate KM-UCL (use when n>=50)	0.37	95% Gamma Adjusted KM-UCL (use when n<50)	0.507

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.135	Mean in Log Scale	-2.745
SD in Original Scale	0.16	SD in Log Scale	1.402
95% t UCL (assumes normality of ROS data)	0.252	95% Percentile Bootstrap UCL	0.232
95% BCA Bootstrap UCL	0.239	95% Bootstrap t UCL	0.712
95% H-UCL (Log ROS)	2.815		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.337	KM Geo Mean	0.0966
KM SD (logged)	0.85	95% Critical H Value (KM-Log)	3.287
KM Standard Error of Mean (logged)	0.359	95% H-UCL (KM -Log)	0.434
KM SD (logged)	0.85	95% Critical H Value (KM-Log)	3.287
KM Standard Error of Mean (logged)	0.359		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.139	Mean in Log Scale	-2.533
SD in Original Scale	0.157	SD in Log Scale	1.123
95% t UCL (Assumes normality)	0.254	95% H-Stat UCL	0.956

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	0.434

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

MIREX

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.051	Minimum Non-Detect	0.0494
Maximum Detect	0.541	Maximum Non-Detect	0.0502
Variance Detects	0.0369	Percent Non-Detects	28.57%
Mean Detects	0.227	SD Detects	0.192
Median Detects	0.138	CV Detects	0.848
Skewness Detects	1.426	Kurtosis Detects	1.962
Mean of Logged Detects	-1.778	SD of Logged Detects	0.879

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.867	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.176	KM Standard Error of Mean	0.0701
KM SD	0.166	95% KM (BCA) UCL	0.292
95% KM (t) UCL	0.312	95% KM (Percentile Bootstrap) UCL	0.292
95% KM (z) UCL	0.291	95% KM Bootstrap t UCL	0.475
90% KM Chebyshev UCL	0.386	95% KM Chebyshev UCL	0.481
97.5% KM Chebyshev UCL	0.614	99% KM Chebyshev UCL	0.873

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.264	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.244	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.853	k star (bias corrected MLE)	0.875
Theta hat (MLE)	0.122	Theta star (bias corrected MLE)	0.259
nu hat (MLE)	18.53	nu star (bias corrected)	8.746
Mean (detects)	0.227		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.01	Mean	0.165
Maximum	0.541	Median	0.135
SD	0.189	CV	1.148
k hat (MLE)	0.763	k star (bias corrected MLE)	0.532
Theta hat (MLE)	0.216	Theta star (bias corrected MLE)	0.31
nu hat (MLE)	10.69	nu star (bias corrected)	7.441
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (7.44, α)	2.416	Adjusted Chi Square Value (7.44, β)	1.643
95% Gamma Approximate UCL (use when n>=50)	0.507	95% Gamma Adjusted UCL (use when n<50)	0.746

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.176	SD (KM)	0.166
Variance (KM)	0.0275	SE of Mean (KM)	0.0701
k hat (KM)	1.126	k star (KM)	0.739
nu hat (KM)	15.76	nu star (KM)	10.34
theta hat (KM)	0.156	theta star (KM)	0.238
80% gamma percentile (KM)	0.289	90% gamma percentile (KM)	0.436
95% gamma percentile (KM)	0.587	99% gamma percentile (KM)	0.947

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (10.34, α)	4.157	Adjusted Chi Square Value (10.34, β)	3.059
95% Gamma Approximate KM-UCL (use when n>=50)	0.438	95% Gamma Adjusted KM-UCL (use when n<50)	0.595

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.167	Mean in Log Scale	-2.432
SD in Original Scale	0.187	SD in Log Scale	1.328
95% t UCL (assumes normality of ROS data)	0.304	95% Percentile Bootstrap UCL	0.28
95% BCA Bootstrap UCL	0.318	95% Bootstrap t UCL	0.459
95% H-UCL (Log ROS)	2.654		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.129	KM Geo Mean	0.119
KM SD (logged)	0.866	95% Critical H Value (KM-Log)	3.329
KM Standard Error of Mean (logged)	0.366	95% H-UCL (KM -Log)	0.562
KM SD (logged)	0.866	95% Critical H Value (KM-Log)	3.329
KM Standard Error of Mean (logged)	0.366		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.169	Mean in Log Scale	-2.325
SD in Original Scale	0.185	SD in Log Scale	1.178
95% t UCL (Assumes normality)	0.305	95% H-Stat UCL	1.486

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.312

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

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.17/31/2018 10:46:53 AM
From File	Tissue LA UA NTA_b.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

4,4'-DDD

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	0.92	Mean	5.473
Maximum	21.89	Median	2.29
SD	7.533	Std. Error of Mean	2.847
Coefficient of Variation	1.376	Skewness	2.275

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.657	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	11.01	95% Adjusted-CLT UCL (Chen-1995)	12.77
		95% Modified-t UCL (Johnson-1978)	11.41

Gamma GOF Test

A-D Test Statistic	0.633	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.315	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.32	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.981	k star (bias corrected MLE)	0.656
Theta hat (MLE)	5.581	Theta star (bias corrected MLE)	8.348
nu hat (MLE)	13.73	nu star (bias corrected)	9.178
MLE Mean (bias corrected)	5.473	MLE Sd (bias corrected)	6.759
		Approximate Chi Square Value (0.05)	3.435
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	2.463

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	14.62	95% Adjusted Gamma UCL (use when n<50)	20.39

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.249	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.0834	Mean of logged Data	1.11
Maximum of Logged Data	3.086	SD of logged Data	1.082

Assuming Lognormal Distribution

95% H-UCL	30.88	90% Chebyshev (MVUE) UCL	10.85
95% Chebyshev (MVUE) UCL	13.56	97.5% Chebyshev (MVUE) UCL	17.33
99% Chebyshev (MVUE) UCL	24.71		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	10.16	95% Jackknife UCL	11.01
95% Standard Bootstrap UCL	9.838	95% Bootstrap-t UCL	47.67
95% Hall's Bootstrap UCL	40.33	95% Percentile Bootstrap UCL	10.51
95% BCA Bootstrap UCL	11.97		
90% Chebyshev(Mean, Sd) UCL	14.01	95% Chebyshev(Mean, Sd) UCL	17.88
97.5% Chebyshev(Mean, Sd) UCL	23.25	99% Chebyshev(Mean, Sd) UCL	33.8

Suggested UCL to Use

95% Adjusted Gamma UCL	20.39

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

4,4'-DDE

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	3.46	Mean	15.56
Maximum	44.3	Median	9.37
SD	15.47	Std. Error of Mean	5.848
Coefficient of Variation	0.995	Skewness	1.358

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.812	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	26.92	95% Adjusted-CLT UCL (Chen-1995)	28.38
		95% Modified-t UCL (Johnson-1978)	27.42

Gamma GOF Test

A-D Test Statistic	0.399	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.318	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.342	k star (bias corrected MLE)	0.862
Theta hat (MLE)	11.59	Theta star (bias corrected MLE)	18.04
nu hat (MLE)	18.79	nu star (bias corrected)	12.07
MLE Mean (bias corrected)	15.56	MLE Sd (bias corrected)	16.75
		Approximate Chi Square Value (0.05)	5.273
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	4.001

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	35.61	95% Adjusted Gamma UCL (use when n<50)	46.93

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.241	Mean of logged Data	2.328
Maximum of Logged Data	3.791	SD of logged Data	0.982

Assuming Lognormal Distribution

95% H-UCL	71.58	90% Chebyshev (MVUE) UCL	32.2
95% Chebyshev (MVUE) UCL	39.9	97.5% Chebyshev (MVUE) UCL	50.58
99% Chebyshev (MVUE) UCL	71.57		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	25.18	95% Jackknife UCL	26.92
95% Standard Bootstrap UCL	24.44	95% Bootstrap-t UCL	48.77
95% Hall's Bootstrap UCL	79.27	95% Percentile Bootstrap UCL	24.95
95% BCA Bootstrap UCL	26.9		
90% Chebyshev(Mean, Sd) UCL	33.1	95% Chebyshev(Mean, Sd) UCL	41.05
97.5% Chebyshev(Mean, Sd) UCL	52.08	99% Chebyshev(Mean, Sd) UCL	73.75

Suggested UCL to Use

95% Student's-t UCL	26.92

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

alpha-Chlordane

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	1.23	Mean	9.581
Maximum	31	Median	5.41
SD	10.45	Std. Error of Mean	3.95
Coefficient of Variation	1.091	Skewness	1.813

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.784	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	17.26	95% Adjusted-CLT UCL (Chen-1995)	18.97
		95% Modified-t UCL (Johnson-1978)	17.71

Gamma GOF Test

A-D Test Statistic	0.273	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.217	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.196	k star (bias corrected MLE)	0.778
Theta hat (MLE)	8.015	Theta star (bias corrected MLE)	12.31
nu hat (MLE)	16.74	nu star (bias corrected)	10.9
MLE Mean (bias corrected)	9.581	MLE Sd (bias corrected)	10.86
		Approximate Chi Square Value (0.05)	4.51
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	3.355

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	23.15	95% Adjusted Gamma UCL (use when n<50)	31.12

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.207	Mean of logged Data	1.787
Maximum of Logged Data	3.434	SD of logged Data	1.067

Assuming Lognormal Distribution

95% H-UCL	57.33	90% Chebyshev (MVUE) UCL	20.94
95% Chebyshev (MVUE) UCL	26.14	97.5% Chebyshev (MVUE) UCL	33.35
99% Chebyshev (MVUE) UCL	47.53		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	16.08	95% Jackknife UCL	17.26
95% Standard Bootstrap UCL	15.44	95% Bootstrap-t UCL	36.67
95% Hall's Bootstrap UCL	53.96	95% Percentile Bootstrap UCL	16.21
95% BCA Bootstrap UCL	18.15		
90% Chebyshev(Mean, Sd) UCL	21.43	95% Chebyshev(Mean, Sd) UCL	26.8
97.5% Chebyshev(Mean, Sd) UCL	34.25	99% Chebyshev(Mean, Sd) UCL	48.88

Suggested UCL to Use

95% Adjusted Gamma UCL	31.12

Recommended UCL exceeds the maximum observation

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

Chlordane, gamma

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	0.217	Mean	3.474
Maximum	9.19	Median	3.98
SD	3.085	Std. Error of Mean	1.166
Coefficient of Variation	0.888	Skewness	0.964

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.74	95% Adjusted-CLT UCL (Chen-1995)	5.846
		95% Modified-t UCL (Johnson-1978)	5.811

Gamma GOF Test

A-D Test Statistic	0.372	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.028	k star (bias corrected MLE)	0.683
Theta hat (MLE)	3.378	Theta star (bias corrected MLE)	5.086
nu hat (MLE)	14.4	nu star (bias corrected)	9.561
MLE Mean (bias corrected)	3.474	MLE Sd (bias corrected)	4.203
		Approximate Chi Square Value (0.05)	3.669
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	2.656

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.051	95% Adjusted Gamma UCL (use when n<50)	12.51

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.528	Mean of logged Data	0.686
Maximum of Logged Data	2.218	SD of logged Data	1.362

Assuming Lognormal Distribution

95% H-UCL	70.78	90% Chebyshev (MVUE) UCL	10.39
95% Chebyshev (MVUE) UCL	13.23	97.5% Chebyshev (MVUE) UCL	17.17
99% Chebyshev (MVUE) UCL	24.92		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.392	95% Jackknife UCL	5.74
95% Standard Bootstrap UCL	5.237	95% Bootstrap-t UCL	6.418
95% Hall's Bootstrap UCL	6.493	95% Percentile Bootstrap UCL	5.275
95% BCA Bootstrap UCL	5.817		
90% Chebyshev(Mean, Sd) UCL	6.972	95% Chebyshev(Mean, Sd) UCL	8.557
97.5% Chebyshev(Mean, Sd) UCL	10.76	99% Chebyshev(Mean, Sd) UCL	15.08

Suggested UCL to Use

95% Student's-t UCL 5.74

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

cis-NONACHLOR

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	1.29	Mean	4.134
Maximum	12.9	Median	2.48
SD	4.203	Std. Error of Mean	1.589
Coefficient of Variation	1.017	Skewness	1.94

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.739	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7.221	95% Adjusted-CLT UCL (Chen-1995)	7.992
		95% Modified-t UCL (Johnson-1978)	7.415

Gamma GOF Test

A-D Test Statistic	0.522	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.72	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.243	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.317	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.595	k star (bias corrected MLE)	1.007
Theta hat (MLE)	2.592	Theta star (bias corrected MLE)	4.107
nu hat (MLE)	22.33	nu star (bias corrected)	14.09
MLE Mean (bias corrected)	4.134	MLE Sd (bias corrected)	4.121
		Approximate Chi Square Value (0.05)	6.635
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	5.171

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	8.782	95% Adjusted Gamma UCL (use when n<50)	11.27

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.255	Mean of logged Data	1.074
Maximum of Logged Data	2.557	SD of logged Data	0.844

Assuming Lognormal Distribution

95% H-UCL	12.9	90% Chebyshev (MVUE) UCL	7.717
95% Chebyshev (MVUE) UCL	9.432	97.5% Chebyshev (MVUE) UCL	11.81
99% Chebyshev (MVUE) UCL	16.49		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.747	95% Jackknife UCL	7.221
95% Standard Bootstrap UCL	6.564	95% Bootstrap-t UCL	16.25
95% Hall's Bootstrap UCL	18.99	95% Percentile Bootstrap UCL	6.71
95% BCA Bootstrap UCL	7.916		
90% Chebyshev(Mean, Sd) UCL	8.9	95% Chebyshev(Mean, Sd) UCL	11.06
97.5% Chebyshev(Mean, Sd) UCL	14.05	99% Chebyshev(Mean, Sd) UCL	19.94

Suggested UCL to Use

95% Adjusted Gamma UCL 11.27

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

DIELDRIN

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	1.03	Mean	2.889
Maximum	8.49	Median	2.49
SD	2.564	Std. Error of Mean	0.969
Coefficient of Variation	0.888	Skewness	2.251

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.7	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.371	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.772	95% Adjusted-CLT UCL (Chen-1995)	5.364
		95% Modified-t UCL (Johnson-1978)	4.909

Gamma GOF Test

A-D Test Statistic	0.549	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.286	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.315	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.226	k star (bias corrected MLE)	1.367
Theta hat (MLE)	1.298	Theta star (bias corrected MLE)	2.113
nu hat (MLE)	31.16	nu star (bias corrected)	19.14
MLE Mean (bias corrected)	2.889	MLE Sd (bias corrected)	2.471
		Approximate Chi Square Value (0.05)	10.22
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	8.325

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.41	95% Adjusted Gamma UCL (use when n<50)	6.641

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.0296	Mean of logged Data	0.82
Maximum of Logged Data	2.139	SD of logged Data	0.699

Assuming Lognormal Distribution

95% H-UCL	6.635	90% Chebyshev (MVUE) UCL	5.006
95% Chebyshev (MVUE) UCL	6.012	97.5% Chebyshev (MVUE) UCL	7.409
99% Chebyshev (MVUE) UCL	10.15		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.483	95% Jackknife UCL	4.772
95% Standard Bootstrap UCL	4.339	95% Bootstrap-t UCL	7.789
95% Hall's Bootstrap UCL	11.25	95% Percentile Bootstrap UCL	4.526
95% BCA Bootstrap UCL	4.997		
90% Chebyshev(Mean, Sd) UCL	5.796	95% Chebyshev(Mean, Sd) UCL	7.113
97.5% Chebyshev(Mean, Sd) UCL	8.941	99% Chebyshev(Mean, Sd) UCL	12.53

Suggested UCL to Use

95% Adjusted Gamma UCL	6.641

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

HEPTACHLOR EPOXIDE

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	0.357	Mean	1.314
Maximum	3.69	Median	1.07
SD	1.126	Std. Error of Mean	0.426
Coefficient of Variation	0.857	Skewness	1.957

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.786	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.141	95% Adjusted-CLT UCL (Chen-1995)	2.351
		95% Modified-t UCL (Johnson-1978)	2.194

Gamma GOF Test

A-D Test Statistic	0.306	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.211	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.315	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.103	k star (bias corrected MLE)	1.297
Theta hat (MLE)	0.625	Theta star (bias corrected MLE)	1.013
nu hat (MLE)	29.44	nu star (bias corrected)	18.16
MLE Mean (bias corrected)	1.314	MLE Sd (bias corrected)	1.154
		Approximate Chi Square Value (0.05)	9.506
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	7.691

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.51	95% Adjusted Gamma UCL (use when n<50)	3.102

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.03	Mean of logged Data	0.0168
Maximum of Logged Data	1.306	SD of logged Data	0.751

Assuming Lognormal Distribution

95% H-UCL	3.415	90% Chebyshev (MVUE) UCL	2.389
95% Chebyshev (MVUE) UCL	2.889	97.5% Chebyshev (MVUE) UCL	3.583
99% Chebyshev (MVUE) UCL	4.945		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.014	95% Jackknife UCL	2.141
95% Standard Bootstrap UCL	1.97	95% Bootstrap-t UCL	3.283
95% Hall's Bootstrap UCL	5.422	95% Percentile Bootstrap UCL	2.051
95% BCA Bootstrap UCL	2.251		
90% Chebyshev(Mean, Sd) UCL	2.591	95% Chebyshev(Mean, Sd) UCL	3.169
97.5% Chebyshev(Mean, Sd) UCL	3.972	99% Chebyshev(Mean, Sd) UCL	5.549

Suggested UCL to Use

95% Student's-t UCL	2.141

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Mercury

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	13
Minimum	0.033	Mean	0.108
Maximum	0.236	Median	0.121
SD	0.0678	Std. Error of Mean	0.0256
Coefficient of Variation	0.627	Skewness	1.076

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.158	95% Adjusted-CLT UCL (Chen-1995)	0.161
		95% Modified-t UCL (Johnson-1978)	0.16

Gamma GOF Test

A-D Test Statistic	0.334	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.712	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.223	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.004	k star (bias corrected MLE)	1.812
Theta hat (MLE)	0.036	Theta star (bias corrected MLE)	0.0597
nu hat (MLE)	42.06	nu star (bias corrected)	25.37
MLE Mean (bias corrected)	0.108	MLE Sd (bias corrected)	0.0803
		Approximate Chi Square Value (0.05)	14.89
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	12.54

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.184	95% Adjusted Gamma UCL (use when n<50)	0.219

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.24	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.411	Mean of logged Data	-2.4
Maximum of Logged Data	-1.444	SD of logged Data	0.659

Assuming Lognormal Distribution

95% H-UCL	0.24	90% Chebyshev (MVUE) UCL	0.191
95% Chebyshev (MVUE) UCL	0.228	97.5% Chebyshev (MVUE) UCL	0.279
99% Chebyshev (MVUE) UCL	0.38		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.15	95% Jackknife UCL	0.158
95% Standard Bootstrap UCL	0.147	95% Bootstrap-t UCL	0.175
95% Hall's Bootstrap UCL	0.181	95% Percentile Bootstrap UCL	0.148
95% BCA Bootstrap UCL	0.158		
90% Chebyshev(Mean, Sd) UCL	0.185	95% Chebyshev(Mean, Sd) UCL	0.22
97.5% Chebyshev(Mean, Sd) UCL	0.268	99% Chebyshev(Mean, Sd) UCL	0.363

Suggested UCL to Use

95% Student's-t UCL	0.158

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

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General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	0.635	Mean	1.817
Maximum	4.82	Median	1.71
SD	1.436	Std. Error of Mean	0.543
Coefficient of Variation	0.79	Skewness	1.863

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.79	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.871	95% Adjusted-CLT UCL (Chen-1995)	3.118
		95% Modified-t UCL (Johnson-1978)	2.935

Gamma GOF Test

A-D Test Statistic	0.363	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.315	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.405	k star (bias corrected MLE)	1.469
Theta hat (MLE)	0.756	Theta star (bias corrected MLE)	1.237
nu hat (MLE)	33.67	nu star (bias corrected)	20.57
MLE Mean (bias corrected)	1.817	MLE Sd (bias corrected)	1.499
		Approximate Chi Square Value (0.05)	11.27
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	9.267

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.315	95% Adjusted Gamma UCL (use when n<50)	4.033

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.454	Mean of logged Data	0.375
Maximum of Logged Data	1.573	SD of logged Data	0.699

Assuming Lognormal Distribution

95% H-UCL	4.254	90% Chebyshev (MVUE) UCL	3.209
95% Chebyshev (MVUE) UCL	3.855	97.5% Chebyshev (MVUE) UCL	4.75
99% Chebyshev (MVUE) UCL	6.509		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.709	95% Jackknife UCL	2.871
95% Standard Bootstrap UCL	2.636	95% Bootstrap-t UCL	3.611
95% Hall's Bootstrap UCL	6.53	95% Percentile Bootstrap UCL	2.748
95% BCA Bootstrap UCL	3.069		
90% Chebyshev(Mean, Sd) UCL	3.445	95% Chebyshev(Mean, Sd) UCL	4.182
97.5% Chebyshev(Mean, Sd) UCL	5.205	99% Chebyshev(Mean, Sd) UCL	7.215

Suggested UCL to Use

95% Student's-t UCL 2.871

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

PCB-TEQ (Mammal)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	1.1661E-4	Mean	0.0013
Maximum	0.00533	Median	5.1159E-4
SD	0.00189	Std. Error of Mean	7.1459E-4
Coefficient of Variation	1.455	Skewness	2.08

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.71	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.291	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.00269	95% Adjusted-CLT UCL (Chen-1995)	0.00307
		95% Modified-t UCL (Johnson-1978)	0.00278

Gamma GOF Test

A-D Test Statistic	0.435	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.324	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.673	k star (bias corrected MLE)	0.48
Theta hat (MLE)	0.00193	Theta star (bias corrected MLE)	0.00271
nu hat (MLE)	9.418	nu star (bias corrected)	6.715
MLE Mean (bias corrected)	0.0013	MLE Sd (bias corrected)	0.00188
		Approximate Chi Square Value (0.05)	2.016
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	1.332

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.00433	95% Adjusted Gamma UCL (use when n<50)	0.00655

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.229	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.057	Mean of logged Data	-7.549
Maximum of Logged Data	-5.235	SD of logged Data	1.481

Assuming Lognormal Distribution

95% H-UCL	0.0349	90% Chebyshev (MVUE) UCL	0.00326
95% Chebyshev (MVUE) UCL	0.00417	97.5% Chebyshev (MVUE) UCL	0.00544
99% Chebyshev (MVUE) UCL	0.00794		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00247	95% Jackknife UCL	0.00269
95% Standard Bootstrap UCL	0.00237	95% Bootstrap-t UCL	0.00706
95% Hall's Bootstrap UCL	0.00743	95% Percentile Bootstrap UCL	0.0025
95% BCA Bootstrap UCL	0.00299		
90% Chebyshev(Mean, Sd) UCL	0.00344	95% Chebyshev(Mean, Sd) UCL	0.00441
97.5% Chebyshev(Mean, Sd) UCL	0.00576	99% Chebyshev(Mean, Sd) UCL	0.00841

Suggested UCL to Use

95% Student's-t UCL 0.00269

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Total PCBs (Congeners)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	41.65	Mean	191.7
Maximum	680.6	Median	119.7
SD	227.9	Std. Error of Mean	86.14
Coefficient of Variation	1.188	Skewness	2.125

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.715	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.302	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	359.1	95% Adjusted-CLT UCL (Chen-1995)	407.3
		95% Modified-t UCL (Johnson-1978)	370.7

Gamma GOF Test

A-D Test Statistic	0.463	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.187	k star (bias corrected MLE)	0.774
Theta hat (MLE)	161.5	Theta star (bias corrected MLE)	247.9
nu hat (MLE)	16.62	nu star (bias corrected)	10.83
MLE Mean (bias corrected)	191.7	MLE Sd (bias corrected)	218
		Approximate Chi Square Value (0.05)	4.467
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	3.32

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	464.9	95% Adjusted Gamma UCL (use when n<50)	625.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.729	Mean of logged Data	4.779
Maximum of Logged Data	6.523	SD of logged Data	1.006

Assuming Lognormal Distribution

95% H-UCL	907.9	90% Chebyshev (MVUE) UCL	385.7
95% Chebyshev (MVUE) UCL	478.9	97.5% Chebyshev (MVUE) UCL	608.4
99% Chebyshev (MVUE) UCL	862.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	333.4	95% Jackknife UCL	359.1
95% Standard Bootstrap UCL	324.8	95% Bootstrap-t UCL	774.8
95% Hall's Bootstrap UCL	962.3	95% Percentile Bootstrap UCL	333.9
95% BCA Bootstrap UCL	380.1		
90% Chebyshev(Mean, Sd) UCL	450.2	95% Chebyshev(Mean, Sd) UCL	567.2
97.5% Chebyshev(Mean, Sd) UCL	729.7	99% Chebyshev(Mean, Sd) UCL	1049

Suggested UCL to Use

95% Student's-t UCL 359.1

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

trans-NONACHLOR

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	14
Minimum	2.94	Mean	10.66
Maximum	30	Median	7.01
SD	9.683	Std. Error of Mean	3.66
Coefficient of Variation	0.909	Skewness	1.657

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use

guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	17.77	95% Adjusted-CLT UCL (Chen-1995)	19.13
		95% Modified-t UCL (Johnson-1978)	18.15

Gamma GOF Test

A-D Test Statistic	0.343	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.188	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.316	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.783	k star (bias corrected MLE)	1.114
Theta hat (MLE)	5.978	Theta star (bias corrected MLE)	9.567
nu hat (MLE)	24.96	nu star (bias corrected)	15.6
MLE Mean (bias corrected)	10.66	MLE Sd (bias corrected)	10.1
		Approximate Chi Square Value (0.05)	7.678
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	6.079

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	21.65	95% Adjusted Gamma UCL (use when n<50)	27.34

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.158	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.078	Mean of logged Data	2.06
Maximum of Logged Data	3.401	SD of logged Data	0.821

Assuming Lognormal Distribution

95% H-UCL	32.21	90% Chebyshev (MVUE) UCL	20.09
95% Chebyshev (MVUE) UCL	24.49	97.5% Chebyshev (MVUE) UCL	30.6
99% Chebyshev (MVUE) UCL	42.61		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	16.68	95% Jackknife UCL	17.77
95% Standard Bootstrap UCL	16.27	95% Bootstrap-t UCL	31.5
95% Hall's Bootstrap UCL	47.77	95% Percentile Bootstrap UCL	16.66
95% BCA Bootstrap UCL	18.77		
90% Chebyshev(Mean, Sd) UCL	21.64	95% Chebyshev(Mean, Sd) UCL	26.61
97.5% Chebyshev(Mean, Sd) UCL	33.51	99% Chebyshev(Mean, Sd) UCL	47.07

Suggested UCL to Use

95% Student's-t UCL	17.77

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.15/10/2018 2:59:46 PM
From File	PotomacProUcl.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

4,4'-DDD (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	4.5200E-4	Mean	0.00346
Maximum	0.014	Median	0.0024
SD	0.00414	Std. Error of Mean	0.00138
Coefficient of Variation	1.198	Skewness	2.509

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.673	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.318	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.00602	95% Adjusted-CLT UCL (Chen-1995)	0.00696
		95% Modified-t UCL (Johnson-1978)	0.00621

Gamma GOF Test

A-D Test Statistic	0.406	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.173	k star (bias corrected MLE)	0.856
Theta hat (MLE)	0.00295	Theta star (bias corrected MLE)	0.00404
nu hat (MLE)	21.11	nu star (bias corrected)	15.41
MLE Mean (bias corrected)	0.00346	MLE Sd (bias corrected)	0.00374
		Approximate Chi Square Value (0.05)	7.545
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	6.42

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.00706	95% Adjusted Gamma UCL (use when n<50)	0.00829

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.172	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.702	Mean of logged Data	-6.151
Maximum of Logged Data	-4.269	SD of logged Data	1.044

Assuming Lognormal Distribution

95% H-UCL	0.0126	90% Chebyshev (MVUE) UCL	0.00705
95% Chebyshev (MVUE) UCL	0.00871	97.5% Chebyshev (MVUE) UCL	0.011
99% Chebyshev (MVUE) UCL	0.0155		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00573	95% Jackknife UCL	0.00602
95% Standard Bootstrap UCL	0.0056	95% Bootstrap-t UCL	0.0104
95% Hall's Bootstrap UCL	0.0157	95% Percentile Bootstrap UCL	0.00599
95% BCA Bootstrap UCL	0.00656		
90% Chebyshev(Mean, Sd) UCL	0.0076	95% Chebyshev(Mean, Sd) UCL	0.00947
97.5% Chebyshev(Mean, Sd) UCL	0.0121	99% Chebyshev(Mean, Sd) UCL	0.0172

Suggested UCL to Use

95% Adjusted Gamma UCL 0.00829

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

4,4'-DDD (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	2.9100E-4	Mean	0.0103
Maximum	0.0516	Median	0.00188
SD	0.0174	Std. Error of Mean	0.00579
Coefficient of Variation	1.69	Skewness	2.139

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.649	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.021	95% Adjusted-CLT UCL (Chen-1995)	0.0242
		95% Modified-t UCL (Johnson-1978)	0.0217

Gamma GOF Test

A-D Test Statistic	0.53	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.772	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.492	k star (bias corrected MLE)	0.402
Theta hat (MLE)	0.0209	Theta star (bias corrected MLE)	0.0255
nu hat (MLE)	8.864	nu star (bias corrected)	7.243
MLE Mean (bias corrected)	0.0103	MLE Sd (bias corrected)	0.0162
		Approximate Chi Square Value (0.05)	2.305
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	1.763

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0323	95% Adjusted Gamma UCL (use when n<50)	0.0422

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.147	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-8.142	Mean of logged Data	-5.871
Maximum of Logged Data	-2.964	SD of logged Data	1.758

Assuming Lognormal Distribution

95% H-UCL	0.312	90% Chebyshev (MVUE) UCL	0.0268
95% Chebyshev (MVUE) UCL	0.0346	97.5% Chebyshev (MVUE) UCL	0.0454
99% Chebyshev (MVUE) UCL	0.0667		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0198	95% Jackknife UCL	0.021
95% Standard Bootstrap UCL	0.0191	95% Bootstrap-t UCL	0.0786
95% Hall's Bootstrap UCL	0.0717	95% Percentile Bootstrap UCL	0.0206
95% BCA Bootstrap UCL	0.0247		
90% Chebyshev(Mean, Sd) UCL	0.0276	95% Chebyshev(Mean, Sd) UCL	0.0355
97.5% Chebyshev(Mean, Sd) UCL	0.0464	99% Chebyshev(Mean, Sd) UCL	0.0678

Suggested UCL to Use

95% Adjusted Gamma UCL	0.0422

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

4,4'-DDE (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.00243	Mean	0.0171
Maximum	0.0601	Median	0.00886
SD	0.0195	Std. Error of Mean	0.0065
Coefficient of Variation	1.139	Skewness	1.787

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.358	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0292	95% Adjusted-CLT UCL (Chen-1995)	0.032
		95% Modified-t UCL (Johnson-1978)	0.0299

Gamma GOF Test

A-D Test Statistic	0.577	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.26	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.181	k star (bias corrected MLE)	0.861
Theta hat (MLE)	0.0145	Theta star (bias corrected MLE)	0.0199
nu hat (MLE)	21.26	nu star (bias corrected)	15.51
MLE Mean (bias corrected)	0.0171	MLE Sd (bias corrected)	0.0185
		Approximate Chi Square Value (0.05)	7.614
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	6.483

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0349	95% Adjusted Gamma UCL (use when n<50)	0.041

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.192	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.02	Mean of logged Data	-4.547
Maximum of Logged Data	-2.812	SD of logged Data	1.009

Assuming Lognormal Distribution

95% H-UCL	0.0564	90% Chebyshev (MVUE) UCL	0.0334
95% Chebyshev (MVUE) UCL	0.0412	97.5% Chebyshev (MVUE) UCL	0.0519
99% Chebyshev (MVUE) UCL	0.073		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0278	95% Jackknife UCL	0.0292
95% Standard Bootstrap UCL	0.0271	95% Bootstrap-t UCL	0.0709
95% Hall's Bootstrap UCL	0.102	95% Percentile Bootstrap UCL	0.0286
95% BCA Bootstrap UCL	0.0305		
90% Chebyshev(Mean, Sd) UCL	0.0366	95% Chebyshev(Mean, Sd) UCL	0.0455
97.5% Chebyshev(Mean, Sd) UCL	0.0578	99% Chebyshev(Mean, Sd) UCL	0.0819

Suggested UCL to Use

95% Adjusted Gamma UCL	0.041

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

4,4'-DDE (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.00416	Mean	0.0624
Maximum	0.243	Median	0.00967
SD	0.101	Std. Error of Mean	0.0337
Coefficient of Variation	1.619	Skewness	1.593

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.602	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.414	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.125	95% Adjusted-CLT UCL (Chen-1995)	0.137
		95% Modified-t UCL (Johnson-1978)	0.128

Gamma GOF Test

A-D Test Statistic	1.063	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.769	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.295	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.294	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.522	k star (bias corrected MLE)	0.422
Theta hat (MLE)	0.119	Theta star (bias corrected MLE)	0.148
nu hat (MLE)	9.402	nu star (bias corrected)	7.601
MLE Mean (bias corrected)	0.0624	MLE Sd (bias corrected)	0.096
		Approximate Chi Square Value (0.05)	2.506
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	1.934

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.189	95% Adjusted Gamma UCL (use when n<50)	0.245

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.482	Mean of logged Data	-3.982
Maximum of Logged Data	-1.415	SD of logged Data	1.59

Assuming Lognormal Distribution

95% H-UCL	0.912	90% Chebyshev (MVUE) UCL	0.137
95% Chebyshev (MVUE) UCL	0.175	97.5% Chebyshev (MVUE) UCL	0.228
99% Chebyshev (MVUE) UCL	0.333		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.118	95% Jackknife UCL	0.125
95% Standard Bootstrap UCL	0.114	95% Bootstrap-t UCL	0.679
95% Hall's Bootstrap UCL	0.556	95% Percentile Bootstrap UCL	0.115
95% BCA Bootstrap UCL	0.138		
90% Chebyshev(Mean, Sd) UCL	0.163	95% Chebyshev(Mean, Sd) UCL	0.209
97.5% Chebyshev(Mean, Sd) UCL	0.273	99% Chebyshev(Mean, Sd) UCL	0.397

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	0.397

Recommended UCL exceeds the maximum observation

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

ALDRIN (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	5	Number of Non-Detects	4
Number of Distinct Detects	5	Number of Distinct Non-Detects	4
Minimum Detect	6.7000E-5	Minimum Non-Detect	4.9200E-5
Maximum Detect	0.0012	Maximum Non-Detect	5.0200E-5
Variance Detects	2.2902E-7	Percent Non-Detects	44.44%
Mean Detects	3.5900E-4	SD Detects	4.7856E-4
Median Detects	1.1500E-4	CV Detects	1.333
Skewness Detects	2.054	Kurtosis Detects	4.267
Mean of Logged Detects	-8.521	SD of Logged Detects	1.14

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.695	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	2.2131E-4	KM Standard Error of Mean	1.3202E-4
KM SD	3.5424E-4	95% KM (BCA) UCL	4.5429E-4
95% KM (t) UCL	4.6680E-4	95% KM (Percentile Bootstrap) UCL	4.5456E-4
95% KM (z) UCL	4.3846E-4	95% KM Bootstrap t UCL	0.00186
90% KM Chebyshev UCL	6.1736E-4	95% KM Chebyshev UCL	7.9676E-4
97.5% KM Chebyshev UCL	0.00105	99% KM Chebyshev UCL	0.00153

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.55	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.692	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.322	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.365	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.982	k star (bias corrected MLE)	0.526
Theta hat (MLE)	3.6563E-4	Theta star (bias corrected MLE)	6.8241E-4
nu hat (MLE)	9.819	nu star (bias corrected)	5.261
Mean (detects)	3.5900E-4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	6.7000E-5	Mean	0.00464
Maximum	0.01	Median	0.0012
SD	0.00509	CV	1.097
k hat (MLE)	0.457	k star (bias corrected MLE)	0.379
Theta hat (MLE)	0.0102	Theta star (bias corrected MLE)	0.0123
nu hat (MLE)	8.231	nu star (bias corrected)	6.821
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (6.82, α)	2.073	Adjusted Chi Square Value (6.82, β)	1.567
95% Gamma Approximate UCL (use when n>=50)	0.0153	95% Gamma Adjusted UCL (use when n<50)	0.0202

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.2131E-4	SD (KM)	3.5424E-4
Variance (KM)	1.2548E-7	SE of Mean (KM)	1.3202E-4
k hat (KM)	0.39	k star (KM)	0.334
nu hat (KM)	7.026	nu star (KM)	6.017
theta hat (KM)	5.6700E-4	theta star (KM)	6.6204E-4
80% gamma percentile (KM)	3.4752E-4	90% gamma percentile (KM)	6.4346E-4
95% gamma percentile (KM)	9.7723E-4	99% gamma percentile (KM)	0.00183

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.02, α)	1.649	Adjusted Chi Square Value (6.02, β)	1.214
95% Gamma Approximate KM-UCL (use when n>=50)	8.0774E-4	95% Gamma Adjusted KM-UCL (use when n<50)	0.0011

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.0294E-4	Mean in Log Scale	-9.958
SD in Original Scale	3.8569E-4	SD in Log Scale	1.885
95% t UCL (assumes normality of ROS data)	4.4201E-4	95% Percentile Bootstrap UCL	4.4051E-4
95% BCA Bootstrap UCL	5.6252E-4	95% Bootstrap t UCL	0.00153
95% H-UCL (Log ROS)	0.0103		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-9.143	KM Geo Mean	1.0699E-4
KM SD (logged)	1.03	95% Critical H Value (KM-Log)	3.306
KM Standard Error of Mean (logged)	0.384	95% H-UCL (KM -Log)	6.0609E-4
KM SD (logged)	1.03	95% Critical H Value (KM-Log)	3.306
KM Standard Error of Mean (logged)	0.384		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.1052E-4	Mean in Log Scale	-9.445
SD in Original Scale	3.8146E-4	SD in Log Scale	1.36
95% t UCL (Assumes normality)	4.4697E-4	95% H-Stat UCL	0.00143

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.00186	ıa Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.0011

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

alpha-Chlordane (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	4.1700E-4	Mean	0.00571
Maximum	0.0241	Median	0.0025
SD	0.0075	Std. Error of Mean	0.0025
Coefficient of Variation	1.312	Skewness	2.258

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.688	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0104	95% Adjusted-CLT UCL (Chen-1995)	0.0118
		95% Modified-t UCL (Johnson-1978)	0.0107

Gamma GOF Test

A-D Test Statistic	0.502	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.294	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.288	Data Not Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	0.933	k star (bias corrected MLE)	0.696
Theta hat (MLE)	0.00612	Theta star (bias corrected MLE)	0.00821
nu hat (MLE)	16.79	nu star (bias corrected)	12.53
MLE Mean (bias corrected)	0.00571	MLE Sd (bias corrected)	0.00685
		Approximate Chi Square Value (0.05)	5.577
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	4.637

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0128	95% Adjusted Gamma UCL (use when n<50)	0.0154

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.229	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.782	Mean of logged Data	-5.789
Maximum of Logged Data	-3.726	SD of logged Data	1.19

Assuming Lognormal Distribution

95% H-UCL	0.0292	90% Chebyshev (MVUE) UCL	0.0124
95% Chebyshev (MVUE) UCL	0.0155	97.5% Chebyshev (MVUE) UCL	0.0198
99% Chebyshev (MVUE) UCL	0.0283		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00982	95% Jackknife UCL	0.0104
95% Standard Bootstrap UCL	0.00957	95% Bootstrap-t UCL	0.0219
95% Hall's Bootstrap UCL	0.026	95% Percentile Bootstrap UCL	0.0103
95% BCA Bootstrap UCL	0.0112		
90% Chebyshev(Mean, Sd) UCL	0.0132	95% Chebyshev(Mean, Sd) UCL	0.0166
97.5% Chebyshev(Mean, Sd) UCL	0.0213	99% Chebyshev(Mean, Sd) UCL	0.0306

Suggested UCL to Use

95% Adjusted Gamma UCL 0.0154

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

alpha-Chlordane (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	2.0500E-4	Mean	0.0123
Maximum	0.0537	Median	0.00284
SD	0.0182	Std. Error of Mean	0.00606
Coefficient of Variation	1.48	Skewness	1.84

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.73	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0236	95% Adjusted-CLT UCL (Chen-1995)	0.0262
		95% Modified-t UCL (Johnson-1978)	0.0242

Gamma GOF Test

A-D Test Statistic	0.366	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.773	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.212	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.486	k star (bias corrected MLE)	0.398
Theta hat (MLE)	0.0253	Theta star (bias corrected MLE)	0.0309
nu hat (MLE)	8.752	nu star (bias corrected)	7.168
MLE Mean (bias corrected)	0.0123	MLE Sd (bias corrected)	0.0195
		Approximate Chi Square Value (0.05)	2.263
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	1.727

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0389	95% Adjusted Gamma UCL (use when n<50)	0.051

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-8.493	Mean of logged Data	-5.711
Maximum of Logged Data	-2.924	SD of logged Data	1.936

Assuming Lognormal Distribution

95% H-UCL	0.959	90% Chebyshev (MVUE) UCL	0.0419
95% Chebyshev (MVUE) UCL	0.0544	97.5% Chebyshev (MVUE) UCL	0.0718
99% Chebyshev (MVUE) UCL	0.106		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0223	95% Jackknife UCL	0.0236
95% Standard Bootstrap UCL	0.0216	95% Bootstrap-t UCL	0.045
95% Hall's Bootstrap UCL	0.0711	95% Percentile Bootstrap UCL	0.0229
95% BCA Bootstrap UCL	0.0271		
90% Chebyshev(Mean, Sd) UCL	0.0305	95% Chebyshev(Mean, Sd) UCL	0.0387
97.5% Chebyshev(Mean, Sd) UCL	0.0501	99% Chebyshev(Mean, Sd) UCL	0.0726

Suggested UCL to Use

95% Adjusted Gamma UCL	0.051

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

Arsenic (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
Number of Detects	2	Number of Non-Detects	7
Number of Distinct Detects	2	Number of Distinct Non-Detects	6
Minimum Detect	0.192	Minimum Non-Detect	0.089
Maximum Detect	3.71	Maximum Non-Detect	0.167
Variance Detects	6.188	Percent Non-Detects	77.78%
Mean Detects	1.951	SD Detects	2.488
Median Detects	1.951	CV Detects	1.275
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.17	SD of Logged Detects	2.094

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

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

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

KM Mean	0.503	KM Standard Error of Mean	0.535
KM SD	1.134	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.497	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.382	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.107	95% KM Chebyshev UCL	2.834
97.5% KM Chebyshev UCL	3.842	99% KM Chebyshev UCL	5.823

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.719	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.715	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.874	nu star (bias corrected)	N/A
Mean (detects)	1.951		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.503	SD (KM)	1.134
Variance (KM)	1.287	SE of Mean (KM)	0.535
k hat (KM)	0.196	k star (KM)	0.205
nu hat (KM)	3.536	nu star (KM)	3.691
theta hat (KM)	2.559	theta star (KM)	2.452
80% gamma percentile (KM)	0.671	90% gamma percentile (KM)	1.521
95% gamma percentile (KM)	2.574	99% gamma percentile (KM)	5.461

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0231
Approximate Chi Square Value (3.69, α)	0.603	Adjusted Chi Square Value (3.69, β)	0.395
95% Gamma Approximate KM-UCL (use when n>=50)	3.075	95% Gamma Adjusted KM-UCL (use when n<50)	4.699

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.434	Mean in Log Scale	-8.956
SD in Original Scale	1.23	SD in Log Scale	5.196
95% t UCL (assumes normality of ROS data)	1.196	95% Percentile Bootstrap UCL	1.237
95% BCA Bootstrap UCL	1.67	95% Bootstrap t UCL	13924
95% H-UCL (Log ROS)	2.224E+13		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.919	KM Geo Mean	0.147
KM SD (logged)	1.167	95% Critical H Value (KM-Log)	3.621
KM Standard Error of Mean (logged)	0.55	95% H-UCL (KM -Log)	1.291
KM SD (logged)	1.167	95% Critical H Value (KM-Log)	3.621
KM Standard Error of Mean (logged)	0.55		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.475	Mean in Log Scale	-2.34
SD in Original Scale	1.214	SD in Log Scale	1.45
95% t UCL (Assumes normality)	1.227	95% H-Stat UCL	2.523

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

KM Bootstrap t UCL N/A

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

Arsenic (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	5	Number of Non-Detects	4
Number of Distinct Detects	5	Number of Distinct Non-Detects	4
Minimum Detect	0.112	Minimum Non-Detect	0.095
Maximum Detect	0.846	Maximum Non-Detect	0.108
Variance Detects	0.0817	Percent Non-Detects	44.44%
Mean Detects	0.354	SD Detects	0.286
Median Detects	0.247	CV Detects	0.808
Skewness Detects	1.826	Kurtosis Detects	3.7
Mean of Logged Detects	-1.264	SD of Logged Detects	0.73

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.796	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.239	KM Standard Error of Mean	0.0857
KM SD	0.23	95% KM (BCA) UCL	0.39
95% KM (t) UCL	0.398	95% KM (Percentile Bootstrap) UCL	0.38
95% KM (z) UCL	0.38	95% KM Bootstrap t UCL	0.526
90% KM Chebyshev UCL	0.496	95% KM Chebyshev UCL	0.612
97.5% KM Chebyshev UCL	0.774	99% KM Chebyshev UCL	1.091

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.381	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.684	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.36	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.386	k star (bias corrected MLE)	1.088
Theta hat (MLE)	0.148	Theta star (bias corrected MLE)	0.325
nu hat (MLE)	23.86	nu star (bias corrected)	10.88
Mean (detects)	0.354		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.201
Maximum	0.846	Median	0.112
SD	0.271	CV	1.351
k hat (MLE)	0.548	k star (bias corrected MLE)	0.439
Theta hat (MLE)	0.367	Theta star (bias corrected MLE)	0.457
nu hat (MLE)	9.858	nu star (bias corrected)	7.905
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (7.91, α)	2.68	Adjusted Chi Square Value (7.91, β)	2.083
95% Gamma Approximate UCL (use when n>=50)	0.593	95% Gamma Adjusted UCL (use when n<50)	0.762

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.239	SD (KM)	0.23
Variance (KM)	0.0528	SE of Mean (KM)	0.0857
k hat (KM)	1.078	k star (KM)	0.793
nu hat (KM)	19.41	nu star (KM)	14.27
theta hat (KM)	0.221	theta star (KM)	0.301
80% gamma percentile (KM)	0.39	90% gamma percentile (KM)	0.582
95% gamma percentile (KM)	0.777	99% gamma percentile (KM)	1.238

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (14.27, α)	6.757	Adjusted Chi Square Value (14.27, β)	5.703
95% Gamma Approximate KM-UCL (use when n>=50)	0.504	95% Gamma Adjusted KM-UCL (use when n<50)	0.597

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.212	Mean in Log Scale	-2.179
SD in Original Scale	0.262	SD in Log Scale	1.202
95% t UCL (assumes normality of ROS data)	0.375	95% Percentile Bootstrap UCL	0.359
95% BCA Bootstrap UCL	0.405	95% Bootstrap t UCL	0.557
95% H-UCL (Log ROS)	1.125		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.748	KM Geo Mean	0.174
KM SD (logged)	0.728	95% Critical H Value (KM-Log)	2.672
KM Standard Error of Mean (logged)	0.271	95% H-UCL (KM -Log)	0.452
KM SD (logged)	0.728	95% Critical H Value (KM-Log)	2.672
KM Standard Error of Mean (logged)	0.271		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.219	Mean in Log Scale	-2.029
SD in Original Scale	0.258	SD in Log Scale	1.045
95% t UCL (Assumes normality)	0.379	95% H-Stat UCL	0.78

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.398

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

beta-BHC (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	6.0000E-5	Mean	6.9133E-4
Maximum	0.00274	Median	4.9600E-4
SD	8.1082E-4	Std. Error of Mean	2.7027E-4
Coefficient of Variation	1.173	Skewness	2.421

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.697	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.337	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.00119	95% Adjusted-CLT UCL (Chen-1995)	0.00137
		95% Modified-t UCL (Johnson-1978)	0.00123

Gamma GOF Test

A-D Test Statistic	0.351	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.206	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.075	k star (bias corrected MLE)	0.791
Theta hat (MLE)	6.4314E-4	Theta star (bias corrected MLE)	8.7433E-4
nu hat (MLE)	19.35	nu star (bias corrected)	14.23
MLE Mean (bias corrected)	6.9133E-4	MLE Sd (bias corrected)	7.7747E-4
		Approximate Chi Square Value (0.05)	6.731
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	5.679

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.00146	95% Adjusted Gamma UCL (use when n<50)	0.00173

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.721	Mean of logged Data	-7.809
Maximum of Logged Data	-5.9	SD of logged Data	1.161

Assuming Lognormal Distribution

95% H-UCL	0.0035	90% Chebyshev (MVUE) UCL	0.00158
95% Chebyshev (MVUE) UCL	0.00197	97.5% Chebyshev (MVUE) UCL	0.00251
99% Chebyshev (MVUE) UCL	0.00358		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00114	95% Jackknife UCL	0.00119
95% Standard Bootstrap UCL	0.0011	95% Bootstrap-t UCL	0.0018
95% Hall's Bootstrap UCL	0.00301	95% Percentile Bootstrap UCL	0.0012
95% BCA Bootstrap UCL	0.00136		
90% Chebyshev(Mean, Sd) UCL	0.0015	95% Chebyshev(Mean, Sd) UCL	0.00187
97.5% Chebyshev(Mean, Sd) UCL	0.00238	99% Chebyshev(Mean, Sd) UCL	0.00338

Suggested UCL to Use

95% Adjusted Gamma UCL	0.00173

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

Chlordane, gamma (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	3.8400E-4	Minimum Non-Detect	4.9600E-5
Maximum Detect	0.00943	Maximum Non-Detect	4.9600E-5
Variance Detects	1.0633E-5	Percent Non-Detects	11.11%
Mean Detects	0.00313	SD Detects	0.00326
Median Detects	0.00157	CV Detects	1.043
Skewness Detects	1.341	Kurtosis Detects	0.706
Mean of Logged Detects	-6.261	SD of Logged Detects	1.088

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.814	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.288	Lilliefors GOF Test
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.00279	KM Standard Error of Mean	0.00108
KM SD	0.00303	95% KM (BCA) UCL	0.00467
95% KM (t) UCL	0.0048	95% KM (Percentile Bootstrap) UCL	0.00456
95% KM (z) UCL	0.00456	95% KM Bootstrap t UCL	0.0075
90% KM Chebyshev UCL	0.00603	95% KM Chebyshev UCL	0.0075
97.5% KM Chebyshev UCL	0.00954	99% KM Chebyshev UCL	0.0135

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.325	Anderson-Darling GOF Test
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.301	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.151	k star (bias corrected MLE)	0.803
Theta hat (MLE)	0.00272	Theta star (bias corrected MLE)	0.0039
nu hat (MLE)	18.41	nu star (bias corrected)	12.84
Mean (detects)	0.00313		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	3.8400E-4	Mean	0.00389
Maximum	0.01	Median	0.00176
SD	0.00381	CV	0.98
k hat (MLE)	1.083	k star (bias corrected MLE)	0.796
Theta hat (MLE)	0.00359	Theta star (bias corrected MLE)	0.00489
nu hat (MLE)	19.49	nu star (bias corrected)	14.33
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (14.33, α)	6.796	Adjusted Chi Square Value (14.33, β)	5.739
95% Gamma Approximate UCL (use when n>=50)	0.0082	95% Gamma Adjusted UCL (use when n<50)	0.00971

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00279	SD (KM)	0.00303
Variance (KM)	9.2060E-6	SE of Mean (KM)	0.00108
k hat (KM)	0.843	k star (KM)	0.636
nu hat (KM)	15.17	nu star (KM)	11.45
theta hat (KM)	0.0033	theta star (KM)	0.00438
80% gamma percentile (KM)	0.00459	90% gamma percentile (KM)	0.00715
95% gamma percentile (KM)	0.00982	99% gamma percentile (KM)	0.0162

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.45, α)	4.865	Adjusted Chi Square Value (11.45, β)	4
95% Gamma Approximate KM-UCL (use when n>=50)	0.00655	95% Gamma Adjusted KM-UCL (use when n<50)	0.00797

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00279	Mean in Log Scale	-6.563
SD in Original Scale	0.00321	SD in Log Scale	1.363
95% t UCL (assumes normality of ROS data)	0.00478	95% Percentile Bootstrap UCL	0.00448
95% BCA Bootstrap UCL	0.00515	95% Bootstrap t UCL	0.00772
95% H-UCL (Log ROS)	0.0257		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.667	KM Geo Mean	0.00127
KM SD (logged)	1.496	95% Critical H Value (KM-Log)	4.432
KM Standard Error of Mean (logged)	0.533	95% H-UCL (KM -Log)	0.0406
KM SD (logged)	1.496	95% Critical H Value (KM-Log)	4.432
KM Standard Error of Mean (logged)	0.533		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00278	Mean in Log Scale	-6.744
SD in Original Scale	0.00322	SD in Log Scale	1.77
95% t UCL (Assumes normality)	0.00478	95% H-Stat UCL	0.138

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.0075	ıa Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.00797

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

Chlordane, gamma (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	5.7000E-5	Minimum Non-Detect	4.9700E-5
Maximum Detect	0.00876	Maximum Non-Detect	4.9700E-5
Variance Detects	1.1915E-5	Percent Non-Detects	11.11%
Mean Detects	0.00285	SD Detects	0.00345
Median Detects	9.8050E-4	CV Detects	1.213
Skewness Detects	0.837	Kurtosis Detects	-1.033
Mean of Logged Detects	-7.159	SD of Logged Detects	2.037

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.00254	KM Standard Error of Mean	0.00113
KM SD	0.00317	95% KM (BCA) UCL	0.00452
95% KM (t) UCL	0.00464	95% KM (Percentile Bootstrap) UCL	0.00443
95% KM (z) UCL	0.00439	95% KM Bootstrap t UCL	0.00539
90% KM Chebyshev UCL	0.00592	95% KM Chebyshev UCL	0.00746
97.5% KM Chebyshev UCL	0.00959	99% KM Chebyshev UCL	0.0138

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.574	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.276	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.309	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.491	k star (bias corrected MLE)	0.39
Theta hat (MLE)	0.0058	Theta star (bias corrected MLE)	0.00729
nu hat (MLE)	7.858	nu star (bias corrected)	6.244
Mean (detects)	0.00285		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	5.7000E-5	Mean	0.00364
Maximum	0.01	Median	0.00174
SD	0.00401	CV	1.102
k hat (MLE)	0.504	k star (bias corrected MLE)	0.41
Theta hat (MLE)	0.00723	Theta star (bias corrected MLE)	0.00888
nu hat (MLE)	9.067	nu star (bias corrected)	7.378
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (7.38, α)	2.38	Adjusted Chi Square Value (7.38, β)	1.827
95% Gamma Approximate UCL (use when n>=50)	0.0113	95% Gamma Adjusted UCL (use when n<50)	0.0147

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00254	SD (KM)	0.00317
Variance (KM)	1.0040E-5	SE of Mean (KM)	0.00113
k hat (KM)	0.641	k star (KM)	0.501
nu hat (KM)	11.53	nu star (KM)	9.02
theta hat (KM)	0.00396	theta star (KM)	0.00506
80% gamma percentile (KM)	0.00417	90% gamma percentile (KM)	0.00686
95% gamma percentile (KM)	0.00973	99% gamma percentile (KM)	0.0168

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.02, α)	3.339	Adjusted Chi Square Value (9.02, β)	2.652
95% Gamma Approximate KM-UCL (use when n>=50)	0.00685	95% Gamma Adjusted KM-UCL (use when n<50)	0.00862

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00253	Mean in Log Scale	-7.704
SD in Original Scale	0.00336	SD in Log Scale	2.512
95% t UCL (assumes normality of ROS data)	0.00462	95% Percentile Bootstrap UCL	0.00429
95% BCA Bootstrap UCL	0.00472	95% Bootstrap t UCL	0.00546
95% H-UCL (Log ROS)	5.554		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-7.464	KM Geo Mean	5.7321E-4
KM SD (logged)	1.994	95% Critical H Value (KM-Log)	5.693
KM Standard Error of Mean (logged)	0.71	95% H-UCL (KM -Log)	0.231
KM SD (logged)	1.994	95% Critical H Value (KM-Log)	5.693
KM Standard Error of Mean (logged)	0.71		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00253	Mean in Log Scale	-7.541
SD in Original Scale	0.00336	SD in Log Scale	2.225
95% t UCL (Assumes normality)	0.00462	95% H-Stat UCL	0.891

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.00464

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

cis-NONACHLOR (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	1.0200E-4	Minimum Non-Detect	4.9700E-5
Maximum Detect	0.0222	Maximum Non-Detect	4.9700E-5
Variance Detects	5.4893E-5	Percent Non-Detects	11.11%
Mean Detects	0.00435	SD Detects	0.00741
Median Detects	0.00113	CV Detects	1.703
Skewness Detects	2.552	Kurtosis Detects	6.75
Mean of Logged Detects	-6.491	SD of Logged Detects	1.61

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.608	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.00387	KM Standard Error of Mean	0.00238
KM SD	0.00667	95% KM (BCA) UCL	0.0075
95% KM (t) UCL	0.00829	95% KM (Percentile Bootstrap) UCL	0.00811
95% KM (z) UCL	0.00778	95% KM Bootstrap t UCL	0.022
90% KM Chebyshev UCL	0.011	95% KM Chebyshev UCL	0.0142
97.5% KM Chebyshev UCL	0.0187	99% KM Chebyshev UCL	0.0275

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.457	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.255	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.307	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.588	k star (bias corrected MLE)	0.451
Theta hat (MLE)	0.0074	Theta star (bias corrected MLE)	0.00965
nu hat (MLE)	9.412	nu star (bias corrected)	7.216
Mean (detects)	0.00435		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	1.0200E-4	Mean	0.00498
Maximum	0.0222	Median	0.00125
SD	0.00718	CV	1.443
k hat (MLE)	0.627	k star (bias corrected MLE)	0.492
Theta hat (MLE)	0.00794	Theta star (bias corrected MLE)	0.0101
nu hat (MLE)	11.29	nu star (bias corrected)	8.86
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (8.86, α)	3.243	Adjusted Chi Square Value (8.86, β)	2.568
95% Gamma Approximate UCL (use when n>=50)	0.0136	95% Gamma Adjusted UCL (use when n<50)	0.0172

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00387	SD (KM)	0.00667
Variance (KM)	4.4521E-5	SE of Mean (KM)	0.00238
k hat (KM)	0.337	k star (KM)	0.299
nu hat (KM)	6.064	nu star (KM)	5.376
theta hat (KM)	0.0115	theta star (KM)	0.013
80% gamma percentile (KM)	0.00593	90% gamma percentile (KM)	0.0114
95% gamma percentile (KM)	0.0177	99% gamma percentile (KM)	0.0342

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.38, α)	1.33	Adjusted Chi Square Value (5.38, β)	0.955
95% Gamma Approximate KM-UCL (use when n>=50)	0.0157	95% Gamma Adjusted KM-UCL (use when n<50)	0.0218

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00387	Mean in Log Scale	-6.929
SD in Original Scale	0.00708	SD in Log Scale	2
95% t UCL (assumes normality of ROS data)	0.00826	95% Percentile Bootstrap UCL	0.00812
95% BCA Bootstrap UCL	0.0096	95% Bootstrap t UCL	0.022
95% H-UCL (Log ROS)	0.409		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.871	KM Geo Mean	0.00104
KM SD (logged)	1.781	95% Critical H Value (KM-Log)	5.143
KM Standard Error of Mean (logged)	0.635	95% H-UCL (KM -Log)	0.129
KM SD (logged)	1.781	95% Critical H Value (KM-Log)	5.143
KM Standard Error of Mean (logged)	0.635		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00387	Mean in Log Scale	-6.948
SD in Original Scale	0.00708	SD in Log Scale	2.036
95% t UCL (Assumes normality)	0.00826	95% H-Stat UCL	0.499

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.022	ıa Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.0218

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

DIELDRIN (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	6.8000E-4	Mean	0.00382
Maximum	0.0148	Median	0.00202
SD	0.00452	Std. Error of Mean	0.00151
Coefficient of Variation	1.185	Skewness	2.139

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.00662	95% Adjusted-CLT UCL (Chen-1995)	0.00745
		95% Modified-t UCL (Johnson-1978)	0.0068

Gamma GOF Test

A-D Test Statistic	0.425	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.125	k star (bias corrected MLE)	0.824
Theta hat (MLE)	0.00339	Theta star (bias corrected MLE)	0.00463
nu hat (MLE)	20.26	nu star (bias corrected)	14.84
MLE Mean (bias corrected)	0.00382	MLE Sd (bias corrected)	0.00421
		Approximate Chi Square Value (0.05)	7.149
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	6.059

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.00793	95% Adjusted Gamma UCL (use when n<50)	0.00935

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.293	Mean of logged Data	-6.074
Maximum of Logged Data	-4.213	SD of logged Data	1.037

Assuming Lognormal Distribution

95% H-UCL	0.0133	90% Chebyshev (MVUE) UCL	0.00754
95% Chebyshev (MVUE) UCL	0.00931	97.5% Chebyshev (MVUE) UCL	0.0118
99% Chebyshev (MVUE) UCL	0.0166		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0063	95% Jackknife UCL	0.00662
95% Standard Bootstrap UCL	0.00616	95% Bootstrap-t UCL	0.0099
95% Hall's Bootstrap UCL	0.0147	95% Percentile Bootstrap UCL	0.00641
95% BCA Bootstrap UCL	0.00758		
90% Chebyshev(Mean, Sd) UCL	0.00834	95% Chebyshev(Mean, Sd) UCL	0.0104
97.5% Chebyshev(Mean, Sd) UCL	0.0132	99% Chebyshev(Mean, Sd) UCL	0.0188

Suggested UCL to Use

95% Student's-t UCL 0.00662

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

DIELDRIN (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	3.4500E-4	Mean	0.00728
Maximum	0.0378	Median	0.00101
SD	0.0124	Std. Error of Mean	0.00414
Coefficient of Variation	1.707	Skewness	2.302

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.637	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.015	95% Adjusted-CLT UCL (Chen-1995)	0.0175
		95% Modified-t UCL (Johnson-1978)	0.0155

Gamma GOF Test

A-D Test Statistic	0.653	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.769	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.276	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.521	k star (bias corrected MLE)	0.422
Theta hat (MLE)	0.014	Theta star (bias corrected MLE)	0.0173
nu hat (MLE)	9.383	nu star (bias corrected)	7.588
MLE Mean (bias corrected)	0.00728	MLE Sd (bias corrected)	0.0112
		Approximate Chi Square Value (0.05)	2.499
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	1.928

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0221	95% Adjusted Gamma UCL (use when n<50)	0.0287

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.234	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.972	Mean of logged Data	-6.133
Maximum of Logged Data	-3.275	SD of logged Data	1.646

Assuming Lognormal Distribution

95% H-UCL	0.138	90% Chebyshev (MVUE) UCL	0.0173
95% Chebyshev (MVUE) UCL	0.0222	97.5% Chebyshev (MVUE) UCL	0.0291
99% Chebyshev (MVUE) UCL	0.0425		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0141	95% Jackknife UCL	0.015
95% Standard Bootstrap UCL	0.0138	95% Bootstrap-t UCL	0.0505
95% Hall's Bootstrap UCL	0.0477	95% Percentile Bootstrap UCL	0.0142
95% BCA Bootstrap UCL	0.0172		
90% Chebyshev(Mean, Sd) UCL	0.0197	95% Chebyshev(Mean, Sd) UCL	0.0253
97.5% Chebyshev(Mean, Sd) UCL	0.0332	99% Chebyshev(Mean, Sd) UCL	0.0485

Suggested UCL to Use

95% Adjusted Gamma UCL 0.0287

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

HEPTACHLOR EPOXIDE (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	4.1400E-4	Mean	0.00137
Maximum	0.0056	Median	7.5200E-4
SD	0.00168	Std. Error of Mean	5.6124E-4
Coefficient of Variation	1.227	Skewness	2.45

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.63	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00242	95% Adjusted-CLT UCL (Chen-1995)	0.00279
		95% Modified-t UCL (Johnson-1978)	0.00249

Gamma GOF Test

A-D Test Statistic	0.899	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.273	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.285	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	1.327	k star (bias corrected MLE)	0.959
Theta hat (MLE)	0.00103	Theta star (bias corrected MLE)	0.00143
nu hat (MLE)	23.89	nu star (bias corrected)	17.26
MLE Mean (bias corrected)	0.00137	MLE Sd (bias corrected)	0.0014
		Approximate Chi Square Value (0.05)	8.857
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	7.622

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.00267	95% Adjusted Gamma UCL (use when n<50)	0.00311

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.222	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.79	Mean of logged Data	-7.013
Maximum of Logged Data	-5.185	SD of logged Data	0.868

Assuming Lognormal Distribution

95% H-UCL	0.00325	90% Chebyshev (MVUE) UCL	0.00236
95% Chebyshev (MVUE) UCL	0.00286	97.5% Chebyshev (MVUE) UCL	0.00356
99% Chebyshev (MVUE) UCL	0.00494		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0023	95% Jackknife UCL	0.00242
95% Standard Bootstrap UCL	0.00223	95% Bootstrap-t UCL	0.00681
95% Hall's Bootstrap UCL	0.00646	95% Percentile Bootstrap UCL	0.00236
95% BCA Bootstrap UCL	0.003		
90% Chebyshev(Mean, Sd) UCL	0.00306	95% Chebyshev(Mean, Sd) UCL	0.00382
97.5% Chebyshev(Mean, Sd) UCL	0.00488	99% Chebyshev(Mean, Sd) UCL	0.00696

Suggested UCL to Use

95% Adjusted Gamma UCL	0.00311

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

HEPTACHLOR EPOXIDE (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	2.1300E-4	Mean	0.00197
Maximum	0.0069	Median	7.2500E-4
SD	0.00229	Std. Error of Mean	7.6196E-4
Coefficient of Variation	1.161	Skewness	1.621

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00339	95% Adjusted-CLT UCL (Chen-1995)	0.00366
		95% Modified-t UCL (Johnson-1978)	0.00345

Gamma GOF Test

A-D Test Statistic	0.405	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.247	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.287	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.996	k star (bias corrected MLE)	0.738
Theta hat (MLE)	0.00198	Theta star (bias corrected MLE)	0.00267
nu hat (MLE)	17.93	nu star (bias corrected)	13.29
MLE Mean (bias corrected)	0.00197	MLE Sd (bias corrected)	0.00229
		Approximate Chi Square Value (0.05)	6.087
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	5.097

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0043	95% Adjusted Gamma UCL (use when n<50)	0.00513

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-8.454	Mean of logged Data	-6.81
Maximum of Logged Data	-4.976	SD of logged Data	1.152

Assuming Lognormal Distribution

95% H-UCL	0.00923	90% Chebyshev (MVUE) UCL	0.00424
95% Chebyshev (MVUE) UCL	0.00528	97.5% Chebyshev (MVUE) UCL	0.00673
99% Chebyshev (MVUE) UCL	0.00958		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00322	95% Jackknife UCL	0.00339
95% Standard Bootstrap UCL	0.00314	95% Bootstrap-t UCL	0.00554
95% Hall's Bootstrap UCL	0.00947	95% Percentile Bootstrap UCL	0.00325
95% BCA Bootstrap UCL	0.00355		
90% Chebyshev(Mean, Sd) UCL	0.00425	95% Chebyshev(Mean, Sd) UCL	0.00529
97.5% Chebyshev(Mean, Sd) UCL	0.00673	99% Chebyshev(Mean, Sd) UCL	0.00955

Suggested UCL to Use

95% Student's-t UCL 0.00339

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

Mercury (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.037	Mean	0.0831
Maximum	0.143	Median	0.064
SD	0.0436	Std. Error of Mean	0.0145
Coefficient of Variation	0.525	Skewness	0.472

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.857	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.11	95% Adjusted-CLT UCL (Chen-1995)	0.109
		95% Modified-t UCL (Johnson-1978)	0.111

Gamma GOF Test

A-D Test Statistic	0.472	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.193	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.072	k star (bias corrected MLE)	2.789
Theta hat (MLE)	0.0204	Theta star (bias corrected MLE)	0.0298
nu hat (MLE)	73.3	nu star (bias corrected)	50.2
MLE Mean (bias corrected)	0.0831	MLE Sd (bias corrected)	0.0498
		Approximate Chi Square Value (0.05)	34.93
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	32.27

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.119	95% Adjusted Gamma UCL (use when n<50)	0.129

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.297	Mean of logged Data	-2.615
Maximum of Logged Data	-1.945	SD of logged Data	0.541

Assuming Lognormal Distribution

95% H-UCL	0.131	90% Chebyshev (MVUE) UCL	0.129
95% Chebyshev (MVUE) UCL	0.15	97.5% Chebyshev (MVUE) UCL	0.178
99% Chebyshev (MVUE) UCL	0.235		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.107	95% Jackknife UCL	0.11
95% Standard Bootstrap UCL	0.106	95% Bootstrap-t UCL	0.112
95% Hall's Bootstrap UCL	0.103	95% Percentile Bootstrap UCL	0.106
95% BCA Bootstrap UCL	0.108		
90% Chebyshev(Mean, Sd) UCL	0.127	95% Chebyshev(Mean, Sd) UCL	0.147
97.5% Chebyshev(Mean, Sd) UCL	0.174	99% Chebyshev(Mean, Sd) UCL	0.228

Suggested UCL to Use

95% Student's-t UCL	0.11

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

Mercury (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.05	Mean	0.123
Maximum	0.241	Median	0.104
SD	0.0619	Std. Error of Mean	0.0206
Coefficient of Variation	0.505	Skewness	1.209

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.841	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.314	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.161	95% Adjusted-CLT UCL (Chen-1995)	0.165
		95% Modified-t UCL (Johnson-1978)	0.162

Gamma GOF Test

A-D Test Statistic	0.52	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.259	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.998	k star (bias corrected MLE)	3.406
Theta hat (MLE)	0.0245	Theta star (bias corrected MLE)	0.036
nu hat (MLE)	89.96	nu star (bias corrected)	61.31
MLE Mean (bias corrected)	0.123	MLE Sd (bias corrected)	0.0664
		Approximate Chi Square Value (0.05)	44.3
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	41.27

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.17	95% Adjusted Gamma UCL (use when n<50)	0.182

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.23	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.996	Mean of logged Data	-2.203
Maximum of Logged Data	-1.423	SD of logged Data	0.477

Assuming Lognormal Distribution

95% H-UCL	0.18	90% Chebyshev (MVUE) UCL	0.181
95% Chebyshev (MVUE) UCL	0.208	97.5% Chebyshev (MVUE) UCL	0.245
99% Chebyshev (MVUE) UCL	0.318		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.157	95% Jackknife UCL	0.161
95% Standard Bootstrap UCL	0.155	95% Bootstrap-t UCL	0.207
95% Hall's Bootstrap UCL	0.454	95% Percentile Bootstrap UCL	0.158
95% BCA Bootstrap UCL	0.16		
90% Chebyshev(Mean, Sd) UCL	0.184	95% Chebyshev(Mean, Sd) UCL	0.213
97.5% Chebyshev(Mean, Sd) UCL	0.251	99% Chebyshev(Mean, Sd) UCL	0.328

Suggested UCL to Use

95% Student's-t UCL 0.161

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

MIREX (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	4	Number of Non-Detects	5
Number of Distinct Detects	4	Number of Distinct Non-Detects	5
Minimum Detect	6.4000E-5	Minimum Non-Detect	4.9200E-5
Maximum Detect	7.8500E-4	Maximum Non-Detect	5.0000E-5
Variance Detects	1.0988E-7	Percent Non-Detects	55.56%
Mean Detects	3.3150E-4	SD Detects	3.3148E-4
Median Detects	2.3850E-4	CV Detects	1
Skewness Detects	1.148	Kurtosis Detects	0.307
Mean of Logged Detects	-8.464	SD of Logged Detects	1.146

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.252	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	1.7467E-4	KM Standard Error of Mean	9.1330E-5
KM SD	2.3728E-4	95% KM (BCA) UCL	N/A
95% KM (t) UCL	3.4450E-4	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	3.2489E-4	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	4.4866E-4	95% KM Chebyshev UCL	5.7276E-4
97.5% KM Chebyshev UCL	7.4502E-4	99% KM Chebyshev UCL	0.00108

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.295	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.665	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.273	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.401	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.245	k star (bias corrected MLE)	0.478
Theta hat (MLE)	2.6626E-4	Theta star (bias corrected MLE)	6.9362E-4
nu hat (MLE)	9.96	nu star (bias corrected)	3.823
Mean (detects)	3.3150E-4		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	6.4000E-5	Mean	0.0057
Maximum	0.01	Median	0.01
SD	0.0051	CV	0.894
k hat (MLE)	0.544	k star (bias corrected MLE)	0.436
Theta hat (MLE)	0.0105	Theta star (bias corrected MLE)	0.0131
nu hat (MLE)	9.784	nu star (bias corrected)	7.856
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (7.86, α)	2.652	Adjusted Chi Square Value (7.86, β)	2.059
95% Gamma Approximate UCL (use when n>=50)	0.0169	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.7467E-4	SD (KM)	2.3728E-4
Variance (KM)	5.6303E-8	SE of Mean (KM)	9.1330E-5
k hat (KM)	0.542	k star (KM)	0.435
nu hat (KM)	9.754	nu star (KM)	7.836
theta hat (KM)	3.2234E-4	theta star (KM)	4.0124E-4
80% gamma percentile (KM)	2.8432E-4	90% gamma percentile (KM)	4.8577E-4
95% gamma percentile (KM)	7.0466E-4	99% gamma percentile (KM)	0.00125

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.84, α)	2.64	Adjusted Chi Square Value (7.84, β)	2.048
95% Gamma Approximate KM-UCL (use when n>=50)	5.1837E-4	95% Gamma Adjusted KM-UCL (use when n<50)	6.6814E-4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.5002E-4	Mean in Log Scale	-10.56
SD in Original Scale	2.6617E-4	SD in Log Scale	2.11
95% t UCL (assumes normality of ROS data)	3.1500E-4	95% Percentile Bootstrap UCL	3.1150E-4
95% BCA Bootstrap UCL	3.5157E-4	95% Bootstrap t UCL	9.8427E-4
95% H-UCL (Log ROS)	0.021		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-9.273	KM Geo Mean	9.3938E-5
KM SD (logged)	0.98	95% Critical H Value (KM-Log)	3.195
KM Standard Error of Mean (logged)	0.377	95% H-UCL (KM -Log)	4.5957E-4
KM SD (logged)	0.98	95% Critical H Value (KM-Log)	3.195
KM Standard Error of Mean (logged)	0.377		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.6113E-4	Mean in Log Scale	-9.653
SD in Original Scale	2.5948E-4	SD in Log Scale	1.328
95% t UCL (Assumes normality)	3.2196E-4	95% H-Stat UCL	0.00102

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 3.4450E-4

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

OXYCHLORDANE (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	5.2300E-4	Mean	0.00168
Maximum	0.00725	Median	7.7300E-4
SD	0.00217	Std. Error of Mean	7.2308E-4
Coefficient of Variation	1.292	Skewness	2.625

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.597	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.312	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00302	95% Adjusted-CLT UCL (Chen-1995)	0.00354
		95% Modified-t UCL (Johnson-1978)	0.00313

Gamma GOF Test

A-D Test Statistic	0.967	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.271	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.285	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	1.284	k star (bias corrected MLE)	0.93
Theta hat (MLE)	0.00131	Theta star (bias corrected MLE)	0.0018
nu hat (MLE)	23.12	nu star (bias corrected)	16.74
MLE Mean (bias corrected)	0.00168	MLE Sd (bias corrected)	0.00174
		Approximate Chi Square Value (0.05)	8.49
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	7.284

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.00331	95% Adjusted Gamma UCL (use when n<50)	0.00386

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.556	Mean of logged Data	-6.827
Maximum of Logged Data	-4.927	SD of logged Data	0.869

Assuming Lognormal Distribution

95% H-UCL	0.00392	90% Chebyshev (MVUE) UCL	0.00285
95% Chebyshev (MVUE) UCL	0.00345	97.5% Chebyshev (MVUE) UCL	0.0043
99% Chebyshev (MVUE) UCL	0.00596		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00287	95% Jackknife UCL	0.00302
95% Standard Bootstrap UCL	0.00282	95% Bootstrap-t UCL	0.00801
95% Hall's Bootstrap UCL	0.00744	95% Percentile Bootstrap UCL	0.00304
95% BCA Bootstrap UCL	0.00353		
90% Chebyshev(Mean, Sd) UCL	0.00385	95% Chebyshev(Mean, Sd) UCL	0.00483
97.5% Chebyshev(Mean, Sd) UCL	0.00619	99% Chebyshev(Mean, Sd) UCL	0.00887

Suggested UCL to Use

95% Adjusted Gamma UCL 0.00386

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

OXYCHLORDANE (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	1.1800E-4	Mean	0.00187
Maximum	0.00985	Median	7.9600E-4
SD	0.00305	Std. Error of Mean	0.00102
Coefficient of Variation	1.632	Skewness	2.799

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.561	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.391	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00376	95% Adjusted-CLT UCL (Chen-1995)	0.00455
		95% Modified-t UCL (Johnson-1978)	0.00392

Gamma GOF Test

A-D Test Statistic	0.689	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.289	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.803	k star (bias corrected MLE)	0.609
Theta hat (MLE)	0.00233	Theta star (bias corrected MLE)	0.00307
nu hat (MLE)	14.45	nu star (bias corrected)	10.97
MLE Mean (bias corrected)	0.00187	MLE Sd (bias corrected)	0.00239
		Approximate Chi Square Value (0.05)	4.557
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	3.725

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0045	95% Adjusted Gamma UCL (use when n<50)	0.0055

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-9.045	Mean of logged Data	-7.021
Maximum of Logged Data	-4.62	SD of logged Data	1.218

Assuming Lognormal Distribution

95% H-UCL	0.00939	90% Chebyshev (MVUE) UCL	0.00376
95% Chebyshev (MVUE) UCL	0.00472	97.5% Chebyshev (MVUE) UCL	0.00604
99% Chebyshev (MVUE) UCL	0.00863		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00354	95% Jackknife UCL	0.00376
95% Standard Bootstrap UCL	0.00348	95% Bootstrap-t UCL	0.00963
95% Hall's Bootstrap UCL	0.00954	95% Percentile Bootstrap UCL	0.00375
95% BCA Bootstrap UCL	0.00478		
90% Chebyshev(Mean, Sd) UCL	0.00492	95% Chebyshev(Mean, Sd) UCL	0.0063
97.5% Chebyshev(Mean, Sd) UCL	0.00821	99% Chebyshev(Mean, Sd) UCL	0.012

Suggested UCL to Use

95% Adjusted Gamma UCL	0.0055

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

PCB-TEQ_MAMMAL (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	1.4958E-7	Mean	3.4088E-6
Maximum	7.4737E-6	Median	2.0623E-6
SD	3.3050E-6	Std. Error of Mean	1.1017E-6
Coefficient of Variation	N/A	Skewness	0.296

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5.4575E-6	95% Adjusted-CLT UCL (Chen-1995)	5.3372E-6
		95% Modified-t UCL (Johnson-1978)	5.4756E-6

Gamma GOF Test

A-D Test Statistic	0.635	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.289	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.753	k star (bias corrected MLE)	0.576
Theta hat (MLE)	4.5274E-6	Theta star (bias corrected MLE)	5.9178E-6
nu hat (MLE)	13.55	nu star (bias corrected)	10.37
MLE Mean (bias corrected)	3.4088E-6	MLE Sd (bias corrected)	4.4914E-6
		Approximate Chi Square Value (0.05)	4.173
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	3.385

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8.4690E-6	95% Adjusted Gamma UCL (use when n<50)	1.0441E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-15.72	Mean of logged Data	-13.38
Maximum of Logged Data	-11.8	SD of logged Data	1.562

Assuming Lognormal Distribution

95% H-UCL	6.6001E-5	90% Chebyshev (MVUE) UCL	1.0794E-5
95% Chebyshev (MVUE) UCL	1.3809E-5	97.5% Chebyshev (MVUE) UCL	1.7994E-5
99% Chebyshev (MVUE) UCL	2.6214E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.2209E-6	95% Jackknife UCL	5.4575E-6
95% Standard Bootstrap UCL	5.0828E-6	95% Bootstrap-t UCL	5.5073E-6
95% Hall's Bootstrap UCL	4.7033E-6	95% Percentile Bootstrap UCL	5.1127E-6
95% BCA Bootstrap UCL	5.2131E-6		
90% Chebyshev(Mean, Sd) UCL	6.7139E-6	95% Chebyshev(Mean, Sd) UCL	8.2109E-6
97.5% Chebyshev(Mean, Sd) UCL	1.0289E-5	99% Chebyshev(Mean, Sd) UCL	1.4370E-5

Suggested UCL to Use

95% Student's-t UCL 5.4575E-6

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

PCB-TEQ_MAMMAL (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	1.9674E-6	Mean	1.4776E-5
Maximum	5.6469E-5	Median	4.6766E-6
SD	1.9467E-5	Std. Error of Mean	6.4892E-6
Coefficient of Variation	N/A	Skewness	1.682

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.716	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.6843E-5	95% Adjusted-CLT UCL (Chen-1995)	2.9337E-5
		95% Modified-t UCL (Johnson-1978)	2.7450E-5

Gamma GOF Test

A-D Test Statistic	0.666	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.243	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.289	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.828	k star (bias corrected MLE)	0.626
Theta hat (MLE)	1.7847E-5	Theta star (bias corrected MLE)	2.3603E-5
nu hat (MLE)	14.9	nu star (bias corrected)	11.27
MLE Mean (bias corrected)	1.4776E-5	MLE Sd (bias corrected)	1.8675E-5
		Approximate Chi Square Value (0.05)	4.75
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	3.896

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3.5059E-5	95% Adjusted Gamma UCL (use when n<50)	4.2736E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.14	Mean of logged Data	-11.84
Maximum of Logged Data	-9.782	SD of logged Data	1.232

Assuming Lognormal Distribution

95% H-UCL	8.0027E-5	90% Chebyshev (MVUE) UCL	3.1122E-5
95% Chebyshev (MVUE) UCL	3.9035E-5	97.5% Chebyshev (MVUE) UCL	5.0017E-5
99% Chebyshev (MVUE) UCL	7.1589E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.5450E-5	95% Jackknife UCL	2.6843E-5
95% Standard Bootstrap UCL	2.4783E-5	95% Bootstrap-t UCL	6.1277E-5
95% Hall's Bootstrap UCL	7.8146E-5	95% Percentile Bootstrap UCL	2.5561E-5
95% BCA Bootstrap UCL	2.8884E-5		
90% Chebyshev(Mean, Sd) UCL	3.4244E-5	95% Chebyshev(Mean, Sd) UCL	4.3062E-5
97.5% Chebyshev(Mean, Sd) UCL	5.5301E-5	99% Chebyshev(Mean, Sd) UCL	7.9343E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 4.2736E-5

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

Total PCBs (Congeners) (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.0333	Mean	0.164
Maximum	0.469	Median	0.101
SD	0.143	Std. Error of Mean	0.0477
Coefficient of Variation	0.875	Skewness	1.438

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.252	95% Adjusted-CLT UCL (Chen-1995)	0.267
		95% Modified-t UCL (Johnson-1978)	0.256

Gamma GOF Test

A-D Test Statistic	0.263	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.283	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.678	k star (bias corrected MLE)	1.193
Theta hat (MLE)	0.0976	Theta star (bias corrected MLE)	0.137
nu hat (MLE)	30.2	nu star (bias corrected)	21.47
MLE Mean (bias corrected)	0.164	MLE Sd (bias corrected)	0.15
		Approximate Chi Square Value (0.05)	11.94
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	10.47

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.294	95% Adjusted Gamma UCL (use when n<50)	0.336

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.126	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.402	Mean of logged Data	-2.136
Maximum of Logged Data	-0.756	SD of logged Data	0.865

Assuming Lognormal Distribution

95% H-UCL	0.423	90% Chebyshev (MVUE) UCL	0.309
95% Chebyshev (MVUE) UCL	0.374	97.5% Chebyshev (MVUE) UCL	0.466
99% Chebyshev (MVUE) UCL	0.646		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.242	95% Jackknife UCL	0.252
95% Standard Bootstrap UCL	0.239	95% Bootstrap-t UCL	0.343
95% Hall's Bootstrap UCL	0.642	95% Percentile Bootstrap UCL	0.243
95% BCA Bootstrap UCL	0.256		
90% Chebyshev(Mean, Sd) UCL	0.307	95% Chebyshev(Mean, Sd) UCL	0.372
97.5% Chebyshev(Mean, Sd) UCL	0.462	99% Chebyshev(Mean, Sd) UCL	0.639

Suggested UCL to Use

95% Student's-t UCL	0.252

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

Total PCBs (Congeners) (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.0315	Mean	0.459
Maximum	1.608	Median	0.0673
SD	0.645	Std. Error of Mean	0.215
Coefficient of Variation	1.407	Skewness	1.402

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.691	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.859	95% Adjusted-CLT UCL (Chen-1995)	0.92
		95% Modified-t UCL (Johnson-1978)	0.875

Gamma GOF Test

A-D Test Statistic	0.807	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.764	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.3	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.292	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.593	k star (bias corrected MLE)	0.469
Theta hat (MLE)	0.774	Theta star (bias corrected MLE)	0.978
nu hat (MLE)	10.67	nu star (bias corrected)	8.444
MLE Mean (bias corrected)	0.459	MLE Sd (bias corrected)	0.67
		Approximate Chi Square Value (0.05)	2.995
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	2.354

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.293	95% Adjusted Gamma UCL (use when n<50)	1.646

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.268	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.459	Mean of logged Data	-1.824
Maximum of Logged Data	0.475	SD of logged Data	1.565

Assuming Lognormal Distribution

95% H-UCL	7.009	90% Chebyshev (MVUE) UCL	1.136
95% Chebyshev (MVUE) UCL	1.454	97.5% Chebyshev (MVUE) UCL	1.895
99% Chebyshev (MVUE) UCL	2.761		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.813	95% Jackknife UCL	0.859
95% Standard Bootstrap UCL	0.794	95% Bootstrap-t UCL	1.789
95% Hall's Bootstrap UCL	2.485	95% Percentile Bootstrap UCL	0.797
95% BCA Bootstrap UCL	0.925		
90% Chebyshev(Mean, Sd) UCL	1.104	95% Chebyshev(Mean, Sd) UCL	1.396
97.5% Chebyshev(Mean, Sd) UCL	1.802	99% Chebyshev(Mean, Sd) UCL	2.599

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	2.599

Recommended UCL exceeds the maximum observation

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

trans-NONACHLOR (lower potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	0.00123	Mean	0.00781
Maximum	0.0358	Median	0.00339
SD	0.0108	Std. Error of Mean	0.0036
Coefficient of Variation	1.384	Skewness	2.691

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.603	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0145	95% Adjusted-CLT UCL (Chen-1995)	0.0172
		95% Modified-t UCL (Johnson-1978)	0.015

Gamma GOF Test

A-D Test Statistic	0.675	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.222	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.286	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.099	k star (bias corrected MLE)	0.807
Theta hat (MLE)	0.00711	Theta star (bias corrected MLE)	0.00968
nu hat (MLE)	19.78	nu star (bias corrected)	14.52
MLE Mean (bias corrected)	0.00781	MLE Sd (bias corrected)	0.00869
		Approximate Chi Square Value (0.05)	6.928
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	5.859

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	0.0164	95% Adjusted Gamma UCL (use when n<50)	0.0194

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.701	Mean of logged Data	-5.372
Maximum of Logged Data	-3.33	SD of logged Data	0.981

Assuming Lognormal Distribution

95% H-UCL	0.0228	90% Chebyshev (MVUE) UCL	0.0141
95% Chebyshev (MVUE) UCL	0.0173	97.5% Chebyshev (MVUE) UCL	0.0218
99% Chebyshev (MVUE) UCL	0.0306		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0137	95% Jackknife UCL	0.0145
95% Standard Bootstrap UCL	0.0134	95% Bootstrap-t UCL	0.0337
95% Hall's Bootstrap UCL	0.0369	95% Percentile Bootstrap UCL	0.0146
95% BCA Bootstrap UCL	0.0181		
90% Chebyshev(Mean, Sd) UCL	0.0186	95% Chebyshev(Mean, Sd) UCL	0.0235
97.5% Chebyshev(Mean, Sd) UCL	0.0303	99% Chebyshev(Mean, Sd) UCL	0.0437

Suggested UCL to Use

95% Adjusted Gamma UCL	0.0194

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

trans-NONACHLOR (upper potomac)

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.00137	Minimum Non-Detect	4.9700E-5
Maximum Detect	0.0626	Maximum Non-Detect	4.9700E-5
Variance Detects	4.3914E-4	Percent Non-Detects	11.11%
Mean Detects	0.0118	SD Detects	0.021
Median Detects	0.00264	CV Detects	1.78
Skewness Detects	2.617	Kurtosis Detects	7.053
Mean of Logged Detects	-5.424	SD of Logged Detects	1.377

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.571	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.378	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0105	KM Standard Error of Mean	0.00672
KM SD	0.0188	95% KM (BCA) UCL	0.0233
95% KM (t) UCL	0.023	95% KM (Percentile Bootstrap) UCL	0.0229
95% KM (z) UCL	0.0215	95% KM Bootstrap t UCL	0.0611
90% KM Chebyshev UCL	0.0306	95% KM Chebyshev UCL	0.0397
97.5% KM Chebyshev UCL	0.0524	99% KM Chebyshev UCL	0.0773

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.858	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.754	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.272	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.307	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics on Detected Data Only

k hat (MLE)	0.626	k star (bias corrected MLE)	0.474
Theta hat (MLE)	0.0188	Theta star (bias corrected MLE)	0.0248
nu hat (MLE)	10.01	nu star (bias corrected)	7.589
Mean (detects)	0.0118		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00137	Mean	0.0116
Maximum	0.0626	Median	0.00333
SD	0.0196	CV	1.694
k hat (MLE)	0.693	k star (bias corrected MLE)	0.536
Theta hat (MLE)	0.0167	Theta star (bias corrected MLE)	0.0216
nu hat (MLE)	12.47	nu star (bias corrected)	9.645
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (9.64, α)	3.721	Adjusted Chi Square Value (9.64, β)	2.986
95% Gamma Approximate UCL (use when n>=50)	0.03	95% Gamma Adjusted UCL (use when n<50)	0.0374

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0105	SD (KM)	0.0188
Variance (KM)	3.5513E-4	SE of Mean (KM)	0.00672
k hat (KM)	0.309	k star (KM)	0.28
nu hat (KM)	5.555	nu star (KM)	5.037
theta hat (KM)	0.0339	theta star (KM)	0.0374
80% gamma percentile (KM)	0.0158	90% gamma percentile (KM)	0.0311
95% gamma percentile (KM)	0.049	99% gamma percentile (KM)	0.0957

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.04, α)	1.169	Adjusted Chi Square Value (5.04, β)	0.826
95% Gamma Approximate KM-UCL (use when n>=50)	0.0451	95% Gamma Adjusted KM-UCL (use when n<50)	0.0638

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0105	Mean in Log Scale	-5.787
SD in Original Scale	0.02	SD in Log Scale	1.687
95% t UCL (assumes normality of ROS data)	0.0229	95% Percentile Bootstrap UCL	0.0231
95% BCA Bootstrap UCL	0.0298	95% Bootstrap t UCL	0.0618
95% H-UCL (Log ROS)	0.238		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.922	KM Geo Mean	0.00268
KM SD (logged)	1.86	95% Critical H Value (KM-Log)	5.347
KM Standard Error of Mean (logged)	0.663	95% H-UCL (KM -Log)	0.509
KM SD (logged)	1.86	95% Critical H Value (KM-Log)	5.347
KM Standard Error of Mean (logged)	0.663		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0105	Mean in Log Scale	-5.999
SD in Original Scale	0.02	SD in Log Scale	2.154
95% t UCL (Assumes normality)	0.0229	95% H-Stat UCL	2.644

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	0.0611	ıa Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.0638

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/31/2018 11:34:34 AM
From File	Tissue UP Hexachlor.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

HEXACHLOROBENZENE

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	18
Number of Detects	4	Number of Non-Detects	5
Number of Distinct Detects	4	Number of Distinct Non-Detects	5
Minimum Detect	0.471	Minimum Non-Detect	0.0492
Maximum Detect	3.5	Maximum Non-Detect	0.05
Variance Detects	1.949	Percent Non-Detects	55.56%
Mean Detects	1.618	SD Detects	1.396
Median Detects	1.251	CV Detects	0.863
Skewness Detects	1.045	Kurtosis Detects	-0.2
Mean of Logged Detects	0.171	SD of Logged Detects	0.928

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	0.746	KM Standard Error of Mean	0.432
KM SD	1.121	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.549	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.456	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.041	95% KM Chebyshev UCL	2.628
97.5% KM Chebyshev UCL	3.442	99% KM Chebyshev UCL	5.041

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.316	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.661	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.283	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.399	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.763	k star (bias corrected MLE)	0.607
Theta hat (MLE)	0.918	Theta star (bias corrected MLE)	2.664
nu hat (MLE)	14.1	nu star (bias corrected)	4.858
Mean (detects)	1.618		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.725
Maximum	3.5	Median	0.01
SD	1.204	CV	1.661
k hat (MLE)	0.316	k star (bias corrected MLE)	0.285
Theta hat (MLE)	2.29	Theta star (bias corrected MLE)	2.542
nu hat (MLE)	5.696	nu star (bias corrected)	5.131
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (5.13, α)	1.213	Adjusted Chi Square Value (5.13, β)	0.861
95% Gamma Approximate UCL (use when n>=50)	3.065	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.746	SD (KM)	1.121
Variance (KM)	1.257	SE of Mean (KM)	0.432
k hat (KM)	0.443	k star (KM)	0.37
nu hat (KM)	7.977	nu star (KM)	6.651
theta hat (KM)	1.684	theta star (KM)	2.02
80% gamma percentile (KM)	1.192	90% gamma percentile (KM)	2.137
95% gamma percentile (KM)	3.187	99% gamma percentile (KM)	5.85

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.65, α)	1.981	Adjusted Chi Square Value (6.65, β)	1.49
95% Gamma Approximate KM-UCL (use when n>=50)	2.506	95% Gamma Adjusted KM-UCL (use when n<50)	3.332

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.241	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.75	Mean in Log Scale	-1.523
SD in Original Scale	1.187	SD in Log Scale	1.705
95% t UCL (assumes normality of ROS data)	1.486	95% Percentile Bootstrap UCL	1.398
95% BCA Bootstrap UCL	1.603	95% Bootstrap t UCL	3.293
95% H-UCL (Log ROS)	18.5		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.597	KM Geo Mean	0.202
KM SD (logged)	1.67	95% Critical H Value (KM-Log)	4.866
KM Standard Error of Mean (logged)	0.643	95% H-UCL (KM -Log)	14.45
KM SD (logged)	1.67	95% Critical H Value (KM-Log)	4.866
KM Standard Error of Mean (logged)	0.643		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.733	Mean in Log Scale	-1.978
SD in Original Scale	1.198	SD in Log Scale	2.116
95% t UCL (Assumes normality)	1.476	95% H-Stat UCL	116.9

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.549

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.17/31/2018 10:55:11 AM
From File	Tissue LA UA NTA_c.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	24	Number of Distinct Observations	19
		Number of Missing Observations	43
Minimum	0.027	Mean	0.0643
Maximum	0.14	Median	0.0625
SD	0.0328	Std. Error of Mean	0.0067
Coefficient of Variation	0.51	Skewness	0.765

Normal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0758	95% Adjusted-CLT UCL (Chen-1995)	0.0765
		95% Modified-t UCL (Johnson-1978)	0.076

Gamma GOF Test

A-D Test Statistic	0.449	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.113	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.179	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.109	k star (bias corrected MLE)	3.623
Theta hat (MLE)	0.0157	Theta star (bias corrected MLE)	0.0178
nu hat (MLE)	197.2	nu star (bias corrected)	173.9
MLE Mean (bias corrected)	0.0643	MLE Sd (bias corrected)	0.0338
		Approximate Chi Square Value (0.05)	144.4
Adjusted Level of Significance	0.0392	Adjusted Chi Square Value	142.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0775	95% Adjusted Gamma UCL (use when n<50)	0.0785

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.177	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.612	Mean of logged Data	-2.87
Maximum of Logged Data	-1.966	SD of logged Data	0.521

Assuming Lognormal Distribution

95% H-UCL	0.0806	90% Chebyshev (MVUE) UCL	0.086
95% Chebyshev (MVUE) UCL	0.0957	97.5% Chebyshev (MVUE) UCL	0.109
99% Chebyshev (MVUE) UCL	0.136		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0754	95% Jackknife UCL	0.0758
95% Standard Bootstrap UCL	0.0753	95% Bootstrap-t UCL	0.0775
95% Hall's Bootstrap UCL	0.0765	95% Percentile Bootstrap UCL	0.0754
95% BCA Bootstrap UCL	0.0764		
90% Chebyshev(Mean, Sd) UCL	0.0844	95% Chebyshev(Mean, Sd) UCL	0.0935
97.5% Chebyshev(Mean, Sd) UCL	0.106	99% Chebyshev(Mean, Sd) UCL	0.131

Suggested UCL to Use

95% Student's-t UCL 0.0758

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

PCB-TEQ (Mammal)

General Statistics

Total Number of Observations	29	Number of Distinct Observations	29
		Number of Missing Observations	44
Minimum	2.3650E-5	Mean	6.6477E-4
Maximum	0.00254	Median	5.5702E-4
SD	5.0368E-4	Std. Error of Mean	9.3530E-5
Coefficient of Variation	0.758	Skewness	1.997

Normal GOF Test

Shapiro Wilk Test Statistic	0.843	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.174	Lilliefors GOF Test
5% Lilliefors Critical Value	0.161	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8.2387E-4	95% Adjusted-CLT UCL (Chen-1995)	8.5567E-4
		95% Modified-t UCL (Johnson-1978)	8.2966E-4

Gamma GOF Test

A-D Test Statistic	0.425	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.108	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.165	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.752	k star (bias corrected MLE)	1.593
Theta hat (MLE)	3.7952E-4	Theta star (bias corrected MLE)	4.1720E-4
nu hat (MLE)	101.6	nu star (bias corrected)	92.42
MLE Mean (bias corrected)	6.6477E-4	MLE Sd (bias corrected)	5.2663E-4
		Approximate Chi Square Value (0.05)	71.25
Adjusted Level of Significance	0.0407	Adjusted Chi Square Value	70.14

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	8.6228E-4	95% Adjusted Gamma UCL (use when n<50)	8.7593E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.926	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.161	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-10.65	Mean of logged Data	-7.628
Maximum of Logged Data	-5.977	SD of logged Data	0.95

Assuming Lognormal Distribution

95% H-UCL	0.00118	90% Chebyshev (MVUE) UCL	0.0012
95% Chebyshev (MVUE) UCL	0.0014	97.5% Chebyshev (MVUE) UCL	0.00168
99% Chebyshev (MVUE) UCL	0.00224		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.1861E-4	95% Jackknife UCL	8.2387E-4
95% Standard Bootstrap UCL	8.1838E-4	95% Bootstrap-t UCL	8.8554E-4
95% Hall's Bootstrap UCL	9.3685E-4	95% Percentile Bootstrap UCL	8.2786E-4
95% BCA Bootstrap UCL	8.4602E-4		
90% Chebyshev(Mean, Sd) UCL	9.4536E-4	95% Chebyshev(Mean, Sd) UCL	0.00107
97.5% Chebyshev(Mean, Sd) UCL	0.00125	99% Chebyshev(Mean, Sd) UCL	0.0016

Suggested UCL to Use

95% Adjusted Gamma UCL 8.7593E-4

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

TCDD-TEQ (Mammal)

General Statistics

Total Number of Observations	28	Number of Distinct Observations	28
		Number of Missing Observations	45
Minimum	1.1000E-5	Mean	9.7401E-5
Maximum	2.8900E-4	Median	8.4500E-5
SD	6.9283E-5	Std. Error of Mean	1.3093E-5
Coefficient of Variation	N/A	Skewness	0.909

Normal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.106	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.1970E-4	95% Adjusted-CLT UCL (Chen-1995)	1.2134E-4
		95% Modified-t UCL (Johnson-1978)	1.2008E-4

Gamma GOF Test

A-D Test Statistic	0.328	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.118	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.168	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.741	k star (bias corrected MLE)	1.578
Theta hat (MLE)	5.5947E-5	Theta star (bias corrected MLE)	6.1715E-5
nu hat (MLE)	97.49	nu star (bias corrected)	88.38
MLE Mean (bias corrected)	9.7401E-5	MLE Sd (bias corrected)	7.7531E-5
		Approximate Chi Square Value (0.05)	67.71
Adjusted Level of Significance	0.0404	Adjusted Chi Square Value	66.59

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.2714E-4	95% Adjusted Gamma UCL (use when n<50)	1.2928E-4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-11.42	Mean of logged Data	-9.551
Maximum of Logged Data	-8.149	SD of logged Data	0.898

Assuming Lognormal Distribution

95% H-UCL	1.5947E-4	90% Chebyshev (MVUE) UCL	1.6412E-4
95% Chebyshev (MVUE) UCL	1.9114E-4	97.5% Chebyshev (MVUE) UCL	2.2865E-4
99% Chebyshev (MVUE) UCL	3.0232E-4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.1894E-4	95% Jackknife UCL	1.1970E-4
95% Standard Bootstrap UCL	1.1817E-4	95% Bootstrap-t UCL	1.2223E-4
95% Hall's Bootstrap UCL	1.2293E-4	95% Percentile Bootstrap UCL	1.1867E-4
95% BCA Bootstrap UCL	1.2195E-4		
90% Chebyshev(Mean, Sd) UCL	1.3668E-4	95% Chebyshev(Mean, Sd) UCL	1.5447E-4
97.5% Chebyshev(Mean, Sd) UCL	1.7917E-4	99% Chebyshev(Mean, Sd) UCL	2.2768E-4

Suggested UCL to Use

95% Student's-t UCL 1.1970E-4

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

Total PCBs (Congeners)

General Statistics

Total Number of Observations	29	Number of Distinct Observations	29
		Number of Missing Observations	44
Minimum	9.494	Mean	28.4
Maximum	59.66	Median	24.91
SD	12.83	Std. Error of Mean	2.383
Coefficient of Variation	0.452	Skewness	0.786

Normal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	32.45	95% Adjusted-CLT UCL (Chen-1995)	32.69
		95% Modified-t UCL (Johnson-1978)	32.51

Gamma GOF Test

A-D Test Statistic	0.56	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.164	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.163	Data Not Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	5.334	k star (bias corrected MLE)	4.805
Theta hat (MLE)	5.325	Theta star (bias corrected MLE)	5.911
nu hat (MLE)	309.4	nu star (bias corrected)	278.7
MLE Mean (bias corrected)	28.4	MLE Sd (bias corrected)	12.96
		Approximate Chi Square Value (0.05)	241
Adjusted Level of Significance	0.0407	Adjusted Chi Square Value	238.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	32.84	95% Adjusted Gamma UCL (use when n<50)	33.13

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.926	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.161	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.251	Mean of logged Data	3.25
Maximum of Logged Data	4.089	SD of logged Data	0.45

Assuming Lognormal Distribution

95% H-UCL	33.55	90% Chebyshev (MVUE) UCL	35.79
95% Chebyshev (MVUE) UCL	39.13	97.5% Chebyshev (MVUE) UCL	43.77
99% Chebyshev (MVUE) UCL	52.87		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	32.32	95% Jackknife UCL	32.45
95% Standard Bootstrap UCL	32.32	95% Bootstrap-t UCL	32.92
95% Hall's Bootstrap UCL	32.67	95% Percentile Bootstrap UCL	32.39
95% BCA Bootstrap UCL	32.54		
90% Chebyshev(Mean, Sd) UCL	35.55	95% Chebyshev(Mean, Sd) UCL	38.79
97.5% Chebyshev(Mean, Sd) UCL	43.28	99% Chebyshev(Mean, Sd) UCL	52.11

Suggested UCL to Use

95% Adjusted Gamma UCL	33.13

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

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

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.17/31/2018 10:53:45 AM
From File	Tissue LA UA NTA_c.xls
Full Precision	OFF
Confidence Coefficient	95%
ımber of Bootstrap Operations	2000

CHLORDANE (ALL)

General Statistics

Total Number of Observations	26	Number of Distinct Observations	23
		Number of Missing Observations	47
Number of Detects	25	Number of Non-Detects	1
Number of Distinct Detects	22	Number of Distinct Non-Detects	1
Minimum Detect	6.3	Minimum Non-Detect	0.47
Maximum Detect	62	Maximum Non-Detect	0.47
Variance Detects	169.2	Percent Non-Detects	3.846%
Mean Detects	22.43	SD Detects	13.01
Median Detects	21	CV Detects	0.58
Skewness Detects	1.154	Kurtosis Detects	2.049
Mean of Logged Detects	2.946	SD of Logged Detects	0.603

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.912	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.113	Lilliefors GOF Test
5% Lilliefors Critical Value	0.173	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	21.59	KM Standard Error of Mean	2.64
KM SD	13.19	95% KM (BCA) UCL	25.57
95% KM (t) UCL	26.1	95% KM (Percentile Bootstrap) UCL	26.02
95% KM (z) UCL	25.93	95% KM Bootstrap t UCL	26.62
90% KM Chebyshev UCL	29.51	95% KM Chebyshev UCL	33.1
97.5% KM Chebyshev UCL	38.08	99% KM Chebyshev UCL	47.86

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.257	Anderson-Darling GOF Test
5% A-D Critical Value	0.751	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.099	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.176	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.197	k star (bias corrected MLE)	2.84
Theta hat (MLE)	7.016	Theta star (bias corrected MLE)	7.898
nu hat (MLE)	159.9	nu star (bias corrected)	142
Mean (detects)	22.43		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.001	Mean	21.61
Maximum	62	Median	20
SD	13.42	CV	0.621
k hat (MLE)	2.233	k star (bias corrected MLE)	2.001
Theta hat (MLE)	9.675	Theta star (bias corrected MLE)	10.8
nu hat (MLE)	116.1	nu star (bias corrected)	104.1
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (104.06, α)	81.53	Adjusted Chi Square Value (104.06, β)	80.21
95% Gamma Approximate UCL (use when n>=50)	27.58	95% Gamma Adjusted UCL (use when n<50)	28.03

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	21.59	SD (KM)	13.19
Variance (KM)	174	SE of Mean (KM)	2.64
k hat (KM)	2.678	k star (KM)	2.395
nu hat (KM)	139.3	nu star (KM)	124.5
theta hat (KM)	8.061	theta star (KM)	9.015
80% gamma percentile (KM)	31.63	90% gamma percentile (KM)	40.27
95% gamma percentile (KM)	48.42	99% gamma percentile (KM)	66.32

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (124.52, α)	99.75	Adjusted Chi Square Value (124.52, β)	98.28
95% Gamma Approximate KM-UCL (use when n>=50)	26.95	95% Gamma Adjusted KM-UCL (use when n<50)	27.35

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.918	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.106	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.173	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	21.73	Mean in Log Scale	2.888
SD in Original Scale	13.23	SD in Log Scale	0.66
95% t UCL (assumes normality of ROS data)	26.17	95% Percentile Bootstrap UCL	26.34
95% BCA Bootstrap UCL	26.15	95% Bootstrap t UCL	26.89
95% H-UCL (Log ROS)	29.51		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.804	KM Geo Mean	16.51
KM SD (logged)	0.918	95% Critical H Value (KM-Log)	2.404
KM Standard Error of Mean (logged)	0.184	95% H-UCL (KM -Log)	39.09
KM SD (logged)	0.918	95% Critical H Value (KM-Log)	2.404
KM Standard Error of Mean (logged)	0.184		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	21.58	Mean in Log Scale	2.777
SD in Original Scale	13.47	SD in Log Scale	1.045
95% t UCL (Assumes normality)	26.09	95% H-Stat UCL	47.41

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 26.1

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cobalt

General Statistics

Total Number of Observations	24	Number of Distinct Observations	18
		Number of Missing Observations	43
Number of Detects	12	Number of Non-Detects	12
Number of Distinct Detects	11	Number of Distinct Non-Detects	10
Minimum Detect	0.0062	Minimum Non-Detect	0.008
Maximum Detect	0.047	Maximum Non-Detect	0.046
Variance Detects	1.2592E-4	Percent Non-Detects	50%
Mean Detects	0.0154	SD Detects	0.0112
Median Detects	0.012	CV Detects	0.728
Skewness Detects	2.32	Kurtosis Detects	6.087
Mean of Logged Detects	-4.343	SD of Logged Detects	0.569

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.733	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.265	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.0121	KM Standard Error of Mean	0.00191
KM SD	0.00857	95% KM (BCA) UCL	0.0157
95% KM (t) UCL	0.0154	95% KM (Percentile Bootstrap) UCL	0.0154
95% KM (z) UCL	0.0153	95% KM Bootstrap t UCL	0.0176
90% KM Chebyshev UCL	0.0178	95% KM Chebyshev UCL	0.0204
97.5% KM Chebyshev UCL	0.024	99% KM Chebyshev UCL	0.0311

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.548	Anderson-Darling GOF Test
5% A-D Critical Value	0.739	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.206	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.247	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.094	k star (bias corrected MLE)	2.376
Theta hat (MLE)	0.00498	Theta star (bias corrected MLE)	0.00649
nu hat (MLE)	74.26	nu star (bias corrected)	57.03
Mean (detects)	0.0154		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0062	Mean	0.0127
Maximum	0.047	Median	0.01
SD	0.00824	CV	0.648
k hat (MLE)	4.775	k star (bias corrected MLE)	4.206
Theta hat (MLE)	0.00266	Theta star (bias corrected MLE)	0.00302
nu hat (MLE)	229.2	nu star (bias corrected)	201.9
Adjusted Level of Significance (β)	0.0392		
Approximate Chi Square Value (201.90, α)	170	Adjusted Chi Square Value (201.90, β)	168
95% Gamma Approximate UCL (use when n>=50)	0.0151	95% Gamma Adjusted UCL (use when n<50)	0.0153

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0121	SD (KM)	0.00857
Variance (KM)	7.3444E-5	SE of Mean (KM)	0.00191
k hat (KM)	2.004	k star (KM)	1.781
nu hat (KM)	96.18	nu star (KM)	85.49
theta hat (KM)	0.00605	theta star (KM)	0.00681
80% gamma percentile (KM)	0.0184	90% gamma percentile (KM)	0.0243
95% gamma percentile (KM)	0.0299	99% gamma percentile (KM)	0.0424

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.49, α)	65.18	Adjusted Chi Square Value (85.49, β)	63.93
95% Gamma Approximate KM-UCL (use when n>=50)	0.0159	95% Gamma Adjusted KM-UCL (use when n<50)	0.0162

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0119	Mean in Log Scale	-4.569
SD in Original Scale	0.00861	SD in Log Scale	0.478
95% t UCL (assumes normality of ROS data)	0.0149	95% Percentile Bootstrap UCL	0.0149
95% BCA Bootstrap UCL	0.0167	95% Bootstrap t UCL	0.0186
95% H-UCL (Log ROS)	0.0141		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.561	KM Geo Mean	0.0105
KM SD (logged)	0.494	95% Critical H Value (KM-Log)	1.975
KM Standard Error of Mean (logged)	0.12	95% H-UCL (KM -Log)	0.0145
KM SD (logged)	0.494	95% Critical H Value (KM-Log)	1.975
KM Standard Error of Mean (logged)	0.12		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0124	Mean in Log Scale	-4.569
SD in Original Scale	0.00912	SD in Log Scale	0.566
95% t UCL (Assumes normality)	0.0155	95% H-Stat UCL	0.0155

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.0162	95% GROS Adjusted Gamma UCL	0.0153

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

DIELDRIN

General Statistics

Total Number of Observations	26	Number of Distinct Observations	24
		Number of Missing Observations	47
Number of Detects	23	Number of Non-Detects	3
Number of Distinct Detects	21	Number of Distinct Non-Detects	3
Minimum Detect	0.2	Minimum Non-Detect	0.078
Maximum Detect	4.7	Maximum Non-Detect	0.14
Variance Detects	1.547	Percent Non-Detects	11.54%
Mean Detects	1.731	SD Detects	1.244
Median Detects	1.6	CV Detects	0.718
Skewness Detects	0.662	Kurtosis Detects	-0.21
Mean of Logged Detects	0.222	SD of Logged Detects	0.911

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.121	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	1.541	KM Standard Error of Mean	0.253
KM SD	1.26	95% KM (BCA) UCL	1.957
95% KM (t) UCL	1.972	95% KM (Percentile Bootstrap) UCL	1.962
95% KM (z) UCL	1.956	95% KM Bootstrap t UCL	2.012
90% KM Chebyshev UCL	2.299	95% KM Chebyshev UCL	2.642
97.5% KM Chebyshev UCL	3.119	99% KM Chebyshev UCL	4.055

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.446	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.758	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.139	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.185	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.677	k star (bias corrected MLE)	1.488
Theta hat (MLE)	1.032	Theta star (bias corrected MLE)	1.164
nu hat (MLE)	77.16	nu star (bias corrected)	68.43
Mean (detects)	1.731		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.533
Maximum	4.7	Median	1.4
SD	1.294	CV	0.845
k hat (MLE)	0.781	k star (bias corrected MLE)	0.717
Theta hat (MLE)	1.962	Theta star (bias corrected MLE)	2.138
nu hat (MLE)	40.63	nu star (bias corrected)	37.28
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (37.28, α)	24.3	Adjusted Chi Square Value (37.28, β)	23.61
95% Gamma Approximate UCL (use when n>=50)	2.351	95% Gamma Adjusted UCL (use when n<50)	2.42

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.541	SD (KM)	1.26
Variance (KM)	1.588	SE of Mean (KM)	0.253
k hat (KM)	1.495	k star (KM)	1.348
nu hat (KM)	77.72	nu star (KM)	70.09
theta hat (KM)	1.031	theta star (KM)	1.143
80% gamma percentile (KM)	2.411	90% gamma percentile (KM)	3.295
95% gamma percentile (KM)	4.16	99% gamma percentile (KM)	6.128

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (70.09, α)	51.81	Adjusted Chi Square Value (70.09, β)	50.78
)5% Gamma Approximate KM-UCL (use when n>=50)	2.084	95% Gamma Adjusted KM-UCL (use when n<50)	2.126

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.551	Mean in Log Scale	-0.0109
SD in Original Scale	1.273	SD in Log Scale	1.078
95% t UCL (assumes normality of ROS data)	1.977	95% Percentile Bootstrap UCL	1.949
95% BCA Bootstrap UCL	2.013	95% Bootstrap t UCL	2.032
95% H-UCL (Log ROS)	3.106		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.0979	KM Geo Mean	0.907
KM SD (logged)	1.219	95% Critical H Value (KM-Log)	2.803
KM Standard Error of Mean (logged)	0.245	95% H-UCL (KM -Log)	3.778
KM SD (logged)	1.219	95% Critical H Value (KM-Log)	2.803
KM Standard Error of Mean (logged)	0.245		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.537	Mean in Log Scale	-0.155
SD in Original Scale	1.289	SD in Log Scale	1.368
95% t UCL (Assumes normality)	1.969	95% H-Stat UCL	4.987

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.972

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

HEPTACHLOR EPOXIDE

General Statistics

Total Number of Observations	26	Number of Distinct Observations	21
		Number of Missing Observations	47
Number of Detects	18	Number of Non-Detects	8
Number of Distinct Detects	16	Number of Distinct Non-Detects	6
Minimum Detect	0.12	Minimum Non-Detect	0.05
Maximum Detect	4.8	Maximum Non-Detect	0.2
Variance Detects	2	Percent Non-Detects	30.77%
Mean Detects	1.761	SD Detects	1.414
Median Detects	1.3	CV Detects	0.803
Skewness Detects	0.7	Kurtosis Detects	-0.471
Mean of Logged Detects	0.118	SD of Logged Detects	1.121

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.918	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.183	Lilliefors GOF Test
5% Lilliefors Critical Value	0.202	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

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

KM Mean	1.237	KM Standard Error of Mean	0.28
KM SD	1.388	95% KM (BCA) UCL	1.723
95% KM (t) UCL	1.715	95% KM (Percentile Bootstrap) UCL	1.687
95% KM (z) UCL	1.698	95% KM Bootstrap t UCL	1.775
90% KM Chebyshev UCL	2.077	95% KM Chebyshev UCL	2.458
97.5% KM Chebyshev UCL	2.986	99% KM Chebyshev UCL	4.024

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.309	Anderson-Darling GOF Test
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.118	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.208	Detected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.257	k star (bias corrected MLE)	1.085
Theta hat (MLE)	1.401	Theta star (bias corrected MLE)	1.624
nu hat (MLE)	45.26	nu star (bias corrected)	39.05
Mean (detects)	1.761		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.222
Maximum	4.8	Median	0.635
SD	1.428	CV	1.168
k hat (MLE)	0.424	k star (bias corrected MLE)	0.401
Theta hat (MLE)	2.88	Theta star (bias corrected MLE)	3.048
nu hat (MLE)	22.07	nu star (bias corrected)	20.86
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (20.86, α)	11.48	Adjusted Chi Square Value (20.86, β)	11.02
95% Gamma Approximate UCL (use when n>=50)	2.22	95% Gamma Adjusted UCL (use when n<50)	2.312

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.237	SD (KM)	1.388
Variance (KM)	1.927	SE of Mean (KM)	0.28
k hat (KM)	0.794	k star (KM)	0.728
nu hat (KM)	41.29	nu star (KM)	37.86
theta hat (KM)	1.558	theta star (KM)	1.699
80% gamma percentile (KM)	2.03	90% gamma percentile (KM)	3.076
95% gamma percentile (KM)	4.151	99% gamma percentile (KM)	6.708

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (37.86, α)	24.77	Adjusted Chi Square Value (37.86, β)	24.07
l5% Gamma Approximate KM-UCL (use when n>=50)	1.89	95% Gamma Adjusted KM-UCL (use when n<50)	1.945

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.25	Mean in Log Scale	-0.64
SD in Original Scale	1.404	SD in Log Scale	1.494
95% t UCL (assumes normality of ROS data)	1.72	95% Percentile Bootstrap UCL	1.682
95% BCA Bootstrap UCL	1.736	95% Bootstrap t UCL	1.836
95% H-UCL (Log ROS)	4.197		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.814	KM Geo Mean	0.443
KM SD (logged)	1.673	95% Critical H Value (KM-Log)	3.484
KM Standard Error of Mean (logged)	0.339	95% H-UCL (KM -Log)	5.762
KM SD (logged)	1.673	95% Critical H Value (KM-Log)	3.484
KM Standard Error of Mean (logged)	0.339		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.236	Mean in Log Scale	-0.855
SD in Original Scale	1.416	SD in Log Scale	1.78
95% t UCL (Assumes normality)	1.711	95% H-Stat UCL	7.61

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.715

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

Mercury

General Statistics

Total Number of Observations	24	Number of Distinct Observations	19
		Number of Missing Observations	43
Number of Detects	23	Number of Non-Detects	1
Number of Distinct Detects	18	Number of Distinct Non-Detects	1
Minimum Detect	0.16	Minimum Non-Detect	0.076
Maximum Detect	0.5	Maximum Non-Detect	0.076
Variance Detects	0.00854	Percent Non-Detects	4.167%
Mean Detects	0.265	SD Detects	0.0924
Median Detects	0.24	CV Detects	0.349
Skewness Detects	0.932	Kurtosis Detects	0.258
Mean of Logged Detects	-1.383	SD of Logged Detects	0.33

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

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

KM Mean	0.257	KM Standard Error of Mean	0.0201
KM SD	0.0962	95% KM (BCA) UCL	0.292
95% KM (t) UCL	0.291	95% KM (Percentile Bootstrap) UCL	0.29
95% KM (z) UCL	0.29	95% KM Bootstrap t UCL	0.297
90% KM Chebyshev UCL	0.317	95% KM Chebyshev UCL	0.344
97.5% KM Chebyshev UCL	0.382	99% KM Chebyshev UCL	0.457

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.581	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.744	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.196	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.182	Detected Data Not Gamma Distributed at 5% Significance Level

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

Gamma Statistics on Detected Data Only

k hat (MLE)	9.453	k star (bias corrected MLE)	8.249
Theta hat (MLE)	0.028	Theta star (bias corrected MLE)	0.0321
nu hat (MLE)	434.8	nu star (bias corrected)	379.4
Mean (detects)	0.265		

Gamma ROS Statistics using Imputed Non-Detects

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

Minimum	0.0812	Mean	0.257
Maximum	0.5	Median	0.225
SD	0.0979	CV	0.381
k hat (MLE)	7.155	k star (bias corrected MLE)	6.288
Theta hat (MLE)	0.0359	Theta star (bias corrected MLE)	0.0409
nu hat (MLE)	343.4	nu star (bias corrected)	301.8
Adjusted Level of Significance (β)	0.0392		
Approximate Chi Square Value (301.84, α)	262.6	Adjusted Chi Square Value (301.84, β)	260
95% Gamma Approximate UCL (use when n>=50)	0.296	95% Gamma Adjusted UCL (use when n<50)	0.298

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.257	SD (KM)	0.0962
Variance (KM)	0.00926	SE of Mean (KM)	0.0201
k hat (KM)	7.132	k star (KM)	6.268
nu hat (KM)	342.3	nu star (KM)	300.9
theta hat (KM)	0.036	theta star (KM)	0.041
80% gamma percentile (KM)	0.337	90% gamma percentile (KM)	0.394
95% gamma percentile (KM)	0.446	99% gamma percentile (KM)	0.554

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (300.86, α)	261.7	Adjusted Chi Square Value (300.86, β)	259.1
95% Gamma Approximate KM-UCL (use when n>=50)	0.295	95% Gamma Adjusted KM-UCL (use when n<50)	0.298

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.914	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.18	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.258	Mean in Log Scale	-1.417
SD in Original Scale	0.0957	SD in Log Scale	0.364
95% t UCL (assumes normality of ROS data)	0.292	95% Percentile Bootstrap UCL	0.291
95% BCA Bootstrap UCL	0.293	95% Bootstrap t UCL	0.296
95% H-UCL (Log ROS)	0.299		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.432	KM Geo Mean	0.239
KM SD (logged)	0.396	95% Critical H Value (KM-Log)	1.894
KM Standard Error of Mean (logged)	0.0827	95% H-UCL (KM -Log)	0.302
KM SD (logged)	0.396	95% Critical H Value (KM-Log)	1.894
KM Standard Error of Mean (logged)	0.0827		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.255	Mean in Log Scale	-1.461
SD in Original Scale	0.102	SD in Log Scale	0.503
95% t UCL (Assumes normality)	0.291	95% H-Stat UCL	0.324

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.298	95% GROS Adjusted Gamma UCL	0.298

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Thallium

General Statistics

Total Number of Observations	24	Number of Distinct Observations	18
		Number of Missing Observations	43
Number of Detects	19	Number of Non-Detects	5
Number of Distinct Detects	15	Number of Distinct Non-Detects	5
Minimum Detect	0.0024	Minimum Non-Detect	0.0021
Maximum Detect	0.0062	Maximum Non-Detect	0.0026
Variance Detects	1.2789E-6	Percent Non-Detects	20.83%
Mean Detects	0.00377	SD Detects	0.00113
Median Detects	0.00355	CV Detects	0.3
Skewness Detects	0.932	Kurtosis Detects	0.0233
Mean of Logged Detects	-5.621	SD of Logged Detects	0.283

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.197	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

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

KM Mean	0.00343	KM Standard Error of Mean	2.4852E-4
KM SD	0.00118	95% KM (BCA) UCL	0.00388
95% KM (t) UCL	0.00385	95% KM (Percentile Bootstrap) UCL	0.00384
95% KM (z) UCL	0.00383	95% KM Bootstrap t UCL	0.00388
90% KM Chebyshev UCL	0.00417	95% KM Chebyshev UCL	0.00451
97.5% KM Chebyshev UCL	0.00498	99% KM Chebyshev UCL	0.0059

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.512	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.741	)etected data appear Gamma Distributed at 5% Significance Leve
K-S Test Statistic	0.176	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.198	)etected data appear Gamma Distributed at 5% Significance Leve

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	12.87	k star (bias corrected MLE)	10.87
Theta hat (MLE)	2.9262E-4	Theta star (bias corrected MLE)	3.4636E-4
nu hat (MLE)	489	nu star (bias corrected)	413.2
Mean (detects)	0.00377		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0024	Mean	0.00506
Maximum	0.01	Median	0.0041
SD	0.00277	CV	0.548
k hat (MLE)	4.192	k star (bias corrected MLE)	3.695
Theta hat (MLE)	0.00121	Theta star (bias corrected MLE)	0.00137
nu hat (MLE)	201.2	nu star (bias corrected)	177.4
Adjusted Level of Significance (β)	0.0392		
Approximate Chi Square Value (177.38, α)	147.6	Adjusted Chi Square Value (177.38, β)	145.7
95% Gamma Approximate UCL (use when n>=50)	0.00609	95% Gamma Adjusted UCL (use when n<50)	0.00617

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00343	SD (KM)	0.00118
Variance (KM)	1.4022E-6	SE of Mean (KM)	2.4852E-4
k hat (KM)	8.366	k star (KM)	7.348
nu hat (KM)	401.6	nu star (KM)	352.7
theta hat (KM)	4.0940E-4	theta star (KM)	4.6611E-4
80% gamma percentile (KM)	0.00442	90% gamma percentile (KM)	0.00511
95% gamma percentile (KM)	0.00573	99% gamma percentile (KM)	0.00702

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (352.70, α)	310.2	Adjusted Chi Square Value (352.70, β)	307.4
)5% Gamma Approximate KM-UCL (use when n>=50)	0.00389	95% Gamma Adjusted KM-UCL (use when n<50)	0.00393

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.941	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.168	Lilliefors GOF Test
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00338	Mean in Log Scale	-5.754
SD in Original Scale	0.00126	SD in Log Scale	0.365
95% t UCL (assumes normality of ROS data)	0.00382	95% Percentile Bootstrap UCL	0.00379
95% BCA Bootstrap UCL	0.00386	95% Bootstrap t UCL	0.00389
95% H-UCL (Log ROS)	0.00391		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.732	KM Geo Mean	0.00324
KM SD (logged)	0.327	95% Critical H Value (KM-Log)	1.845
KM Standard Error of Mean (logged)	0.0687	95% H-UCL (KM -Log)	0.00388
KM SD (logged)	0.327	95% Critical H Value (KM-Log)	1.845
KM Standard Error of Mean (logged)	0.0687		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00323	Mean in Log Scale	-5.855
SD in Original Scale	0.00147	SD in Log Scale	0.531
95% t UCL (Assumes normality)	0.00374	95% H-Stat UCL	0.00412

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.00385

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Attachment F

Derivation of Volatilization Factors for Groundwater to Excavation Trench

Attachment F
Derivation of Volatilization Factors for Groundwater to Excavation Trench

The Virginia Department of Environmental Quality (VADEQ) has published an approach for predicting exposure of workers to volatile substances in trenches from standing groundwater in the trench (VADEQ, 2018, Appendix 2). The model is based on the assumption that the trench would only intercept groundwater for a few inches, as any deeper than that would require dewatering. The VADEQ model uses a simple box model to simulate the mixing of contaminants in air. The main equation is:

$\mathbf{C_{trench} = C_{GW} \times VF}$ Equation (1)

where:

C_{trench} = concentration of volatile substance in trench (µg/m^3)

C_{GW} = concentration of volatile substance in groundwater (µg/L)

VF = volatilization factor

The exposed groundwater model is very conservative, and in some cases yields unrealistically high vapor concentrations in a trench, as discussed in the uncertainty section of this attachment. However, the default model is conservatively used in this evaluation as a screening tool.

For standing groundwater in the floor of an excavation trench exposed to the atmosphere, the following equation is used to determine the volatilization factor:

$\mathbf{VF = (K_i \times A \times F \times 10^{-3} \times 10^{4} \times 3{,}600) \div (ACH \times V)}$ Equation (2)

where:

Ki = overall mass transfer coefficient of the volatile substance (cm/s)

A = area of trench (m^2)

F = fraction of floor through which contaminant can enter (dimensionless)

ACH = air changes per hour (hr^{-1})

V = volume of trench (m^3)

Per United States Environmental Protection Agency (USEPA) Region III, a value of 2 hr^{-1} is to be used for ACH in cases when the trench depth is greater than the trench width. Table F-1 presents the calculations based on the default model for exposed groundwater.

Uncertainty

The default VADEQ ACH of 2 hr^{-1} represents the restricted gas exchange between the trench and the ambient atmosphere in an 8-foot-long by 3-foot-wide by 8-foot-deep trench (i.e., its depth is greater than its width). When the trench width exceeds the trench depth, the gas exchange between the trench and the ambient atmosphere is assumed to be relatively unrestricted, and a value of 360 hr^{-1} is suggested by the USEPA. For an ambient wind speed of 1 meter per second (m/s), it is assumed that the in-trench air velocity is 0.1 m/s (10% of ambient), resulting in a more realistic ACH of 148 hr^{-1}. In that case, the air concentrations estimated by the default model are over 70 times greater than those predicted by a model based on a more realistic ACH.

Reference:

VADEQ. 2018. Virginia Unified Risk Assessment Model (VURAM) 2.0 User's Guide for Risk Assessors. Virginia Department of Environmental Quality.

Table F-1: Calculation of Volatilization Factors for the Trench Air Pathway

Exposure-point concentrations
(inhalation) for construction/utility workers in a trench

Groundwater less than 15 feet deep (Groundwater exposed in Trench)

For Mass-Transfer Coefficients

Kg,H2O	0.833	cm/s
MWH2O	18	
Kl,O2	0.002	cm/s
MWO2	32	
T	**77**	F
T	298	K
R	8.20E-05	atm-m3/mol-K

For Emission Flux and Concentration in Trench

CF1	1.00E-03	L/cm3
CF2	1.00E+04	cm2/m2
CF3	3600	s/hr
F	**1**	
ACH	2	hr-1

Trench dimensions

Length	**8**	ft
	2.44	m
Width	**3**	ft
	0.91	m
Depth	**8**	ft
	2.44	m
Width/Depth	0.38	

Chemical	CAS No.	Molecular Weight MWi g/mol (a)	Henry's Law Constant Hi atm-m3/mol (a)	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Unit Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3	Concentration of Contaminant in Trench Ctrench mg/m3
Bromodichloromethane	75-27-4	163.83	2.12E-03	3.98E-01	8.84E-04	8.62E-04	1.00E+00	6.36E+00	6.36E+00	6.36E-03
Butyl alcohol, tert-	75-65-0	60.10	8.10E-06	5.56E-01	1.46E-03	1.64E-04	1.00E+00	1.21E+00	1.21E+00	1.21E-03
Chloroform	67-66-3	119.38	3.67E-03	4.42E-01	1.04E-03	1.02E-03	1.00E+00	7.53E+00	7.53E+00	7.53E-03
Methyl tert-butyl ether	1634-04-4	88.15	5.87E-04	4.89E-01	1.21E-03	1.09E-03	1.00E+00	8.07E+00	8.07E+00	8.07E-03
Tetrachloroethene	127-18-4	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	1.00E+00	6.47E+00	6.47E+00	6.47E-03
Trichloroethene	79-01-6	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	1.00E+00	7.24E+00	7.24E+00	7.24E-03
Vinyl Chloride	75-01-4	62.50	2.78E-02	5.49E-01	1.43E-03	1.43E-03	1.00E+00	1.05E+01	1.05E+01	1.05E-02

(a) Values from USEPA Regional Screening Level table parameters, November 2018. Values for isopropanol were used for tert-butyl alcohol.

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Attachment G

Calculation of Groundwater-to-Surface Water Dilution and Attenuation Factor

Groundwater discharge from MW-1 upper aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Elevation of top of silt-clay layer

-21.36 ft MLLW

Elevation of water table (low tide)

2.43 ft MLLW

Saturated thickness (h) of unconfined aquifer

23.79 ft

Width of boundary segment through which GW flows (l)

235 ft (distance from property boundary to halfway between MW-1 and MW-2, from Google Earth)

A= 5590.65 square ft

Calculation of K:

Average of K from slug tests:

MW-1A

0.00002596 ft/sec
0.00002817 ft/sec
0.00002737 ft/sec
0.0000275 ft/sec
0.00002781 ft/sec

K= 2.7362E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-1, MW-2, and MW-5

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-1A	1323686.71	448230.77	2.43
MW-2A	1323684.71	448456.98	2.50
MW-5A	1324032.04	448172.22	5.52

I= 0.009 ft/ft

Q= 0.001380108 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 9.92883E-05

Groundwater discharge from MW-1 lower aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Thickness of lower aquifer (h)

Top of LWZ (ft bgs)	Bottom of LWZ (ft bgs)	Thickness
39	52	13

Width of boundary segment through which GW flows (l)

235 ft (distance from property boundary to halfway between MW-1 and MW-2, from Google Earth)

A= 3055 square ft

Calculation of K:

Average of K from slug tests:

MW-1B	
0.00005158	ft/sec
0.00005409	ft/sec
0.00005568	ft/sec
0.00005965	ft/sec
0.00007115	ft/sec
0.00005471	ft/sec

K= 0.00005781 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-1, MW-2, and MW-5

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-1B	1323686.71	448230.768	2.42
MW-2B	1323684.71	448456.975	2.65
MW-5B	1324032.04	448172.221	3.11

I= 0.002408 ft/ft

Q= 0.00042528 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 3.0595E-05

Groundwater discharge from MW-2 upper aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Elevation of top of silt-clay layer

-14.72 ft MLLW

Elevation of water table (low tide)

2.50 ft MLLW

Saturated thickness (h) of unconfined aquifer

17.22 ft

Width of boundary segment through which GW flows (l)

290 ft (distance from midpoint of MW-1 and MW-2 to midpoint of MW-2 and MW-3, from Google Earth)

A= 4993.8 square ft

Calculation of K:

Average of K from slug tests at 3 wells in the western portion of the site:

	MW-1A	MW-3A	MW-6A	
	0.00002596	8.022E-05	0.0000173	ft/sec
	0.00002817	0.0000565	2.399E-05	ft/sec
	0.00002737	5.023E-05	2.221E-05	ft/sec
	0.0000275	5.748E-05	2.251E-05	ft/sec
	0.00002781	4.915E-05	2.131E-05	ft/sec
		5.104E-05	1.976E-05	ft/sec
average	2.7362E-05	5.744E-05	2.118E-05	ft/sec

K= 3.2168E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-2, MW-3, and MW-6

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-2A	1323684.71	448456.98	2.50
MW-3A	1323686.31	448809.39	3.83
MW-6A	1324211.25	448553.86	4.52

I= 0.005 ft/ft

Q= 0.000787294 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 5.66398E-05

Groundwater discharge from MW-2 lower aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Thickness of lower aquifer (h)

Top of LWZ (ft bgs)	Bottom of LWZ (ft bgs)	Thickness
35	53	18

Width of boundary segment through which GW flows (l)

290 ft (distance from midpoint of MW-1 and MW-2 to midpoint of MW-2 and MW-3, from Google

A= 5220 square ft

Calculation of K:

Average of K from slug tests at 3 wells in the western portion of the site:

	MW-1B	MW-3B	MW-6B	
	0.00005158	0.00008006	0.0000268	ft/sec
	0.00005409	0.00007025	0.00001901	ft/sec
	0.00005568	0.00007011	0.00002869	ft/sec
	0.00005965	0.00005106	0.00002498	ft/sec
	0.00007115	0.00009747	0.00002324	ft/sec
	0.00005471	0.0000648	0.00001652	ft/sec
average	0.00005781	7.2292E-05	2.3207E-05	ft/sec

K= 4.5945E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-1, MW-2, and MW-5

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-2B	1323684.71	448456.975	2.65
MW-3B	1323686.31	448809.394	3.52
MW-6B	1324211.25	448553.855	4.86

I= 0.004477 ft/ft

Q= 0.00107372 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 7.7246E-05

Groundwater discharge from MW-3 upper aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Elevation of top of silt-clay layer
-8.42 ft MLLW

Elevation of water table (low tide)
3.83 ft MLLW

Saturated thickness (h) of unconfined aquifer
12.25 ft

Width of boundary segment through which GW flows (l)
330 ft (distance from midpoint of MW-2 and MW-3 to midpoint of MW-3 and MW-4, from Google

A= 4042.5 square ft

Calculation of K:

Average of K from slug tests:

MW-3A
8.022E-05 ft/sec
0.0000565 ft/sec
5.023E-05 ft/sec
5.748E-05 ft/sec
4.915E-05 ft/sec
5.104E-05 ft/sec

K= 5.872E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-3, MW-4, and MW-8

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-3A	1323686.3	448809.39	3.83
MW-4A	1323752.9	449113.68	4.05
MW-8A	1324070.2	449146.9	4.26

I= 0.0008 ft/ft

Q= 0.000199999 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 1.43884E-05

Groundwater discharge from MW-3 lower aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Thickness of lower aquifer (h)

Top of LWZ (ft bgs)	Bottom of LWZ (ft bgs)	Thickness
40	50	10

Width of boundary segment through which GW flows (l)

330 ft (distance from property boundary to halfway between MW-1 and MW-2, from Google Earth)

A= 3300 square ft

Calculation of K:

Average of K from slug tests:

MW-3B	
0.00008006	ft/sec
0.00007025	ft/sec
0.00007011	ft/sec
0.00005106	ft/sec
0.00009747	ft/sec
0.0000648	ft/sec
K= 7.2292E-05	ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-3, MW-4, and MW-7

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-3B	1323686.31	448809.394	3.52
MW-4B	1323752.88	449113.68	3.80
MW-7B	1324287.51	448860.381	6.05

I= 0.004208 ft/ft

Q= 0.001003871 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 7.22209E-05

Groundwater discharge from MW-4 upper aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Elevation of top of silt-clay layer
-9.95 ft MLLW

Elevation of water table (low tide)
4.05 ft MLLW

Saturated thickness (h) of unconfined aquifer
14 ft

Width of boundary segment through which GW flows (l)
250 ft (distance from midpoint of MW-3 and MW-4 to midpoint of MW-4 and MW-8, from Google Earth)

A= 3500 square ft

Calculation of K:

Average of K from slug tests at 3 wells in the western portion of the site:

	MW-1A	MW-3A	MW-6A	
	2.596E-05	8.022E-05	0.0000173	ft/sec
	2.817E-05	0.0000565	2.399E-05	ft/sec
	2.737E-05	5.023E-05	2.221E-05	ft/sec
	0.0000275	5.748E-05	2.251E-05	ft/sec
	2.781E-05	4.915E-05	2.131E-05	ft/sec
		5.104E-05	1.976E-05	ft/sec
average	2.736E-05	5.744E-05	2.118E-05	ft/sec

K= 3.217E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-4, MW-6, and MW-8

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-4A	1323752.9	449113.68	4.05
MW-6A	1324211.3	448553.86	4.52
MW-8A	1324070.2	449146.9	4.26

I= 0.0007 ft/ft

Q= 8.3641E-05 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 6.01734E-06

Groundwater discharge from MW-4 lower aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Thickness of lower aquifer (h)

Top of LWZ (ft bgs)	Bottom of LWZ (ft bgs)	Thickness
35	45	10

Width of boundary segment through which GW flows (l)

250 ft (distance from midpoint of MW-3 and MW-4 to midpoint of MW-4 and MW-8, from Google

A= 2500 square ft

Calculation of K:

Average of K from slug tests at 3 wells in the western portion of the site:

	MW-1B	MW-3B	MW-6B	
	0.00005158	0.00008006	0.0000268	ft/sec
	0.00005409	0.00007025	0.00001901	ft/sec
	0.00005568	0.00007011	0.00002869	ft/sec
	0.00005965	0.00005106	0.00002498	ft/sec
	0.00007115	0.00009747	0.00002324	ft/sec
	0.00005471	0.0000648	0.00001652	ft/sec
average	0.00005781	7.2292E-05	2.3207E-05	ft/sec

K= 4.5945E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-4, MW-6, and MW-7

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-4B	1323752.88	449113.68	3.80
MW-6B	1324211.25	448553.855	4.86
MW-7B	1324287.51	448860.381	6.05

I= 0.005975 ft/ft

Q= 0.000686298 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 4.93739E-05

Groundwater discharge from MW-8 upper aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Elevation of top of silt-clay layer
-6.4 ft MLLW

Elevation of water table (low tide)
4.26 ft MLLW

Saturated thickness (h) of unconfined aquifer
10.66 ft

Width of boundary segment through which GW flows (l)
440 ft (distance from midpoint of MW-4 and MW-8 to midpoint of MW-8 and MW-11, from Google Earth)

A= 4690.4 square ft

Calculation of K:

Average of K from slug tests at 3 wells in the northwest portion of the site:

	MW-3A	MW-6A	MW-11A	
	8.022E-05	0.0000173	1.376E-05	ft/sec
	0.0000565	2.399E-05	1.278E-05	ft/sec
	5.023E-05	2.221E-05	2.109E-05	ft/sec
	5.748E-05	2.251E-05	1.388E-05	ft/sec
	4.915E-05	2.131E-05	1.903E-05	ft/sec
	5.104E-05	1.976E-05	1.377E-05	ft/sec
average	5.872E-05	2.118E-05	1.572E-05	ft/sec

K= 2.694E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-8, MW-7, and MW-11

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-8A	1324070.2	449146.9	4.26
MW-7A	1324287.5	448860.38	5.89
MW-11A	1324624.3	449241.15	5.09

I= 0.0046 ft/ft

Q= 0.000579438 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 4.16862E-05

Groundwater discharge from MW-8 lower aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Thickness of lower aquifer (h)

Top of LWZ (ft bgs)	Bottom of LWZ (ft bgs)	Thickness
50	60	10

Width of boundary segment through which GW flows (l)

440 ft (distance from midpoint of MW-4 and MW-8 to midpoint of MW-8 and MW-11, from Google Earth)

A= 4400 square ft

Calculation of K:

Average of K from slug tests at 3 wells in the northwest portion of the site:

	MW-3A	MW-6A	MW-11A	
	0.00008022	0.0000173	0.00001376	ft/sec
	0.0000565	0.00002399	0.00001278	ft/sec
	0.00005023	0.00002221	0.00002109	ft/sec
	0.00005748	0.00002251	0.00001388	ft/sec
	0.00004915	0.00002131	0.00001903	ft/sec
	0.00005104	0.00001976	0.00001377	ft/sec
average	5.7437E-05	0.00002118	1.5718E-05	ft/sec

K= 2.6741E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-8, MW-7, and MW-11

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-8B	1324070.24	449146.902	2.96
MW-7B	1324287.51	448860.381	6.05
MW-11B	1324624.32	449241.152	3.74

I= 0.009073 ft/ft

Q= 0.001067524 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 7.68003E-05

Groundwater discharge from MW-11 upper aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Elevation of top of silt-clay layer
-23.5 ft MLLW

Elevation of water table (low tide)
5.09 ft MLLW

Saturated thickness (h) of unconfined aquifer
28.59 ft

Width of boundary segment through which GW flows (l)
500 ft (distance from midpoint of MW-8 and MW-1 to site boundary, from Google Earth)

A= 14295 square ft

Calculation of K:

Average of K from slug tests:

MW-11A
1.376E-05 ft/sec
1.278E-05 ft/sec
2.109E-05 ft/sec
1.388E-05 ft/sec
1.903E-05 ft/sec
1.377E-05 ft/sec

K= 1.572E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-11, MW-7, and MW-10

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-11A	1324624.3	449241.15	5.09
MW-7A	1324287.5	448860.38	5.89
MW-10A	1324574	448707.16	9.50

I= 0.0119 ft/ft

Q= 0.00267385 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 0.00019236

Groundwater discharge from MW-11 lower aquifer to the Anacostia (Q) = KIA

Calculation of A (lxh):

Thickness of lower aquifer (h)

Top of LWZ (ft bgs)	Bottom of LWZ (ft bgs)	Thickness
50	61.8	11.8

Width of boundary segment through which GW flows (l)

500 ft (distance from property boundary to halfway between MW-1 and MW-2, from Google Earth)

A= 5900 square ft

Calculation of K:

Average of K from slug tests:

MW-11B
3.333E-05 ft/sec
2.153E-05 ft/sec
2.161E-05 ft/sec
2.016E-05 ft/sec
0.0000233 ft/sec
2.235E-05 ft/sec
K= 2.371E-05 ft/sec

Calculation of I (dh/dL):

dh/dl = slope of the plane formed by gw level at MW-11, MW-7, and MW-10

	x (easting)	y (northing)	z (water level, ft MLLW)
MW-11B	1324624.3	449241.152	3.74
MW-7B	1324287.5	448860.381	6.05
MW-10B	1324574	448707.159	9.21

I= 0.01197 ft/ft

Q= 0.001674707 cu.ft./sec

7Q10 Anacostia streamflow 13.9 cu.ft./sec

DAF= 0.000120482

Notes:

7Q10 is the annual minimum 7-day average streamflow with a 10-year recurrence interval
7Q10 estimated by USGS Maryland StreamStats application
(http://water.usgs.gov/osw/streamstats/maryland.html)
Hydraulic gradient calculated using EPA's on-line tool for Site Assessments
(https://www3.epa.gov/ceampubl/learn2model/part-two/onsite/gradient4plus-ns.html)
A = Flow cross section area
I = hydraulic gradient
K = hydraulic conductivity
Q = flow rate
DAF = Dillution Attenuation Factor

Attachment H

Risk Calculation Spreadsheets

pepco
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Reasonable Maximum Exposure (RME)

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Risk Calculation Tables (RME)

Table H-1-1. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC (1)		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (2)	Risk	Value	Units	Value	Units	Quotient
Soil	Soil		Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.30E+05	kg-day/mg		8.40E-04	4.52E-07	mg/kg-day	7.00E-10	mg/kg-day	6.46E+02
				Inorganics													
				Arsenic	1.00E+00	mg/kg	3.87E-09	mg/kg-day	1.50E+00	kg-day/mg		5.81E-09	2.71E-07	mg/kg-day	3.00E-04	mg/kg-day	9.04E-04
				Cobalt	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	3.00E-04	mg/kg-day	1.51E-03
				Manganese	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	2.40E-02	mg/kg-day	1.88E-05
				Nickel	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	2.00E-02	mg/kg-day	2.26E-05
				Thallium	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	1.00E-05	mg/kg-day	4.52E-02
				Vanadium	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	5.04E-03	mg/kg-day	8.97E-05
				PCBs													
				Total PCBs	1.00E+00	mg/kg	6.46E-09	mg/kg-day	2.00E+00	kg-day/mg		1.29E-08	4.52E-07	mg/kg-day	5.00E-05	mg/kg-day	9.04E-03
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E-01	kg-day/mg	1	6.46E-10	4.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E+00	kg-day/mg	1	6.46E-09	4.52E-07	mg/kg-day	3.00E-04	mg/kg-day	1.51E-03
				Benzo(b)fluoranthene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E-01	kg-day/mg	1	6.46E-10	4.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E-02	kg-day/mg	1	6.46E-11	4.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E-03	kg-day/mg	1	6.46E-12	4.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E+00	kg-day/mg	1	6.46E-09	4.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	1.00E-01	kg-day/mg	1	6.46E-10	4.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	2.00E-02	mg/kg-day	2.26E-05
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	6.46E-09	mg/kg-day	NA	kg-day/mg		NA	4.52E-07	mg/kg-day	1.00E-02	mg/kg-day	4.52E-05
			Exp. Route Total									(3)					(3)
Soil	Sol		Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	6.21E-10	mg/kg-day	1.30E+05	kg-day/mg		8.08E-05	4.35E-08	mg/kg-day	7.00E-10	mg/kg-day	6.21E+01
				Inorganics													
				Arsenic	1.00E+00	mg/kg	6.21E-10	mg/kg-day	1.50E+00	kg-day/mg		9.32E-10	4.35E-08	mg/kg-day	3.00E-04	mg/kg-day	1.45E-04
				Cobalt	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Manganese	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	1.00E+00	mg/kg	2.90E-09	mg/kg-day	2.00E+00	kg-day/mg		5.80E-09	2.03E-07	mg/kg-day	5.00E-05	mg/kg-day	4.06E-03
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.69E-10	1.88E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E+00	kg-day/mg	1	2.69E-09	1.88E-07	mg/kg-day	3.00E-04	mg/kg-day	6.28E-04
				Benzo(b)fluoranthene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.69E-10	1.88E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E-02	kg-day/mg	1	2.69E-11	1.88E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E-03	kg-day/mg	1	2.69E-12	1.88E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E+00	kg-day/mg	1	2.69E-09	1.88E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.69E-10	1.88E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	2.69E-09	mg/kg-day	NA	kg-day/mg		NA	1.88E-07	mg/kg-day	2.00E-02	mg/kg-day	9.42E-06
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									(3)					(3)

Table H-1-1. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC (1)		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (2)	Risk	Value	Units	Value	Units	Quotient
Soil	Outdoor air		Inhalation														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/m3	5.22E-04	mg/m3	3.80E+01	mg/m3		1.98E-02	3.65E-02	mg/m3	4.00E-08	mg/m3	9.13E+05
				Inorganics													
				Arsenic	1.00E+00	mg/m3	5.22E-04	mg/m3	4.30E-03	mg/m3		2.24E-06	3.65E-02	mg/m3	1.50E-05	mg/m3	2.44E+03
				Cobalt	1.00E+00	mg/m3	5.22E-04	mg/m3	9.00E-03	mg/m3		4.70E-06	3.65E-02	mg/m3	6.00E-06	mg/m3	6.09E+03
				Manganese	1.00E+00	mg/m3	5.22E-04	mg/m3	NA	mg/m3		NA	3.65E-02	mg/m3	5.00E-05	mg/m3	7.31E+02
				Nickel	1.00E+00	mg/m3	5.22E-04	mg/m3	2.60E-04	mg/m3		1.36E-07	3.65E-02	mg/m3	9.00E-05	mg/m3	4.06E+02
				Thallium	1.00E+00	mg/m3	5.22E-04	mg/m3	NA	mg/m3		NA	3.65E-02	mg/m3	NA	mg/m3	NA
				Vanadium	1.00E+00	mg/m3	5.22E-04	mg/m3	NA	mg/m3		NA	3.65E-02	mg/m3	1.00E-04	mg/m3	3.65E+02
				PCBs													
				Total PCBs	1.00E+00	mg/m3	5.22E-04	mg/m3	5.71E-04	mg/m3		2.98E-07	3.65E-02	mg/m3	NA	mg/m3	NA
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-05	mg/m3	1	3.13E-08	3.65E-02	mg/m3	NA	mg/m3	NA
				Benzo(a)pyrene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-04	mg/m3	1	3.13E-07	3.65E-02	mg/m3	2.00E-06	mg/m3	1.83E+04
				Benzo(b)fluoranthene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-05	mg/m3	1	3.13E-08	3.65E-02	mg/m3	NA	mg/m3	NA
				Benzo(k)fluoranthene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-06	mg/m3	1	3.13E-09	3.65E-02	mg/m3	NA	mg/m3	NA
				Chrysene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-07	mg/m3	1	3.13E-10	3.65E-02	mg/m3	NA	mg/m3	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-04	mg/m3	1	3.13E-07	3.65E-02	mg/m3	NA	mg/m3	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/m3	5.22E-04	mg/m3	6.00E-05	mg/m3	1	3.13E-08	3.65E-02	mg/m3	NA	mg/m3	NA
				Naphthalene	1.00E+00	mg/m3	5.22E-04	mg/m3	3.40E-05	mg/m3		1.77E-08	3.65E-02	mg/m3	3.00E-03	mg/m3	1.22E+01
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/m3	5.22E-04	mg/m3	NA	mg/m3		NA	3.65E-02	mg/m3	1.00E-01	mg/m3	3.65E-01
			Exp. Route Total									(3)					(3)
		Exposure Point Total										(3)					(3)
	Exposure Medium Total											(3)					(3)
Soil Total												(3)					(3)
Groundwater	Trench Air		Inhalation														
				VOCs													
				Bromodichloromethane	1.00E+00	mg/m3	1.30E-04	mg/m3	3.70E-05	mg/m3		4.83E-09	9.13E-03	mg/m3	NA	mg/m3	NA
				Butyl alcohol, tert-	1.00E+00	mg/m3	1.30E-04	mg/m3	NA	mg/m3		NA	9.13E-03	mg/m3	2.00E-01	mg/m3	4.57E-02
				Chloroform	1.00E+00	mg/m3	1.30E-04	mg/m3	2.30E-05	mg/m3		3.00E-09	9.13E-03	mg/m3	9.80E-02	mg/m3	9.32E-02
				Methyl tert-Butyl Ether (MTBE)	1.00E+00	mg/m3	1.30E-04	mg/m3	2.60E-07	mg/m3		3.39E-11	9.13E-03	mg/m3	3.00E+00	mg/m3	3.04E-03
				Tetrachloroethylene	1.00E+00	mg/m3	1.30E-04	mg/m3	2.60E-07	mg/m3		3.39E-11	9.13E-03	mg/m3	4.00E-02	mg/m3	2.28E-01
				Trichloroethene	1.00E+00	mg/m3	1.30E-04	mg/m3	4.10E-06	mg/m3	1	5.35E-10	9.13E-03	mg/m3	2.00E-03	mg/m3	4.57E+00
				Vinyl Chloride	1.00E+00	mg/m3	1.30E-04	mg/m3	4.40E-06	mg/m3		5.74E-10	9.13E-03	mg/m3	1.00E-01	mg/m3	9.13E-02
			Exp. Route Total									(3)					(3)
		Exposure Point Total										(3)					(3)
	Exposure Medium Total											(3)					(3)
Groundwater												(3)					(3)
Total Receptor Risk/Hazard												(3)					(3)

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.

(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(3) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-1-2. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC [1]		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [2]	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Surface Soil		Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.30E+05	kg-day/mg		3.58E-02	7.71E-07	mg/kg-day	7.00E-10	mg/kg-day	1.10E+03
				Inorganics													
				Arsenic	1.00E+00	mg/kg	1.65E-07	mg/kg-day	1.50E+00	kg-day/mg		2.48E-07	4.62E-07	mg/kg-day	3.00E-04	mg/kg-day	1.54E-03
				Cobalt	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	3.00E-04	mg/kg-day	2.57E-03
				Manganese	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	2.40E-02	mg/kg-day	3.21E-05
				Nickel	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	2.00E-02	mg/kg-day	3.85E-05
				Thallium	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	1.00E-05	mg/kg-day	7.71E-02
				Vanadium	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	5.04E-03	mg/kg-day	1.53E-04
				PCBs													
				Total PCBs	1.00E+00	mg/kg	2.75E-07	mg/kg-day	2.00E+00	kg-day/mg		5.50E-07	7.71E-07	mg/kg-day	2.00E-05	mg/kg-day	3.85E-02
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E-01	kg-day/mg	1	2.75E-08	7.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E+00	kg-day/mg	1	2.75E-07	7.71E-07	mg/kg-day	3.00E-04	mg/kg-day	2.57E-03
				Benzo(b)fluoranthene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E-01	kg-day/mg	1	2.75E-08	7.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E-02	kg-day/mg	1	2.75E-09	7.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E-03	kg-day/mg	1	2.75E-10	7.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E+00	kg-day/mg	1	2.75E-07	7.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	1.00E-01	kg-day/mg	1	2.75E-08	7.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	2.00E-02	mg/kg-day	3.85E-05
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	2.75E-07	mg/kg-day	NA	kg-day/mg		NA	7.71E-07	mg/kg-day	1.00E-02	mg/kg-day	7.71E-05
			Exp. Route Total									(3)					(3)
Surface Soil	Surface Soil		Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	3.49E-08	mg/kg-day	1.30E+05	kg-day/mg		4.54E-03	9.78E-08	mg/kg-day	7.00E-10	mg/kg-day	1.40E+02
				Inorganics													
				Arsenic	1.00E+00	mg/kg	3.49E-08	mg/kg-day	1.50E+00	kg-day/mg		5.24E-08	9.78E-08	mg/kg-day	3.00E-04	mg/kg-day	3.26E-04
				Cobalt	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Manganese	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	1.00E+00	mg/kg	1.63E-07	mg/kg-day	2.00E+00	kg-day/mg		3.26E-07	4.57E-07	mg/kg-day	2.00E-05	mg/kg-day	2.28E-02
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E-01	kg-day/mg	1	1.51E-08	4.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E+00	kg-day/mg	1	1.51E-07	4.24E-07	mg/kg-day	3.00E-04	mg/kg-day	1.41E-03
				Benzo(b)fluoranthene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E-01	kg-day/mg	1	1.51E-08	4.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E-02	kg-day/mg	1	1.51E-09	4.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E-03	kg-day/mg	1	1.51E-10	4.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E+00	kg-day/mg	1	1.51E-07	4.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	1.00E-01	kg-day/mg	1	1.51E-08	4.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	1.51E-07	mg/kg-day	NA	kg-day/mg		NA	4.24E-07	mg/kg-day	2.00E-02	mg/kg-day	2.12E-05
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									(3)					(3)

Table H-1-2. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC (1)		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (2)	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Outdoor air		Inhalation														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/m3	7.34E-02	mg/m3	3.80E+01	mg/m3		2.79E+00	2.05E-01	mg/m3	4.00E-08	mg/m3	5.14E+06
				Inorganics													
				Arsenic	1.00E+00	mg/m3	7.34E-02	mg/m3	4.30E-03	mg/m3		3.16E-04	2.05E-01	mg/m3	1.50E-05	mg/m3	1.37E+04
				Cobalt	1.00E+00	mg/m3	7.34E-02	mg/m3	9.00E-03	mg/m3		6.60E-04	2.05E-01	mg/m3	6.00E-06	mg/m3	3.42E+04
				Manganese	1.00E+00	mg/m3	7.34E-02	mg/m3	NA	mg/m3		NA	2.05E-01	mg/m3	5.00E-05	mg/m3	4.11E+03
				Nickel	1.00E+00	mg/m3	7.34E-02	mg/m3	2.60E-04	mg/m3		1.91E-05	2.05E-01	mg/m3	9.00E-05	mg/m3	2.28E+03
				Thallium	1.00E+00	mg/m3	7.34E-02	mg/m3	NA	mg/m3		NA	2.05E-01	mg/m3	NA	mg/m3	NA
				Vanadium	1.00E+00	mg/m3	7.34E-02	mg/m3	NA	mg/m3		NA	2.05E-01	mg/m3	1.00E-04	mg/m3	2.05E+03
				PCBs													
				Total PCBs	1.00E+00	mg/m3	7.34E-02	mg/m3	5.71E-04	mg/m3		4.19E-05	2.05E-01	mg/m3	NA	mg/m3	NA
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-05	mg/m3	1	4.40E-06	2.05E-01	mg/m3	NA	mg/m3	NA
				Benzo(a)pyrene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-04	mg/m3	1	4.40E-05	2.05E-01	mg/m3	2.00E-06	mg/m3	1.03E+05
				Benzo(b)fluoranthene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-05	mg/m3	1	4.40E-06	2.05E-01	mg/m3	NA	mg/m3	NA
				Benzo(k)fluoranthene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-06	mg/m3	1	4.40E-07	2.05E-01	mg/m3	NA	mg/m3	NA
				Chrysene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-07	mg/m3	1	4.40E-08	2.05E-01	mg/m3	NA	mg/m3	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-04	mg/m3	1	4.40E-05	2.05E-01	mg/m3	NA	mg/m3	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/m3	7.34E-02	mg/m3	6.00E-05	mg/m3	1	4.40E-06	2.05E-01	mg/m3	NA	mg/m3	NA
				Naphthalene	1.00E+00	mg/m3	7.34E-02	mg/m3	3.40E-05	mg/m3		2.50E-06	2.05E-01	mg/m3	3.00E-03	mg/m3	6.85E+01
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/m3	7.34E-02	mg/m3	NA	mg/m3		NA	2.05E-01	mg/m3	1.00E-01	mg/m3	2.05E+00
			Exp. Route Total									(3)					(3)
		Exposure Point Total										(3)					(3)
	Exposure Medium Total											(3)					(3)
Soil Total												(3)					(3)
Total Receptor Risk/Hazard												(3)					(3)

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(3) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-1-3. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Recreational Visitor
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

							Cancer Risk Calculations						Noncancer Hazard Calculations				
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/IUR Value	CSF/IUR Units	ADAF [1]	Cancer Risk	Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Soil	Surface Soil	Hypothetical Future Park Land/Green Space	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.51E-06	mg/kg	4.34E-14	mg/kg-day	1.30E+05	kg-day/mg		5.64E-09	2.53E-13	mg/kg-day	7.00E-10	mg/kg-day	3.61E-04
				Inorganics													
				Arsenic	2.60E+00	mg/kg	2.70E-08	mg/kg-day	1.50E+00	kg-day/mg		4.04E-08	1.57E-07	mg/kg-day	3.00E-04	mg/kg-day	5.24E-04
				Cobalt	1.30E+02	mg/kg	2.25E-06	mg/kg-day	NA	kg-day/mg		NA	1.31E-05	mg/kg-day	3.00E-04	mg/kg-day	4.37E-02
				Manganese	2.00E+02	mg/kg	3.46E-06	mg/kg-day	NA	kg-day/mg		NA	2.02E-05	mg/kg-day	2.40E-02	mg/kg-day	8.40E-04
				Nickel	1.20E+01	mg/kg	2.07E-07	mg/kg-day	NA	kg-day/mg		NA	1.21E-06	mg/kg-day	2.00E-02	mg/kg-day	6.05E-05
				Thallium	ND	mg/kg	ND	mg/kg-day	NA	kg-day/mg		ND	ND	mg/kg-day	1.00E-05	mg/kg-day	ND
				Vanadium	5.80E+01	mg/kg	1.00E-06	mg/kg-day	NA	kg-day/mg		NA	5.85E-06	mg/kg-day	5.04E-03	mg/kg-day	1.16E-03
				PCBs													
				Total PCBs	9.20E-02	mg/kg	1.59E-09	mg/kg-day	2.00E+00	kg-day/mg		3.18E-09	9.27E-09	mg/kg-day	2.00E-05	mg/kg-day	4.64E-04
				SVOCs													
				Benzo(a)anthracene	1.90E-01	mg/kg	3.28E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	8.21E-10	1.92E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.80E-01	mg/kg	3.11E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	7.78E-09	1.81E-08	mg/kg-day	3.00E-04	mg/kg-day	6.05E-05
				Benzo(b)fluoranthene	2.60E-01	mg/kg	4.49E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.12E-09	2.62E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	9.10E-02	mg/kg	1.57E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	3.93E-11	9.17E-09	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	2.00E-01	mg/kg	3.46E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	8.64E-12	2.02E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	4.60E-02	mg/kg	7.95E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.99E-09	4.64E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.50E-01	mg/kg	2.59E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	6.48E-10	1.51E-08	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.80E-02	mg/kg	3.11E-10	mg/kg-day	NA	kg-day/mg		NA	1.81E-09	mg/kg-day	2.00E-02	mg/kg-day	9.07E-08
				TPH													
				Diesel Range Organics (C10-C20)	1.30E+01	mg/kg	2.25E-07	mg/kg-day	NA	kg-day/mg		NA	1.31E-06	mg/kg-day	1.00E-02	mg/kg-day	1.31E-04
			Exp. Route Total									6.17E-08					4.73E-02
Surface Soil	Surface Soil	Hypothetical Future Park Land/Green Space	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.51E-06	mg/kg	1.03E-15	mg/kg-day	1.30E+05	kg-day/mg		1.34E-10	6.00E-15	mg/kg-day	7.00E-10	mg/kg-day	8.57E-06
				Inorganics													
				Arsenic	2.60E+00	mg/kg	1.06E-09	mg/kg-day	1.50E+00	kg-day/mg		1.60E-09	6.21E-09	mg/kg-day	3.00E-04	mg/kg-day	2.07E-05
				Cobalt	1.30E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Manganese	2.00E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	1.20E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	ND	mg/kg	ND	mg/kg-day	NA	kg-day/mg		ND	ND	mg/kg-day	1.00E-05	mg/kg-day	ND
				Vanadium	5.80E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	9.20E-02	mg/kg	1.76E-10	mg/kg-day	2.00E+00	kg-day/mg		3.52E-10	1.03E-09	mg/kg-day	2.00E-05	mg/kg-day	5.13E-05
				SVOCs													
				Benzo(a)anthracene	1.90E-01	mg/kg	3.37E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	8.43E-11	1.97E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.80E-01	mg/kg	3.19E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	7.99E-10	1.86E-09	mg/kg-day	3.00E-04	mg/kg-day	6.21E-06
				Benzo(b)fluoranthene	2.60E-01	mg/kg	4.61E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.15E-10	2.69E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	9.10E-02	mg/kg	1.61E-10	mg/kg-day	1.00E-02	kg-day/mg	2.5	4.04E-12	9.42E-10	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	2.00E-01	mg/kg	3.55E-10	mg/kg-day	1.00E-03	kg-day/mg	2.5	8.87E-13	2.07E-09	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	4.60E-02	mg/kg	8.16E-11	mg/kg-day	1.00E+00	kg-day/mg	2.5	2.04E-10	4.76E-10	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.50E-01	mg/kg	2.66E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	6.65E-11	1.55E-09	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.80E-02	mg/kg	3.19E-11	mg/kg-day	NA	kg-day/mg		NA	1.86E-10	mg/kg-day	2.00E-02	mg/kg-day	9.32E-09
				TPH													
				Diesel Range Organics (C10-C20)	1.30E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									3.36E-09					8.68E-05

Table H-1-3. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Recreational Visitor
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Outdoor air	Hypothetical Future Park Land/Green Space	Inhalation														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.39E-15	mg/m3	6.70E-18	mg/m3	3.80E+01	mg/m3		2.55E-16	3.91E-17	mg/m3	4.00E-08	mg/m3	9.77E-10
				Inorganics													
				Arsenic	4.55E-09	mg/m3	6.94E-12	mg/m3	4.30E-03	mg/m3		2.98E-14	4.05E-11	mg/m3	1.50E-05	mg/m3	2.70E-06
				Cobalt	2.27E-07	mg/m3	3.47E-10	mg/m3	9.00E-03	mg/m3		3.12E-12	2.02E-09	mg/m3	6.00E-06	mg/m3	3.37E-04
				Manganese	3.50E-07	mg/m3	5.34E-10	mg/m3	NA	mg/m3		NA	3.11E-09	mg/m3	5.00E-05	mg/m3	6.23E-05
				Nickel	2.10E-08	mg/m3	3.20E-11	mg/m3	2.60E-04	mg/m3		8.33E-15	1.87E-10	mg/m3	9.00E-05	mg/m3	2.08E-06
				Thallium	ND	mg/m3	ND	mg/m3	NA	mg/m3		ND	ND	mg/m3	NA	mg/m3	ND
				Vanadium	1.01E-07	mg/m3	1.55E-10	mg/m3	NA	mg/m3		NA	9.03E-10	mg/m3	1.00E-04	mg/m3	9.03E-06
				PCBs													
				Total PCBs	1.61E-10	mg/m3	2.46E-13	mg/m3	5.71E-04	mg/m3		1.40E-16	1.43E-12	mg/m3	NA	mg/m3	NA
				SVOCs													
				Benzo(a)anthracene	3.32E-10	mg/m3	5.07E-13	mg/m3	6.00E-05	mg/m3	2.5	7.61E-17	2.96E-12	mg/m3	NA	mg/m3	NA
				Benzo(a)pyrene	3.15E-10	mg/m3	4.81E-13	mg/m3	6.00E-04	mg/m3	2.5	7.21E-16	2.80E-12	mg/m3	2.00E-06	mg/m3	1.40E-06
				Benzo(b)fluoranthene	4.55E-10	mg/m3	6.94E-13	mg/m3	6.00E-05	mg/m3	2.5	1.04E-16	4.05E-12	mg/m3	NA	mg/m3	NA
				Benzo(k)fluoranthene	1.59E-10	mg/m3	2.43E-13	mg/m3	6.00E-06	mg/m3	2.5	3.64E-18	1.42E-12	mg/m3	NA	mg/m3	NA
				Chrysene	3.50E-10	mg/m3	5.34E-13	mg/m3	6.00E-07	mg/m3	2.5	8.01E-19	3.11E-12	mg/m3	NA	mg/m3	NA
				Dibenzo(a,h)anthracene	8.05E-11	mg/m3	1.23E-13	mg/m3	6.00E-04	mg/m3	2.5	1.84E-16	7.16E-13	mg/m3	NA	mg/m3	NA
				Indeno(1,2,3-cd)pyrene	2.62E-10	mg/m3	4.00E-13	mg/m3	6.00E-05	mg/m3	2.5	6.01E-17	2.34E-12	mg/m3	NA	mg/m3	NA
				Naphthalene	3.15E-11	mg/m3	4.81E-14	mg/m3	3.40E-05	mg/m3		1.63E-18	2.80E-13	mg/m3	3.00E-03	mg/m3	9.34E-11
				TPH													
				Diesel Range Organics (C10-C20)	2.27E-08	mg/m3	3.47E-11	mg/m3	NA	mg/m3		NA	2.02E-10	mg/m3	1.00E-01	mg/m3	2.02E-09
			Exp. Route Total									3.16E-12					4.15E-04
		Exposure Point Total										6.50E-08					4.78E-02
	Exposure Medium Total											6.50E-08					4.78E-02
Surface Soil Total												6.50E-08					4.78E-02
Total Receptor Risk/Hazard												6.50E-08					4.78E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable/no dose-response value.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-4. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	2.70E-12	mg/kg-day	1.30E+05	kg-day/mg		3.52E-07	9.47E-12	mg/kg-day	7.00E-10	mg/kg-day	1.35E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	1.13E-04	mg/kg-day	NA	kg-day/mg		NA	3.97E-04	mg/kg-day	1.00E+00	mg/kg-day	3.97E-04
				Antimony	6.43E+00	mg/kg	8.17E-08	mg/kg-day	NA	kg-day/mg		NA	2.86E-07	mg/kg-day	4.00E-04	mg/kg-day	7.15E-04
				Arsenic	6.55E+00	mg/kg	5.00E-08	mg/kg-day	1.50E+00	kg-day/mg		7.50E-08	1.75E-07	mg/kg-day	3.00E-04	mg/kg-day	5.83E-04
				Cobalt	1.65E+01	mg/kg	2.09E-07	mg/kg-day	NA	kg-day/mg		NA	7.32E-07	mg/kg-day	3.00E-04	mg/kg-day	2.44E-03
				Cyanide	3.40E+00	mg/kg	4.33E-08	mg/kg-day	NA	kg-day/mg	1	NA	1.52E-07	mg/kg-day	6.30E-04	mg/kg-day	2.40E-04
				Manganese	2.34E+02	mg/kg	2.98E-06	mg/kg-day	NA	kg-day/mg		NA	1.04E-05	mg/kg-day	2.40E-02	mg/kg-day	4.35E-04
				Nickel	6.02E+01	mg/kg	7.65E-07	mg/kg-day	NA	kg-day/mg		NA	2.68E-06	mg/kg-day	2.00E-02	mg/kg-day	1.34E-04
				Thallium	2.38E-01	mg/kg	3.03E-09	mg/kg-day	NA	kg-day/mg		NA	1.06E-08	mg/kg-day	1.00E-05	mg/kg-day	1.06E-03
				Vanadium	1.49E+02	mg/kg	1.90E-06	mg/kg-day	NA	kg-day/mg		NA	6.63E-06	mg/kg-day	5.04E-03	mg/kg-day	1.32E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	7.54E-09	mg/kg-day	2.00E+00	kg-day/mg		1.51E-08	2.64E-08	mg/kg-day	2.00E-05	mg/kg-day	1.32E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	1.59E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.59E-09	5.57E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	9.69E-09	mg/kg-day	1.00E+00	kg-day/mg	1	9.69E-09	3.39E-08	mg/kg-day	3.00E-04	mg/kg-day	1.13E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	1.42E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.42E-09	4.98E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	5.18E-09	mg/kg-day	1.00E-02	kg-day/mg	1	5.18E-11	1.81E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.28E-08	mg/kg-day	1.00E-03	kg-day/mg	1	1.28E-11	4.50E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	2.28E-09	mg/kg-day	1.00E+00	kg-day/mg	1	2.28E-09	7.97E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	8.33E-09	mg/kg-day	1.00E-01	kg-day/mg	1	8.33E-10	2.92E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	1.59E-06	mg/kg-day	NA	kg-day/mg		NA	5.55E-06	mg/kg-day	1.00E-02	mg/kg-day	5.55E-04
			Exp. Route Total									4.58E-07					2.28E-02

Table H-1-4. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.85E-12	mg/kg-day	1.30E+05	kg-day/mg		2.41E-07	6.48E-12	mg/kg-day	7.00E-10	mg/kg-day	9.25E-03
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	5.70E-08	mg/kg-day	1.50E+00	kg-day/mg		8.55E-08	1.99E-07	mg/kg-day	3.00E-04	mg/kg-day	6.65E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	2.41E-08	mg/kg-day	2.00E+00	kg-day/mg		4.82E-08	8.43E-08	mg/kg-day	2.00E-05	mg/kg-day	4.21E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	4.72E-08	mg/kg-day	1.00E-01	kg-day/mg	1	4.72E-09	1.65E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	2.87E-08	mg/kg-day	1.00E+00	kg-day/mg	1	2.87E-08	1.01E-07	mg/kg-day	3.00E-04	mg/kg-day	3.35E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	4.22E-08	mg/kg-day	1.00E-01	kg-day/mg	1	4.22E-09	1.48E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	1.53E-08	mg/kg-day	1.00E-02	kg-day/mg	1	1.53E-10	5.37E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	3.81E-08	mg/kg-day	1.00E-03	kg-day/mg	1	3.81E-11	1.33E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	6.75E-09	mg/kg-day	1.00E+00	kg-day/mg	1	6.75E-09	2.36E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	2.47E-08	mg/kg-day	1.00E-01	kg-day/mg	1	2.47E-09	8.64E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									4.21E-07					1.45E-02
		Exposure Point Total										8.79E-07					3.73E-02
	Exposure Medium Total											8.79E-07					3.73E-02
Sediment Total												8.79E-07					3.73E-02

Table H-1-4. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	2.02E-15	mg/kg-day	1.30E+05	kg-day/mg		2.63E-10	7.08E-15	mg/kg-day	7.00E-10	mg/kg-day	1.01E-05
				Metals													
				Arsenic	9.21E-01	ug/L	3.05E-09	mg/kg-day	1.50E+00	kg-day/mg		4.57E-09	1.07E-08	mg/kg-day	3.00E-04	mg/kg-day	3.55E-05
				Cobalt	1.04E+00	ug/L	3.44E-09	mg/kg-day	NA	kg-day/mg		NA	1.20E-08	mg/kg-day	3.00E-04	mg/kg-day	4.01E-05
				Manganese	1.48E+02	ug/L	4.88E-07	mg/kg-day	NA	kg-day/mg		NA	1.71E-06	mg/kg-day	2.40E-02	mg/kg-day	7.12E-05
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	5.29E-12	mg/kg-day	3.40E-01	kg-day/mg		1.80E-12	1.85E-11	mg/kg-day	5.00E-04	mg/kg-day	3.70E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	3.11E-11	mg/kg-day	4.00E-01	kg-day/mg		1.24E-11	1.09E-10	mg/kg-day	2.00E-05	mg/kg-day	5.44E-06
			Exp. Route Total									4.85E-09					1.62E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	8.90E-10	mg/kg-day	1.50E+00	kg-day/mg		1.34E-09	3.12E-09	mg/kg-day	3.00E-04	mg/kg-day	1.04E-05
				Cobalt	1.04E+00	ug/L	4.02E-10	mg/kg-day	NA	kg-day/mg		NA	1.41E-09	mg/kg-day	3.00E-04	mg/kg-day	4.69E-06
				Manganese	1.48E+02	ug/L	1.43E-07	mg/kg-day	NA	kg-day/mg		NA	5.00E-07	mg/kg-day	9.60E-04	mg/kg-day	5.21E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.34E-09					5.36E-04
		Exposure Point Total										6.18E-09					6.98E-04
	Exposure Medium Total											6.18E-09					6.98E-04
Surface Water Total												6.18E-09					6.98E-04
Fish Tissue	Tissue - Mixed Diet [2]	Upper Anacostia	Ingestion														
				Metals													
				Mercury	1.58E-01	mg/kg	5.64E-06	mg/kg-day	NA	kg-day/mg		NA	1.98E-05	mg/kg-day	1.00E-04	mg/kg-day	1.98E-01
				Pesticides													
				4,4'-DDD	2.04E-02	mg/kg	6.55E-07	mg/kg-day	2.40E-01	kg-day/mg		1.57E-07	2.29E-06	mg/kg-day	3.00E-05	mg/kg-day	7.65E-02
				4,4'-DDE	2.69E-02	mg/kg	8.65E-07	mg/kg-day	3.40E-01	kg-day/mg		2.94E-07	3.03E-06	mg/kg-day	3.00E-04	mg/kg-day	1.01E-02
				Aldrin	3.82E-04	mg/kg	1.23E-08	mg/kg-day	1.70E+01	kg-day/mg		2.09E-07	4.30E-08	mg/kg-day	3.00E-05	mg/kg-day	1.43E-03
				alpha-Chlordane	3.10E-02	mg/kg	9.95E-07	mg/kg-day	3.50E-01	kg-day/mg		3.48E-07	3.48E-06	mg/kg-day	5.00E-04	mg/kg-day	6.97E-03
				cis-Nonachlor	1.13E-02	mg/kg	3.62E-07	mg/kg-day	3.50E-01	kg-day/mg		1.27E-07	1.27E-06	mg/kg-day	5.00E-04	mg/kg-day	2.54E-03
				Dieldrin	6.64E-03	mg/kg	2.13E-07	mg/kg-day	1.60E+01	kg-day/mg		3.42E-06	7.47E-07	mg/kg-day	5.00E-05	mg/kg-day	1.49E-02
				gamma-Chlordane	5.74E-03	mg/kg	1.85E-07	mg/kg-day	3.50E-01	kg-day/mg		6.46E-08	6.46E-07	mg/kg-day	5.00E-04	mg/kg-day	1.29E-03
				Heptachlor epoxide	2.14E-03	mg/kg	6.88E-08	mg/kg-day	9.10E+00	kg-day/mg		6.26E-07	2.41E-07	mg/kg-day	1.30E-05	mg/kg-day	1.85E-02
				Mirex	3.12E-04	mg/kg	1.00E-08	mg/kg-day	1.80E+01	kg-day/mg		1.81E-07	3.51E-08	mg/kg-day	2.00E-04	mg/kg-day	1.76E-04
				Oxychlordane	2.87E-03	mg/kg	9.23E-08	mg/kg-day	3.50E-01	kg-day/mg		3.23E-08	3.23E-07	mg/kg-day	5.00E-04	mg/kg-day	6.46E-04
				trans-Nonachlor	1.78E-02	mg/kg	5.71E-07	mg/kg-day	3.50E-01	kg-day/mg		2.00E-07	2.00E-06	mg/kg-day	5.00E-04	mg/kg-day	4.00E-03
				PCBs													
				Total PCBs	3.59E-01	mg/kg	1.12E-05	mg/kg-day	2.00E+00	kg-day/mg		2.23E-05	3.91E-05	mg/kg-day	2.00E-05	mg/kg-day	1.95E+00
				PCB-TEQ	2.69E-06	mg/kg	6.82E-11	mg/kg-day	1.30E+05	kg-day/mg		8.87E-06	2.39E-10	mg/kg-day	7.00E-10	mg/kg-day	3.41E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]												2.80E-05					2.29E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]												1.45E-05					6.76E-01
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)												**2.89E-05**					**2.33E+00**
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)												**1.54E-05**					**7.14E-01**

Table H-1-4. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
EPD - Effective Predictive Domain.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Fish consumption Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Fish consumption Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-5. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	2.45E-12	mg/kg-day	1.30E+05	kg-day/mg		3.18E-07	1.43E-11	mg/kg-day	7.00E-10	mg/kg-day	2.04E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	1.03E-04	mg/kg-day	NA	kg-day/mg		NA	5.99E-04	mg/kg-day	1.00E+00	mg/kg-day	5.99E-04
				Antimony	6.43E+00	mg/kg	7.40E-08	mg/kg-day	NA	kg-day/mg		NA	4.32E-07	mg/kg-day	4.00E-04	mg/kg-day	1.08E-03
				Arsenic	6.55E+00	mg/kg	4.53E-08	mg/kg-day	1.50E+00	kg-day/mg		6.79E-08	2.64E-07	mg/kg-day	3.00E-04	mg/kg-day	8.80E-04
				Cobalt	1.65E+01	mg/kg	1.90E-07	mg/kg-day	NA	kg-day/mg		NA	1.11E-06	mg/kg-day	3.00E-04	mg/kg-day	3.68E-03
				Cyanide	3.40E+00	mg/kg	3.92E-08	mg/kg-day	NA	kg-day/mg		NA	2.29E-07	mg/kg-day	6.30E-04	mg/kg-day	3.63E-04
				Manganese	2.34E+02	mg/kg	2.70E-06	mg/kg-day	NA	kg-day/mg		NA	1.57E-05	mg/kg-day	2.40E-02	mg/kg-day	6.56E-04
				Nickel	6.02E+01	mg/kg	6.93E-07	mg/kg-day	NA	kg-day/mg		NA	4.04E-06	mg/kg-day	2.00E-02	mg/kg-day	2.02E-04
				Thallium	2.38E-01	mg/kg	2.74E-09	mg/kg-day	NA	kg-day/mg		NA	1.60E-08	mg/kg-day	1.00E-05	mg/kg-day	1.60E-03
				Vanadium	1.49E+02	mg/kg	1.72E-06	mg/kg-day	NA	kg-day/mg		NA	1.00E-05	mg/kg-day	5.04E-03	mg/kg-day	1.99E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	6.83E-09	mg/kg-day	2.00E+00	kg-day/mg		1.37E-08	3.99E-08	mg/kg-day	2.00E-05	mg/kg-day	1.99E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	1.44E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.60E-09	8.41E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	8.78E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	2.19E-08	5.12E-08	mg/kg-day	3.00E-04	mg/kg-day	1.71E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	1.29E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.22E-09	7.52E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	4.69E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	1.17E-10	2.74E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.16E-08	mg/kg-day	1.00E-03	kg-day/mg	2.5	2.91E-11	6.79E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	2.06E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	5.16E-09	1.20E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	7.55E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.89E-09	4.40E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	1.44E-06	mg/kg-day	NA	kg-day/mg		NA	8.38E-06	mg/kg-day	1.00E-02	mg/kg-day	8.38E-04
			Exp. Route Total									4.36E-07					3.45E-02

Table H-1-5. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	9.96E-13	mg/kg-day	1.30E+05	kg-day/mg		1.29E-07	5.81E-12	mg/kg-day	7.00E-10	mg/kg-day	8.30E-03
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	3.07E-08	mg/kg-day	1.50E+00	kg-day/mg		4.60E-08	1.79E-07	mg/kg-day	3.00E-04	mg/kg-day	5.96E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.30E-08	mg/kg-day	2.00E+00	kg-day/mg		2.59E-08	7.56E-08	mg/kg-day	2.00E-05	mg/kg-day	3.78E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	2.54E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	6.35E-09	1.48E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.55E-08	mg/kg-day	1.00E+00	kg-day/mg	2.5	3.87E-08	9.02E-08	mg/kg-day	3.00E-04	mg/kg-day	3.01E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	2.27E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.68E-09	1.32E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	8.26E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	2.06E-10	4.82E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	2.05E-08	mg/kg-day	1.00E-03	kg-day/mg	2.5	5.12E-11	1.20E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	3.63E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	9.08E-09	2.12E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.33E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.32E-09	7.75E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									2.65E-07					1.30E-02
		Exposure Point Total										7.01E-07					4.74E-02
	Exposure Medium Total											7.01E-07					4.74E-02
Sediment Total												7.01E-07					4.74E-02

Table H-1-5. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	1.83E-15	mg/kg-day	1.30E+05	kg-day/mg		2.38E-10	1.07E-14	mg/kg-day	7.00E-10	mg/kg-day	1.53E-05
				Metals													
				Arsenic	9.21E-01	ug/L	2.76E-09	mg/kg-day	1.50E+00	kg-day/mg		4.14E-09	1.61E-08	mg/kg-day	3.00E-04	mg/kg-day	5.36E-05
				Cobalt	1.04E+00	ug/L	3.12E-09	mg/kg-day	NA	kg-day/mg		NA	1.82E-08	mg/kg-day	3.00E-04	mg/kg-day	6.06E-05
				Manganese	1.48E+02	ug/L	4.42E-07	mg/kg-day	NA	kg-day/mg		NA	2.58E-06	mg/kg-day	2.40E-02	mg/kg-day	1.08E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	4.79E-12	mg/kg-day	3.40E-01	kg-day/mg		1.63E-12	2.80E-11	mg/kg-day	5.00E-04	mg/kg-day	5.59E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	2.82E-11	mg/kg-day	4.00E-01	kg-day/mg		1.13E-11	1.64E-10	mg/kg-day	2.00E-05	mg/kg-day	8.21E-06
			Exp. Route Total									4.39E-09					2.45E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	5.75E-10	mg/kg-day	1.50E+00	kg-day/mg		8.63E-10	3.35E-09	mg/kg-day	3.00E-04	mg/kg-day	1.12E-05
				Cobalt	1.04E+00	ug/L	2.60E-10	mg/kg-day	NA	kg-day/mg		NA	1.52E-09	mg/kg-day	3.00E-04	mg/kg-day	5.05E-06
				Manganese	1.48E+02	ug/L	9.22E-08	mg/kg-day	NA	kg-day/mg		NA	5.38E-07	mg/kg-day	9.60E-04	mg/kg-day	5.60E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									8.63E-10					5.77E-04
		Exposure Point Total										5.25E-09					8.22E-04
	Exposure Medium Total											5.25E-09					8.22E-04
Surface Water Total												5.25E-09					8.22E-04

Table H-1-5. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upper Anacostia	Ingestion														
				Metals													
				Mercury	1.58E-01	mg/kg	3.32E-06	mg/kg-day	NA	kg-day/mg		NA	1.94E-05	mg/kg-day	1.00E-04	mg/kg-day	1.94E-01
				Pesticides													
				4,4'-DDD	2.04E-02	mg/kg	3.86E-07	mg/kg-day	2.40E-01	kg-day/mg		9.26E-08	2.25E-06	mg/kg-day	3.00E-05	mg/kg-day	7.50E-02
				4,4'-DDE	2.69E-02	mg/kg	5.09E-07	mg/kg-day	3.40E-01	kg-day/mg		1.73E-07	2.97E-06	mg/kg-day	3.00E-04	mg/kg-day	9.90E-03
				Aldrin	3.82E-04	mg/kg	7.23E-09	mg/kg-day	1.70E+01	kg-day/mg		1.23E-07	4.22E-08	mg/kg-day	3.00E-05	mg/kg-day	1.41E-03
				alpha-Chlordane	3.10E-02	mg/kg	5.86E-07	mg/kg-day	3.50E-01	kg-day/mg		2.05E-07	3.42E-06	mg/kg-day	5.00E-04	mg/kg-day	6.84E-03
				cis-Nonachlor	1.13E-02	mg/kg	2.13E-07	mg/kg-day	3.50E-01	kg-day/mg		7.46E-08	1.24E-06	mg/kg-day	5.00E-04	mg/kg-day	2.49E-03
				Dieldrin	6.64E-03	mg/kg	1.26E-07	mg/kg-day	1.60E+01	kg-day/mg		2.01E-06	7.33E-07	mg/kg-day	5.00E-05	mg/kg-day	1.47E-02
				gamma-Chlordane	5.74E-03	mg/kg	1.09E-07	mg/kg-day	3.50E-01	kg-day/mg		3.80E-08	6.34E-07	mg/kg-day	5.00E-04	mg/kg-day	1.27E-03
				Heptachlor epoxide	2.14E-03	mg/kg	4.05E-08	mg/kg-day	9.10E+00	kg-day/mg		3.69E-07	2.36E-07	mg/kg-day	1.30E-05	mg/kg-day	1.82E-02
				Mirex	3.12E-04	mg/kg	5.90E-09	mg/kg-day	1.80E+01	kg-day/mg		1.06E-07	3.44E-08	mg/kg-day	2.00E-04	mg/kg-day	1.72E-04
				Oxychlordane	2.87E-03	mg/kg	5.43E-08	mg/kg-day	3.50E-01	kg-day/mg		1.90E-08	3.17E-07	mg/kg-day	5.00E-04	mg/kg-day	6.34E-04
				trans-Nonachlor	1.78E-02	mg/kg	3.36E-07	mg/kg-day	3.50E-01	kg-day/mg		1.18E-07	1.96E-06	mg/kg-day	5.00E-04	mg/kg-day	3.92E-03
				PCBs													
				Total PCBs	3.59E-01	mg/kg	6.57E-06	mg/kg-day	2.00E+00	kg-day/mg		1.31E-05	3.83E-05	mg/kg-day	2.00E-05	mg/kg-day	1.92E+00
				PCB-TEQ	2.69E-06	mg/kg	4.02E-11	mg/kg-day	1.30E+05	kg-day/mg		5.22E-06	2.34E-10	mg/kg-day	7.00E-10	mg/kg-day	3.35E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]												1.65E-05					2.24E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]												8.55E-06					6.63E-01
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)												**1.72E-05**					**2.29E+00**
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)												**9.25E-06**					**7.11E-01**

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
EPD - Effective Predictive Domain.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Fish consumption Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Fish consumption Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-6. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	7.64E-12	mg/kg-day	1.30E+05	kg-day/mg		9.93E-07	8.91E-11	mg/kg-day	7.00E-10	mg/kg-day	1.27E-01
				Metals													
				Aluminum	8.92E+03	mg/kg	3.20E-04	mg/kg-day	NA	kg-day/mg		NA	3.74E-03	mg/kg-day	1.00E+00	mg/kg-day	3.74E-03
				Antimony	6.43E+00	mg/kg	2.31E-07	mg/kg-day	NA	kg-day/mg		NA	2.69E-06	mg/kg-day	4.00E-04	mg/kg-day	6.73E-03
				Arsenic	6.55E+00	mg/kg	1.41E-07	mg/kg-day	1.50E+00	kg-day/mg		2.12E-07	1.65E-06	mg/kg-day	3.00E-04	mg/kg-day	5.49E-03
				Cobalt	1.65E+01	mg/kg	5.91E-07	mg/kg-day	NA	kg-day/mg		NA	6.89E-06	mg/kg-day	3.00E-04	mg/kg-day	2.30E-02
				Cyanide	3.40E+00	mg/kg	1.22E-07	mg/kg-day	NA	kg-day/mg		NA	1.43E-06	mg/kg-day	6.30E-04	mg/kg-day	2.26E-03
				Manganese	2.34E+02	mg/kg	8.42E-06	mg/kg-day	NA	kg-day/mg		NA	9.82E-05	mg/kg-day	2.40E-02	mg/kg-day	4.09E-03
				Nickel	6.02E+01	mg/kg	2.16E-06	mg/kg-day	NA	kg-day/mg		NA	2.52E-05	mg/kg-day	2.00E-02	mg/kg-day	1.26E-03
				Thallium	2.38E-01	mg/kg	8.55E-09	mg/kg-day	NA	kg-day/mg		NA	9.97E-08	mg/kg-day	1.00E-05	mg/kg-day	9.97E-03
				Vanadium	1.49E+02	mg/kg	5.35E-06	mg/kg-day	NA	kg-day/mg		NA	6.24E-05	mg/kg-day	5.04E-03	mg/kg-day	1.24E-02
				PCBs													
				Total PCBs	5.93E-01	mg/kg	2.13E-08	mg/kg-day	2.00E+00	kg-day/mg		4.26E-08	2.48E-07	mg/kg-day	2.00E-05	mg/kg-day	1.24E-02
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	4.49E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.89E-08	5.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	2.74E-08	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.15E-07	3.19E-07	mg/kg-day	3.00E-04	mg/kg-day	1.06E-03
				Benzo(b)fluoranthene	1.12E+00	mg/kg	4.02E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.69E-08	4.69E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	1.46E-08	mg/kg-day	1.00E-02	kg-day/mg	4.2	6.14E-10	1.71E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	3.63E-08	mg/kg-day	1.00E-03	kg-day/mg	4.2	1.52E-10	4.23E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	6.43E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	2.70E-08	7.50E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	2.35E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	9.88E-09	2.74E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	4.48E-06	mg/kg-day	NA	kg-day/mg		NA	5.23E-05	mg/kg-day	1.00E-02	mg/kg-day	5.23E-03
			Exp. Route Total									1.44E-06					2.15E-01
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.32E-12	mg/kg-day	1.30E+05	kg-day/mg		1.72E-07	1.54E-11	mg/kg-day	7.00E-10	mg/kg-day	2.20E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	4.06E-08	mg/kg-day	1.50E+00	kg-day/mg		6.10E-08	4.74E-07	mg/kg-day	3.00E-04	mg/kg-day	1.58E-03
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.72E-08	mg/kg-day	2.00E+00	kg-day/mg		3.43E-08	2.00E-07	mg/kg-day	2.00E-05	mg/kg-day	1.00E-02
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	3.36E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.41E-08	3.92E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	2.05E-08	mg/kg-day	1.00E+00	kg-day/mg	4.2	8.61E-08	2.39E-07	mg/kg-day	3.00E-04	mg/kg-day	7.97E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	3.01E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.26E-08	3.51E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	1.09E-08	mg/kg-day	1.00E-02	kg-day/mg	4.2	4.60E-10	1.28E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	2.72E-08	mg/kg-day	1.00E-03	kg-day/mg	4.2	1.14E-10	3.17E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	4.81E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	2.02E-08	5.62E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.76E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	7.40E-09	2.05E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									4.08E-07					3.44E-02
		Exposure Point Total										1.84E-06					2.49E-01
	Exposure Medium Total											1.84E-06					2.49E-01
Sediment Total												1.84E-06					2.49E-01

Table H-1-6. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	2.86E-15	mg/kg-day	1.30E+05	kg-day/mg		3.71E-10	3.33E-14	mg/kg-day	7.00E-10	mg/kg-day	4.76E-05
				Metals													
				Arsenic	9.21E-01	ug/L	4.30E-09	mg/kg-day	1.50E+00	kg-day/mg		6.45E-09	5.02E-08	mg/kg-day	3.00E-04	mg/kg-day	1.67E-04
				Cobalt	1.04E+00	ug/L	4.86E-09	mg/kg-day	NA	kg-day/mg		NA	5.67E-08	mg/kg-day	3.00E-04	mg/kg-day	1.89E-04
				Manganese	1.48E+02	ug/L	6.90E-07	mg/kg-day	NA	kg-day/mg		NA	8.05E-06	mg/kg-day	2.40E-02	mg/kg-day	3.35E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	7.47E-12	mg/kg-day	3.40E-01	kg-day/mg		2.54E-12	8.72E-11	mg/kg-day	5.00E-04	mg/kg-day	1.74E-07
				PCBs													
				Total PCBs	9.40E-03	ug/L	4.39E-11	mg/kg-day	4.00E-01	kg-day/mg		1.76E-11	5.12E-10	mg/kg-day	2.00E-05	mg/kg-day	2.56E-05
			Exp. Route Total									6.84E-09					7.65E-04
			Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	6.80E-10	mg/kg-day	1.50E+00	kg-day/mg		1.02E-09	7.94E-09	mg/kg-day	3.00E-04	mg/kg-day	2.65E-05
				Cobalt	1.04E+00	ug/L	3.07E-10	mg/kg-day	NA	kg-day/mg		NA	3.59E-09	mg/kg-day	3.00E-04	mg/kg-day	1.20E-05
				Manganese	1.48E+02	ug/L	1.09E-07	mg/kg-day	NA	kg-day/mg		NA	1.27E-06	mg/kg-day	9.60E-04	mg/kg-day	1.33E-03
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.02E-09					1.36E-03
		Exposure Point Total										7.86E-09					2.13E-03
	Exposure Medium Total											7.86E-09					2.13E-03
Surface Water Total												7.86E-09					2.13E-03
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Upper Anacostia	Ingestion	**Metals**													
				Mercury	1.58E-01	mg/kg	2.79E-06	mg/kg-day	NA	kg-day/mg		NA	3.25E-05	mg/kg-day	1.00E-04	mg/kg-day	3.25E-01
				Pesticides													
				4,4'-DDD	2.04E-02	mg/kg	3.24E-07	mg/kg-day	2.40E-01	kg-day/mg		7.77E-08	3.78E-06	mg/kg-day	3.00E-05	mg/kg-day	1.26E-01
				4,4'-DDE	2.69E-02	mg/kg	4.28E-07	mg/kg-day	3.40E-01	kg-day/mg		1.45E-07	4.99E-06	mg/kg-day	3.00E-04	mg/kg-day	1.66E-02
				Aldrin	3.82E-04	mg/kg	6.07E-09	mg/kg-day	1.70E+01	kg-day/mg		1.03E-07	7.08E-08	mg/kg-day	3.00E-05	mg/kg-day	2.36E-03
				alpha-Chlordane	3.10E-02	mg/kg	4.92E-07	mg/kg-day	3.50E-01	kg-day/mg		1.72E-07	5.74E-06	mg/kg-day	5.00E-04	mg/kg-day	1.15E-02
				cis-Nonachlor	1.13E-02	mg/kg	1.79E-07	mg/kg-day	3.50E-01	kg-day/mg		6.26E-08	2.09E-06	mg/kg-day	5.00E-04	mg/kg-day	4.18E-03
				Dieldrin	6.64E-03	mg/kg	1.05E-07	mg/kg-day	1.60E+01	kg-day/mg		1.69E-06	1.23E-06	mg/kg-day	5.00E-05	mg/kg-day	2.46E-02
				gamma-Chlordane	5.74E-03	mg/kg	9.12E-08	mg/kg-day	3.50E-01	kg-day/mg		3.19E-08	1.06E-06	mg/kg-day	5.00E-04	mg/kg-day	2.13E-03
				Heptachlor epoxide	2.14E-03	mg/kg	3.40E-08	mg/kg-day	9.10E+00	kg-day/mg		3.09E-07	3.97E-07	mg/kg-day	1.30E-05	mg/kg-day	3.05E-02
				Mirex	3.12E-04	mg/kg	4.96E-09	mg/kg-day	1.80E+01	kg-day/mg		8.92E-08	5.78E-08	mg/kg-day	2.00E-04	mg/kg-day	2.89E-04
				Oxychlordane	2.87E-03	mg/kg	4.56E-08	mg/kg-day	3.50E-01	kg-day/mg		1.60E-08	5.32E-07	mg/kg-day	5.00E-04	mg/kg-day	1.06E-03
				trans-Nonachlor	1.78E-02	mg/kg	2.82E-07	mg/kg-day	3.50E-01	kg-day/mg		9.88E-08	3.29E-06	mg/kg-day	5.00E-04	mg/kg-day	6.59E-03
				PCBs													
				Total PCBs	3.59E-01	mg/kg	5.51E-06	mg/kg-day	2.00E+00	kg-day/mg		1.10E-05	6.43E-05	mg/kg-day	2.00E-05	mg/kg-day	3.22E+00
				PCB-TEQ	2.69E-06	mg/kg	3.37E-11	mg/kg-day	1.30E+05	kg-day/mg		4.38E-06	3.93E-10	mg/kg-day	7.00E-10	mg/kg-day	5.62E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]												1.38E-05					3.77E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]												7.18E-06					1.11E+00
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)												**1.57E-05**					**4.02E+00**
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)												**9.03E-06**					**1.36E+00**

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-7. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upper Potomac	Ingestion														
				Inorganics													
				Arsenic	3.98E-02	mg/kg	1.42E-06	mg/kg-day	1.50E+00	kg-day/mg		2.13E-06	4.98E-06	mg/kg-day	3.00E-04	mg/kg-day	1.66E-02
				Arsenic, organic	3.58E-01	mg/kg	1.28E-05	mg/kg-day	NA	kg-day/mg		NA	4.48E-05	mg/kg-day	2.00E-02	mg/kg-day	2.24E-03
				Mercury	1.61E-01	mg/kg	5.75E-06	mg/kg-day	NA	kg-day/mg		NA	2.01E-05	mg/kg-day	1.00E-04	mg/kg-day	2.01E-01
				Pesticides													
				4,4'-DDD	4.22E-02	mg/kg	1.36E-06	mg/kg-day	2.40E-01	kg-day/mg		3.26E-07	4.75E-06	mg/kg-day	3.00E-05	mg/kg-day	1.58E-01
				4,4'-DDE	2.43E-01	mg/kg	7.81E-06	mg/kg-day	3.40E-01	kg-day/mg		2.66E-06	2.73E-05	mg/kg-day	3.00E-04	mg/kg-day	9.11E-02
				Aldrin	1.20E-03	mg/kg	3.86E-08	mg/kg-day	1.70E+01	kg-day/mg		6.56E-07	1.35E-07	mg/kg-day	3.00E-05	mg/kg-day	4.50E-03
				alpha-Chlordane	5.10E-02	mg/kg	1.64E-06	mg/kg-day	3.50E-01	kg-day/mg		5.74E-07	5.74E-06	mg/kg-day	5.00E-04	mg/kg-day	1.15E-02
				beta-BHC	1.73E-03	mg/kg	5.56E-08	mg/kg-day	1.80E+00	kg-day/mg		1.00E-07	1.95E-07	mg/kg-day	NA	mg/kg-day	NA
				cis-Nonachlor	2.20E-02	mg/kg	7.07E-07	mg/kg-day	3.50E-01	kg-day/mg		2.48E-07	2.48E-06	mg/kg-day	5.00E-04	mg/kg-day	4.95E-03
				Dieldrin	2.87E-02	mg/kg	9.23E-07	mg/kg-day	1.60E+01	kg-day/mg		1.48E-05	3.23E-06	mg/kg-day	5.00E-05	mg/kg-day	6.46E-02
				gamma-Chlordane	4.64E-03	mg/kg	1.49E-07	mg/kg-day	3.50E-01	kg-day/mg		5.22E-08	5.22E-07	mg/kg-day	5.00E-04	mg/kg-day	1.04E-03
				Heptachlor epoxide	3.39E-03	mg/kg	1.09E-07	mg/kg-day	9.10E+00	kg-day/mg		9.92E-07	3.81E-07	mg/kg-day	1.30E-05	mg/kg-day	2.93E-02
				Hexachlorobenzene	1.55E-03	mg/kg	4.98E-08	mg/kg-day	1.60E+00	kg-day/mg		7.97E-08	1.74E-07	mg/kg-day	8.00E-04	mg/kg-day	2.18E-04
				Mirex	3.45E-04	mg/kg	1.11E-08	mg/kg-day	1.80E+01	kg-day/mg		1.99E-07	3.88E-08	mg/kg-day	2.00E-04	mg/kg-day	1.94E-04
				Oxychlordane	5.50E-03	mg/kg	1.77E-07	mg/kg-day	3.50E-01	kg-day/mg		6.19E-08	6.19E-07	mg/kg-day	5.00E-04	mg/kg-day	1.24E-03
				trans-Nonachlor	6.26E-02	mg/kg	2.01E-06	mg/kg-day	3.50E-01	kg-day/mg		7.04E-07	7.04E-06	mg/kg-day	5.00E-04	mg/kg-day	1.41E-02
				PCBs													
				Total PCBs	1.61E+00	mg/kg	5.00E-05	mg/kg-day	2.00E+00	kg-day/mg		9.99E-05	1.75E-04	mg/kg-day	2.00E-05	mg/kg-day	8.75E+00
				PCB-TEQ	4.27E-05	mg/kg	1.08E-09	mg/kg-day	1.30E+05	kg-day/mg		1.41E-04	3.79E-09	mg/kg-day	7.00E-10	mg/kg-day	5.42E+00
Fish Tissue Total - Upper Potomac (Total PCBs)[3]												1.23E-04					9.35E+00
Fish Tissue Total - Upper Potomac (PCB-TEQ)[4]												1.64E-04					6.02E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Potomac	Ingestion														
				Inorganics													
				Arsenic	3.71E-01	mg/kg	1.33E-05	mg/kg-day	1.50E+00	kg-day/mg		1.99E-05	4.64E-05	mg/kg-day	3.00E-04	mg/kg-day	1.55E-01
				Arsenic, organic	3.34E+00	mg/kg	1.19E-04	mg/kg-day	NA	kg-day/mg		NA	4.17E-04	mg/kg-day	2.00E-02	mg/kg-day	2.09E-02
				Mercury	1.10E-01	mg/kg	3.93E-06	mg/kg-day	NA	kg-day/mg		NA	1.38E-05	mg/kg-day	1.00E-04	mg/kg-day	1.38E-01
				Pesticides													
				4,4'-DDD	8.29E-03	mg/kg	2.66E-07	mg/kg-day	2.40E-01	kg-day/mg		6.40E-08	9.33E-07	mg/kg-day	3.00E-05	mg/kg-day	3.11E-02
				4,4'-DDE	4.10E-02	mg/kg	1.32E-06	mg/kg-day	3.40E-01	kg-day/mg		4.48E-07	4.61E-06	mg/kg-day	3.00E-04	mg/kg-day	1.54E-02
				alpha-Chlordane	1.54E-02	mg/kg	4.95E-07	mg/kg-day	3.50E-01	kg-day/mg		1.73E-07	1.73E-06	mg/kg-day	5.00E-04	mg/kg-day	3.47E-03
				Dieldrin	6.62E-03	mg/kg	2.13E-07	mg/kg-day	1.60E+01	kg-day/mg		3.40E-06	7.45E-07	mg/kg-day	5.00E-05	mg/kg-day	1.49E-02
				gamma-Chlordane	7.97E-03	mg/kg	2.56E-07	mg/kg-day	3.50E-01	kg-day/mg		8.97E-08	8.97E-07	mg/kg-day	5.00E-04	mg/kg-day	1.79E-03
				Heptachlor epoxide	3.11E-03	mg/kg	1.00E-07	mg/kg-day	9.10E+00	kg-day/mg		9.10E-07	3.50E-07	mg/kg-day	1.30E-05	mg/kg-day	2.69E-02
				Oxychlordane	3.86E-03	mg/kg	1.24E-07	mg/kg-day	3.50E-01	kg-day/mg		4.34E-08	4.34E-07	mg/kg-day	5.00E-04	mg/kg-day	8.69E-04
				trans-Nonachlor	1.94E-02	mg/kg	6.24E-07	mg/kg-day	3.50E-01	kg-day/mg		2.18E-07	2.18E-06	mg/kg-day	5.00E-04	mg/kg-day	4.37E-03
				PCBs													
				Total PCBs	2.52E-01	mg/kg	7.83E-06	mg/kg-day	2.00E+00	kg-day/mg		1.57E-05	2.74E-05	mg/kg-day	2.00E-05	mg/kg-day	1.37E+00
				PCB-TEQ	5.46E-06	mg/kg	1.38E-10	mg/kg-day	1.30E+05	kg-day/mg		1.80E-05	4.84E-10	mg/kg-day	7.00E-10	mg/kg-day	6.92E-01
Fish Tissue Total - Lower Potomac (Total PCBs)[3]												4.09E-05					1.78E+00
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]												4.32E-05					1.10E+00

Table H-1-7. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Non-Tidal Anacostia	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.20E-07	mg/kg	3.04E-12	mg/kg-day	1.30E+05	kg-day/mg		3.95E-07	1.06E-11	mg/kg-day	7.00E-10	mg/kg-day	1.52E-02
				Inorganics													
				Arsenic	7.58E-03	mg/kg	2.71E-07	mg/kg-day	1.50E+00	kg-day/mg		4.06E-07	9.48E-07	mg/kg-day	3.00E-04	mg/kg-day	3.16E-03
				Arsenic, organic	6.82E-02	mg/kg	2.44E-06	mg/kg-day	NA	kg-day/mg		NA	8.53E-06	mg/kg-day	2.00E-02	mg/kg-day	4.26E-04
				Cobalt	1.62E-02	mg/kg	5.79E-07	mg/kg-day	NA	kg-day/mg		NA	2.03E-06	mg/kg-day	3.00E-04	mg/kg-day	6.75E-03
				Mercury	2.98E-01	mg/kg	1.06E-05	mg/kg-day	NA	kg-day/mg		NA	3.73E-05	mg/kg-day	1.00E-04	mg/kg-day	3.73E-01
				Thallium	3.85E-03	mg/kg	1.38E-07	mg/kg-day	NA	kg-day/mg		NA	4.81E-07	mg/kg-day	1.00E-05	mg/kg-day	4.81E-02
				Pesticides													
				Chlordane	2.61E-02	mg/kg	8.39E-07	mg/kg-day	3.50E-01	kg-day/mg		2.94E-07	2.94E-06	mg/kg-day	5.00E-04	mg/kg-day	5.87E-03
				Dieldrin	1.97E-03	mg/kg	6.34E-08	mg/kg-day	1.60E+01	kg-day/mg		1.01E-06	2.22E-07	mg/kg-day	5.00E-05	mg/kg-day	4.44E-03
				Heptachlor epoxide	1.72E-03	mg/kg	5.51E-08	mg/kg-day	9.10E+00	kg-day/mg		5.02E-07	1.93E-07	mg/kg-day	1.30E-05	mg/kg-day	1.48E-02
				PCBs													
				Total PCBs	3.31E-02	mg/kg	1.03E-06	mg/kg-day	2.00E+00	kg-day/mg		2.06E-06	3.60E-06	mg/kg-day	2.00E-05	mg/kg-day	1.80E-01
				PCB-TEQ	8.76E-07	mg/kg	2.22E-11	mg/kg-day	1.30E+05	kg-day/mg		2.89E-06	7.77E-11	mg/kg-day	7.00E-10	mg/kg-day	1.11E-01
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]												4.67E-06					6.51E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]												5.50E-06					5.82E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Lower Anacostia	Ingestion														
				Metals													
				Arsenic	2.45E-02	mg/kg	8.75E-07	mg/kg-day	1.50E+00	kg-day/mg		1.31E-06	3.06E-06	mg/kg-day	3.00E-04	mg/kg-day	1.02E-02
				Arsenic, organic	2.21E-01	mg/kg	7.88E-06	mg/kg-day	NA	kg-day/mg		NA	2.76E-05	mg/kg-day	2.00E-02	mg/kg-day	1.38E-03
				Mercury	9.77E-02	mg/kg	3.49E-06	mg/kg-day	NA	kg-day/mg		NA	1.22E-05	mg/kg-day	1.00E-04	mg/kg-day	1.22E-01
				Pesticides													
				4,4'-DDD	3.32E-02	mg/kg	1.07E-06	mg/kg-day	2.40E-01	kg-day/mg		2.56E-07	3.74E-06	mg/kg-day	3.00E-05	mg/kg-day	1.25E-01
				4,4'-DDE	6.62E-02	mg/kg	2.13E-06	mg/kg-day	3.40E-01	kg-day/mg		7.23E-07	7.45E-06	mg/kg-day	3.00E-04	mg/kg-day	2.48E-02
				Aldrin	4.02E-04	mg/kg	1.29E-08	mg/kg-day	1.70E+01	kg-day/mg		2.20E-07	4.52E-08	mg/kg-day	3.00E-05	mg/kg-day	1.51E-03
				alpha-Chlordane	3.60E-02	mg/kg	1.16E-06	mg/kg-day	3.50E-01	kg-day/mg		4.05E-07	4.05E-06	mg/kg-day	5.00E-04	mg/kg-day	8.11E-03
				cis-Nonachlor	1.55E-02	mg/kg	4.97E-07	mg/kg-day	3.50E-01	kg-day/mg		1.74E-07	1.74E-06	mg/kg-day	5.00E-04	mg/kg-day	3.48E-03
				Dieldrin	1.78E-02	mg/kg	5.72E-07	mg/kg-day	1.60E+01	kg-day/mg		9.15E-06	2.00E-06	mg/kg-day	5.00E-05	mg/kg-day	4.01E-02
				gamma-Chlordane	1.98E-02	mg/kg	6.38E-07	mg/kg-day	3.50E-01	kg-day/mg		2.23E-07	2.23E-06	mg/kg-day	5.00E-04	mg/kg-day	4.46E-03
				Heptachlor epoxide	4.27E-03	mg/kg	1.37E-07	mg/kg-day	9.10E+00	kg-day/mg		1.25E-06	4.80E-07	mg/kg-day	1.30E-05	mg/kg-day	3.69E-02
				Mirex	3.92E-04	mg/kg	1.26E-08	mg/kg-day	1.80E+01	kg-day/mg		2.27E-07	4.41E-08	mg/kg-day	2.00E-04	mg/kg-day	2.21E-04
				Oxychlordane	8.13E-03	mg/kg	2.61E-07	mg/kg-day	3.50E-01	kg-day/mg		9.15E-08	9.15E-07	mg/kg-day	5.00E-04	mg/kg-day	1.83E-03
				trans-Nonachlor	4.48E-02	mg/kg	1.44E-06	mg/kg-day	3.50E-01	kg-day/mg		5.04E-07	5.04E-06	mg/kg-day	5.00E-04	mg/kg-day	1.01E-02
				PCBs													
				Total PCBs	5.28E-01	mg/kg	1.64E-05	mg/kg-day	2.00E+00	kg-day/mg		3.28E-05	5.74E-05	mg/kg-day	2.00E-05	mg/kg-day	2.87E+00
				PCB-TEQ	1.40E-05	mg/kg	3.55E-10	mg/kg-day	1.30E+05	kg-day/mg		4.62E-05	1.24E-09	mg/kg-day	7.00E-10	mg/kg-day	1.78E+00
Fish Tissue Total - Lower Anacostia (Total PCBs)[3]												4.73E-05					3.26E+00
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[4]												6.07E-05					2.16E+00
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Potomac (Total PCBs)[3]												**1.23E-04**					**9.35E+00**
Total Receptor Risk/Hazard - Upper Potomac (PCB-TEQ)[4]												**1.64E-04**					**6.02E+00**
Total Receptor Risk/Hazard - Lower Potomac (Total PCBs)[3]												**4.09E-05**					**1.78E+00**
Total Receptor Risk/Hazard - Lower Potomac (PCB-TEQ)[4]												**4.32E-05**					**1.10E+00**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (Total PCBs)[3]												**4.67E-06**					**6.51E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (PCB-TEQ)[4]												**5.50E-06**					**5.82E-01**
Total Receptor Risk/Hazard - Lower Anacostia (Total PCBs)[3]												**4.73E-05**					**3.26E+00**
Total Receptor Risk/Hazard - Lower Anacostia (PCB-TEQ)[4]												**6.07E-05**					**2.16E+00**

Table H-1-7. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
					Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-8. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upper Potomac	Ingestion														
				Metals													
				Arsenic	3.98E-02	mg/kg	8.37E-07	mg/kg-day	1.50E+00	kg-day/mg		1.26E-06	4.88E-06	mg/kg-day	3.00E-04	mg/kg-day	1.63E-02
				Arsenic, organic	3.58E-01	mg/kg	7.53E-06	mg/kg-day	NA	kg-day/mg		NA	4.39E-05	mg/kg-day	2.00E-02	mg/kg-day	2.20E-03
				Mercury	1.61E-01	mg/kg	3.38E-06	mg/kg-day	NA	kg-day/mg		NA	1.97E-05	mg/kg-day	1.00E-04	mg/kg-day	1.97E-01
				Pesticides													
				4,4'-DDD	4.22E-02	mg/kg	7.99E-07	mg/kg-day	2.40E-01	kg-day/mg		1.92E-07	4.66E-06	mg/kg-day	3.00E-05	mg/kg-day	1.55E-01
				4,4'-DDE	2.43E-01	mg/kg	4.60E-06	mg/kg-day	3.40E-01	kg-day/mg		1.56E-06	2.68E-05	mg/kg-day	3.00E-04	mg/kg-day	8.94E-02
				Aldrin	1.20E-03	mg/kg	2.27E-08	mg/kg-day	1.70E+01	kg-day/mg		3.86E-07	1.32E-07	mg/kg-day	3.00E-05	mg/kg-day	4.42E-03
				alpha-Chlordane	5.10E-02	mg/kg	9.65E-07	mg/kg-day	3.50E-01	kg-day/mg		3.38E-07	5.63E-06	mg/kg-day	5.00E-04	mg/kg-day	1.13E-02
				beta-BHC	1.73E-03	mg/kg	3.27E-08	mg/kg-day	1.80E+00	kg-day/mg		5.89E-08	1.91E-07	mg/kg-day	NA	mg/kg-day	NA
				cis-Nonachlor	2.20E-02	mg/kg	4.16E-07	mg/kg-day	3.50E-01	kg-day/mg		1.46E-07	2.43E-06	mg/kg-day	5.00E-04	mg/kg-day	4.86E-03
				Dieldrin	2.87E-02	mg/kg	5.43E-07	mg/kg-day	1.60E+01	kg-day/mg		8.69E-06	3.17E-06	mg/kg-day	5.00E-05	mg/kg-day	6.34E-02
				gamma-Chlordane	4.64E-03	mg/kg	8.78E-08	mg/kg-day	3.50E-01	kg-day/mg		3.07E-08	5.12E-07	mg/kg-day	5.00E-04	mg/kg-day	1.02E-03
				Heptachlor epoxide	3.39E-03	mg/kg	6.41E-08	mg/kg-day	9.10E+00	kg-day/mg		5.84E-07	3.74E-07	mg/kg-day	1.30E-05	mg/kg-day	2.88E-02
				Hexachlorobenzene	1.55E-03	mg/kg	2.93E-08	mg/kg-day	1.60E+00	kg-day/mg		4.69E-08	1.71E-07	mg/kg-day	8.00E-04	mg/kg-day	2.14E-04
				Mirex	3.45E-04	mg/kg	6.52E-09	mg/kg-day	1.80E+01	kg-day/mg		1.17E-07	3.80E-08	mg/kg-day	2.00E-04	mg/kg-day	1.90E-04
				Oxychlordane	5.50E-03	mg/kg	1.04E-07	mg/kg-day	3.50E-01	kg-day/mg		3.64E-08	6.07E-07	mg/kg-day	5.00E-04	mg/kg-day	1.21E-03
				trans-Nonachlor	6.26E-02	mg/kg	1.18E-06	mg/kg-day	3.50E-01	kg-day/mg		4.15E-07	6.91E-06	mg/kg-day	5.00E-04	mg/kg-day	1.38E-02
				PCBs													
				Total PCBs	1.61E+00	mg/kg	2.94E-05	mg/kg-day	2.00E+00	kg-day/mg		5.88E-05	1.72E-04	mg/kg-day	2.00E-05	mg/kg-day	8.58E+00
				PCB-TEQ	4.27E-05	mg/kg	6.38E-10	mg/kg-day	1.30E+05	kg-day/mg		8.29E-05	3.72E-09	mg/kg-day	7.00E-10	mg/kg-day	5.32E+00
Fish Tissue Total - Upper Potomac (Total PCBs)3												7.27E-05					9.17E+00
Fish Tissue Total - Upper Potomac (PCB-TEQ)4												9.68E-05					5.91E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Potomac	Ingestion														
				Metals													
				Arsenic	3.71E-01	mg/kg	7.80E-06	mg/kg-day	1.50E+00	kg-day/mg		1.17E-05	4.55E-05	mg/kg-day	3.00E-04	mg/kg-day	1.52E-01
				Arsenic, organic	3.34E+00	mg/kg	7.02E-05	mg/kg-day	NA	kg-day/mg		NA	4.10E-04	mg/kg-day	2.00E-02	mg/kg-day	2.05E-02
				Mercury	1.10E-01	mg/kg	2.31E-06	mg/kg-day	NA	kg-day/mg		NA	1.35E-05	mg/kg-day	1.00E-04	mg/kg-day	1.35E-01
				Pesticides													
				4,4'-DDD	8.29E-03	mg/kg	1.57E-07	mg/kg-day	2.40E-01	kg-day/mg		3.76E-08	9.15E-07	mg/kg-day	3.00E-05	mg/kg-day	3.05E-02
				4,4'-DDE	4.10E-02	mg/kg	7.76E-07	mg/kg-day	3.40E-01	kg-day/mg		2.64E-07	4.53E-06	mg/kg-day	3.00E-04	mg/kg-day	1.51E-02
				alpha-Chlordane	1.54E-02	mg/kg	2.91E-07	mg/kg-day	3.50E-01	kg-day/mg		1.02E-07	1.70E-06	mg/kg-day	5.00E-04	mg/kg-day	3.40E-03
				Dieldrin	6.62E-03	mg/kg	1.25E-07	mg/kg-day	1.60E+01	kg-day/mg		2.00E-06	7.31E-07	mg/kg-day	5.00E-05	mg/kg-day	1.46E-02
				gamma-Chlordane	7.97E-03	mg/kg	1.51E-07	mg/kg-day	3.50E-01	kg-day/mg		5.28E-08	8.80E-07	mg/kg-day	5.00E-04	mg/kg-day	1.76E-03
				Heptachlor epoxide	3.11E-03	mg/kg	5.88E-08	mg/kg-day	9.10E+00	kg-day/mg		5.36E-07	3.43E-07	mg/kg-day	1.30E-05	mg/kg-day	2.64E-02
				Oxychlordane	3.86E-03	mg/kg	7.30E-08	mg/kg-day	3.50E-01	kg-day/mg		2.56E-08	4.26E-07	mg/kg-day	5.00E-04	mg/kg-day	8.52E-04
				trans-Nonachlor	1.94E-02	mg/kg	3.67E-07	mg/kg-day	3.50E-01	kg-day/mg		1.28E-07	2.14E-06	mg/kg-day	5.00E-04	mg/kg-day	4.28E-03
				PCBs													
				Total PCBs	2.52E-01	mg/kg	4.61E-06	mg/kg-day	2.00E+00	kg-day/mg		9.22E-06	2.69E-05	mg/kg-day	2.00E-05	mg/kg-day	1.34E+00
				PCB-TEQ	5.46E-06	mg/kg	8.15E-11	mg/kg-day	1.30E+05	kg-day/mg		1.06E-05	4.75E-10	mg/kg-day	7.00E-10	mg/kg-day	6.79E-01
Fish Tissue Total - Lower Potomac (Total PCBs)3												2.41E-05					1.75E+00
Fish Tissue Total - Lower Potomac (PCB-TEQ)4												2.54E-05					1.08E+00

Table H-1-8. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Tissue - Mixed Diet [2]	Upstream Non-Tidal Anacostia	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.20E-07	mg/kg	1.79E-12	mg/kg-day	1.30E+05	kg-day/mg		2.32E-07	1.04E-11	mg/kg-day	7.00E-10	mg/kg-day	1.49E-02
				Metals													
				Arsenic	7.58E-03	mg/kg	1.59E-07	mg/kg-day	1.50E+00	kg-day/mg		2.39E-07	9.30E-07	mg/kg-day	3.00E-04	mg/kg-day	3.10E-03
				Arsenic, organic	6.82E-02	mg/kg	1.43E-06	mg/kg-day	NA	kg-day/mg		NA	8.36E-06	mg/kg-day	2.00E-02	mg/kg-day	4.18E-04
				Cobalt	1.62E-02	mg/kg	3.41E-07	mg/kg-day	NA	kg-day/mg		NA	1.99E-06	mg/kg-day	3.00E-04	mg/kg-day	6.62E-03
				Mercury	2.98E-01	mg/kg	6.27E-06	mg/kg-day	NA	kg-day/mg		NA	3.65E-05	mg/kg-day	1.00E-04	mg/kg-day	3.65E-01
				Thallium	3.85E-03	mg/kg	8.09E-08	mg/kg-day	NA	kg-day/mg		NA	4.72E-07	mg/kg-day	1.00E-05	mg/kg-day	4.72E-02
				Pesticides													
				Chlordane	2.61E-02	mg/kg	4.94E-07	mg/kg-day	3.50E-01	kg-day/mg		1.73E-07	2.88E-06	mg/kg-day	5.00E-04	mg/kg-day	5.76E-03
				Dieldrin	1.97E-03	mg/kg	3.73E-08	mg/kg-day	1.60E+01	kg-day/mg		5.97E-07	2.18E-07	mg/kg-day	5.00E-05	mg/kg-day	4.35E-03
				Heptachlor epoxide	1.72E-03	mg/kg	3.25E-08	mg/kg-day	9.10E+00	kg-day/mg		2.95E-07	1.89E-07	mg/kg-day	1.30E-05	mg/kg-day	1.46E-02
				PCBs													
				Total PCBs	3.31E-02	mg/kg	6.06E-07	mg/kg-day	2.00E+00	kg-day/mg		1.21E-06	3.53E-06	mg/kg-day	2.00E-05	mg/kg-day	1.77E-01
				PCB-TEQ	8.76E-07	mg/kg	1.31E-11	mg/kg-day	1.30E+05	kg-day/mg		1.70E-06	7.63E-11	mg/kg-day	7.00E-10	mg/kg-day	1.09E-01
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]												2.52E-06					6.24E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]												3.00E-06					5.56E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Lower Anacostia	Ingestion														
				Metals													
				Arsenic	2.45E-02	mg/kg	5.15E-07	mg/kg-day	1.50E+00	kg-day/mg		7.73E-07	3.00E-06	mg/kg-day	3.00E-04	mg/kg-day	1.00E-02
				Arsenic, organic	2.21E-01	mg/kg	4.64E-06	mg/kg-day	NA	kg-day/mg		NA	2.70E-05	mg/kg-day	2.00E-02	mg/kg-day	1.35E-03
				Mercury	9.77E-02	mg/kg	2.05E-06	mg/kg-day	NA	kg-day/mg		NA	1.20E-05	mg/kg-day	1.00E-04	mg/kg-day	1.20E-01
				Pesticides													
				4,4'-DDD	3.32E-02	mg/kg	6.28E-07	mg/kg-day	2.40E-01	kg-day/mg		1.51E-07	3.66E-06	mg/kg-day	3.00E-05	mg/kg-day	1.22E-01
				4,4'-DDE	6.62E-02	mg/kg	1.25E-06	mg/kg-day	3.40E-01	kg-day/mg		4.26E-07	7.31E-06	mg/kg-day	3.00E-04	mg/kg-day	2.44E-02
				Aldrin	4.02E-04	mg/kg	7.61E-09	mg/kg-day	1.70E+01	kg-day/mg		1.29E-07	4.44E-08	mg/kg-day	3.00E-05	mg/kg-day	1.48E-03
				alpha-Chlordane	3.60E-02	mg/kg	6.82E-07	mg/kg-day	3.50E-01	kg-day/mg		2.39E-07	3.98E-06	mg/kg-day	5.00E-04	mg/kg-day	7.96E-03
				cis-Nonachlor	1.55E-02	mg/kg	2.93E-07	mg/kg-day	3.50E-01	kg-day/mg		1.02E-07	1.71E-06	mg/kg-day	5.00E-04	mg/kg-day	3.41E-03
				Dieldrin	1.78E-02	mg/kg	3.37E-07	mg/kg-day	1.60E+01	kg-day/mg		5.39E-06	1.96E-06	mg/kg-day	5.00E-05	mg/kg-day	3.93E-02
				gamma-Chlordane	1.98E-02	mg/kg	3.75E-07	mg/kg-day	3.50E-01	kg-day/mg		1.31E-07	2.19E-06	mg/kg-day	5.00E-04	mg/kg-day	4.38E-03
				Heptachlor epoxide	4.27E-03	mg/kg	8.07E-08	mg/kg-day	9.10E+00	kg-day/mg		7.35E-07	4.71E-07	mg/kg-day	1.30E-05	mg/kg-day	3.62E-02
				Mirex	3.92E-04	mg/kg	7.42E-09	mg/kg-day	1.80E+01	kg-day/mg		1.34E-07	4.33E-08	mg/kg-day	2.00E-04	mg/kg-day	2.16E-04
				Oxychlordane	8.13E-03	mg/kg	1.54E-07	mg/kg-day	3.50E-01	kg-day/mg		5.38E-08	8.97E-07	mg/kg-day	5.00E-04	mg/kg-day	1.79E-03
				trans-Nonachlor	4.48E-02	mg/kg	8.48E-07	mg/kg-day	3.50E-01	kg-day/mg		2.97E-07	4.95E-06	mg/kg-day	5.00E-04	mg/kg-day	9.89E-03
				PCBs													
				Total PCBs	5.28E-01	mg/kg	9.66E-06	mg/kg-day	2.00E+00	kg-day/mg		1.93E-05	5.63E-05	mg/kg-day	2.00E-05	mg/kg-day	2.82E+00
				PCB-TEQ	1.40E-05	mg/kg	2.09E-10	mg/kg-day	1.30E+05	kg-day/mg		2.72E-05	1.22E-09	mg/kg-day	7.00E-10	mg/kg-day	1.74E+00
Fish Tissue Total - Lower Anacostia (Total PCBs)[3]												2.79E-05					3.20E+00
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[4]												3.57E-05					2.12E+00
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Potomac (Total PCBs)[3]												**7.27E-05**					**9.17E+00**
Total Receptor Risk/Hazard - Upper Potomac (PCB-TEQ)[4]												**9.68E-05**					**5.91E+00**
Total Receptor Risk/Hazard - Lower Potomac (Total PCBs)[3]												**2.41E-05**					**1.75E+00**
Total Receptor Risk/Hazard - Lower Potomac (PCB-TEQ)[4]												**2.54E-05**					**1.08E+00**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (Total PCBs)[3]												**2.52E-06**					**6.24E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (PCB-TEQ)[4]												**3.00E-06**					**5.56E-01**
Total Receptor Risk/Hazard - Lower Anacostia (Total PCBs)[3]												**2.79E-05**					**3.20E+00**
Total Receptor Risk/Hazard - Lower Anacostia (PCB-TEQ)[4]												**3.57E-05**					**2.12E+00**

Table H-1-8. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-9. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Upper Potomac	Ingestion														
				Metals													
				Arsenic	3.98E-02	mg/kg	7.02E-07	mg/kg-day	1.50E+00	kg-day/mg		1.05E-06	8.19E-06	mg/kg-day	3.00E-04	mg/kg-day	2.73E-02
				Arsenic, organic	3.58E-01	mg/kg	6.32E-06	mg/kg-day	NA	kg-day/mg		NA	7.37E-05	mg/kg-day	2.00E-02	mg/kg-day	3.69E-03
				Mercury	1.61E-01	mg/kg	2.84E-06	mg/kg-day	NA	kg-day/mg		NA	3.31E-05	mg/kg-day	1.00E-04	mg/kg-day	3.31E-01
				Pesticides													
				4,4'-DDD	4.22E-02	mg/kg	6.70E-07	mg/kg-day	2.40E-01	kg-day/mg		1.61E-07	7.82E-06	mg/kg-day	3.00E-05	mg/kg-day	2.61E-01
				4,4'-DDE	2.43E-01	mg/kg	3.86E-06	mg/kg-day	3.40E-01	kg-day/mg		1.31E-06	4.50E-05	mg/kg-day	3.00E-04	mg/kg-day	1.50E-01
				Aldrin	1.20E-03	mg/kg	1.91E-08	mg/kg-day	1.70E+01	kg-day/mg		3.24E-07	2.22E-07	mg/kg-day	3.00E-05	mg/kg-day	7.41E-03
				alpha-Chlordane	5.10E-02	mg/kg	8.10E-07	mg/kg-day	3.50E-01	kg-day/mg		2.84E-07	9.45E-06	mg/kg-day	5.00E-04	mg/kg-day	1.89E-02
				beta-BHC	1.73E-03	mg/kg	2.75E-08	mg/kg-day	1.80E+00	kg-day/mg		4.95E-08	3.21E-07	mg/kg-day	NA	mg/kg-day	NA
				cis-Nonachlor	2.20E-02	mg/kg	3.49E-07	mg/kg-day	3.50E-01	kg-day/mg		1.22E-07	4.08E-06	mg/kg-day	5.00E-04	mg/kg-day	8.15E-03
				Dieldrin	2.87E-02	mg/kg	4.56E-07	mg/kg-day	1.60E+01	kg-day/mg		7.29E-06	5.32E-06	mg/kg-day	5.00E-05	mg/kg-day	1.06E-01
				gamma-Chlordane	4.64E-03	mg/kg	7.37E-08	mg/kg-day	3.50E-01	kg-day/mg		2.58E-08	8.60E-07	mg/kg-day	5.00E-04	mg/kg-day	1.72E-03
				Heptachlor epoxide	3.39E-03	mg/kg	5.38E-08	mg/kg-day	9.10E+00	kg-day/mg		4.90E-07	6.28E-07	mg/kg-day	1.30E-05	mg/kg-day	4.83E-02
				Hexachlorobenzene	1.55E-03	mg/kg	2.46E-08	mg/kg-day	1.60E+00	kg-day/mg		3.94E-08	2.87E-07	mg/kg-day	8.00E-04	mg/kg-day	3.59E-04
				Mirex	3.45E-04	mg/kg	5.47E-09	mg/kg-day	1.80E+01	kg-day/mg		9.85E-08	6.38E-08	mg/kg-day	2.00E-04	mg/kg-day	3.19E-04
				Oxychlordane	5.50E-03	mg/kg	8.74E-08	mg/kg-day	3.50E-01	kg-day/mg		3.06E-08	1.02E-06	mg/kg-day	5.00E-04	mg/kg-day	2.04E-03
				trans-Nonachlor	6.26E-02	mg/kg	9.94E-07	mg/kg-day	3.50E-01	kg-day/mg		3.48E-07	1.16E-05	mg/kg-day	5.00E-04	mg/kg-day	2.32E-02
				PCBs													
				Total PCBs	1.61E+00	mg/kg	2.47E-05	mg/kg-day	2.00E+00	kg-day/mg		4.94E-05	2.88E-04	mg/kg-day	2.00E-05	mg/kg-day	1.44E+01
				PCB-TEQ	4.27E-05	mg/kg	5.35E-10	mg/kg-day	1.30E+05	kg-day/mg		6.96E-05	6.25E-09	mg/kg-day	7.00E-10	mg/kg-day	8.92E+00
Fish Tissue Total - Upper Potomac (Total PCBs)[3]												6.10E-05					1.54E+01
Fish Tissue Total - Upper Potomac (PCB-TEQ)[4]												8.12E-05					9.91E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Lower Potomac	Ingestion														
				Metals													
				Arsenic	3.71E-01	mg/kg	6.55E-06	mg/kg-day	1.50E+00	kg-day/mg		9.82E-06	7.64E-05	mg/kg-day	3.00E-04	mg/kg-day	2.55E-01
				Arsenic, organic	3.34E+00	mg/kg	5.89E-05	mg/kg-day	NA	kg-day/mg		NA	6.87E-04	mg/kg-day	2.00E-02	mg/kg-day	3.44E-02
				Mercury	1.10E-01	mg/kg	1.94E-06	mg/kg-day	NA	kg-day/mg		NA	2.26E-05	mg/kg-day	1.00E-04	mg/kg-day	2.26E-01
				Pesticides													
				4,4'-DDD	8.29E-03	mg/kg	1.32E-07	mg/kg-day	2.40E-01	kg-day/mg		3.16E-08	1.54E-06	mg/kg-day	3.00E-05	mg/kg-day	5.12E-02
				4,4'-DDE	4.10E-02	mg/kg	6.51E-07	mg/kg-day	3.40E-01	kg-day/mg		2.21E-07	7.60E-06	mg/kg-day	3.00E-04	mg/kg-day	2.53E-02
				alpha-Chlordane	1.54E-02	mg/kg	2.45E-07	mg/kg-day	3.50E-01	kg-day/mg		8.56E-08	2.85E-06	mg/kg-day	5.00E-04	mg/kg-day	5.71E-03
				Dieldrin	6.62E-03	mg/kg	1.05E-07	mg/kg-day	1.60E+01	kg-day/mg		1.68E-06	1.23E-06	mg/kg-day	5.00E-05	mg/kg-day	2.45E-02
				gamma-Chlordane	7.97E-03	mg/kg	1.27E-07	mg/kg-day	3.50E-01	kg-day/mg		4.43E-08	1.48E-06	mg/kg-day	5.00E-04	mg/kg-day	2.95E-03
				Heptachlor epoxide	3.11E-03	mg/kg	4.94E-08	mg/kg-day	9.10E+00	kg-day/mg		4.49E-07	5.76E-07	mg/kg-day	1.30E-05	mg/kg-day	4.43E-02
				Oxychlordane	3.86E-03	mg/kg	6.13E-08	mg/kg-day	3.50E-01	kg-day/mg		2.15E-08	7.15E-07	mg/kg-day	5.00E-04	mg/kg-day	1.43E-03
				trans-Nonachlor	1.94E-02	mg/kg	3.08E-07	mg/kg-day	3.50E-01	kg-day/mg		1.08E-07	3.59E-06	mg/kg-day	5.00E-04	mg/kg-day	7.19E-03
				PCBs													
				Total PCBs	2.52E-01	mg/kg	3.87E-06	mg/kg-day	2.00E+00	kg-day/mg		7.74E-06	4.51E-05	mg/kg-day	2.00E-05	mg/kg-day	2.26E+00
				PCB-TEQ	5.46E-06	mg/kg	6.84E-11	mg/kg-day	1.30E+05	kg-day/mg		8.89E-06	7.98E-10	mg/kg-day	7.00E-10	mg/kg-day	1.14E+00
Fish Tissue Total - Lower Potomac (Total PCBs)[3]												2.02E-05					2.94E+00
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]												2.14E-05					1.82E+00

Table H-1-9. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upstream Non-Tidal Anacostia	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.20E-07	mg/kg	1.50E-12	mg/kg-day	1.30E+05	kg-day/mg		1.95E-07	1.75E-11	mg/kg-day	7.00E-10	mg/kg-day	2.50E-02
				Metals													
				Arsenic	7.58E-03	mg/kg	1.34E-07	mg/kg-day	1.50E+00	kg-day/mg		2.01E-07	1.56E-06	mg/kg-day	3.00E-04	mg/kg-day	5.20E-03
				Arsenic, organic	6.82E-02	mg/kg	1.20E-06	mg/kg-day	NA	kg-day/mg		NA	1.40E-05	mg/kg-day	2.00E-02	mg/kg-day	7.02E-04
				Cobalt	1.62E-02	mg/kg	2.86E-07	mg/kg-day	NA	kg-day/mg		NA	3.34E-06	mg/kg-day	3.00E-04	mg/kg-day	1.11E-02
				Mercury	2.98E-01	mg/kg	5.26E-06	mg/kg-day	NA	kg-day/mg		NA	6.14E-05	mg/kg-day	1.00E-04	mg/kg-day	6.14E-01
				Thallium	3.85E-03	mg/kg	6.79E-08	mg/kg-day	NA	kg-day/mg		NA	7.93E-07	mg/kg-day	1.00E-05	mg/kg-day	7.93E-02
				Pesticides													
				Chlordane	2.61E-02	mg/kg	4.15E-07	mg/kg-day	2.40E-01	kg-day/mg		9.95E-08	4.84E-06	mg/kg-day	3.00E-05	mg/kg-day	1.61E-01
				Dieldrin	1.97E-03	mg/kg	3.13E-08	mg/kg-day	3.40E-01	kg-day/mg		1.06E-08	3.65E-07	mg/kg-day	3.00E-04	mg/kg-day	1.22E-03
				Heptachlor epoxide	1.72E-03	mg/kg	2.72E-08	mg/kg-day	1.70E+01	kg-day/mg		4.63E-07	3.18E-07	mg/kg-day	3.00E-05	mg/kg-day	1.06E-02
				PCBs													
				Total PCBs	3.31E-02	mg/kg	5.09E-07	mg/kg-day	2.00E+00	kg-day/mg		1.02E-06	5.93E-06	mg/kg-day	2.00E-05	mg/kg-day	2.97E-01
				PCB-TEQ	8.76E-07	mg/kg	1.10E-11	mg/kg-day	1.30E+05	kg-day/mg		1.43E-06	1.28E-10	mg/kg-day	7.00E-10	mg/kg-day	1.83E-01
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]												1.99E-06					1.20E+00
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]												2.40E-06					1.09E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Anacostia	Ingestion														
				Metals													
				Arsenic	2.45E-02	mg/kg	4.32E-07	mg/kg-day	1.50E+00	kg-day/mg		6.49E-07	5.04E-06	mg/kg-day	3.00E-04	mg/kg-day	1.68E-02
				Arsenic, organic	2.21E-01	mg/kg	3.89E-06	mg/kg-day	NA	kg-day/mg		NA	4.54E-05	mg/kg-day	2.00E-02	mg/kg-day	2.27E-03
				Mercury	9.77E-02	mg/kg	1.72E-06	mg/kg-day	NA	kg-day/mg		NA	2.01E-05	mg/kg-day	1.00E-04	mg/kg-day	2.01E-01
				Pesticides													
				4,4'-DDD	3.32E-02	mg/kg	5.27E-07	mg/kg-day	2.40E-01	kg-day/mg		1.27E-07	6.15E-06	mg/kg-day	3.00E-05	mg/kg-day	2.05E-01
				4,4'-DDE	6.62E-02	mg/kg	1.05E-06	mg/kg-day	3.40E-01	kg-day/mg		3.57E-07	1.23E-05	mg/kg-day	3.00E-04	mg/kg-day	4.09E-02
				Aldrin	4.02E-04	mg/kg	6.38E-09	mg/kg-day	1.70E+01	kg-day/mg		1.09E-07	7.45E-08	mg/kg-day	3.00E-05	mg/kg-day	2.48E-03
				alpha-Chlordane	3.60E-02	mg/kg	5.72E-07	mg/kg-day	3.50E-01	kg-day/mg		2.00E-07	6.68E-06	mg/kg-day	5.00E-04	mg/kg-day	1.34E-02
				cis-Nonachlor	1.55E-02	mg/kg	2.46E-07	mg/kg-day	3.50E-01	kg-day/mg		8.59E-08	2.86E-06	mg/kg-day	5.00E-04	mg/kg-day	5.73E-03
				Dieldrin	1.78E-02	mg/kg	2.83E-07	mg/kg-day	1.60E+01	kg-day/mg		4.52E-06	3.30E-06	mg/kg-day	5.00E-05	mg/kg-day	6.60E-02
				gamma-Chlordane	1.98E-02	mg/kg	3.15E-07	mg/kg-day	3.50E-01	kg-day/mg		1.10E-07	3.68E-06	mg/kg-day	5.00E-04	mg/kg-day	7.35E-03
				Heptachlor epoxide	4.27E-03	mg/kg	6.78E-08	mg/kg-day	9.10E+00	kg-day/mg		6.17E-07	7.91E-07	mg/kg-day	1.30E-05	mg/kg-day	6.08E-02
				Mirex	3.92E-04	mg/kg	6.23E-09	mg/kg-day	1.80E+01	kg-day/mg		1.12E-07	7.26E-08	mg/kg-day	2.00E-04	mg/kg-day	3.63E-04
				Oxychlordane	8.13E-03	mg/kg	1.29E-07	mg/kg-day	3.50E-01	kg-day/mg		4.52E-08	1.51E-06	mg/kg-day	5.00E-04	mg/kg-day	3.01E-03
				trans-Nonachlor	4.48E-02	mg/kg	7.12E-07	mg/kg-day	3.50E-01	kg-day/mg		2.49E-07	8.30E-06	mg/kg-day	5.00E-04	mg/kg-day	1.66E-02
				PCBs													
				Total PCBs	5.28E-01	mg/kg	8.10E-06	mg/kg-day	2.00E+00	kg-day/mg		1.62E-05	9.46E-05	mg/kg-day	2.00E-05	mg/kg-day	4.73E+00
				PCB-TEQ	1.40E-05	mg/kg	1.75E-10	mg/kg-day	1.30E+05	kg-day/mg		2.28E-05	2.05E-09	mg/kg-day	7.00E-10	mg/kg-day	2.92E+00
Fish Tissue Total - Lower Anacostia (Total PCBs)[3]												2.34E-05					5.37E+00
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[4]												3.00E-05					3.57E+00
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Potomac (Total PCBs)[3]												**6.10E-05**					**1.54E+01**
Total Receptor Risk/Hazard - Upper Potomac (PCB-TEQ)[4]												**8.12E-05**					**9.91E+00**
Total Receptor Risk/Hazard - Lower Potomac (Total PCBs)[3]												**2.02E-05**					**2.94E+00**
Total Receptor Risk/Hazard - Lower Potomac (PCB-TEQ)[4]												**2.14E-05**					**1.82E+00**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (Total PCBs)[3]												**1.99E-06**					**1.20E+00**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (PCB-TEQ)[4]												**2.40E-06**					**1.09E+00**
Total Receptor Risk/Hazard - Lower Anacostia (Total PCBs)[3]												**2.34E-05**					**5.37E+00**
Total Receptor Risk/Hazard - Lower Anacostia (PCB-TEQ)[4]												**3.00E-05**					**3.57E+00**

Table H-1-9. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
					Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-10. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Ingestion														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.35E-12	mg/kg-day	1.30E+05	kg-day/mg		1.76E-07	4.73E-12	mg/kg-day	7.00E-10	mg/kg-day	6.76E-03
				Metals													
				Aluminum	8.92E+03	mg/kg	5.67E-05	mg/kg-day	NA	kg-day/mg		NA	1.99E-04	mg/kg-day	1.00E+00	mg/kg-day	1.99E-04
				Antimony	6.43E+00	mg/kg	4.09E-08	mg/kg-day	NA	kg-day/mg		NA	1.43E-07	mg/kg-day	4.00E-04	mg/kg-day	3.58E-04
				Arsenic	6.55E+00	mg/kg	2.50E-08	mg/kg-day	1.50E+00	kg-day/mg		3.75E-08	8.75E-08	mg/kg-day	3.00E-04	mg/kg-day	2.92E-04
				Cobalt	1.65E+01	mg/kg	1.05E-07	mg/kg-day	NA	kg-day/mg		NA	3.66E-07	mg/kg-day	3.00E-04	mg/kg-day	1.22E-03
				Cyanide	3.40E+00	mg/kg	2.16E-08	mg/kg-day	NA	kg-day/mg		NA	7.58E-08	mg/kg-day	6.30E-04	mg/kg-day	1.20E-04
				Manganese	2.34E+02	mg/kg	1.49E-06	mg/kg-day	NA	kg-day/mg		NA	5.22E-06	mg/kg-day	2.40E-02	mg/kg-day	2.17E-04
				Nickel	6.02E+01	mg/kg	3.83E-07	mg/kg-day	NA	kg-day/mg		NA	1.34E-06	mg/kg-day	2.00E-02	mg/kg-day	6.69E-05
				Thallium	2.38E-01	mg/kg	1.51E-09	mg/kg-day	NA	kg-day/mg		NA	5.30E-09	mg/kg-day	1.00E-05	mg/kg-day	5.30E-04
				Vanadium	1.49E+02	mg/kg	9.48E-07	mg/kg-day	NA	kg-day/mg		NA	3.32E-06	mg/kg-day	5.04E-03	mg/kg-day	6.58E-04
				PCBs													
				Total PCBs	5.93E-01	mg/kg	3.77E-09	mg/kg-day	2.00E+00	kg-day/mg		7.54E-09	1.32E-08	mg/kg-day	2.00E-05	mg/kg-day	6.60E-04
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	7.96E-09	mg/kg-day	1.00E-01	kg-day/mg	1	7.96E-10	2.78E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	4.85E-09	mg/kg-day	1.00E+00	kg-day/mg	1	4.85E-09	1.70E-08	mg/kg-day	3.00E-04	mg/kg-day	5.65E-05
				Benzo(b)fluoranthene	1.12E+00	mg/kg	7.12E-09	mg/kg-day	1.00E-01	kg-day/mg	1	7.12E-10	2.49E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	2.59E-09	mg/kg-day	1.00E-02	kg-day/mg	1	2.59E-11	9.06E-09	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	6.42E-09	mg/kg-day	1.00E-03	kg-day/mg	1	6.42E-12	2.25E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	1.14E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.14E-09	3.98E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	4.17E-09	mg/kg-day	1.00E-01	kg-day/mg	1	4.17E-10	1.46E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	7.93E-07	mg/kg-day	NA	kg-day/mg		NA	2.78E-06	mg/kg-day	1.00E-02	mg/kg-day	2.78E-04
			Exp. Route Total									2.29E-07					1.14E-02

Table H-1-10. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Dermal														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	9.25E-13	mg/kg-day	1.30E+05	kg-day/mg		1.20E-07	3.24E-12	mg/kg-day	7.00E-10	mg/kg-day	4.63E-03
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	2.85E-08	mg/kg-day	1.50E+00	kg-day/mg		4.27E-08	9.97E-08	mg/kg-day	3.00E-04	mg/kg-day	3.32E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.20E-08	mg/kg-day	2.00E+00	kg-day/mg		2.41E-08	4.21E-08	mg/kg-day	2.00E-05	mg/kg-day	2.11E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	2.36E-08	mg/kg-day	1.00E-01	kg-day/mg	1	2.36E-09	8.25E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.44E-08	mg/kg-day	1.00E+00	kg-day/mg	1	1.44E-08	5.03E-08	mg/kg-day	3.00E-04	mg/kg-day	1.68E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	2.11E-08	mg/kg-day	1.00E-01	kg-day/mg	1	2.11E-09	7.38E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	7.67E-09	mg/kg-day	1.00E-02	kg-day/mg	1	7.67E-11	2.69E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.90E-08	mg/kg-day	1.00E-03	kg-day/mg	1	1.90E-11	6.66E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	3.37E-09	mg/kg-day	1.00E+00	kg-day/mg	1	3.37E-09	1.18E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.23E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.23E-09	4.32E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									2.11E-07					7.23E-03
		Exposure Point Total										4.39E-07					1.86E-02
	Exposure Medium Total											4.39E-07					1.86E-02
Sediment Total												4.39E-07					1.86E-02

Table H-1-10. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	2.76E-15	mg/kg-day	1.30E+05	kg-day/mg		3.59E-10	9.67E-15	mg/kg-day	7.00E-10	mg/kg-day	1.38E-05
				Metals													
				Arsenic	9.21E-01	ug/L	4.16E-09	mg/kg-day	1.50E+00	kg-day/mg		6.24E-09	1.46E-08	mg/kg-day	3.00E-04	mg/kg-day	4.85E-05
				Cobalt	1.04E+00	ug/L	4.70E-09	mg/kg-day	NA	kg-day/mg		NA	1.64E-08	mg/kg-day	3.00E-04	mg/kg-day	5.48E-05
				Manganese	1.48E+02	ug/L	6.67E-07	mg/kg-day	NA	kg-day/mg		NA	2.33E-06	mg/kg-day	2.40E-02	mg/kg-day	9.73E-05
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	7.23E-12	mg/kg-day	3.40E-01	kg-day/mg		2.46E-12	2.53E-11	mg/kg-day	5.00E-04	mg/kg-day	5.06E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	4.24E-11	mg/kg-day	4.00E-01	kg-day/mg		1.70E-11	1.49E-10	mg/kg-day	2.00E-05	mg/kg-day	7.43E-06
			Exp. Route Total									6.62E-09					2.22E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	3.35E-12	mg/kg-day	1.30E+05	kg-day/mg		4.36E-07	1.17E-11	mg/kg-day	7.00E-10	mg/kg-day	1.68E-02
				Metals													
				Arsenic	9.21E-01	ug/L	1.22E-09	mg/kg-day	1.50E+00	kg-day/mg		1.84E-09	4.28E-09	mg/kg-day	3.00E-04	mg/kg-day	1.43E-05
				Cobalt	1.04E+00	ug/L	5.53E-10	mg/kg-day	NA	kg-day/mg		NA	1.94E-09	mg/kg-day	3.00E-04	mg/kg-day	6.45E-06
				Manganese	1.48E+02	ug/L	1.96E-07	mg/kg-day	NA	kg-day/mg		NA	6.87E-07	mg/kg-day	9.60E-04	mg/kg-day	7.16E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	5.06E-09	mg/kg-day	3.40E-01	kg-day/mg		1.72E-09	1.77E-08	mg/kg-day	5.00E-04	mg/kg-day	3.54E-05
				PCBs													
				Total PCBs	9.40E-03	ug/L	3.54E-08	mg/kg-day	4.00E-01	kg-day/mg		1.42E-08	1.24E-07	mg/kg-day	2.00E-05	mg/kg-day	6.20E-03
			Exp. Route Total									4.54E-07					2.37E-02
		Exposure Point Total										4.60E-07					2.40E-02
	Exposure Medium Total											4.60E-07					2.40E-02
Surface Water Total												4.60E-07					2.40E-02
Total Receptor Risk/Hazard												9.00E-07					4.26E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-11. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Ingestion														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	2.45E-12	mg/kg-day	1.30E+05	kg-day/mg		3.18E-07	1.43E-11	mg/kg-day	7.00E-10	mg/kg-day	2.04E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	1.03E-04	mg/kg-day	NA	kg-day/mg		NA	5.99E-04	mg/kg-day	1.00E+00	mg/kg-day	5.99E-04
				Antimony	6.43E+00	mg/kg	7.40E-08	mg/kg-day	NA	kg-day/mg		NA	4.32E-07	mg/kg-day	4.00E-04	mg/kg-day	1.08E-03
				Arsenic	6.55E+00	mg/kg	4.53E-08	mg/kg-day	1.50E+00	kg-day/mg		6.79E-08	2.64E-07	mg/kg-day	3.00E-04	mg/kg-day	8.80E-04
				Cobalt	1.65E+01	mg/kg	1.90E-07	mg/kg-day	NA	kg-day/mg		NA	1.11E-06	mg/kg-day	3.00E-04	mg/kg-day	3.68E-03
				Cyanide	3.40E+00	mg/kg	3.92E-08	mg/kg-day	NA	kg-day/mg		NA	2.29E-07	mg/kg-day	6.30E-04	mg/kg-day	3.63E-04
				Manganese	2.34E+02	mg/kg	2.70E-06	mg/kg-day	NA	kg-day/mg		NA	1.57E-05	mg/kg-day	2.40E-02	mg/kg-day	6.56E-04
				Nickel	6.02E+01	mg/kg	6.93E-07	mg/kg-day	NA	kg-day/mg		NA	4.04E-06	mg/kg-day	2.00E-02	mg/kg-day	2.02E-04
				Thallium	2.38E-01	mg/kg	2.74E-09	mg/kg-day	NA	kg-day/mg		NA	1.60E-08	mg/kg-day	1.00E-05	mg/kg-day	1.60E-03
				Vanadium	1.49E+02	mg/kg	1.72E-06	mg/kg-day	NA	kg-day/mg		NA	1.00E-05	mg/kg-day	5.04E-03	mg/kg-day	1.99E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	6.83E-09	mg/kg-day	2.00E+00	kg-day/mg		1.37E-08	3.99E-08	mg/kg-day	2.00E-05	mg/kg-day	1.99E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	1.44E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.60E-09	8.41E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	8.78E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	2.19E-08	5.12E-08	mg/kg-day	3.00E-04	mg/kg-day	1.71E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	1.29E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.22E-09	7.52E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	4.69E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	1.17E-10	2.74E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.16E-08	mg/kg-day	1.00E-03	kg-day/mg	2.5	2.91E-11	6.79E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	2.06E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	5.16E-09	1.20E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	7.55E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.89E-09	4.40E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	1.44E-06	mg/kg-day	NA	kg-day/mg		NA	8.38E-06	mg/kg-day	1.00E-02	mg/kg-day	8.38E-04
			Exp. Route Total									4.36E-07					3.45E-02

Table H-1-11. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Dermal														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	9.96E-13	mg/kg-day	1.30E+05	kg-day/mg		1.29E-07	5.81E-12	mg/kg-day	7.00E-10	mg/kg-day	8.30E-03
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	3.07E-08	mg/kg-day	1.50E+00	kg-day/mg		4.60E-08	1.79E-07	mg/kg-day	3.00E-04	mg/kg-day	5.96E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.30E-08	mg/kg-day	2.00E+00	kg-day/mg		2.59E-08	7.56E-08	mg/kg-day	2.00E-05	mg/kg-day	3.78E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	2.54E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	6.35E-09	1.48E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.55E-08	mg/kg-day	1.00E+00	kg-day/mg	2.5	3.87E-08	9.02E-08	mg/kg-day	3.00E-04	mg/kg-day	3.01E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	2.27E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.68E-09	1.32E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	8.26E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	2.06E-10	4.82E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	2.05E-08	mg/kg-day	1.00E-03	kg-day/mg	2.5	5.12E-11	1.20E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	3.63E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	9.08E-09	2.12E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.33E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.32E-09	7.75E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									2.65E-07					1.30E-02
		Exposure Point Total										7.01E-07					4.74E-02
	Exposure Medium Total											7.01E-07					4.74E-02
Sediment Total												7.01E-07					4.74E-02

Table H-1-11. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer: Intake/Exposure Concentration Value	Cancer: Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer: Intake/Exposure Concentration Value	Noncancer: Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	5.01E-15	mg/kg-day	1.30E+05	kg-day/mg		6.51E-10	2.92E-14	mg/kg-day	7.00E-10	mg/kg-day	4.17E-05
				Metals													
				Arsenic	9.21E-01	ug/L	7.53E-09	mg/kg-day	1.50E+00	kg-day/mg		1.13E-08	4.39E-08	mg/kg-day	3.00E-04	mg/kg-day	1.46E-04
				Cobalt	1.04E+00	ug/L	8.51E-09	mg/kg-day	NA	kg-day/mg		NA	4.96E-08	mg/kg-day	3.00E-04	mg/kg-day	1.65E-04
				Manganese	1.48E+02	ug/L	1.21E-06	mg/kg-day	NA	kg-day/mg		NA	7.05E-06	mg/kg-day	2.40E-02	mg/kg-day	2.94E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	1.31E-11	mg/kg-day	3.40E-01	kg-day/mg		4.45E-12	7.63E-11	mg/kg-day	5.00E-04	mg/kg-day	1.53E-07
				PCBs													
				Total PCBs	9.40E-03	ug/L	7.69E-11	mg/kg-day	4.00E-01	kg-day/mg		3.08E-11	4.48E-10	mg/kg-day	2.00E-05	mg/kg-day	2.24E-05
			Exp. Route Total									1.20E-08					6.70E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	1.57E-09	mg/kg-day	1.50E+00	kg-day/mg		2.36E-09	9.18E-09	mg/kg-day	3.00E-04	mg/kg-day	3.06E-05
				Cobalt	1.04E+00	ug/L	7.10E-10	mg/kg-day	NA	kg-day/mg		NA	4.14E-09	mg/kg-day	3.00E-04	mg/kg-day	1.38E-05
				Manganese	1.48E+02	ug/L	2.52E-07	mg/kg-day	NA	kg-day/mg		NA	1.47E-06	mg/kg-day	9.60E-04	mg/kg-day	1.53E-03
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									2.36E-09					1.58E-03
		Exposure Point Total										1.43E-08					2.25E-03
	Exposure Medium Total											1.43E-08					2.25E-03
Surface Water Total												1.43E-08					2.25E-03
Total Receptor Risk/Hazard												7.15E-07					4.97E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-12. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Ingestion														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	3.82E-12	mg/kg-day	1.30E+05	kg-day/mg		4.96E-07	4.46E-11	mg/kg-day	7.00E-10	mg/kg-day	6.36E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	1.60E-04	mg/kg-day	NA	kg-day/mg		NA	1.87E-03	mg/kg-day	1.00E+00	mg/kg-day	1.87E-03
				Antimony	6.43E+00	mg/kg	1.15E-07	mg/kg-day	NA	kg-day/mg		NA	1.35E-06	mg/kg-day	4.00E-04	mg/kg-day	3.37E-03
				Arsenic	6.55E+00	mg/kg	7.06E-08	mg/kg-day	1.50E+00	kg-day/mg		1.06E-07	8.23E-07	mg/kg-day	3.00E-04	mg/kg-day	2.74E-03
				Cobalt	1.65E+01	mg/kg	2.95E-07	mg/kg-day	NA	kg-day/mg		NA	3.45E-06	mg/kg-day	3.00E-04	mg/kg-day	1.15E-02
				Cyanide	3.40E+00	mg/kg	6.11E-08	mg/kg-day	NA	kg-day/mg		NA	7.13E-07	mg/kg-day	6.30E-04	mg/kg-day	1.13E-03
				Manganese	2.34E+02	mg/kg	4.21E-06	mg/kg-day	NA	kg-day/mg		NA	4.91E-05	mg/kg-day	2.40E-02	mg/kg-day	2.05E-03
				Nickel	6.02E+01	mg/kg	1.08E-06	mg/kg-day	NA	kg-day/mg		NA	1.26E-05	mg/kg-day	2.00E-02	mg/kg-day	6.30E-04
				Thallium	2.38E-01	mg/kg	4.27E-09	mg/kg-day	NA	kg-day/mg		NA	4.99E-08	mg/kg-day	1.00E-05	mg/kg-day	4.99E-03
				Vanadium	1.49E+02	mg/kg	2.68E-06	mg/kg-day	NA	kg-day/mg		NA	3.12E-05	mg/kg-day	5.04E-03	mg/kg-day	6.19E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.06E-08	mg/kg-day	2.00E+00	kg-day/mg		2.13E-08	1.24E-07	mg/kg-day	2.00E-05	mg/kg-day	6.21E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	2.25E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	9.44E-09	2.62E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.37E-08	mg/kg-day	1.00E+00	kg-day/mg	4.2	5.75E-08	1.60E-07	mg/kg-day	3.00E-04	mg/kg-day	5.32E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	2.01E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	8.44E-09	2.34E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	7.31E-09	mg/kg-day	1.00E-02	kg-day/mg	4.2	3.07E-10	8.53E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.81E-08	mg/kg-day	1.00E-03	kg-day/mg	4.2	7.62E-11	2.12E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	3.21E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.35E-08	3.75E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.18E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	4.94E-09	1.37E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	2.24E-06	mg/kg-day	NA	kg-day/mg		NA	2.61E-05	mg/kg-day	1.00E-02	mg/kg-day	2.61E-03
			Exp. Route Total									7.18E-07					1.07E-01

Table H-1-12. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	6.60E-13	mg/kg-day	1.30E+05	kg-day/mg		8.58E-08	7.70E-12	mg/kg-day	7.00E-10	mg/kg-day	1.10E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	2.03E-08	mg/kg-day	1.50E+00	kg-day/mg		3.05E-08	2.37E-07	mg/kg-day	3.00E-04	mg/kg-day	7.90E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	8.59E-09	mg/kg-day	2.00E+00	kg-day/mg		1.72E-08	1.00E-07	mg/kg-day	2.00E-05	mg/kg-day	5.01E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	1.68E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	7.06E-09	1.96E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.02E-08	mg/kg-day	1.00E+00	kg-day/mg	4.2	4.30E-08	1.20E-07	mg/kg-day	3.00E-04	mg/kg-day	3.98E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	1.50E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	6.32E-09	1.76E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	5.47E-09	mg/kg-day	1.00E-02	kg-day/mg	4.2	2.30E-10	6.38E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.36E-08	mg/kg-day	1.00E-03	kg-day/mg	4.2	5.70E-11	1.58E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	2.41E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.01E-08	2.81E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	8.81E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	3.70E-09	1.03E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									2.04E-07					1.72E-02
		Exposure Point Total										9.22E-07					1.25E-01
	Exposure Medium Total											9.22E-07					1.25E-01
Sediment Total												9.22E-07					1.25E-01

Table H-1-12. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	6.59E-15	mg/kg-day	1.30E+05	kg-day/mg		8.57E-10	7.69E-14	mg/kg-day	7.00E-10	mg/kg-day	1.10E-04
				Metals													
				Arsenic	9.21E-01	ug/L	9.92E-09	mg/kg-day	1.50E+00	kg-day/mg		1.49E-08	1.16E-07	mg/kg-day	3.00E-04	mg/kg-day	3.86E-04
				Cobalt	1.04E+00	ug/L	1.12E-08	mg/kg-day	NA	kg-day/mg		NA	1.31E-07	mg/kg-day	3.00E-04	mg/kg-day	4.36E-04
				Manganese	1.48E+02	ug/L	1.59E-06	mg/kg-day	NA	kg-day/mg		NA	1.86E-05	mg/kg-day	2.40E-02	mg/kg-day	7.74E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	1.72E-11	mg/kg-day	3.40E-01	kg-day/mg		5.86E-12	2.01E-10	mg/kg-day	5.00E-04	mg/kg-day	4.02E-07
				PCBs													
				Total PCBs	9.40E-03	ug/L	1.01E-10	mg/kg-day	4.00E-01	kg-day/mg		4.05E-11	1.18E-09	mg/kg-day	2.00E-05	mg/kg-day	5.91E-05
			Exp. Route Total									1.58E-08					1.76E-03
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	6.20E-10	mg/kg-day	1.50E+00	kg-day/mg		9.30E-10	7.24E-09	mg/kg-day	3.00E-04	mg/kg-day	2.41E-05
				Cobalt	1.04E+00	ug/L	2.80E-10	mg/kg-day	NA	kg-day/mg		NA	3.27E-09	mg/kg-day	3.00E-04	mg/kg-day	1.09E-05
				Manganese	1.48E+02	ug/L	9.95E-08	mg/kg-day	NA	kg-day/mg		NA	1.16E-06	mg/kg-day	9.60E-04	mg/kg-day	1.21E-03
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									9.30E-10					1.24E-03
		Exposure Point Total										1.67E-08					3.01E-03
	Exposure Medium Total											1.67E-08					3.01E-03
Surface Water Total												1.67E-08					3.01E-03
Total Receptor Risk/Hazard												9.38E-07					1.28E-01

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-13. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	3.64E-12	mg/kg-day	1.30E+05	kg-day/mg		4.73E-07	1.27E-11	mg/kg-day	7.00E-10	mg/kg-day	1.82E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	1.53E-04	mg/kg-day	NA	kg-day/mg		NA	5.35E-04	mg/kg-day	1.00E+00	mg/kg-day	5.35E-04
				Antimony	6.43E+00	mg/kg	1.10E-07	mg/kg-day	NA	kg-day/mg		NA	3.85E-07	mg/kg-day	4.00E-04	mg/kg-day	9.63E-04
				Arsenic	6.55E+00	mg/kg	6.73E-08	mg/kg-day	1.50E+00	kg-day/mg		1.01E-07	2.35E-07	mg/kg-day	3.00E-04	mg/kg-day	7.85E-04
				Cobalt	1.65E+01	mg/kg	2.82E-07	mg/kg-day	NA	kg-day/mg		NA	9.86E-07	mg/kg-day	3.00E-04	mg/kg-day	3.29E-03
				Cyanide	3.40E+00	mg/kg	5.83E-08	mg/kg-day	NA	kg-day/mg		NA	2.04E-07	mg/kg-day	6.30E-04	mg/kg-day	3.24E-04
				Manganese	2.34E+02	mg/kg	4.01E-06	mg/kg-day	NA	kg-day/mg		NA	1.40E-05	mg/kg-day	2.40E-02	mg/kg-day	5.85E-04
				Nickel	6.02E+01	mg/kg	1.03E-06	mg/kg-day	NA	kg-day/mg		NA	3.60E-06	mg/kg-day	2.00E-02	mg/kg-day	1.80E-04
				Thallium	2.38E-01	mg/kg	4.08E-09	mg/kg-day	NA	kg-day/mg		NA	1.43E-08	mg/kg-day	1.00E-05	mg/kg-day	1.43E-03
				Vanadium	1.49E+02	mg/kg	2.55E-06	mg/kg-day	NA	kg-day/mg		NA	8.93E-06	mg/kg-day	5.04E-03	mg/kg-day	1.77E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.02E-08	mg/kg-day	2.00E+00	kg-day/mg		2.03E-08	3.55E-08	mg/kg-day	2.00E-05	mg/kg-day	1.78E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	2.14E-08	mg/kg-day	1.00E-01	kg-day/mg	1	2.14E-09	7.50E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.30E-08	mg/kg-day	1.00E+00	kg-day/mg	1	1.30E-08	4.57E-08	mg/kg-day	3.00E-04	mg/kg-day	1.52E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	1.92E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.92E-09	6.71E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	6.97E-09	mg/kg-day	1.00E-02	kg-day/mg	1	6.97E-11	2.44E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.73E-08	mg/kg-day	1.00E-03	kg-day/mg	1	1.73E-11	6.05E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	3.07E-09	mg/kg-day	1.00E+00	kg-day/mg	1	3.07E-09	1.07E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.12E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.12E-09	3.93E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	2.14E-06	mg/kg-day	NA	kg-day/mg		NA	7.47E-06	mg/kg-day	1.00E-02	mg/kg-day	7.47E-04
			Exp. Route Total									6.16E-07					3.07E-02

Table H-1-13. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	2.49E-12	mg/kg-day	1.30E+05	kg-day/mg		3.24E-07	8.72E-12	mg/kg-day	7.00E-10	mg/kg-day	1.25E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	7.67E-08	mg/kg-day	1.50E+00	kg-day/mg		1.15E-07	2.68E-07	mg/kg-day	3.00E-04	mg/kg-day	8.95E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	3.24E-08	mg/kg-day	2.00E+00	kg-day/mg		6.48E-08	1.13E-07	mg/kg-day	2.00E-05	mg/kg-day	5.67E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	6.35E-08	mg/kg-day	1.00E-01	kg-day/mg	1	6.35E-09	2.22E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	3.87E-08	mg/kg-day	1.00E+00	kg-day/mg	1	3.87E-08	1.35E-07	mg/kg-day	3.00E-04	mg/kg-day	4.51E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	5.68E-08	mg/kg-day	1.00E-01	kg-day/mg	1	5.68E-09	1.99E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	2.07E-08	mg/kg-day	1.00E-02	kg-day/mg	1	2.07E-10	7.23E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	5.13E-08	mg/kg-day	1.00E-03	kg-day/mg	1	5.13E-11	1.79E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	9.08E-09	mg/kg-day	1.00E+00	kg-day/mg	1	9.08E-09	3.18E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	3.32E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.32E-09	1.16E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									5.67E-07					1.95E-02
		Exposure Point Total										1.18E-06					5.02E-02
	Exposure Medium Total											1.18E-06					5.02E-02
Sediment Total												1.18E-06					5.02E-02

Table H-1-13. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	2.72E-15	mg/kg-day	1.30E+05	kg-day/mg		3.54E-10	9.54E-15	mg/kg-day	7.00E-10	mg/kg-day	1.36E-05
				Metals													
				Arsenic	9.21E-01	ug/L	4.10E-09	mg/kg-day	1.50E+00	kg-day/mg		6.15E-09	1.44E-08	mg/kg-day	3.00E-04	mg/kg-day	4.78E-05
				Cobalt	1.04E+00	ug/L	4.63E-09	mg/kg-day	NA	kg-day/mg		NA	1.62E-08	mg/kg-day	3.00E-04	mg/kg-day	5.40E-05
				Manganese	1.48E+02	ug/L	6.58E-07	mg/kg-day	NA	kg-day/mg		NA	2.30E-06	mg/kg-day	2.40E-02	mg/kg-day	9.59E-05
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	7.12E-12	mg/kg-day	3.40E-01	kg-day/mg		2.42E-12	2.49E-11	mg/kg-day	5.00E-04	mg/kg-day	4.99E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	4.18E-11	mg/kg-day	4.00E-01	kg-day/mg		1.67E-11	1.46E-10	mg/kg-day	2.00E-05	mg/kg-day	7.32E-06
			Exp. Route Total									6.52E-09					2.19E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	2.32E-12	mg/kg-day	1.30E+05	kg-day/mg		3.02E-07	8.12E-12	mg/kg-day	7.00E-10	mg/kg-day	1.16E-02
				Metals													
				Arsenic	9.21E-01	ug/L	1.20E-09	mg/kg-day	1.50E+00	kg-day/mg		1.80E-09	4.19E-09	mg/kg-day	3.00E-04	mg/kg-day	1.40E-05
				Cobalt	1.04E+00	ug/L	5.41E-10	mg/kg-day	NA	kg-day/mg		NA	1.89E-09	mg/kg-day	3.00E-04	mg/kg-day	6.32E-06
				Manganese	1.48E+02	ug/L	1.92E-07	mg/kg-day	NA	kg-day/mg		NA	6.73E-07	mg/kg-day	9.60E-04	mg/kg-day	7.01E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	3.50E-09	mg/kg-day	3.40E-01	kg-day/mg		1.19E-09	1.23E-08	mg/kg-day	5.00E-04	mg/kg-day	2.45E-05
				PCBs													
				Total PCBs	9.40E-03	ug/L	2.45E-08	mg/kg-day	4.00E-01	kg-day/mg		9.81E-09	8.58E-08	mg/kg-day	2.00E-05	mg/kg-day	4.29E-03
			Exp. Route Total									3.15E-07					1.66E-02
		Exposure Point Total										3.21E-07					1.69E-02
	Exposure Medium Total											3.21E-07					1.69E-02
Surface Water Total												3.21E-07					1.69E-02
Total Receptor Risk/Hazard												1.50E-06					6.71E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-14. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	4.05E-12	mg/kg-day	1.30E+05	kg-day/mg		5.27E-07	2.36E-11	mg/kg-day	7.00E-10	mg/kg-day	3.38E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	1.70E-04	mg/kg-day	NA	kg-day/mg		NA	9.91E-04	mg/kg-day	1.00E+00	mg/kg-day	9.91E-04
				Antimony	6.43E+00	mg/kg	1.22E-07	mg/kg-day	NA	kg-day/mg		NA	7.14E-07	mg/kg-day	4.00E-04	mg/kg-day	1.79E-03
				Arsenic	6.55E+00	mg/kg	7.49E-08	mg/kg-day	1.50E+00	kg-day/mg		1.12E-07	4.37E-07	mg/kg-day	3.00E-04	mg/kg-day	1.46E-03
				Cobalt	1.65E+01	mg/kg	3.13E-07	mg/kg-day	NA	kg-day/mg		NA	1.83E-06	mg/kg-day	3.00E-04	mg/kg-day	6.09E-03
				Cyanide	3.40E+00	mg/kg	6.48E-08	mg/kg-day	NA	kg-day/mg		NA	3.78E-07	mg/kg-day	6.30E-04	mg/kg-day	6.00E-04
				Manganese	2.34E+02	mg/kg	4.46E-06	mg/kg-day	NA	kg-day/mg		NA	2.60E-05	mg/kg-day	2.40E-02	mg/kg-day	1.09E-03
				Nickel	6.02E+01	mg/kg	1.15E-06	mg/kg-day	NA	kg-day/mg		NA	6.69E-06	mg/kg-day	2.00E-02	mg/kg-day	3.34E-04
				Thallium	2.38E-01	mg/kg	4.53E-09	mg/kg-day	NA	kg-day/mg		NA	2.65E-08	mg/kg-day	1.00E-05	mg/kg-day	2.65E-03
				Vanadium	1.49E+02	mg/kg	2.84E-06	mg/kg-day	NA	kg-day/mg		NA	1.66E-05	mg/kg-day	5.04E-03	mg/kg-day	3.29E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	1.13E-08	mg/kg-day	2.00E+00	kg-day/mg		2.26E-08	6.59E-08	mg/kg-day	2.00E-05	mg/kg-day	3.30E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	2.38E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.96E-09	1.39E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	1.45E-08	mg/kg-day	1.00E+00	kg-day/mg	2.5	3.63E-08	8.47E-08	mg/kg-day	3.00E-04	mg/kg-day	2.82E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	2.13E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.33E-09	1.24E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	7.75E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	1.94E-10	4.52E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	1.92E-08	mg/kg-day	1.00E-03	kg-day/mg	2.5	4.81E-11	1.12E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	3.41E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	8.53E-09	1.99E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	1.25E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.12E-09	7.28E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	2.38E-06	mg/kg-day	NA	kg-day/mg		NA	1.39E-05	mg/kg-day	1.00E-02	mg/kg-day	1.39E-03
			Exp. Route Total									7.21E-07					5.70E-02

Table H-1-14. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.65E-12	mg/kg-day	1.30E+05	kg-day/mg		2.14E-07	9.61E-12	mg/kg-day	7.00E-10	mg/kg-day	1.37E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	5.07E-08	mg/kg-day	1.50E+00	kg-day/mg		7.61E-08	2.96E-07	mg/kg-day	3.00E-04	mg/kg-day	9.86E-04
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	2.14E-08	mg/kg-day	2.00E+00	kg-day/mg		4.29E-08	1.25E-07	mg/kg-day	2.00E-05	mg/kg-day	6.25E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	4.20E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.05E-08	2.45E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	2.56E-08	mg/kg-day	1.00E+00	kg-day/mg	2.5	6.39E-08	1.49E-07	mg/kg-day	3.00E-04	mg/kg-day	4.97E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	3.76E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	9.39E-09	2.19E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	1.37E-08	mg/kg-day	1.00E-02	kg-day/mg	2.5	3.41E-10	7.97E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	3.39E-08	mg/kg-day	1.00E-03	kg-day/mg	2.5	8.47E-11	1.98E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	6.01E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.50E-08	3.50E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	2.20E-08	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.50E-09	1.28E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									4.38E-07					2.15E-02
		Exposure Point Total										1.16E-06					7.85E-02
	Exposure Medium Total											1.16E-06					7.85E-02
Sediment Total												1.16E-06					7.85E-02

Table H-1-14. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	3.03E-15	mg/kg-day	1.30E+05	kg-day/mg		3.94E-10	1.77E-14	mg/kg-day	7.00E-10	mg/kg-day	2.53E-05
				Metals													
				Arsenic	9.21E-01	ug/L	4.56E-09	mg/kg-day	1.50E+00	kg-day/mg		6.84E-09	2.66E-08	mg/kg-day	3.00E-04	mg/kg-day	8.87E-05
				Cobalt	1.04E+00	ug/L	5.15E-09	mg/kg-day	NA	kg-day/mg		NA	3.01E-08	mg/kg-day	3.00E-04	mg/kg-day	1.00E-04
				Manganese	1.48E+02	ug/L	7.32E-07	mg/kg-day	NA	kg-day/mg		NA	4.27E-06	mg/kg-day	2.40E-02	mg/kg-day	1.78E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	7.93E-12	mg/kg-day	3.40E-01	kg-day/mg		2.69E-12	4.62E-11	mg/kg-day	5.00E-04	mg/kg-day	9.25E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	4.66E-11	mg/kg-day	4.00E-01	kg-day/mg		1.86E-11	2.72E-10	mg/kg-day	2.00E-05	mg/kg-day	1.36E-05
			Exp. Route Total									7.26E-09					4.06E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	9.51E-10	mg/kg-day	1.50E+00	kg-day/mg		1.43E-09	5.55E-09	mg/kg-day	3.00E-04	mg/kg-day	1.85E-05
				Cobalt	1.04E+00	ug/L	4.30E-10	mg/kg-day	NA	kg-day/mg		NA	2.51E-09	mg/kg-day	3.00E-04	mg/kg-day	8.35E-06
				Manganese	1.48E+02	ug/L	1.53E-07	mg/kg-day	NA	kg-day/mg		NA	8.90E-07	mg/kg-day	9.60E-04	mg/kg-day	9.27E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.43E-09					9.54E-04
		Exposure Point Total										8.69E-09					1.36E-03
	Exposure Medium Total											8.69E-09					1.36E-03
Surface Water Total												8.69E-09					1.36E-03
Total Receptor Risk/Hazard												1.17E-06					7.98E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-15. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.03E-11	mg/kg-day	1.30E+05	kg-day/mg		1.34E-06	1.20E-10	mg/kg-day	7.00E-10	mg/kg-day	1.71E-01
				Metals													
				Aluminum	8.92E+03	mg/kg	4.31E-04	mg/kg-day	NA	kg-day/mg		NA	5.03E-03	mg/kg-day	1.00E+00	mg/kg-day	5.03E-03
				Antimony	6.43E+00	mg/kg	3.11E-07	mg/kg-day	NA	kg-day/mg		NA	3.62E-06	mg/kg-day	4.00E-04	mg/kg-day	9.06E-03
				Arsenic	6.55E+00	mg/kg	1.90E-07	mg/kg-day	1.50E+00	kg-day/mg		2.85E-07	2.22E-06	mg/kg-day	3.00E-04	mg/kg-day	7.39E-03
				Cobalt	1.65E+01	mg/kg	7.95E-07	mg/kg-day	NA	kg-day/mg		NA	9.28E-06	mg/kg-day	3.00E-04	mg/kg-day	3.09E-02
				Cyanide	3.40E+00	mg/kg	1.65E-07	mg/kg-day	NA	kg-day/mg		NA	1.92E-06	mg/kg-day	6.30E-04	mg/kg-day	3.05E-03
				Manganese	2.34E+02	mg/kg	1.13E-05	mg/kg-day	NA	kg-day/mg		NA	1.32E-04	mg/kg-day	2.40E-02	mg/kg-day	5.51E-03
				Nickel	6.02E+01	mg/kg	2.91E-06	mg/kg-day	NA	kg-day/mg		NA	3.39E-05	mg/kg-day	2.00E-02	mg/kg-day	1.70E-03
				Thallium	2.38E-01	mg/kg	1.15E-08	mg/kg-day	NA	kg-day/mg		NA	1.34E-07	mg/kg-day	1.00E-05	mg/kg-day	1.34E-02
				Vanadium	1.49E+02	mg/kg	7.20E-06	mg/kg-day	NA	kg-day/mg		NA	8.40E-05	mg/kg-day	5.04E-03	mg/kg-day	1.67E-02
				PCBs													
				Total PCBs	5.93E-01	mg/kg	2.87E-08	mg/kg-day	2.00E+00	kg-day/mg		5.73E-08	3.34E-07	mg/kg-day	2.00E-05	mg/kg-day	1.67E-02
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	6.05E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	2.54E-08	7.06E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	3.68E-08	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.55E-07	4.30E-07	mg/kg-day	3.00E-04	mg/kg-day	1.43E-03
				Benzo(b)fluoranthene	1.12E+00	mg/kg	5.41E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	2.27E-08	6.31E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	1.97E-08	mg/kg-day	1.00E-02	kg-day/mg	4.2	8.26E-10	2.30E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	4.88E-08	mg/kg-day	1.00E-03	kg-day/mg	4.2	2.05E-10	5.70E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	8.65E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	3.63E-08	1.01E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	3.17E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.33E-08	3.69E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	6.03E-06	mg/kg-day	NA	kg-day/mg		NA	7.03E-05	mg/kg-day	1.00E-02	mg/kg-day	7.03E-03
			Exp. Route Total									1.93E-06					2.89E-01

Table H-1-15. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Dermal														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.78E-12	mg/kg-day	1.30E+05	kg-day/mg		2.31E-07	2.07E-11	mg/kg-day	7.00E-10	mg/kg-day	2.96E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	5.47E-08	mg/kg-day	1.50E+00	kg-day/mg		8.21E-08	6.38E-07	mg/kg-day	3.00E-04	mg/kg-day	2.13E-03
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	2.31E-08	mg/kg-day	2.00E+00	kg-day/mg		4.62E-08	2.70E-07	mg/kg-day	2.00E-05	mg/kg-day	1.35E-02
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	4.53E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.90E-08	5.28E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	2.76E-08	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.16E-07	3.22E-07	mg/kg-day	3.00E-04	mg/kg-day	1.07E-03
				Benzo(b)fluoranthene	1.12E+00	mg/kg	4.05E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.70E-08	4.73E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	1.47E-08	mg/kg-day	1.00E-02	kg-day/mg	4.2	6.19E-10	1.72E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	3.66E-08	mg/kg-day	1.00E-03	kg-day/mg	4.2	1.54E-10	4.27E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	6.48E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	2.72E-08	7.56E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	2.37E-08	mg/kg-day	1.00E-01	kg-day/mg	4.2	9.96E-09	2.77E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									5.49E-07					4.63E-02
		Exposure Point Total										2.48E-06					3.36E-01
	Exposure Medium Total											2.48E-06					3.36E-01
Sediment Total												2.48E-06					3.36E-01

Table H-1-15. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	3.85E-15	mg/kg-day	1.30E+05	kg-day/mg		5.00E-10	4.49E-14	mg/kg-day	7.00E-10	mg/kg-day	6.41E-05
				Metals													
				Arsenic	9.21E-01	ug/L	5.79E-09	mg/kg-day	1.50E+00	kg-day/mg		8.68E-09	6.75E-08	mg/kg-day	3.00E-04	mg/kg-day	2.25E-04
				Cobalt	1.04E+00	ug/L	6.54E-09	mg/kg-day	NA	kg-day/mg		NA	7.63E-08	mg/kg-day	3.00E-04	mg/kg-day	2.54E-04
				Manganese	1.48E+02	ug/L	9.28E-07	mg/kg-day	NA	kg-day/mg		NA	1.08E-05	mg/kg-day	2.40E-02	mg/kg-day	4.51E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	1.01E-11	mg/kg-day	3.40E-01	kg-day/mg		3.42E-12	1.17E-10	mg/kg-day	5.00E-04	mg/kg-day	2.35E-07
				PCBs													
				Total PCBs	9.40E-03	ug/L	5.91E-11	mg/kg-day	4.00E-01	kg-day/mg		2.36E-11	6.89E-10	mg/kg-day	2.00E-05	mg/kg-day	3.45E-05
			Exp. Route Total									9.21E-09					1.03E-03
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	9.21E-01	ug/L	9.16E-10	mg/kg-day	1.50E+00	kg-day/mg		1.37E-09	1.07E-08	mg/kg-day	3.00E-04	mg/kg-day	3.56E-05
				Cobalt	1.04E+00	ug/L	4.14E-10	mg/kg-day	NA	kg-day/mg		NA	4.83E-09	mg/kg-day	3.00E-04	mg/kg-day	1.61E-05
				Manganese	1.48E+02	ug/L	1.47E-07	mg/kg-day	NA	kg-day/mg		NA	1.71E-06	mg/kg-day	9.60E-04	mg/kg-day	1.79E-03
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.37E-09					1.84E-03
		Exposure Point Total										1.06E-08					2.87E-03
	Exposure Medium Total											1.06E-08					2.87E-03
Surface Water Total												1.06E-08					2.87E-03
Total Receptor Risk/Hazard												2.49E-06					3.38E-01

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-16. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards -Shoreline Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	1.30E-11	mg/kg-day	1.30E+05	kg-day/mg		1.69E-06	3.64E-11	mg/kg-day	7.00E-10	mg/kg-day	5.20E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	5.45E-04	mg/kg-day	NA	kg-day/mg		NA	1.53E-03	mg/kg-day	1.00E+00	mg/kg-day	1.53E-03
				Antimony	6.43E+00	mg/kg	3.93E-07	mg/kg-day	NA	kg-day/mg		NA	1.10E-06	mg/kg-day	4.00E-04	mg/kg-day	2.75E-03
				Arsenic	6.55E+00	mg/kg	2.40E-07	mg/kg-day	1.50E+00	kg-day/mg		3.60E-07	6.73E-07	mg/kg-day	3.00E-04	mg/kg-day	2.24E-03
				Cobalt	1.65E+01	mg/kg	1.01E-06	mg/kg-day	NA	kg-day/mg		NA	2.82E-06	mg/kg-day	3.00E-04	mg/kg-day	9.39E-03
				Cyanide	3.40E+00	mg/kg	2.08E-07	mg/kg-day	NA	kg-day/mg		NA	5.83E-07	mg/kg-day	6.30E-04	mg/kg-day	9.25E-04
				Manganese	2.34E+02	mg/kg	1.43E-05	mg/kg-day	NA	kg-day/mg		NA	4.01E-05	mg/kg-day	2.40E-02	mg/kg-day	1.67E-03
				Nickel	6.02E+01	mg/kg	3.68E-06	mg/kg-day	NA	kg-day/mg		NA	1.03E-05	mg/kg-day	2.00E-02	mg/kg-day	5.15E-04
				Thallium	2.38E-01	mg/kg	1.46E-08	mg/kg-day	NA	kg-day/mg		NA	4.08E-08	mg/kg-day	1.00E-05	mg/kg-day	4.08E-03
				Vanadium	1.49E+02	mg/kg	9.11E-06	mg/kg-day	NA	kg-day/mg		NA	2.55E-05	mg/kg-day	5.04E-03	mg/kg-day	5.06E-03
				PCBs													
				Total PCBs	5.93E-01	mg/kg	3.63E-08	mg/kg-day	2.00E+00	kg-day/mg		7.25E-08	1.02E-07	mg/kg-day	2.00E-05	mg/kg-day	5.08E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	7.65E-08	mg/kg-day	1.00E-01	kg-day/mg	1	7.65E-09	2.14E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	4.66E-08	mg/kg-day	1.00E+00	kg-day/mg	1	4.66E-08	1.30E-07	mg/kg-day	3.00E-04	mg/kg-day	4.35E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	6.84E-08	mg/kg-day	1.00E-01	kg-day/mg	1	6.84E-09	1.92E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	2.49E-08	mg/kg-day	1.00E-02	kg-day/mg	1	2.49E-10	6.97E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	6.18E-08	mg/kg-day	1.00E-03	kg-day/mg	1	6.18E-11	1.73E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	1.09E-08	mg/kg-day	1.00E+00	kg-day/mg	1	1.09E-08	3.07E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	4.01E-08	mg/kg-day	1.00E-01	kg-day/mg	1	4.01E-09	1.12E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	7.63E-06	mg/kg-day	NA	kg-day/mg		NA	2.14E-05	mg/kg-day	1.00E-02	mg/kg-day	2.14E-03
			Exp. Route Total									2.20E-06					8.78E-02

Table H-1-16. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards -Shoreline Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	2.13E-04	mg/kg	4.13E-12	mg/kg-day	1.30E+05	kg-day/mg		5.37E-07	1.16E-11	mg/kg-day	7.00E-10	mg/kg-day	1.65E-02
				Metals													
				Aluminum	8.92E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	6.43E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	6.55E+00	mg/kg	1.27E-07	mg/kg-day	1.50E+00	kg-day/mg		1.91E-07	3.56E-07	mg/kg-day	3.00E-04	mg/kg-day	1.19E-03
				Cobalt	1.65E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	3.40E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.34E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	6.02E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.38E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.49E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	5.93E-01	mg/kg	5.37E-08	mg/kg-day	2.00E+00	kg-day/mg		1.07E-07	1.50E-07	mg/kg-day	2.00E-05	mg/kg-day	7.52E-03
				SVOCs													
				Benzo(a)anthracene	1.25E+00	mg/kg	1.05E-07	mg/kg-day	1.00E-01	kg-day/mg	1	1.05E-08	2.95E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	7.62E-01	mg/kg	6.41E-08	mg/kg-day	1.00E+00	kg-day/mg	1	6.41E-08	1.79E-07	mg/kg-day	3.00E-04	mg/kg-day	5.98E-04
				Benzo(b)fluoranthene	1.12E+00	mg/kg	9.41E-08	mg/kg-day	1.00E-01	kg-day/mg	1	9.41E-09	2.64E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	4.07E-01	mg/kg	3.42E-08	mg/kg-day	1.00E-02	kg-day/mg	1	3.42E-10	9.59E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.01E+00	mg/kg	8.50E-08	mg/kg-day	1.00E-03	kg-day/mg	1	8.50E-11	2.38E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.79E-01	mg/kg	1.51E-08	mg/kg-day	1.00E+00	kg-day/mg	1	1.51E-08	4.22E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	6.55E-01	mg/kg	5.51E-08	mg/kg-day	1.00E-01	kg-day/mg	1	5.51E-09	1.54E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	1.25E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									9.40E-07					2.58E-02
		Exposure Point Total										3.14E-06					1.14E-01
	Exposure Medium Total											3.14E-06					1.14E-01
Sediment Total												3.14E-06					1.14E-01

Table H-1-16. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards -Shoreline Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	4.87E-15	mg/kg-day	1.30E+05	kg-day/mg		6.33E-10	1.36E-14	mg/kg-day	7.00E-10	mg/kg-day	1.95E-05
				Metals													
				Arsenic	9.21E-01	ug/L	7.32E-09	mg/kg-day	1.50E+00	kg-day/mg		1.10E-08	2.05E-08	mg/kg-day	3.00E-04	mg/kg-day	6.83E-05
				Cobalt	1.04E+00	ug/L	8.27E-09	mg/kg-day	NA	kg-day/mg		NA	2.32E-08	mg/kg-day	3.00E-04	mg/kg-day	7.72E-05
				Manganese	1.48E+02	ug/L	1.17E-06	mg/kg-day	NA	kg-day/mg		NA	3.29E-06	mg/kg-day	2.40E-02	mg/kg-day	1.37E-04
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	1.27E-11	mg/kg-day	3.40E-01	kg-day/mg		4.32E-12	3.56E-11	mg/kg-day	5.00E-04	mg/kg-day	7.12E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	7.47E-11	mg/kg-day	4.00E-01	kg-day/mg		2.99E-11	2.09E-10	mg/kg-day	2.00E-05	mg/kg-day	1.05E-05
			Exp. Route Total									1.16E-08					3.12E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	6.12E-07	ug/L	5.44E-12	mg/kg-day	1.30E+05	kg-day/mg		7.07E-07	1.52E-11	mg/kg-day	7.00E-10	mg/kg-day	2.18E-02
				Metals													
				Arsenic	9.21E-01	ug/L	3.97E-09	mg/kg-day	1.50E+00	kg-day/mg		5.96E-09	1.11E-08	mg/kg-day	3.00E-04	mg/kg-day	3.71E-05
				Cobalt	1.04E+00	ug/L	1.79E-09	mg/kg-day	NA	kg-day/mg		NA	5.02E-09	mg/kg-day	3.00E-04	mg/kg-day	1.67E-05
				Manganese	1.48E+02	ug/L	6.37E-07	mg/kg-day	NA	kg-day/mg		NA	1.78E-06	mg/kg-day	9.60E-04	mg/kg-day	1.86E-03
				Pesticides													
				4,4'-DDT	1.60E-03	ug/L	8.21E-09	mg/kg-day	3.40E-01	kg-day/mg		2.79E-09	2.30E-08	mg/kg-day	5.00E-04	mg/kg-day	4.60E-05
				PCBs													
				Total PCBs	9.40E-03	ug/L	5.75E-08	mg/kg-day	4.00E-01	kg-day/mg		2.30E-08	1.61E-07	mg/kg-day	2.00E-05	mg/kg-day	8.05E-03
			Exp. Route Total									7.39E-07					3.18E-02
		Exposure Point Total										7.51E-07					3.21E-02
	Exposure Medium Total											7.51E-07					3.21E-02
Surface Water Total												7.51E-07					3.21E-02
Total Receptor Risk/Hazard												3.89E-06					1.46E-01

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Risk Summary Tables (RME)

Table H-2a-1. RME
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations - Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil											
			Dioxin									
			2,3,7,8-TCDD-TEQ	8.40E-04	--	8.08E-05	9.20E-04	Reproductive, Developmental	6.46E+02	--	6.21E+01	7.08E+02
			Inorganics									
			Arsenic	5.81E-09	--	9.32E-10	6.74E-09	Skin, Vascular	9.04E-04	--	1.45E-04	1.05E-03
			Cobalt	NA	--	NA	NA	Thyroid	1.51E-03	--	NA	1.51E-03
			Manganese	NA	--	NA	NA	Neurological	1.88E-05	--	NA	1.88E-05
			Nickel	NA	--	NA	NA	Decreased body and organ weights	2.26E-05	--	NA	2.26E-05
			Thallium	NA	--	NA	NA	Hair	4.52E-02	--	NA	4.52E-02
			Vanadium	NA	--	NA	NA	Hair	8.97E-05	--	NA	8.97E-05
			PCBs									
			Total PCBs	1.29E-08	--	5.80E-09	1.87E-08	Ocular/eye, Nails, Immune	9.04E-03	--	4.06E-03	1.31E-02
			SVOCs									
			Benzo(a)anthracene	6.46E-10	--	2.69E-10	9.15E-10	NA	NA	--	NA	NA
			Benzo(a)pyrene	6.46E-09	--	2.69E-09	9.15E-09	Developmental	1.51E-03	--	6.28E-04	2.13E-03
			Benzo(b)fluoranthene	6.46E-10	--	2.69E-10	9.15E-10	NA	NA	--	NA	NA
			Benzo(k)fluoranthene	6.46E-11	--	2.69E-11	9.15E-11	NA	NA	--	NA	NA
			Chrysene	6.46E-12	--	2.69E-12	9.15E-12	NA	NA	--	NA	NA
			Dibenzo(a,h)anthracene	6.46E-09	--	2.69E-09	9.15E-09	NA	NA	--	NA	NA
			Indeno(1,2,3-cd)pyrene	6.46E-10	--	2.69E-10	9.15E-10	NA	NA	--	NA	NA
			Naphthalene	NA	--	NA	NA	Developmental	2.26E-05	--	9.42E-06	3.20E-05
			TPH									
			Diesel Range Organics (C10-C20)	NA	--	NA	NA	Liver, Kidney, Blood	4.52E-05	--	NA	4.52E-05
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)

Table H-2a-1. RME
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations - Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Outdoor Air											
			Dioxin									
			2,3,7,8-TCDD-TEQ	--	1.98E-02	--	1.98E-02	Liver, reproductive, developmental, endocrine, respiratory, blood	--	9.13E+05	--	9.13E+05
			Inorganics									
			Arsenic	--	2.24E-06	--	2.24E-06	Neurological, developmental	--	2.44E+03	--	2.44E+03
			Cobalt	--	4.70E-06	--	4.70E-06	Respiratory	--	6.09E+03	--	6.09E+03
			Manganese	--	NA	--	NA	Neurological	--	7.31E+02	--	7.31E+02
			Nickel	--	1.36E-07	--	1.36E-07	Respiratory	--	4.06E+02	--	4.06E+02
			Thallium	--	NA	--	NA	NA	--	NA	--	NA
			Vanadium	--	NA	--	NA	Respiratory	--	3.65E+02	--	3.65E+02
			PCBs									
			Total PCBs	--	2.98E-07	--	2.98E-07	NA	--	NA	--	NA
			SVOCs									
			Benzo(a)anthracene	--	3.13E-08	--	3.13E-08	NA	--	NA	--	NA
			Benzo(a)pyrene	--	3.13E-07	--	3.13E-07	Developmental	--	1.83E+04	--	1.83E+04
			Benzo(b)fluoranthene	--	3.13E-08	--	3.13E-08	NA	--	NA	--	NA
			Benzo(k)fluoranthene	--	3.13E-09	--	3.13E-09	NA	--	NA	--	NA
			Chrysene	--	3.13E-10	--	3.13E-10	NA	--	NA	--	NA
			Dibenzo(a,h)anthracene	--	3.13E-07	--	3.13E-07	NA	--	NA	--	NA
			Indeno(1,2,3-cd)pyrene	--	3.13E-08	--	3.13E-08	NA	--	NA	--	NA
			Naphthalene	--	1.77E-08	--	1.77E-08	Neurological and Respiratory	--	1.22E+01	--	1.22E+01
			TPH									
			Diesel Range Organics (C10-C20)	--	NA	--	NA	Respiratory	--	3.65E-01	--	3.65E-01
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)
Soil							(2)					(2)
Groundwater	Trench Air		**VOCs**									
			Bromodichloromethane	NA	4.83E-09	NA	4.83E-09	NA	NA	NA	NA	NA
			Butyl alcohol, tert-	NA	NA	NA	NA	Reproductive	NA	4.57E-02	NA	4.57E-02
			Chloroform	NA	3.00E-09	NA	3.00E-09	Liver	NA	9.32E-02	NA	9.32E-02
			Methyl tert-Butyl Ether (MTBE)	NA	3.39E-11	NA	3.39E-11	Liver, Kidney, Ocular	NA	3.04E-03	NA	3.04E-03
			Tetrachloroethylene	NA	3.39E-11	NA	3.39E-11	Neurological, Ocular	NA	2.28E-01	NA	2.28E-01
			Trichloroethene	NA	5.35E-10	NA	5.35E-10	Thyroid Vascular	NA	4.57E+00	NA	4.57E+00
			Vinyl Chloride	NA	5.74E-10	NA	5.74E-10	Liver	NA	9.13E-02	NA	9.13E-02
Receptor Total							(2)					(2)

Notes:
NA - Not Applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land /Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.20E-04	7.08E+02	Reproductive, Developmental	2.51E-06	mg/kg	2.31E-09	1.78E-03	2.85E-05	mg/kg	2.63E-08	2.02E-02
		Inorganics											
		Arsenic	6.74E-09	1.05E-03	Skin, Vascular	2.60E+00	mg/kg	1.75E-08	2.73E-03	2.70E+01	mg/kg	1.82E-07	2.84E-02
		Cobalt	NA	1.51E-03	Thyroid	1.30E+02	mg/kg	NA	1.96E-01	2.99E+01	mg/kg	NA	4.51E-02
		Manganese	NA	1.88E-05	Neurological	3.70E+02	mg/kg	NA	6.97E-03	7.05E+02	mg/kg	NA	1.33E-02
		Nickel	NA	2.26E-05	Decreased body and organ weights	1.20E+01	mg/kg	NA	2.71E-04	9.36E+02	mg/kg	NA	2.12E-02
		Thallium	NA	4.52E-02	Hair	5.30E-02	mg/kg	NA	2.40E-03	2.45E-01	mg/kg	NA	1.11E-02
		Vanadium	NA	8.97E-05	Hair	5.80E+01	mg/kg	NA	5.20E-03	4.51E+03	mg/kg	NA	4.05E-01
		PCBs											
		Total PCBs	1.87E-08	1.31E-02	Ocular/eye, Nails, Immune	2.66E-02	mg/kg	4.98E-10	3.48E-04	8.34E+00	mg/kg	1.56E-07	1.09E-01
		SVOCs											
		Benzo(a)anthracene	9.15E-10	NA	NA	1.56E-01	mg/kg	1.43E-10	NA	2.85E+00	mg/kg	2.60E-09	NA
		Benzo(a)pyrene	9.15E-09	2.13E-03	Developmental	1.50E-01	mg/kg	1.37E-09	3.20E-04	1.78E+00	mg/kg	1.63E-08	3.80E-03
		Benzo(b)fluoranthene	9.15E-10	NA	NA	1.85E-01	mg/kg	1.69E-10	NA	3.90E+00	mg/kg	3.56E-09	NA
		Benzo(k)fluoranthene	9.15E-11	NA	NA	7.24E-02	mg/kg	6.62E-12	NA	6.01E-01	mg/kg	5.50E-11	NA
		Chrysene	9.15E-12	NA	NA	1.63E-01	mg/kg	1.49E-12	NA	3.94E+00	mg/kg	3.61E-11	NA
		Dibenzo(a,h)anthracene	9.15E-09	NA	NA	3.33E-02	mg/kg	3.05E-10	NA	2.54E-01	mg/kg	2.32E-09	NA
		Indeno(1,2,3-cd)pyrene	9.15E-10	NA	NA	1.06E-01	mg/kg	9.70E-11	NA	1.21E+00	mg/kg	1.11E-09	NA
		Naphthalene	NA	3.20E-05	Developmental	1.15E-02	mg/kg	NA	3.68E-07	9.07E-02	mg/kg	NA	2.90E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	4.52E-05	Liver, Kidney, Blood	1.30E+01	mg/kg	NA	5.88E-04	8.23E+02	mg/kg	NA	3.72E-02
		Exposure Point Total						2.24E-08	2.16E-01			3.91E-07	6.94E-01
	Exposure Medium Total							2.24E-08	2.16E-01			3.91E-07	6.94E-01

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land /Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	1.98E-02	9.13E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	3.49E-12	mg/m3	6.92E-14	3.19E-06	3.97E-11	mg/m3	7.87E-13	3.62E-05
		Inorganics											
		Arsenic	2.24E-06	2.44E+03	Neurological, developmental	3.62E-06	mg/m3	8.11E-12	8.80E-03	3.76E-05	mg/m3	8.44E-11	9.16E-02
		Cobalt	4.70E-06	6.09E+03	Respiratory	1.81E-04	mg/m3	8.49E-10	1.10E+00	4.16E-05	mg/m3	1.95E-10	2.53E-01
		Manganese	NA	7.31E+02	Neurological	5.15E-04	mg/m3	NA	3.76E-01	9.80E-04	mg/m3	NA	7.16E-01
		Nickel	1.36E-07	4.06E+02	Respiratory	1.67E-05	mg/m3	2.26E-12	6.77E-03	1.30E-03	mg/m3	1.77E-10	5.28E-01
		Thallium	NA	NA	NA	7.37E-08	mg/m3	NA	NA	3.41E-07	mg/m3	NA	NA
		Vanadium	NA	3.65E+02	Respiratory	8.07E-05	mg/m3	NA	2.95E-02	6.27E-03	mg/m3	NA	2.29E+00
		PCBs											
		Total PCBs	2.98E-07	NA	NA	3.70E-08	mg/m3	1.10E-14	NA	1.16E-05	mg/m3	3.46E-12	NA
		SVOCs											
		Benzo(a)anthracene	3.13E-08	NA	NA	2.17E-07	mg/m3	6.79E-15	NA	3.96E-06	mg/m3	1.24E-13	NA
		Benzo(a)pyrene	3.13E-07	1.83E+04	Developmental	2.09E-07	mg/m3	6.53E-14	3.81E-03	2.47E-06	mg/m3	7.75E-13	4.52E-02
		Benzo(b)fluoranthene	3.13E-08	NA	NA	2.57E-07	mg/m3	8.06E-15	NA	5.42E-06	mg/m3	1.70E-13	NA
		Benzo(k)fluoranthene	3.13E-09	NA	NA	1.01E-07	mg/m3	3.15E-16	NA	8.36E-07	mg/m3	2.62E-15	NA
		Chrysene	3.13E-10	NA	NA	2.27E-07	mg/m3	7.10E-17	NA	5.48E-06	mg/m3	1.72E-15	NA
		Dibenzo(a,h)anthracene	3.13E-07	NA	NA	4.63E-08	mg/m3	1.45E-14	NA	3.53E-07	mg/m3	1.11E-13	NA
		Indeno(1,2,3-cd)pyrene	3.13E-08	NA	NA	1.47E-07	mg/m3	4.62E-15	NA	1.69E-06	mg/m3	5.29E-14	NA
		Naphthalene	1.77E-08	1.22E+01	Neurological and Respiratory	1.60E-08	mg/m3	2.84E-16	1.95E-07	1.26E-07	mg/m3	2.24E-15	1.54E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.65E-01	Respiratory	1.81E-05	mg/m3	NA	6.60E-06	1.14E-03	mg/m3	NA	4.18E-04
		Exposure Point Total						8.60E-10	1.53E+00			4.62E-10	3.93E+00
	Exposure Medium Total							8.60E-10	1.53E+00			4.62E-10	3.93E+00
Soil								2.33E-08	1.74E+00			3.91E-07	4.62E+00

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land /Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	4.83E-09	NA	NA	ND	mg/m3	ND	ND	2.29E-03	mg/m3	1.11E-11	NA
		Butyl alcohol, tert-	NA	4.57E-02	Reproductive	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Chloroform	3.00E-09	9.32E-02	Liver	9.03E-03	mg/m3	2.71E-11	8.42E-04	8.00E-03	mg/m3	2.40E-11	7.46E-04
		Methyl tert-Butyl Ether (MTBE)	3.39E-11	3.04E-03	Liver, Kidney, Ocular	1.03E-02	mg/m3	3.49E-13	3.13E-05	9.87E-03	mg/m3	3.35E-13	3.00E-05
		Tetrachloroethylene	3.39E-11	2.28E-01	Neurological, Ocular	6.47E-02	mg/m3	2.20E-12	1.48E-02	9.70E-02	mg/m3	3.29E-12	2.21E-02
		Trichloroethene	5.35E-10	4.57E+00	Thyroid Vascular	9.72E-03	mg/m3	5.20E-12	4.44E-02	1.67E-02	mg/m3	8.91E-12	7.61E-02
		Vinyl Chloride	5.74E-10	9.13E-02	Liver	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Exposure Point Total						3.48E-11	6.00E-02			4.76E-11	9.90E-02
	Exposure Medium Total							3.48E-11	6.00E-02			4.76E-11	9.90E-02
Groundwater								3.48E-11	6.00E-02			4.76E-11	9.90E-02
Receptor Total								2.33E-08	1.80E+00			3.91E-07	4.72E+00

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. RME and G-2a-1. RME based on a unit soil or air concentration.

Target Endpoint Evaluation		Target Endpoint Evaluation	
Organ	**Endpoint HI**	**Organ**	**Endpoint HI**
Blood	5.91E-04	Blood	3.72E-02
Decreased body and organ weights	2.71E-04	Decreased body and organ weights	2.12E-02
Endocrine	3.19E-06	Endocrine	3.62E-05
Developmental	1.47E-02	Developmental	1.61E-01
Hair	7.60E-03	Hair	4.16E-01
Immune	3.48E-04	Immune	1.09E-01
Kidney	6.19E-04	Kidney	3.72E-02
Liver	1.46E-03	Liver	3.80E-02
Nails	3.48E-04	Nails	1.09E-01
Neurological	4.06E-01	Neurological	8.43E-01
Ocular	1.52E-02	Ocular	1.31E-01
Reproductive	1.78E-03	Reproductive	2.02E-02
Respiratory	1.14E+00	Respiratory	3.07E+00
Skin	2.73E-03	Skin	2.84E-02
Thyroid	2.40E-01	Thyroid	1.21E-01
Vascular	4.71E-02	Vascular	1.04E-01

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.20E-04	7.08E+02	Reproductive, Developmental	8.23E-05	mg/kg	7.57E-08	5.83E-02	1.25E-05	mg/kg	1.15E-08	8.82E-03
		Inorganics											
		Arsenic	6.74E-09	1.05E-03	Skin, Vascular	1.40E+01	mg/kg	9.44E-08	1.47E-02	5.56E+00	mg/kg	3.75E-08	5.83E-03
		Cobalt	NA	1.51E-03	Thyroid	1.70E+01	mg/kg	NA	2.56E-02	5.09E+00	mg/kg	NA	7.68E-03
		Manganese	NA	1.88E-05	Neurological	5.00E+02	mg/kg	NA	9.42E-03	1.55E+02	mg/kg	NA	2.93E-03
		Nickel	NA	2.26E-05	Decreased body and organ weights	2.70E+01	mg/kg	NA	6.10E-04	2.19E+01	mg/kg	NA	4.95E-04
		Thallium	NA	4.52E-02	Hair	2.00E-01	mg/kg	NA	9.04E-03	1.17E-01	mg/kg	NA	5.29E-03
		Vanadium	NA	8.97E-05	Hair	3.60E+01	mg/kg	NA	3.23E-03	2.37E+01	mg/kg	NA	2.13E-03
		PCBs											
		Total PCBs	1.87E-08	1.31E-02	Ocular/eye, Nails, Immune	1.32E+00	mg/kg	2.47E-08	1.73E-02	7.14E-01	mg/kg	1.34E-08	9.35E-03
		SVOCs											
		Benzo(a)anthracene	9.15E-10	NA	NA	2.35E+01	mg/kg	2.15E-08	NA	4.63E+00	mg/kg	4.23E-09	NA
		Benzo(a)pyrene	9.15E-09	2.13E-03	Developmental	2.14E+01	mg/kg	1.96E-07	4.57E-02	2.31E+00	mg/kg	2.11E-08	4.93E-03
		Benzo(b)fluoranthene	9.15E-10	NA	NA	2.21E+01	mg/kg	2.02E-08	NA	4.66E+00	mg/kg	4.27E-09	NA
		Benzo(k)fluoranthene	9.15E-11	NA	NA	5.87E+00	mg/kg	5.37E-10	NA	4.46E-01	mg/kg	4.08E-11	NA
		Chrysene	9.15E-12	NA	NA	2.51E+01	mg/kg	2.30E-10	NA	4.25E+00	mg/kg	3.89E-11	NA
		Dibenzo(a,h)anthracene	9.15E-09	NA	NA	9.18E-01	mg/kg	8.40E-09	NA	1.69E-01	mg/kg	1.55E-09	NA
		Indeno(1,2,3-cd)pyrene	9.15E-10	NA	NA	1.29E+01	mg/kg	1.18E-08	NA	6.11E-01	mg/kg	5.59E-10	NA
		Naphthalene	NA	3.20E-05	Developmental	7.24E-01	mg/kg	NA	2.32E-05	8.86E-02	mg/kg	NA	2.84E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	4.52E-05	Liver, Kidney, Blood	2.09E+03	mg/kg	NA	9.46E-02	7.82E+01	mg/kg	NA	3.53E-03
		Exposure Point Total						4.53E-07	2.79E-01			9.42E-08	5.10E-02
	Exposure Medium Total							4.53E-07	2.79E-01			9.42E-08	5.10E-02

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC		Cancer Risk (1)	Hazard Quotient (1)	EPC		Cancer Risk (1)	Hazard Quotient (1)
						Value	Units			Value	Units		
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	1.98E-02	9.13E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	1.14E-10	mg/m3	2.27E-12	1.05E-04	1.73E-11	mg/m3	3.44E-13	1.58E-05
		Inorganics											
		Arsenic	2.24E-06	2.44E+03	Neurological, developmental	1.95E-05	mg/m3	4.37E-11	4.74E-02	7.73E-06	mg/m3	1.74E-11	1.88E-02
		Cobalt	4.70E-06	6.09E+03	Respiratory	2.36E-05	mg/m3	1.11E-10	1.44E-01	7.08E-06	mg/m3	3.33E-11	4.31E-02
		Manganese	NA	7.31E+02	Neurological	6.95E-04	mg/m3	NA	5.08E-01	2.16E-04	mg/m3	NA	1.58E-01
		Nickel	1.36E-07	4.06E+02	Respiratory	3.75E-05	mg/m3	5.09E-12	1.52E-02	3.04E-05	mg/m3	4.13E-12	1.24E-02
		Thallium	NA	NA	NA	2.78E-07	mg/m3	NA	NA	1.63E-07	mg/m3	NA	NA
		Vanadium	NA	3.65E+02	Respiratory	5.01E-05	mg/m3	NA	1.83E-02	3.30E-05	mg/m3	NA	1.20E-02
		PCBs											
		Total PCBs	2.98E-07	NA	NA	1.84E-06	mg/m3	5.48E-13	NA	9.93E-07	mg/m3	2.96E-13	NA
		SVOCs											
		Benzo(a)anthracene	3.13E-08	NA	NA	3.27E-05	mg/m3	1.02E-12	NA	6.43E-06	mg/m3	2.01E-13	NA
		Benzo(a)pyrene	3.13E-07	1.83E+04	Developmental	2.98E-05	mg/m3	9.32E-12	5.44E-01	3.21E-06	mg/m3	1.01E-12	5.87E-02
		Benzo(b)fluoranthene	3.13E-08	NA	NA	3.07E-05	mg/m3	9.62E-13	NA	6.49E-06	mg/m3	2.03E-13	NA
		Benzo(k)fluoranthene	3.13E-09	NA	NA	8.16E-06	mg/m3	2.55E-14	NA	6.20E-07	mg/m3	1.94E-15	NA
		Chrysene	3.13E-10	NA	NA	3.49E-05	mg/m3	1.09E-14	NA	5.91E-06	mg/m3	1.85E-15	NA
		Dibenzo(a,h)anthracene	3.13E-07	NA	NA	1.28E-06	mg/m3	4.00E-13	NA	2.35E-07	mg/m3	7.36E-14	NA
		Indeno(1,2,3-cd)pyrene	3.13E-08	NA	NA	1.80E-05	mg/m3	5.62E-13	NA	8.50E-07	mg/m3	2.66E-14	NA
		Naphthalene	1.77E-08	1.22E+01	Neurological and Respiratory	1.01E-06	mg/m3	1.79E-14	1.23E-05	1.23E-07	mg/m3	2.19E-15	1.50E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.65E-01	Respiratory	2.91E-03	mg/m3	NA	1.06E-03	1.09E-04	mg/m3	NA	3.97E-05
		Exposure Point Total						1.75E-10	1.28E+00			5.69E-11	3.03E-01
	Exposure Medium Total							1.75E-10	1.28E+00			5.69E-11	3.03E-01
Soil								4.54E-07	1.56E+00			9.42E-08	3.54E-01

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	4.83E-09	NA	NA	ND	mg/m3	ND	ND	1.65E-02	mg/m3	7.98E-11	NA
		Butyl alcohol, tert-	NA	4.57E-02	Reproductive	ND	mg/m3	ND	ND	1.33E-01	mg/m3	NA	6.07E-03
		Chloroform	3.00E-09	9.32E-02	Liver	ND	mg/m3	ND	ND	1.13E-01	mg/m3	3.39E-10	1.05E-02
		Methyl tert-Butyl Ether (MTBE)	3.39E-11	3.04E-03	Liver, Kidney, Ocular	3.95E-02	mg/m3	1.34E-12	1.20E-04	2.77E-01	mg/m3	9.41E-12	8.44E-04
		Tetrachloroethylene	3.39E-11	2.28E-01	Neurological, Ocular	1.75E-03	mg/m3	5.92E-14	3.99E-04	8.08E-02	mg/m3	2.74E-12	1.84E-02
		Trichloroethene	5.35E-10	4.57E+00	Thyroid Vascular	ND	mg/m3	ND	ND	4.20E-03	mg/m3	2.25E-12	1.92E-02
		Vinyl Chloride	5.74E-10	9.13E-02	Liver	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Exposure Point Total						1.40E-12	5.19E-04			4.33E-10	5.51E-02
	Exposure Medium Total							1.40E-12	5.19E-04			4.33E-10	5.51E-02
Groundwater								1.40E-12	5.19E-04			4.33E-10	5.51E-02
Receptor Total								4.54E-07	1.56E+00			9.47E-08	4.09E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. RME and G-2a-1. RME based on a unit soil or air concentration.

Target Endpoint Evaluation (Salvage Yard and Waste Storage Area) Organ	Endpoint HI	Target Endpoint Evaluation (Stores and Fleet Maintenance Area) Organ	Endpoint HI
Blood	9.47E-02	Blood	3.55E-03
Decreased body and organ weights	6.10E-04	Decreased body and organ weights	4.95E-04
Endocrine	1.05E-04	Endocrine	1.58E-05
Developmental	6.95E-01	Developmental	9.13E-02
Hair	1.23E-02	Hair	7.42E-03
Immune	1.73E-02	Immune	9.35E-03
Kidney	9.47E-02	Kidney	4.38E-03
Liver	9.48E-02	Liver	1.49E-02
Nails	1.73E-02	Nails	9.35E-03
Neurological	5.65E-01	Neurological	1.98E-01
Ocular	1.78E-02	Ocular	2.86E-02
Reproductive	5.84E-02	Reproductive	1.49E-02
Respiratory	1.79E-01	Respiratory	6.76E-02
Skin	1.47E-02	Skin	5.83E-03
Thyroid	2.56E-02	Thyroid	2.69E-02
Vascular	1.47E-02	Vascular	2.50E-02

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.20E-04	7.08E+02	Reproductive, Developmental	1.37E-05	mg/kg	1.26E-08	9.70E-03	4.37E-06	mg/kg	4.02E-09	3.09E-03
		Inorganics											
		Arsenic	6.74E-09	1.05E-03	Skin, Vascular	4.20E+00	mg/kg	2.83E-08	4.41E-03	3.30E+01	mg/kg	2.23E-07	3.46E-02
		Cobalt	NA	1.51E-03	Thyroid	1.30E+01	mg/kg	NA	1.96E-02	4.70E+00	mg/kg	NA	7.08E-03
		Manganese	NA	1.88E-05	Neurological	4.00E+02	mg/kg	NA	7.53E-03	3.70E+02	mg/kg	NA	6.97E-03
		Nickel	NA	2.26E-05	Decreased body and organ weights	3.00E+01	mg/kg	NA	6.78E-04	1.40E+01	mg/kg	NA	3.16E-04
		Thallium	NA	4.52E-02	Hair	1.30E-01	mg/kg	NA	5.88E-03	2.50E-01	mg/kg	NA	1.13E-02
		Vanadium	NA	8.97E-05	Hair	3.60E+01	mg/kg	NA	3.23E-03	3.20E+01	mg/kg	NA	2.87E-03
		PCBs											
		Total PCBs	1.87E-08	1.31E-02	Ocular/eye, Nails, Immune	1.73E-01	mg/kg	3.24E-09	2.27E-03	1.56E+00	mg/kg	2.92E-08	2.04E-02
		SVOCs											
		Benzo(a)anthracene	9.15E-10	NA	NA	3.07E+01	mg/kg	2.81E-08	NA	1.80E+00	mg/kg	1.65E-09	NA
		Benzo(a)pyrene	9.15E-09	2.13E-03	Developmental	2.72E+01	mg/kg	2.49E-07	5.80E-02	1.34E+00	mg/kg	1.22E-08	2.85E-03
		Benzo(b)fluoranthene	9.15E-10	NA	NA	2.15E+01	mg/kg	1.97E-08	NA	3.20E+00	mg/kg	2.93E-09	NA
		Benzo(k)fluoranthene	9.15E-11	NA	NA	2.15E+01	mg/kg	1.97E-09	NA	1.62E+00	mg/kg	1.48E-10	NA
		Chrysene	9.15E-12	NA	NA	2.68E+01	mg/kg	2.45E-10	NA	3.20E+00	mg/kg	2.93E-11	NA
		Dibenzo(a,h)anthracene	9.15E-09	NA	NA	7.68E+00	mg/kg	7.02E-08	NA	4.00E-01	mg/kg	3.66E-09	NA
		Indeno(1,2,3-cd)pyrene	9.15E-10	NA	NA	1.68E+01	mg/kg	1.54E-08	NA	1.30E+00	mg/kg	1.19E-09	NA
		Naphthalene	NA	3.20E-05	Developmental	1.12E+00	mg/kg	NA	3.60E-05	6.70E-02	mg/kg	NA	2.15E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	4.52E-05	Liver, Kidney, Blood	2.30E+01	mg/kg	NA	1.04E-03	2.00E+01	mg/kg	NA	9.04E-04
		Exposure Point Total						4.28E-07	1.12E-01			2.78E-07	9.05E-02
	Exposure Medium Total							4.28E-07	1.12E-01			2.78E-07	9.05E-02

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	1.98E-02	9.13E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	1.91E-11	mg/m3	3.78E-13	1.74E-05	6.08E-12	mg/m3	1.21E-13	5.55E-06
		Inorganics											
		Arsenic	2.24E-06	2.44E+03	Neurological, developmental	5.84E-06	mg/m3	1.31E-11	1.42E-02	4.59E-05	mg/m3	1.03E-10	1.12E-01
		Cobalt	4.70E-06	6.09E+03	Respiratory	1.81E-05	mg/m3	8.49E-11	1.10E-01	6.54E-06	mg/m3	3.07E-11	3.98E-02
		Manganese	NA	7.31E+02	Neurological	5.56E-04	mg/m3	NA	4.06E-01	5.15E-04	mg/m3	NA	3.76E-01
		Nickel	1.36E-07	4.06E+02	Respiratory	4.17E-05	mg/m3	5.66E-12	1.69E-02	1.95E-05	mg/m3	2.64E-12	7.90E-03
		Thallium	NA	NA	NA	1.81E-07	mg/m3	NA	NA	3.48E-07	mg/m3	NA	NA
		Vanadium	NA	3.65E+02	Respiratory	5.01E-05	mg/m3	NA	1.83E-02	4.45E-05	mg/m3	NA	1.63E-02
		PCBs											
		Total PCBs	2.98E-07	NA	NA	2.41E-07	mg/m3	7.17E-14	NA	2.17E-06	mg/m3	6.47E-13	NA
		SVOCs											
		Benzo(a)anthracene	3.13E-08	NA	NA	4.27E-05	mg/m3	1.34E-12	NA	2.50E-06	mg/m3	7.84E-14	NA
		Benzo(a)pyrene	3.13E-07	1.83E+04	Developmental	3.78E-05	mg/m3	1.18E-11	6.90E-01	1.86E-06	mg/m3	5.82E-13	3.40E-02
		Benzo(b)fluoranthene	3.13E-08	NA	NA	2.99E-05	mg/m3	9.37E-13	NA	4.45E-06	mg/m3	1.39E-13	NA
		Benzo(k)fluoranthene	3.13E-09	NA	NA	2.99E-05	mg/m3	9.37E-14	NA	2.25E-06	mg/m3	7.06E-15	NA
		Chrysene	3.13E-10	NA	NA	3.73E-05	mg/m3	1.17E-14	NA	4.45E-06	mg/m3	1.39E-15	NA
		Dibenzo(a,h)anthracene	3.13E-07	NA	NA	1.07E-05	mg/m3	3.34E-12	NA	5.56E-07	mg/m3	1.74E-13	NA
		Indeno(1,2,3-cd)pyrene	3.13E-08	NA	NA	2.34E-05	mg/m3	7.33E-13	NA	1.81E-06	mg/m3	5.66E-14	NA
		Naphthalene	1.77E-08	1.22E+01	Neurological and Respiratory	1.56E-06	mg/m3	2.77E-14	1.90E-05	9.32E-08	mg/m3	1.65E-15	1.13E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.65E-01	Respiratory	3.20E-05	mg/m3	NA	1.17E-05	2.78E-05	mg/m3	NA	1.02E-05
		Exposure Point Total						1.22E-10	1.26E+00			1.38E-10	5.86E-01
	Exposure Medium Total							1.22E-10	1.26E+00			1.38E-10	5.86E-01
Soil								4.29E-07	1.37E+00			2.78E-07	6.76E-01

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	4.83E-09	NA	NA	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Butyl alcohol, tert-	NA	4.57E-02	Reproductive	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Chloroform	3.00E-09	9.32E-02	Liver	9.78E-03	mg/m3	2.94E-11	9.12E-04	ND	mg/m3	ND	ND
		Methyl tert-Butyl Ether (MTBE)	3.39E-11	3.04E-03	Liver, Kidney, Ocular	4.03E-02	mg/m3	1.37E-12	1.23E-04	1.69E-01	mg/m3	5.75E-12	5.16E-04
		Tetrachloroethylene	3.39E-11	2.28E-01	Neurological, Ocular	1.01E+00	mg/m3	3.43E-11	2.31E-01	6.21E-03	mg/m3	2.11E-13	1.42E-03
		Trichloroethene	5.35E-10	4.57E+00	Thyroid Vascular	9.31E-02	mg/m3	4.98E-11	4.25E-01	1.23E-03	mg/m3	6.59E-13	5.62E-03
		Vinyl Chloride	5.74E-10	9.13E-02	Liver	5.59E-02	mg/m3	3.21E-11	5.10E-03	ND	mg/m3	ND	ND
		Exposure Point Total						1.47E-10	6.62E-01			6.62E-12	7.56E-03
	Exposure Medium Total							1.47E-10	6.62E-01			6.62E-12	7.56E-03
Groundwater								1.47E-10	6.62E-01			6.62E-12	7.56E-03
Receptor Total								4.29E-07	2.03E+00			2.78E-07	6.84E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. RME and G-2a-1. RME based on a unit soil or air concentration.

Target Endpoint Evaluation (Offices and Parking Lot) Organ	Endpoint HI	Target Endpoint Evaluation (Substation #7) Organ	Endpoint HI
Blood	1.06E-03	Blood	9.10E-04
Decreased body and organ weights	6.78E-04	Decreased body and organ weights	3.16E-04
Endocrine	1.74E-05	Endocrine	5.55E-06
Developmental	7.72E-01	Developmental	1.52E-01
Hair	9.11E-03	Hair	1.42E-02
Immune	2.27E-03	Immune	2.04E-02
Kidney	1.16E-03	Kidney	1.42E-03
Liver	7.19E-03	Liver	1.43E-03
Nails	2.27E-03	Nails	2.04E-02
Neurological	6.59E-01	Neurological	4.96E-01
Ocular	2.33E-01	Ocular	2.24E-02
Reproductive	9.72E-03	Reproductive	3.10E-03
Respiratory	1.45E-01	Respiratory	6.40E-02
Skin	4.41E-03	Skin	3.46E-02
Thyroid	4.45E-01	Thyroid	1.27E-02
Vascular	4.29E-01	Vascular	4.02E-02

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.20E-04	7.08E+02	Reproductive, Developmental	ND	mg/kg	ND	ND	ND	mg/kg	ND	ND
		Inorganics											
		Arsenic	6.74E-09	1.05E-03	Skin, Vascular	7.70E+00	mg/kg	5.19E-08	8.08E-03	3.70E+00	mg/kg	2.50E-08	3.88E-03
		Cobalt	NA	1.51E-03	Thyroid	6.50E+00	mg/kg	NA	9.79E-03	7.30E+00	mg/kg	NA	1.10E-02
		Manganese	NA	1.88E-05	Neurological	2.60E+02	mg/kg	NA	4.90E-03	2.00E+02	mg/kg	NA	3.77E-03
		Nickel	NA	2.26E-05	Decreased body and organ weights	2.30E+01	mg/kg	NA	5.20E-04	1.20E+01	mg/kg	NA	2.71E-04
		Thallium	NA	4.52E-02	Hair	1.70E-01	mg/kg	NA	7.68E-03	1.50E-01	mg/kg	NA	6.78E-03
		Vanadium	NA	8.97E-05	Hair	2.30E+01	mg/kg	NA	2.06E-03	2.90E+01	mg/kg	NA	2.60E-03
		PCBs											
		Total PCBs	1.87E-08	1.31E-02	Ocular/eye, Nails, Immune	1.26E+02	mg/kg	2.35E-06	1.64E+00	6.03E-02	mg/kg	1.13E-09	7.90E-04
		SVOCs											
		Benzo(a)anthracene	9.15E-10	NA	NA	3.04E+00	mg/kg	2.78E-09	NA	8.96E-01	mg/kg	8.20E-10	NA
		Benzo(a)pyrene	9.15E-09	2.13E-03	Developmental	2.52E+00	mg/kg	2.30E-08	5.37E-03	6.81E-01	mg/kg	6.23E-09	1.45E-03
		Benzo(b)fluoranthene	9.15E-10	NA	NA	3.25E+00	mg/kg	2.97E-09	NA	1.01E+00	mg/kg	9.20E-10	NA
		Benzo(k)fluoranthene	9.15E-11	NA	NA	1.22E+00	mg/kg	1.12E-10	NA	2.63E-01	mg/kg	2.41E-11	NA
		Chrysene	9.15E-12	NA	NA	2.77E+00	mg/kg	2.54E-11	NA	8.78E-01	mg/kg	8.03E-12	NA
		Dibenzo(a,h)anthracene	9.15E-09	NA	NA	5.67E-01	mg/kg	5.19E-09	NA	1.17E-01	mg/kg	1.07E-09	NA
		Indeno(1,2,3-cd)pyrene	9.15E-10	NA	NA	1.82E+00	mg/kg	1.67E-09	NA	4.50E-01	mg/kg	4.12E-10	NA
		Naphthalene	NA	3.20E-05	Developmental	1.94E-01	mg/kg	NA	6.21E-06	2.37E-01	mg/kg	NA	7.59E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	4.52E-05	Liver, Kidney, Blood	8.00E+01	mg/kg	NA	3.62E-03	3.80E+02	mg/kg	NA	1.72E-02
		Exposure Point Total						2.44E-06	1.69E+00			3.56E-08	4.77E-02
	Exposure Medium Total							2.44E-06	1.69E+00			3.56E-08	4.77E-02

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	1.98E-02	9.13E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Inorganics											
		Arsenic	2.24E-06	2.44E+03	Neurological, developmental	1.07E-05	mg/m3	2.40E-11	2.61E-02	5.15E-06	mg/m3	1.15E-11	1.25E-02
		Cobalt	4.70E-06	6.09E+03	Respiratory	9.04E-06	mg/m3	4.25E-11	5.50E-02	1.02E-05	mg/m3	4.77E-11	6.18E-02
		Manganese	NA	7.31E+02	Neurological	3.62E-04	mg/m3	NA	2.64E-01	2.78E-04	mg/m3	NA	2.03E-01
		Nickel	1.36E-07	4.06E+02	Respiratory	3.20E-05	mg/m3	4.34E-12	1.30E-02	1.67E-05	mg/m3	2.26E-12	6.77E-03
		Thallium	NA	NA	NA	2.36E-07	mg/m3	NA	NA	2.09E-07	mg/m3	NA	NA
		Vanadium	NA	3.65E+02	Respiratory	3.20E-05	mg/m3	NA	1.17E-02	4.03E-05	mg/m3	NA	1.47E-02
		PCBs											
		Total PCBs	2.98E-07	NA	NA	1.75E-04	mg/m3	5.20E-11	NA	8.39E-08	mg/m3	2.50E-14	NA
		SVOCs											
		Benzo(a)anthracene	3.13E-08	NA	NA	4.22E-06	mg/m3	1.32E-13	NA	1.25E-06	mg/m3	3.90E-14	NA
		Benzo(a)pyrene	3.13E-07	1.83E+04	Developmental	3.50E-06	mg/m3	1.10E-12	6.39E-02	9.47E-07	mg/m3	2.97E-13	1.73E-02
		Benzo(b)fluoranthene	3.13E-08	NA	NA	4.52E-06	mg/m3	1.42E-13	NA	1.40E-06	mg/m3	4.38E-14	NA
		Benzo(k)fluoranthene	3.13E-09	NA	NA	1.70E-06	mg/m3	5.33E-15	NA	3.66E-07	mg/m3	1.15E-15	NA
		Chrysene	3.13E-10	NA	NA	3.86E-06	mg/m3	1.21E-15	NA	1.22E-06	mg/m3	3.82E-16	NA
		Dibenzo(a,h)anthracene	3.13E-07	NA	NA	7.88E-07	mg/m3	2.47E-13	NA	1.63E-07	mg/m3	5.09E-14	NA
		Indeno(1,2,3-cd)pyrene	3.13E-08	NA	NA	2.53E-06	mg/m3	7.93E-14	NA	6.26E-07	mg/m3	1.96E-14	NA
		Naphthalene	1.77E-08	1.22E+01	Neurological and Respiratory	2.70E-07	mg/m3	4.79E-15	3.28E-06	3.30E-07	mg/m3	5.85E-15	4.01E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.65E-01	Respiratory	1.11E-04	mg/m3	NA	4.06E-05	5.28E-04	mg/m3	NA	1.93E-04
		Exposure Point Total						1.25E-10	4.34E-01			6.20E-11	3.17E-01
	Exposure Medium Total							1.25E-10	4.34E-01			6.20E-11	3.17E-01
Soil								2.44E-06	2.12E+00			3.56E-08	3.64E-01

Table H-2b-1. RME
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	4.83E-09	NA	NA	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Butyl alcohol, tert-	NA	4.57E-02	Reproductive	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Chloroform	3.00E-09	9.32E-02	Liver	3.31E-03	mg/m3	9.94E-12	3.09E-04	2.48E-02	mg/m3	7.45E-11	2.31E-03
		Methyl tert-Butyl Ether (MTBE)	3.39E-11	3.04E-03	Liver, Kidney, Ocular	ND	mg/m3	ND	ND	1.29E-02	mg/m3	4.38E-13	3.93E-05
		Tetrachloroethylene	3.39E-11	2.28E-01	Neurological, Ocular	1.29E-03	mg/m3	4.39E-14	2.95E-04	1.68E-03	mg/m3	5.70E-14	3.84E-04
		Trichloroethene	5.35E-10	4.57E+00	Thyroid Vascular	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Vinyl Chloride	5.74E-10	9.13E-02	Liver	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Exposure Point Total						9.98E-12	6.04E-04			7.50E-11	2.74E-03
	Exposure Medium Total							9.98E-12	6.04E-04			7.50E-11	2.74E-03
Groundwater								9.98E-12	6.04E-04			7.50E-11	2.74E-03
Receptor Total								2.44E-06	2.12E+00			3.57E-08	3.67E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. RME and G-2a-1. RME based on a unit soil or air concentration.

Target Endpoint Evaluation (Transformer Shop) Organ	Endpoint HI	Target Endpoint Evaluation (Vehicle Refueling Area) Organ	Endpoint HI
Blood	3.62E-03	Blood	1.72E-02
Decreased body and organ weights	5.20E-04	Decreased body and organ weights	2.71E-04
Endocrine	--	Endocrine	--
Developmental	9.54E-02	Developmental	3.13E-02
Hair	9.75E-03	Hair	9.38E-03
Immune	1.64E+00	Immune	7.90E-04
Kidney	3.62E-03	Kidney	1.72E-02
Liver	3.93E-03	Liver	1.95E-02
Nails	1.64E+00	Nails	7.90E-04
Neurological	2.95E-01	Neurological	2.20E-01
Ocular	1.64E+00	Ocular	1.21E-03
Reproductive	--	Reproductive	--
Respiratory	7.97E-02	Respiratory	8.35E-02
Skin	8.08E-03	Skin	3.88E-03
Thyroid	9.79E-03	Thyroid	1.10E-02
Vascular	8.08E-03	Vascular	3.88E-03

Table H-2a-2. RME
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations - Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil		**Dioxin**									
			2,3,7,8-TCDD-TEQ	3.58E-02	--	4.54E-03	4.03E-02	Reproductive, Developmental	1.10E+03	--	1.40E+02	1.24E+03
			Inorganics									
			Arsenic	2.48E-07	--	5.24E-08	3.00E-07	Skin, Vascular	1.54E-03	--	3.26E-04	1.87E-03
			Cobalt	NA	--	NA	NA	Thyroid	2.57E-03	--	NA	2.57E-03
			Manganese	NA	--	NA	NA	Neurological	3.21E-05	--	NA	3.21E-05
			Nickel	NA	--	NA	NA	Decreased body and organ weights	3.85E-05	--	NA	3.85E-05
			Thallium	NA	--	NA	NA	Hair	7.71E-02	--	NA	7.71E-02
			Vanadium	NA	--	NA	NA	Hair	1.53E-04	--	NA	1.53E-04
			PCBs									
			Total PCBs	5.50E-07	--	3.26E-07	8.77E-07	Ocular/eye, Nails, Immune	3.85E-02	--	2.28E-02	6.14E-02
			SVOCs									
			Benzo(a)anthracene	2.75E-08	--	1.51E-08	4.27E-08	NA	NA	--	NA	NA
			Benzo(a)pyrene	2.75E-07	--	1.51E-07	4.27E-07	Developmental	2.57E-03	--	1.41E-03	3.98E-03
			Benzo(b)fluoranthene	2.75E-08	--	1.51E-08	4.27E-08	NA	NA	--	NA	NA
			Benzo(k)fluoranthene	2.75E-09	--	1.51E-09	4.27E-09	NA	NA	--	NA	NA
			Chrysene	2.75E-10	--	1.51E-10	4.27E-10	NA	NA	--	NA	NA
			Dibenzo(a,h)anthracene	2.75E-07	--	1.51E-07	4.27E-07	NA	NA	--	NA	NA
			Indeno(1,2,3-cd)pyrene	2.75E-08	--	1.51E-08	4.27E-08	NA	NA	--	NA	NA
			Naphthalene	NA	--	NA	NA	Developmental	3.85E-05	--	2.12E-05	5.97E-05
			TPH									
			Diesel Range Organics (C10-C20)	NA	--	NA	NA	Liver, Kidney, Blood	7.71E-05	--	NA	7.71E-05
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)

Table H-2a-2. RME
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations - Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Outdoor Air											
			Dioxin									
			2,3,7,8-TCDD-TEQ	--	2.79E+00	--	2.79E+00	Liver, reproductive, developmental, endocrine, respiratory, blood	--	5.14E+06	--	5.14E+06
			Inorganics									
			Arsenic	--	3.16E-04	--	3.16E-04	Neurological, developmental	--	1.37E+04	--	1.37E+04
			Cobalt	--	6.60E-04	--	6.60E-04	Respiratory	--	3.42E+04	--	3.42E+04
			Manganese	--	NA	--	NA	Neurological	--	4.11E+03	--	4.11E+03
			Nickel	--	1.91E-05	--	1.91E-05	Respiratory	--	2.28E+03	--	2.28E+03
			Thallium	--	NA	--	NA	NA	--	NA	--	NA
			Vanadium	--	NA	--	NA	Respiratory	--	2.05E+03	--	2.05E+03
			PCBs									
			Total PCBs	--	4.19E-05	--	4.19E-05	NA	--	NA	--	NA
			SVOCs									
			Benzo(a)anthracene	--	4.40E-06	--	4.40E-06	NA	--	NA	--	NA
			Benzo(a)pyrene	--	4.40E-05	--	4.40E-05	Developmental	--	1.03E+05	--	1.03E+05
			Benzo(b)fluoranthene	--	4.40E-06	--	4.40E-06	NA	--	NA	--	NA
			Benzo(k)fluoranthene	--	4.40E-07	--	4.40E-07	NA	--	NA	--	NA
			Chrysene	--	4.40E-08	--	4.40E-08	NA	--	NA	--	NA
			Dibenzo(a,h)anthracene	--	4.40E-05	--	4.40E-05	NA	--	NA	--	NA
			Indeno(1,2,3-cd)pyrene	--	4.40E-06	--	4.40E-06	NA	--	NA	--	NA
			Naphthalene	--	2.50E-06	--	2.50E-06	Neurological and Respiratory	--	6.85E+01	--	6.85E+01
			TPH									
			Diesel Range Organics (C10-C20)	--	NA	--	NA	Respiratory	--	2.05E+00	--	2.05E+00
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)
Surface Soil							(2)					(2)
Receptor Total							(2)					(2)

Notes:
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.

(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil	**Dioxin**											
		2,3,7,8-TCDD-TEQ	4.03E-02	1.24E+03	Reproductive, Developmental	2.51E-06	mg/kg	1.01E-07	3.11E-03	3.17E-05	mg/kg	1.28E-06	3.93E-02
		Inorganics											
		Arsenic	3.00E-07	1.87E-03	Skin, Vascular	2.60E+00	mg/kg	7.80E-07	4.85E-03	3.85E+01	mg/kg	1.16E-05	7.19E-02
		Cobalt	NA	2.57E-03	Thyroid	1.30E+02	mg/kg	NA	3.34E-01	4.55E+01	mg/kg	NA	1.17E-01
		Manganese	NA	3.21E-05	Neurological	2.00E+02	mg/kg	NA	6.42E-03	1.05E+03	mg/kg	NA	3.37E-02
		Nickel	NA	3.85E-05	Decreased body and organ weights	1.20E+01	mg/kg	NA	4.62E-04	1.53E+03	mg/kg	NA	5.91E-02
		Thallium	NA	7.71E-02	Hair	ND	mg/kg	ND	ND	1.56E-01	mg/kg	NA	1.20E-02
		Vanadium	NA	1.53E-04	Hair	5.80E+01	mg/kg	NA	8.87E-03	7.06E+03	mg/kg	NA	1.08E+00
		PCBs											
		Total PCBs	8.77E-07	6.14E-02	Ocular/eye, Nails, Immune	9.20E-02	mg/kg	8.06E-08	5.64E-03	5.19E+00	mg/kg	4.55E-06	3.18E-01
		SVOCs											
		Benzo(a)anthracene	4.27E-08	NA	NA	1.90E-01	mg/kg	8.11E-09	NA	5.83E-01	mg/kg	2.49E-08	NA
		Benzo(a)pyrene	4.27E-07	3.98E-03	Developmental	1.80E-01	mg/kg	7.68E-08	7.17E-04	5.77E-01	mg/kg	2.46E-07	2.30E-03
		Benzo(b)fluoranthene	4.27E-08	NA	NA	2.60E-01	mg/kg	1.11E-08	NA	6.81E-01	mg/kg	2.91E-08	NA
		Benzo(k)fluoranthene	4.27E-09	NA	NA	9.10E-02	mg/kg	3.88E-10	NA	2.58E-01	mg/kg	1.10E-09	NA
		Chrysene	4.27E-10	NA	NA	2.00E-01	mg/kg	8.53E-11	NA	6.39E-01	mg/kg	2.73E-10	NA
		Dibenzo(a,h)anthracene	4.27E-07	NA	NA	4.60E-02	mg/kg	1.96E-08	NA	1.50E-01	mg/kg	6.40E-08	NA
		Indeno(1,2,3-cd)pyrene	4.27E-08	NA	NA	1.50E-01	mg/kg	6.40E-09	NA	4.42E-01	mg/kg	1.89E-08	NA
		Naphthalene	NA	5.97E-05	Developmental	1.80E-02	mg/kg	NA	1.08E-06	1.14E-01	mg/kg	NA	6.81E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	7.71E-05	Liver, Kidney, Blood	1.30E+01	mg/kg	NA	1.00E-03	1.49E+02	mg/kg	NA	1.15E-02
		Exposure Point Total						1.08E-06	3.65E-01			1.78E-05	1.74E+00
	Exposure Medium Total							1.08E-06	3.65E-01			1.78E-05	1.74E+00

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	2.79E+00	5.14E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	4.39E-15	mg/m3	1.22E-14	2.26E-08	5.54E-14	mg/m3	1.54E-13	2.84E-07
		Inorganics											
		Arsenic	3.16E-04	1.37E+04	Neurological, developmental	4.55E-09	mg/m3	1.43E-12	6.23E-05	6.74E-08	mg/m3	2.13E-11	9.23E-04
		Cobalt	6.60E-04	3.42E+04	Respiratory	2.27E-07	mg/m3	1.50E-10	7.79E-03	7.96E-08	mg/m3	5.26E-11	2.73E-03
		Manganese	NA	4.11E+03	Neurological	3.50E-07	mg/m3	NA	1.44E-03	1.84E-06	mg/m3	NA	7.55E-03
		Nickel	1.91E-05	2.28E+03	Respiratory	2.10E-08	mg/m3	4.00E-13	4.79E-05	2.68E-06	mg/m3	5.12E-11	6.12E-03
		Thallium	NA	NA	NA	ND	mg/m3	ND	ND	2.73E-10	mg/m3	NA	NA
		Vanadium	NA	2.05E+03	Respiratory	1.01E-07	mg/m3	NA	2.08E-04	1.23E-05	mg/m3	NA	2.54E-02
		PCBs											
		Total PCBs	4.19E-05	NA	NA	1.61E-10	mg/m3	6.75E-15	NA	9.08E-09	mg/m3	3.81E-13	NA
		SVOCs											
		Benzo(a)anthracene	4.40E-06	NA	NA	3.32E-10	mg/m3	1.46E-15	NA	1.02E-09	mg/m3	4.49E-15	NA
		Benzo(a)pyrene	4.40E-05	1.03E+05	Developmental	3.15E-10	mg/m3	1.39E-14	3.23E-05	1.01E-09	mg/m3	4.44E-14	1.04E-04
		Benzo(b)fluoranthene	4.40E-06	NA	NA	4.55E-10	mg/m3	2.00E-15	NA	1.19E-09	mg/m3	5.24E-15	NA
		Benzo(k)fluoranthene	4.40E-07	NA	NA	1.59E-10	mg/m3	7.01E-17	NA	4.51E-10	mg/m3	1.99E-16	NA
		Chrysene	4.40E-08	NA	NA	3.50E-10	mg/m3	1.54E-17	NA	1.12E-09	mg/m3	4.92E-17	NA
		Dibenzo(a,h)anthracene	4.40E-05	NA	NA	8.05E-11	mg/m3	3.54E-15	NA	2.62E-10	mg/m3	1.16E-14	NA
		Indeno(1,2,3-cd)pyrene	4.40E-06	NA	NA	2.62E-10	mg/m3	1.16E-15	NA	7.73E-10	mg/m3	3.40E-15	NA
		Naphthalene	2.50E-06	6.85E+01	Neurological and Respiratory	3.15E-11	mg/m3	7.86E-17	2.16E-09	1.99E-10	mg/m3	4.97E-16	1.37E-08
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.05E+00	Respiratory	2.27E-08	mg/m3	NA	4.67E-08	2.61E-07	mg/m3	NA	5.35E-07
		Exposure Point Total						1.52E-10	9.58E-03			1.26E-10	4.28E-02
	Exposure Medium Total							1.52E-10	9.58E-03			1.26E-10	4.28E-02
Surface Soil								1.08E-06	3.75E-01			1.78E-05	1.79E+00
Receptor Total								1.08E-06	3.75E-01			1.78E-05	1.79E+00

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. RME and G-2a-2. RME based on a unit soil or air concentration.

Target Endpoint Evaluation		Target Endpoint Evaluation	
Organ	**Endpoint HI**	**Organ**	**Endpoint HI**
Blood	1.00E-03	Blood	1.15E-02
Decreased body and organ weights	4.62E-04	Decreased body and organ weights	5.91E-02
Endocrine	2.26E-08	Endocrine	2.84E-07
Developmental	3.93E-03	Developmental	4.26E-02
Eye	5.64E-03	Eye	3.18E-01
Hair	8.87E-03	Hair	1.09E+00
Immune	5.64E-03	Immune	3.18E-01
Kidney	1.00E-03	Kidney	1.15E-02
Liver	1.00E-03	Liver	1.15E-02
Nails	5.64E-03	Nails	3.18E-01
Neurological	7.92E-03	Neurological	4.22E-02
Reproductive	3.11E-03	Reproductive	3.93E-02
Respiratory	8.04E-03	Respiratory	3.42E-02
Skin	4.85E-03	Skin	7.19E-02
Thyroid	3.34E-01	Thyroid	1.17E-01
Vascular	4.85E-03	Vascular	7.19E-02

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil	**Dioxin**											
		2,3,7,8-TCDD-TEQ	4.03E-02	1.24E+03	Reproductive, Developmental	1.08E-04	mg/kg	4.34E-06	1.34E-01	1.45E-05	mg/kg	5.84E-07	1.80E-02
		Inorganics											
		Arsenic	3.00E-07	1.87E-03	Skin, Vascular	1.40E+01	mg/kg	4.20E-06	2.61E-02	7.50E+00	mg/kg	2.25E-06	1.40E-02
		Cobalt	NA	2.57E-03	Thyroid	1.70E+01	mg/kg	NA	4.37E-02	7.90E+00	mg/kg	NA	2.03E-02
		Manganese	NA	3.21E-05	Neurological	5.00E+02	mg/kg	NA	1.61E-02	2.20E+02	mg/kg	NA	7.06E-03
		Nickel	NA	3.85E-05	Decreased body and organ weights	2.70E+01	mg/kg	NA	1.04E-03	3.10E+01	mg/kg	NA	1.19E-03
		Thallium	NA	7.71E-02	Hair	2.00E-01	mg/kg	NA	1.54E-02	1.70E-01	mg/kg	NA	1.31E-02
		Vanadium	NA	1.53E-04	Hair	3.60E+01	mg/kg	NA	5.50E-03	3.00E+01	mg/kg	NA	4.59E-03
		PCBs											
		Total PCBs	8.77E-07	6.14E-02	Ocular/eye, Nails, Immune	2.15E+00	mg/kg	1.88E-06	1.32E-01	1.35E+00	mg/kg	1.18E-06	8.28E-02
		SVOCs											
		Benzo(a)anthracene	4.27E-08	NA	NA	1.34E+00	mg/kg	5.72E-08	NA	3.70E-01	mg/kg	1.58E-08	NA
		Benzo(a)pyrene	4.27E-07	3.98E-03	Developmental	1.29E+00	mg/kg	5.50E-07	5.13E-03	5.41E-01	mg/kg	2.31E-07	2.15E-03
		Benzo(b)fluoranthene	4.27E-08	NA	NA	2.03E+00	mg/kg	8.68E-08	NA	6.87E-01	mg/kg	2.93E-08	NA
		Benzo(k)fluoranthene	4.27E-09	NA	NA	4.92E-01	mg/kg	2.10E-09	NA	2.73E-01	mg/kg	1.16E-09	NA
		Chrysene	4.27E-10	NA	NA	1.41E+00	mg/kg	6.00E-10	NA	6.82E-01	mg/kg	2.91E-10	NA
		Dibenzo(a,h)anthracene	4.27E-07	NA	NA	2.40E-01	mg/kg	1.02E-07	NA	1.39E-01	mg/kg	5.93E-08	NA
		Indeno(1,2,3-cd)pyrene	4.27E-08	NA	NA	9.69E-01	mg/kg	4.13E-08	NA	4.37E-01	mg/kg	1.86E-08	NA
		Naphthalene	NA	5.97E-05	Developmental	1.66E-01	mg/kg	NA	9.91E-06	4.00E-02	mg/kg	NA	2.39E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	7.71E-05	Liver, Kidney, Blood	3.40E+03	mg/kg	NA	2.62E-01	1.70E+02	mg/kg	NA	1.31E-02
		Exposure Point Total						1.13E-05	6.40E-01			4.37E-06	1.76E-01
	Exposure Medium Total							1.13E-05	6.40E-01			4.37E-06	1.76E-01

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	2.79E+00	5.14E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	1.88E-13	mg/m3	5.26E-13	9.68E-07	2.53E-14	mg/m3	7.06E-14	1.30E-07
		Inorganics											
		Arsenic	3.16E-04	1.37E+04	Neurological, developmental	2.45E-08	mg/m3	7.73E-12	3.35E-04	1.31E-08	mg/m3	4.14E-12	1.80E-04
		Cobalt	6.60E-04	3.42E+04	Respiratory	2.97E-08	mg/m3	1.96E-11	1.02E-03	1.38E-08	mg/m3	9.13E-12	4.73E-04
		Manganese	NA	4.11E+03	Neurological	8.75E-07	mg/m3	NA	3.59E-03	3.85E-07	mg/m3	NA	1.58E-03
		Nickel	1.91E-05	2.28E+03	Respiratory	4.72E-08	mg/m3	9.01E-13	1.08E-04	5.42E-08	mg/m3	1.03E-12	1.24E-04
		Thallium	NA	NA	NA	3.50E-10	mg/m3	NA	NA	2.97E-10	mg/m3	NA	NA
		Vanadium	NA	2.05E+03	Respiratory	6.30E-08	mg/m3	NA	1.29E-04	5.25E-08	mg/m3	NA	1.08E-04
		PCBs											
		Total PCBs	4.19E-05	NA	NA	3.76E-09	mg/m3	1.58E-13	NA	2.36E-09	mg/m3	9.90E-14	NA
		SVOCs											
		Benzo(a)anthracene	4.40E-06	NA	NA	2.35E-09	mg/m3	1.03E-14	NA	6.47E-10	mg/m3	2.85E-15	NA
		Benzo(a)pyrene	4.40E-05	1.03E+05	Developmental	2.25E-09	mg/m3	9.93E-14	2.32E-04	9.46E-10	mg/m3	4.17E-14	9.72E-05
		Benzo(b)fluoranthene	4.40E-06	NA	NA	3.56E-09	mg/m3	1.57E-14	NA	1.20E-09	mg/m3	5.29E-15	NA
		Benzo(k)fluoranthene	4.40E-07	NA	NA	8.61E-10	mg/m3	3.79E-16	NA	4.77E-10	mg/m3	2.10E-16	NA
		Chrysene	4.40E-08	NA	NA	2.46E-09	mg/m3	1.08E-16	NA	1.19E-09	mg/m3	5.25E-17	NA
		Dibenzo(a,h)anthracene	4.40E-05	NA	NA	4.20E-10	mg/m3	1.85E-14	NA	2.43E-10	mg/m3	1.07E-14	NA
		Indeno(1,2,3-cd)pyrene	4.40E-06	NA	NA	1.69E-09	mg/m3	7.46E-15	NA	7.64E-10	mg/m3	3.37E-15	NA
		Naphthalene	2.50E-06	6.85E+01	Neurological and Respiratory	2.90E-10	mg/m3	7.24E-16	1.99E-08	7.00E-11	mg/m3	1.75E-16	4.79E-09
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.05E+00	Respiratory	5.95E-06	mg/m3	NA	1.22E-05	2.97E-07	mg/m3	NA	6.11E-07
		Exposure Point Total						2.91E-11	5.43E-03			1.45E-11	2.56E-03
	Exposure Medium Total							2.91E-11	5.43E-03			1.45E-11	2.56E-03
Surface Soil								1.13E-05	6.46E-01			4.37E-06	1.79E-01
Receptor Total								1.13E-05	6.46E-01			4.37E-06	1.79E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. RME and G-2a-2. RME based on a unit soil or air concentration.

Target Endpoint Evaluation (Salvage Yard and Waste Storage Area) Organ	Endpoint HI	Target Endpoint Evaluation (Stores and Fleet Maintenance Area) Organ	Endpoint HI
Blood	2.62E-01	Blood	1.31E-02
Decreased body and organ weights	1.04E-03	Decreased body and organ weights	1.19E-03
Endocrine	9.68E-07	Endocrine	1.30E-07
Developmental	1.39E-01	Developmental	2.04E-02
Eye	1.32E-01	Eye	8.28E-02
Hair	2.09E-02	Hair	1.77E-02
Immune	1.32E-01	Immune	8.28E-02
Kidney	2.62E-01	Kidney	1.31E-02
Liver	2.62E-01	Liver	1.31E-02
Nails	1.32E-01	Nails	8.28E-02
Neurological	2.00E-02	Neurological	8.82E-03
Reproductive	1.34E-01	Reproductive	1.80E-02
Respiratory	1.27E-03	Respiratory	7.06E-04
Skin	2.61E-02	Skin	1.40E-02
Thyroid	4.37E-02	Thyroid	2.03E-02
Vascular	2.61E-02	Vascular	1.40E-02

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil	**Dioxin**											
		2,3,7,8-TCDD-TEQ	4.03E-02	1.24E+03	Reproductive, Developmental	1.37E-05	mg/kg	5.52E-07	1.70E-02	4.37E-06	mg/kg	1.76E-07	5.42E-03
		Inorganics											
		Arsenic	3.00E-07	1.87E-03	Skin, Vascular	3.70E+00	mg/kg	1.11E-06	6.91E-03	3.30E+01	mg/kg	9.90E-06	6.16E-02
		Cobalt	NA	2.57E-03	Thyroid	1.10E+01	mg/kg	NA	2.83E-02	4.70E+00	mg/kg	NA	1.21E-02
		Manganese	NA	3.21E-05	Neurological	2.60E+02	mg/kg	NA	8.35E-03	3.70E+02	mg/kg	NA	1.19E-02
		Nickel	NA	3.85E-05	Decreased body and organ weights	3.00E+01	mg/kg	NA	1.16E-03	1.40E+01	mg/kg	NA	5.39E-04
		Thallium	NA	7.71E-02	Hair	ND	mg/kg	ND	ND	2.50E-01	mg/kg	NA	1.93E-02
		Vanadium	NA	1.53E-04	Hair	2.30E+01	mg/kg	NA	3.52E-03	2.30E+01	mg/kg	NA	3.52E-03
		PCBs											
		Total PCBs	8.77E-07	6.14E-02	Ocular/eye, Nails, Immune	3.30E-01	mg/kg	2.89E-07	2.02E-02	5.10E+00	mg/kg	4.47E-06	3.13E-01
		SVOCs											
		Benzo(a)anthracene	4.27E-08	NA	NA	2.79E+00	mg/kg	1.19E-07	NA	1.80E+00	mg/kg	7.68E-08	NA
		Benzo(a)pyrene	4.27E-07	3.98E-03	Developmental	2.27E+00	mg/kg	9.67E-07	9.03E-03	1.40E+00	mg/kg	5.97E-07	5.57E-03
		Benzo(b)fluoranthene	4.27E-08	NA	NA	2.58E+00	mg/kg	1.10E-07	NA	3.20E+00	mg/kg	1.37E-07	NA
		Benzo(k)fluoranthene	4.27E-09	NA	NA	1.12E+00	mg/kg	4.76E-09	NA	1.70E+00	mg/kg	7.25E-09	NA
		Chrysene	4.27E-10	NA	NA	2.45E+00	mg/kg	1.04E-09	NA	3.20E+00	mg/kg	1.37E-09	NA
		Dibenzo(a,h)anthracene	4.27E-07	NA	NA	4.70E-01	mg/kg	2.01E-07	NA	4.00E-01	mg/kg	1.71E-07	NA
		Indeno(1,2,3-cd)pyrene	4.27E-08	NA	NA	1.51E+00	mg/kg	6.46E-08	NA	1.30E+00	mg/kg	5.55E-08	NA
		Naphthalene	NA	5.97E-05	Developmental	7.92E-02	mg/kg	NA	4.73E-06	6.70E-02	mg/kg	NA	4.00E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	7.71E-05	Liver, Kidney, Blood	ND	mg/kg	ND	ND	2.00E+01	mg/kg	NA	1.54E-03
		Exposure Point Total						3.42E-06	9.45E-02			1.56E-05	4.34E-01
	Exposure Medium Total							3.42E-06	9.45E-02			1.56E-05	4.34E-01

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	2.79E+00	5.14E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	2.40E-14	mg/m3	6.68E-14	1.23E-07	7.64E-15	mg/m3	2.13E-14	3.93E-08
		Inorganics											
		Arsenic	3.16E-04	1.37E+04	Neurological, developmental	6.47E-09	mg/m3	2.04E-12	8.86E-05	5.77E-08	mg/m3	1.82E-11	7.91E-04
		Cobalt	6.60E-04	3.42E+04	Respiratory	1.92E-08	mg/m3	1.27E-11	6.59E-04	8.22E-09	mg/m3	5.43E-12	2.82E-04
		Manganese	NA	4.11E+03	Neurological	4.55E-07	mg/m3	NA	1.87E-03	6.47E-07	mg/m3	NA	2.66E-03
		Nickel	1.91E-05	2.28E+03	Respiratory	5.25E-08	mg/m3	1.00E-12	1.20E-04	2.45E-08	mg/m3	4.67E-13	5.59E-05
		Thallium	NA	NA	NA	ND	mg/m3	ND	ND	4.37E-10	mg/m3	NA	NA
		Vanadium	NA	2.05E+03	Respiratory	4.02E-08	mg/m3	NA	8.27E-05	4.02E-08	mg/m3	NA	8.27E-05
		PCBs											
		Total PCBs	4.19E-05	NA	NA	5.77E-10	mg/m3	2.42E-14	NA	8.92E-09	mg/m3	3.74E-13	NA
		SVOCs											
		Benzo(a)anthracene	4.40E-06	NA	NA	4.88E-09	mg/m3	2.15E-14	NA	3.15E-09	mg/m3	1.39E-14	NA
		Benzo(a)pyrene	4.40E-05	1.03E+05	Developmental	3.97E-09	mg/m3	1.75E-13	4.07E-04	2.45E-09	mg/m3	1.08E-13	2.52E-04
		Benzo(b)fluoranthene	4.40E-06	NA	NA	4.50E-09	mg/m3	1.98E-14	NA	5.60E-09	mg/m3	2.46E-14	NA
		Benzo(k)fluoranthene	4.40E-07	NA	NA	1.95E-09	mg/m3	8.59E-16	NA	2.97E-09	mg/m3	1.31E-15	NA
		Chrysene	4.40E-08	NA	NA	4.28E-09	mg/m3	1.88E-16	NA	5.60E-09	mg/m3	2.46E-16	NA
		Dibenzo(a,h)anthracene	4.40E-05	NA	NA	8.22E-10	mg/m3	3.62E-14	NA	7.00E-10	mg/m3	3.08E-14	NA
		Indeno(1,2,3-cd)pyrene	4.40E-06	NA	NA	2.65E-09	mg/m3	1.17E-14	NA	2.27E-09	mg/m3	1.00E-14	NA
		Naphthalene	2.50E-06	6.85E+01	Neurological and Respiratory	1.39E-10	mg/m3	3.46E-16	9.49E-09	1.17E-10	mg/m3	2.92E-16	8.03E-09
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.05E+00	Respiratory	ND	mg/m3	ND	ND	3.50E-08	mg/m3	NA	7.19E-08
		Exposure Point Total						1.61E-11	3.23E-03			2.47E-11	4.12E-03
	Exposure Medium Total							1.61E-11	3.23E-03			2.47E-11	4.12E-03
Surface Soil								3.42E-06	9.77E-02			1.56E-05	4.38E-01
Receptor Total								3.42E-06	9.77E-02			1.56E-05	4.38E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. RME and G-2a-2. RME based on a unit soil or air concentration.

Target Endpoint Evaluation		Target Endpoint Evaluation	
Organ	**Endpoint HI**	**Organ**	**Endpoint HI**
Blood	1.23E-07	Blood	1.54E-03
Decreased body and organ weights	1.16E-03	Decreased body and organ weights	5.39E-04
Endocrine	1.23E-07	Endocrine	3.93E-08
Developmental	2.65E-02	Developmental	1.20E-02
Eye	2.02E-02	Eye	3.13E-01
Hair	3.52E-03	Hair	2.28E-02
Immune	2.02E-02	Immune	3.13E-01
Kidney	--	Kidney	1.54E-03
Liver	1.23E-07	Liver	1.54E-03
Nails	2.02E-02	Nails	3.13E-01
Neurological	1.03E-02	Neurological	1.53E-02
Reproductive	1.70E-02	Reproductive	5.42E-03
Respiratory	8.61E-04	Respiratory	4.20E-04
Skin	6.91E-03	Skin	6.16E-02
Thyroid	2.83E-02	Thyroid	1.21E-02
Vascular	6.91E-03	Vascular	6.16E-02

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil	**Dioxin**											
		2,3,7,8-TCDD-TEQ	4.03E-02	1.24E+03	Reproductive, Developmental	ND	mg/kg	ND	ND	ND	mg/kg	ND	ND
		Inorganics											
		Arsenic	3.00E-07	1.87E-03	Skin, Vascular	1.70E+00	mg/kg	5.10E-07	3.17E-03	ND	mg/kg	ND	ND
		Cobalt	NA	2.57E-03	Thyroid	2.70E+00	mg/kg	NA	6.93E-03	ND	mg/kg	ND	ND
		Manganese	NA	3.21E-05	Neurological	2.60E+02	mg/kg	NA	8.35E-03	ND	mg/kg	ND	ND
		Nickel	NA	3.85E-05	Decreased body and organ weights	1.60E+01	mg/kg	NA	6.16E-04	ND	mg/kg	ND	ND
		Thallium	NA	7.71E-02	Hair	ND	mg/kg	ND	ND	ND	mg/kg	ND	ND
		Vanadium	NA	1.53E-04	Hair	9.70E+00	mg/kg	NA	1.48E-03	ND	mg/kg	ND	ND
		PCBs											
		Total PCBs	8.77E-07	6.14E-02	Ocular/eye, Nails, Immune	2.01E+03	mg/kg	1.76E-03	1.24E+02	1.40E-01	mg/kg	1.23E-07	8.59E-03
		SVOCs											
		Benzo(a)anthracene	4.27E-08	NA	NA	7.49E-01	mg/kg	3.20E-08	NA	2.60E+00	mg/kg	1.11E-07	NA
		Benzo(a)pyrene	4.27E-07	3.98E-03	Developmental	6.52E-01	mg/kg	2.78E-07	2.60E-03	1.30E+00	mg/kg	5.55E-07	5.18E-03
		Benzo(b)fluoranthene	4.27E-08	NA	NA	8.16E-01	mg/kg	3.48E-08	NA	2.20E+00	mg/kg	9.39E-08	NA
		Benzo(k)fluoranthene	4.27E-09	NA	NA	2.33E-01	mg/kg	9.94E-10	NA	6.10E-01	mg/kg	2.60E-09	NA
		Chrysene	4.27E-10	NA	NA	7.36E-01	mg/kg	3.14E-10	NA	2.50E+00	mg/kg	1.07E-09	NA
		Dibenzo(a,h)anthracene	4.27E-07	NA	NA	1.22E-01	mg/kg	5.20E-08	NA	3.10E-01	mg/kg	1.32E-07	NA
		Indeno(1,2,3-cd)pyrene	4.27E-08	NA	NA	3.91E-01	mg/kg	1.67E-08	NA	7.80E-01	mg/kg	3.33E-08	NA
		Naphthalene	NA	5.97E-05	Developmental	2.67E-02	mg/kg	NA	1.59E-06	6.30E-01	mg/kg	NA	3.76E-05
		TPH											
		Diesel Range Organics (C10-C20)	NA	7.71E-05	Liver, Kidney, Blood	8.00E+01	mg/kg	NA	6.16E-03	3.80E+02	mg/kg	NA	2.93E-02
		Exposure Point Total						1.77E-03	1.24E+02			1.05E-06	4.31E-02
	Exposure Medium Total							1.77E-03	1.24E+02			1.05E-06	4.31E-02

Table H-2b-2. RME
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	2.79E+00	5.14E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Inorganics											
		Arsenic	3.16E-04	1.37E+04	Neurological, developmental	2.97E-09	mg/m3	9.38E-13	4.07E-05	ND	mg/m3	ND	ND
		Cobalt	6.60E-04	3.42E+04	Respiratory	4.72E-09	mg/m3	3.12E-12	1.62E-04	ND	mg/m3	ND	ND
		Manganese	NA	4.11E+03	Neurological	4.55E-07	mg/m3	NA	1.87E-03	ND	mg/m3	ND	ND
		Nickel	1.91E-05	2.28E+03	Respiratory	2.80E-08	mg/m3	5.34E-13	6.39E-05	ND	mg/m3	ND	ND
		Thallium	NA	NA	NA	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Vanadium	NA	2.05E+03	Respiratory	1.70E-08	mg/m3	NA	3.49E-05	ND	mg/m3	ND	ND
		PCBs											
		Total PCBs	4.19E-05	NA	NA	3.52E-06	mg/m3	1.48E-10	NA	2.45E-10	mg/m3	1.03E-14	NA
		SVOCs											
		Benzo(a)anthracene	4.40E-06	NA	NA	1.31E-09	mg/m3	5.77E-15	NA	4.55E-09	mg/m3	2.00E-14	NA
		Benzo(a)pyrene	4.40E-05	1.03E+05	Developmental	1.14E-09	mg/m3	5.02E-14	1.17E-04	2.27E-09	mg/m3	1.00E-13	2.34E-04
		Benzo(b)fluoranthene	4.40E-06	NA	NA	1.43E-09	mg/m3	6.28E-15	NA	3.85E-09	mg/m3	1.69E-14	NA
		Benzo(k)fluoranthene	4.40E-07	NA	NA	4.08E-10	mg/m3	1.79E-16	NA	1.07E-09	mg/m3	4.70E-16	NA
		Chrysene	4.40E-08	NA	NA	1.29E-09	mg/m3	5.67E-17	NA	4.37E-09	mg/m3	1.93E-16	NA
		Dibenzo(a,h)anthracene	4.40E-05	NA	NA	2.13E-10	mg/m3	9.40E-15	NA	5.42E-10	mg/m3	2.39E-14	NA
		Indeno(1,2,3-cd)pyrene	4.40E-06	NA	NA	6.84E-10	mg/m3	3.01E-15	NA	1.36E-09	mg/m3	6.01E-15	NA
		Naphthalene	2.50E-06	6.85E+01	Neurological and Respiratory	4.67E-11	mg/m3	1.17E-16	3.20E-09	1.10E-09	mg/m3	2.75E-15	7.55E-08
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.05E+00	Respiratory	1.40E-07	mg/m3	NA	2.88E-07	6.65E-07	mg/m3	NA	1.37E-06
		Exposure Point Total						1.52E-10	2.29E-03			1.81E-13	2.35E-04
	Exposure Medium Total							1.52E-10	2.29E-03			1.81E-13	2.35E-04
Surface Soil								1.77E-03	1.24E+02			1.05E-06	4.33E-02
Receptor Total								1.77E-03	1.24E+02			1.05E-06	4.33E-02

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. RME and G-2a-2. RME based on a unit soil or air concentration.

Target Endpoint Evaluation (Transformer Shop) Organ	Endpoint HI	Target Endpoint Evaluation (Vehicle Refueling Area) Organ	Endpoint HI
Blood	6.16E-03	Blood	2.93E-02
Decreased body and organ weights	6.16E-04	Decreased body and organ weights	--
Endocrine	--	Endocrine	--
Developmental	2.76E-03	Developmental	5.45E-03
Eye	1.24E+02	Eye	8.59E-03
Hair	1.48E-03	Hair	--
Immune	1.24E+02	Immune	8.59E-03
Kidney	6.16E-03	Kidney	2.93E-02
Liver	6.16E-03	Liver	2.93E-02
Nails	1.24E+02	Nails	8.59E-03
Neurological	1.03E-02	Neurological	7.55E-08
Reproductive	--	Reproductive	--
Respiratory	2.61E-04	Respiratory	1.44E-06
Skin	3.17E-03	Skin	--
Thyroid	6.93E-03	Thyroid	--
Vascular	3.17E-03	Vascular	--

Table H-2-3. RME
Summary of Receptor Risks and Hazards for COPCs - Recreational Visitor
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Strafe Soil	Surface Soil	Hypothetical Future Park Land/Green Space	**Dioxin**									
			2,3,7,8-TCDD-TEQ	5.64E-09	--	1.34E-10	5.77E-09	Reproductive, Developmental	3.61E-04	--	8.57E-06	3.70E-04
			Inorganics									
			Arsenic	4.04E-08	--	1.60E-09	4.20E-08	Skin, Vascular	5.24E-04	--	2.07E-05	5.45E-04
			Cobalt	NA	--	NA	NA	Thyroid	4.37E-02	--	NA	4.37E-02
			Manganese	NA	--	NA	NA	Neurological	8.40E-04	--	NA	8.40E-04
			Nickel	NA	--	NA	NA	Decreased body and organ weights	6.05E-05	--	NA	6.05E-05
			Thallium	ND	--	ND	ND	Hair	ND	--	ND	ND
			Vanadium	NA	--	NA	NA	Hair	1.16E-03	--	NA	1.16E-03
			PCBs									
			Total PCBs	3.18E-09	--	3.52E-10	3.53E-09	Ocular/eye, Nails, Immune	4.64E-04	--	5.13E-05	5.15E-04
			SVOCs									
			Benzo(a)anthracene	8.21E-10	--	8.43E-11	9.05E-10	NA	NA	--	NA	NA
			Benzo(a)pyrene	7.78E-09	--	7.99E-10	8.57E-09	Developmental	6.05E-05	--	6.21E-06	6.67E-05
			Benzo(b)fluoranthene	1.12E-09	--	1.15E-10	1.24E-09	NA	NA	--	NA	NA
			Benzo(k)fluoranthene	3.93E-11	--	4.04E-12	4.33E-11	NA	NA	--	NA	NA
			Chrysene	8.64E-12	--	8.87E-13	9.53E-12	NA	NA	--	NA	NA
			Dibenzo(a,h)anthracene	1.99E-09	--	2.04E-10	2.19E-09	NA	NA	--	NA	NA
			Indeno(1,2,3-cd)pyrene	6.48E-10	--	6.65E-11	7.15E-10	NA	NA	--	NA	NA
			Naphthalene	NA	--	NA	NA	Developmental	9.07E-08	--	9.32E-09	1.00E-07
			TPH									
			Diesel Range Organics (C10-C20)	NA	--	NA	NA	Liver, Kidney, Blood	1.31E-04	--	NA	1.31E-04
		Exposure Point Total					6.50E-08					4.74E-02
	Exposure Medium Total						6.50E-08					4.74E-02

Table H-2-3. RME
Summary of Receptor Risks and Hazards for COPCs - Recreational Visitor
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Outdoor Air	Hypothetical Future Park Land/Green Space										
			Dioxin									
			2,3,7,8-TCDD-TEQ	--	2.55E-16	--	2.55E-16	Liver, reproductive, developmental, endocrine, respiratory, blood	--	9.77E-10	--	9.77E-10
			Inorganics									
			Arsenic	--	2.98E-14	--	2.98E-14	Neurological, developmental	--	2.70E-06	--	2.70E-06
			Cobalt	--	3.12E-12	--	3.12E-12	Respiratory	--	3.37E-04	--	3.37E-04
			Manganese	--	NA	--	NA	Neurological	--	6.23E-05	--	6.23E-05
			Nickel	--	8.33E-15	--	8.33E-15	Respiratory	--	2.08E-06	--	2.08E-06
			Thallium	--	ND	--	ND	NA	--	ND	--	ND
			Vanadium	--	NA	--	NA	Respiratory	--	9.03E-06	--	9.03E-06
			PCBs									
			Total PCBs	--	1.40E-16	--	1.40E-16	NA	--	NA	--	NA
			SVOCs									
			Benzo(a)anthracene	--	7.61E-17	--	7.61E-17	NA	--	NA	--	NA
			Benzo(a)pyrene	--	7.21E-16	--	7.21E-16	Developmental	--	1.40E-06	--	1.40E-06
			Benzo(b)fluoranthene	--	1.04E-16	--	1.04E-16	NA	--	NA	--	NA
			Benzo(k)fluoranthene	--	3.64E-18	--	3.64E-18	NA	--	NA	--	NA
			Chrysene	--	8.01E-19	--	8.01E-19	NA	--	NA	--	NA
			Dibenzo(a,h)anthracene	--	1.84E-16	--	1.84E-16	NA	--	NA	--	NA
			Indeno(1,2,3-cd)pyrene	--	6.01E-17	--	6.01E-17	NA	--	NA	--	NA
			Naphthalene	--	1.63E-18	--	1.63E-18	Neurological and Respiratory	--	9.34E-11	--	9.34E-11
			TPH									
			Diesel Range Organics (C10-C20)	--	NA	--	NA	Respiratory	--	2.02E-09	--	2.02E-09
		Exposure Point Total					3.16E-12					4.15E-04
	Exposure Medium Total						3.16E-12					4.15E-04
Surface Soil							6.50E-08					4.78E-02
Receptor Total							6.50E-08					4.78E-02

Notes:
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable/no dose-response value.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.

Target Organ	Target Organ Hazard Index			
	Chemical (ing/dermal)	**Chemical (inhalation)**	**Surface Soil**	**Total**
Blood	DRO	TCDD-TEQ	1.31E-04	1.31E-04
Decreased body and organ weights	Nickel	--	6.05E-05	6.05E-05
Developmental	TCDD-TEQ, BaP, Naphthalene	TCDD-TEQ, Arsenic, Benzo(a)pyrene	4.41E-04	4.41E-04
Endocrine	--	TCDD-TEQ	9.77E-10	9.77E-10
Eye	Total PCBs	--	5.15E-04	5.15E-04
Hair	Thallium, Vanadium	--	1.16E-03	1.16E-03
Immune	Total PCBs	--	5.15E-04	5.15E-04
Kidney	DRO	--	1.31E-04	1.31E-04
Liver	DRO	TCDD-TEQ	1.31E-04	1.31E-04
Nails	Total PCBs	--	5.15E-04	5.15E-04
Nervous System	--	--	--	--
Reproductive	TCDD-TEQ	TCDD-TEQ	3.70E-04	3.70E-04
Respiratory	--	Cobalt, DRO, Nickel, Vanadium, Naphthalene, TCDD-TEQ	3.49E-04	3.49E-04
Skin	Arsenic	--	5.45E-04	5.45E-04
Thyroid	Cobalt	--	4.37E-02	4.37E-02
Vascular	Arsenic	--	5.45E-04	5.45E-04

Table H-2-4. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.52E-07	2.41E-07	5.92E-07	Reproductive, Developmental	1.35E-02	9.25E-03	2.28E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	3.97E-04	NA	3.97E-04
			Antimony	NA	NA	NA	Mortality, Blood	7.15E-04	NA	7.15E-04
			Arsenic	7.50E-08	8.55E-08	1.60E-07	Skin, Vascular	5.83E-04	6.65E-04	1.25E-03
			Cobalt	NA	NA	NA	Thyroid	2.44E-03	NA	2.44E-03
			Cyanide	NA	NA	NA	Reproductive	2.40E-04	NA	2.40E-04
			Manganese	NA	NA	NA	Neurological	4.35E-04	NA	4.35E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	1.34E-04	NA	1.34E-04
			Thallium	NA	NA	NA	Hair	1.06E-03	NA	1.06E-03
			Vanadium	NA	NA	NA	Hair	1.32E-03	NA	1.32E-03
			PCBs							
			Total PCBs	1.51E-08	4.82E-08	6.32E-08	Ocular/eye, Nails, Immune	1.32E-03	4.21E-03	5.53E-03
			SVOCs							
			Benzo(a)anthracene	1.59E-09	4.72E-09	6.31E-09	NA	NA	NA	NA
			Benzo(a)pyrene	9.69E-09	2.87E-08	3.84E-08	Developmental	1.13E-04	3.35E-04	4.48E-04
			Benzo(b)fluoranthene	1.42E-09	4.22E-09	5.64E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	5.18E-11	1.53E-10	2.05E-10	NA	NA	NA	NA
			Chrysene	1.28E-11	3.81E-11	5.09E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	2.28E-09	6.75E-09	9.03E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	8.33E-10	2.47E-09	3.30E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	5.55E-04	NA	5.55E-04
			Chemical Total	4.58E-07	4.21E-07	8.79E-07		2.28E-02	1.45E-02	3.73E-02
		Exposure Point Total				8.79E-07				3.73E-02
	Exposure Medium Total					8.79E-07				3.73E-02
Sediment Total						8.79E-07				3.73E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	2.63E-10	Outside EPD	2.63E-10	Reproductive, Developmental	1.01E-05	Outside EPD	1.01E-05
			Metals							
			Arsenic	4.57E-09	1.34E-09	5.90E-09	Skin, Vascular	3.55E-05	1.04E-05	4.59E-05
			Cobalt	NA	NA	NA	Thyroid	4.01E-05	4.69E-06	4.48E-05
			Manganese	NA	NA	NA	Neurological	7.12E-05	5.21E-04	5.92E-04
			Pesticides							
			4,4'-DDT	1.80E-12	Outside EPD	1.80E-12	Liver	3.70E-08	Outside EPD	3.70E-08
			PCBs							
			Total PCBs	1.24E-11	Outside EPD	1.24E-11	Ocular/eye, Nails, Immune	5.44E-06	Outside EPD	5.44E-06
			Chemical Total	4.85E-09	1.34E-09	6.18E-09		1.62E-04	5.36E-04	6.98E-04
		Exposure Point Total				6.18E-09				6.98E-04
	Exposure Medium Total					6.18E-09				6.98E-04
Surface Water Total						6.18E-09				6.98E-04

Table H-2-4. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Anacostia								
			Metals							
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.98E-01		1.98E-01
			Pesticides							
			4,4'-DDD	1.57E-07	--	1.57E-07	Liver	7.65E-02		7.65E-02
			4,4'-DDE	2.94E-07	--	2.94E-07	Liver, Developmental	1.01E-02		1.01E-02
			Aldrin	2.09E-07	--	2.09E-07	Liver	1.43E-03		1.43E-03
			alpha-Chlordane	3.48E-07	--	3.48E-07	Liver	6.97E-03		6.97E-03
			cis-Nonachlor	1.27E-07	--	1.27E-07	Liver	2.54E-03		2.54E-03
			Dieldrin	3.42E-06	--	3.42E-06	Liver	1.49E-02		1.49E-02
			gamma-Chlordane	6.46E-08	--	6.46E-08	Liver	1.29E-03		1.29E-03
			Heptachlor epoxide	6.26E-07	--	6.26E-07	Liver	1.85E-02		1.85E-02
			Mirex	1.81E-07		1.81E-07	Endocrine, Liver	1.76E-04		1.76E-04
			Oxychlordane	3.23E-08	--	3.23E-08	Liver	6.46E-04		6.46E-04
			trans-Nonachlor	2.00E-07	--	2.00E-07	Liver	4.00E-03		4.00E-03
			PCBs							
			Total PCBs	2.23E-05	--	2.23E-05	Ocular/eye, Nails, Immune	1.95E+00		1.95E+00
			PCB-TEQ	8.87E-06	--	8.87E-06	Reproductive, Developmental	3.41E-01		3.41E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						2.80E-05				2.29E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						1.45E-05				6.76E-01
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)						2.89E-05				2.33E+00
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)						1.54E-05				7.14E-01

Notes

NA - Not applicable.

EPD - Effective Predictive Domain.

PCB - Polychlorinated Biphenyl.

PCB-TEQ - PCB Toxicity Equivalence.

RfD - Oral Reference Dose.

SVOC - Semivolatile Organic Compound.

TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.

(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.

(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Sediment, Surface Water, and Upper Anacostia Fish

Organ	Chemical	Sediment	Surface Water	Fish Tissue	Total
Blood	Antimony, DRO	1.27E-03	--	--	1E-03
Decreased body and organ weights	Nickel	1.34E-04	--	--	1E-04
Developmental	TCDD-TEQ, PCB-TEQ, Benzo(a)pyrene, 4,4-DDE	2.32E-02	1.01E-05	3.51E-01	4E-01
Endocrine	Mirex	--	--	1.76E-04	2E-04
Eye	Total PCBs	5.53E-03	5.44E-06	1.95E+00	2E+00
Hair	Thallium, Vanadium	2.38E-03	--	--	2E-03
Immune	Total PCBs	5.53E-03	5.44E-06	1.95E+00	2E+00
Kidney	DRO	5.55E-04	--	--	6E-04
Liver	Pesticides, DRO	5.55E-04	3.70E-08	1.37E-01	1E-01
Mortality	Antimony	7.15E-04	--	--	7E-04
Nails	Total PCBs	5.53E-03	5.44E-06	1.95E+00	2E+00
Neurological	Aluminum, Manganese, Methyl Mercury	8.32E-04	5.92E-04	1.98E-01	2E-01
Reproductive	TCDD-TEQ, PCB-TEQ, Cyanide	2.30E-02	1.01E-05	3.41E-01	4E-01
Skin	Arsenic	1.25E-03	4.59E-05	--	1E-03
Thyroid	Cobalt	2.44E-03	4.48E-05	--	2E-03
Vascular	Arsenic	1.25E-03	4.59E-05	--	1E-03

Table H-2-5. RME
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.18E-07	1.29E-07	4.48E-07	Reproductive, Developmental	2.04E-02	8.30E-03	2.87E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	5.99E-04	NA	5.99E-04
			Antimony	NA	NA	NA	Mortality, Blood	1.08E-03	NA	1.08E-03
			Arsenic	6.79E-08	4.60E-08	1.14E-07	Skin, Vascular	8.80E-04	5.96E-04	1.48E-03
			Cobalt	NA	NA	NA	Thyroid	3.68E-03	NA	3.68E-03
			Cyanide	NA	NA	NA	Reproductive	3.63E-04	NA	3.63E-04
			Manganese	NA	NA	NA	Neurological	6.56E-04	NA	6.56E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	2.02E-04	NA	2.02E-04
			Thallium	NA	NA	NA	Hair	1.60E-03	NA	1.60E-03
			Vanadium	NA	NA	NA	Hair	1.99E-03	NA	1.99E-03
			PCBs							
			Total PCBs	1.37E-08	2.59E-08	3.96E-08	Ocular/eye, Nails, Immune	1.99E-03	3.78E-03	5.77E-03
			SVOCs							
			Benzo(a)anthracene	3.60E-09	6.35E-09	9.95E-09	NA	NA	NA	NA
			Benzo(a)pyrene	2.19E-08	3.87E-08	6.06E-08	Developmental	1.71E-04	3.01E-04	4.71E-04
			Benzo(b)fluoranthene	3.22E-09	5.68E-09	8.90E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	1.17E-10	2.06E-10	3.24E-10	NA	NA	NA	NA
			Chrysene	2.91E-11	5.12E-11	8.03E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	5.16E-09	9.08E-09	1.42E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.89E-09	3.32E-09	5.21E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	8.38E-04	NA	8.38E-04
			Chemical Total	4.36E-07	2.65E-07	7.01E-07		3.45E-02	1.30E-02	4.74E-02
		Exposure Point Total				7.01E-07				4.74E-02
	Exposure Medium Total					7.01E-07				4.74E-02
Sediment Total						7.01E-07				4.74E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	2.38E-10	Outside EPD	2.38E-10	Reproductive, Developmental	1.53E-05	Outside EPD	1.53E-05
			Metals							
			Arsenic	4.14E-09	8.63E-10	5.00E-09	Skin, Vascular	5.36E-05	1.12E-05	6.48E-05
			Cobalt	NA	NA	NA	Thyroid	6.06E-05	5.05E-06	6.56E-05
			Manganese	NA	NA	NA	Neurological	1.08E-04	5.60E-04	6.68E-04
			Pesticides							
			4,4'-DDT	1.63E-12	Outside EPD	1.63E-12	Liver	5.59E-08	Outside EPD	5.59E-08
			PCBs							
			Total PCBs	1.13E-11	Outside EPD	1.13E-11	Ocular/eye, Nails, Immune	8.21E-06	Outside EPD	8.21E-06
			Chemical Total	4.39E-09	8.63E-10	5.25E-09		2.45E-04	5.77E-04	8.22E-04
		Exposure Point Total				5.25E-09				8.22E-04
	Exposure Medium Total					5.25E-09				8.22E-04
Surface Water Total						5.25E-09				8.22E-04

Table H-2-5. RME
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Anacostia								
			Metals							
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.94E-01		1.94E-01
			Pesticides							
			4,4'-DDD	9.26E-08	--	9.26E-08	Liver	7.50E-02		7.50E-02
			4,4'-DDE	1.73E-07	--	1.73E-07	Liver, Developmental	9.90E-03		9.90E-03
			Aldrin	1.23E-07	--	1.23E-07	Liver	1.41E-03		1.41E-03
			alpha-Chlordane	2.05E-07	--	2.05E-07	Liver	6.84E-03		6.84E-03
			cis-Nonachlor	7.46E-08	--	7.46E-08	Liver	2.49E-03		2.49E-03
			Dieldrin	2.01E-06	--	2.01E-06	Liver	1.47E-02		1.47E-02
			gamma-Chlordane	3.80E-08	--	3.80E-08	Liver	1.27E-03		1.27E-03
			Heptachlor epoxide	3.69E-07	--	3.69E-07	Liver	1.82E-02		1.82E-02
			Mirex	1.06E-07		1.06E-07	Endocrine, Liver	1.72E-04		1.72E-04
			Oxychlordane	1.90E-08	--	1.90E-08	Liver	6.34E-04		6.34E-04
			trans-Nonachlor	1.18E-07	--	1.18E-07	Liver	3.92E-03		3.92E-03
			PCBs							
			Total PCBs	1.31E-05	--	1.31E-05	Ocular/eye, Nails, Immune	1.92E+00		1.92E+00
			PCB-TEQ	5.22E-06	--	5.22E-06	Reproductive, Developmental	3.35E-01		3.35E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						1.65E-05				2.24E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						8.55E-06				6.63E-01
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)						1.72E-05				2.29E+00
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)						9.25E-06				7.11E-01

Notes
NA - Not applicable.
EPD - Effective Predictive Domain.
PCB - Polychlorinated Biphenyl.

PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Sediment, Surface Water, and Upper Anacostia Fish

Organ	Chemical	Sediment	Surface Water	Fish Tissue	Total
Blood	Antimony, DRO	1.92E-03	--	--	2E-03
Decreased body and organ weights	Nickel	2.02E-04	--	--	2E-04
Developmental	TCDD-TEQ, PCB-TEQ, Benzo(a)pyrene, 4	2.92E-02	1.53E-05	3.45E-01	4E-01
Endocrine	Mirex	--	--	1.72E-04	2E-04
Eye	Total PCBs	5.77E-03	8.21E-06	1.92E+00	2E+00
Hair	Thallium, Vanadium	3.59E-03	--	--	4E-03
Immune	Total PCBs	5.77E-03	8.21E-06	1.92E+00	2E+00
Kidney	DRO	8.38E-04	--	--	8E-04
Liver	Pesticides, DRO	8.38E-04	5.59E-08	1.34E-01	1E-01
Mortality	Antimony	1.08E-03	--	--	1E-03
Nails	Total PCBs	5.77E-03	8.21E-06	1.92E+00	2E+00
Neurological	Aluminum, Manganese, Methyl Mercury	1.26E-03	6.68E-04	1.94E-01	2E-01
Reproductive	TCDD-TEQ, PCB-TEQ, Cyanide	2.91E-02	1.53E-05	3.35E-01	4E-01
Skin	Arsenic	1.48E-03	6.48E-05	--	2E-03
Thyroid	Cobalt	3.68E-03	6.56E-05	--	4E-03
Vascular	Arsenic	1.48E-03	6.48E-05	--	2E-03

Table H-2-6. RME
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	9.93E-07	1.72E-07	1.16E-06	Reproductive, Developmental	1.27E-01	2.20E-02	1.49E-01
			Metals							
			Aluminum	NA	NA	NA	Neurological	3.74E-03	NA	3.74E-03
			Antimony	NA	NA	NA	Mortality, Blood	6.73E-03	NA	6.73E-03
			Arsenic	2.12E-07	6.10E-08	2.73E-07	Skin, Vascular	5.49E-03	1.58E-03	7.07E-03
			Cobalt	NA	NA	NA	Thyroid	2.30E-02	NA	2.30E-02
			Cyanide	NA	NA	NA	Reproductive	2.26E-03	NA	2.26E-03
			Manganese	NA	NA	NA	Neurological	4.09E-03	NA	4.09E-03
			Nickel	NA	NA	NA	Decreased body and organ weights	1.26E-03	NA	1.26E-03
			Thallium	NA	NA	NA	Hair	9.97E-03	NA	9.97E-03
			Vanadium	NA	NA	NA	Hair	1.24E-02	NA	1.24E-02
			PCBs							
			Total PCBs	4.26E-08	3.43E-08	7.69E-08	Ocular/eye, Nails, Immune	1.24E-02	1.00E-02	2.24E-02
			SVOCs							
			Benzo(a)anthracene	1.89E-08	1.41E-08	3.30E-08	NA	NA	NA	NA
			Benzo(a)pyrene	1.15E-07	8.61E-08	2.01E-07	Developmental	1.06E-03	7.97E-04	1.86E-03
			Benzo(b)fluoranthene	1.69E-08	1.26E-08	2.95E-08	NA	NA	NA	NA
			Benzo(k)fluoranthene	6.14E-10	4.60E-10	1.07E-09	NA	NA	NA	NA
			Chrysene	1.52E-10	1.14E-10	2.66E-10	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	2.70E-08	2.02E-08	4.72E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	9.88E-09	7.40E-09	1.73E-08	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C2	NA	NA	NA	Liver, Kidney, Blood	5.23E-03	NA	5.23E-03
			Chemical Total	1.44E-06	4.08E-07	1.84E-06		2.15E-01	3.44E-02	2.49E-01
		Exposure Point Total				1.84E-06				2.49E-01
	Exposure Medium Total					1.84E-06				2.49E-01
Sediment Total						1.84E-06				2.49E-01
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.71E-10	Outside EPD	3.71E-10	Reproductive, Developmental	4.76E-05	Outside EPD	4.76E-05
			Metals							
			Arsenic	6.45E-09	1.02E-09	7.47E-09	Skin, Vascular	1.67E-04	2.65E-05	1.94E-04
			Cobalt	NA	NA	NA	Thyroid	1.89E-04	1.20E-05	2.01E-04
			Manganese	NA	NA	NA	Neurological	3.35E-04	1.33E-03	1.66E-03
			Pesticides							
			4,4'-DDT	2.54E-12	Outside EPD	2.54E-12	Liver	1.74E-07	Outside EPD	1.74E-07
			PCBs							
			Total PCBs	1.76E-11	Outside EPD	1.76E-11	Ocular/eye, Nails, Immune	2.56E-05	Outside EPD	2.56E-05
			Chemical Total	6.84E-09	1.02E-09	7.86E-09		7.65E-04	1.36E-03	2.13E-03
		Exposure Point Total				7.86E-09				2.13E-03
	Exposure Medium Total					7.86E-09				2.13E-03
Surface Water Total						7.86E-09				2.13E-03

Table H-2-6. RME
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Anacostia								
			Metals							
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.25E-01		3.25E-01
			Pesticides							
			4,4'-DDD	7.77E-08	--	7.77E-08	Liver	1.26E-01		1.26E-01
			4,4'-DDE	1.45E-07	--	1.45E-07	Liver, Developmental	1.66E-02		1.66E-02
			Aldrin	1.03E-07	--	1.03E-07	Liver	2.36E-03		2.36E-03
			alpha-Chlordane	1.72E-07	--	1.72E-07	Liver	1.15E-02		1.15E-02
			cis-Nonachlor	6.26E-08	--	6.26E-08	Liver	4.18E-03		4.18E-03
			Dieldrin	1.69E-06	--	1.69E-06	Liver	2.46E-02		2.46E-02
			gamma-Chlordane	3.19E-08	--	3.19E-08	Liver	2.13E-03		2.13E-03
			Heptachlor epoxide	3.09E-07	--	3.09E-07	Liver	3.05E-02		3.05E-02
			Mirex	8.92E-08		8.92E-08	Endocrine, Liver	2.89E-04		2.89E-04
			Oxychlordane	1.60E-08	--	1.60E-08	Liver	1.06E-03		1.06E-03
			trans-Nonachlor	9.88E-08	--	9.88E-08	Liver	6.59E-03		6.59E-03
			PCBs							
			Total PCBs	1.10E-05	--	1.10E-05	Ocular/eye, Nails, Immune	3.22E+00		3.22E+00
			PCB-TEQ	4.38E-06	--	4.38E-06	Reproductive, Developmental	5.62E-01		5.62E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						1.38E-05				3.77E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						7.18E-06				1.11E+00
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)						1.57E-05				4.02E+00
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)						9.03E-06				1.36E+00

Notes
NA - Not applicable.
EPD - Effective Predictive Domain.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Sediment, Surface Water, and Upper Anacostia Fish

Organ	Chemical	Sediment	Surface Water	Fish Tissue	Total
Blood	Antimony, DRO	1.20E-02	--	--	1E-02
Decreased body and organ weights	Nickel	1.26E-03	--	--	1E-03
Developmental	TCDD-TEQ, PCB-TEQ, Benzo(a)pyrene, 4,4-DDE	1.51E-01	4.76E-05	5.78E-01	7E-01
Endocrine	Mirex	--	--	2.89E-04	3E-04
Eye	Total PCBs	2.24E-02	2.56E-05	3.22E+00	3E+00
Hair	Thallium, Vanadium	2.24E-02	--	--	2E-02
Immune	Total PCBs	2.24E-02	2.56E-05	3.22E+00	3E+00
Kidney	DRO	5.23E-03	--	--	5E-03
Liver	Pesticides, DRO	5.23E-03	1.74E-07	2.26E-01	2E-01
Mortality	Antimony	6.73E-03	--	--	7E-03
Nails	Total PCBs	2.24E-02	2.56E-05	3.22E+00	3E+00
Neurological	Aluminum, Manganese, Methyl Mercury	7.83E-03	1.66E-03	3.25E-01	3E-01
Reproductive	TCDD-TEQ, PCB-TEQ, Cyanide	1.52E-01	4.76E-05	5.62E-01	7E-01
Skin	Arsenic	7.07E-03	1.94E-04	--	7E-03
Thyroid	Cobalt	2.30E-02	2.01E-04	--	2E-02
Vascular	Arsenic	7.07E-03	1.94E-04	--	7E-03

Table H-2-7. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Potomac								
			Inorganics							
			Arsenic	2.13E-06	--	2.13E-06	Skin, Vascular	1.66E-02		1.66E-02
			Arsenic, organic	NA	--	NA	Bladder	2.24E-03		2.24E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.01E-01		2.01E-01
			Pesticides							
			4,4'-DDD	3.26E-07	--	3.26E-07	Liver	1.58E-01		1.58E-01
			4,4'-DDE	2.66E-06	--	2.66E-06	Liver, Developmental	9.11E-02		9.11E-02
			Aldrin	6.56E-07	--	6.56E-07	Liver	4.50E-03		4.50E-03
			alpha-Chlordane	5.74E-07	--	5.74E-07	Liver	1.15E-02		1.15E-02
			beta-BHC	1.00E-07	--	1.00E-07	NA	NA		NA
			cis-Nonachlor	2.48E-07	--	2.48E-07	Liver	4.95E-03		4.95E-03
			Dieldrin	1.48E-05	--	1.48E-05	Liver	6.46E-02		6.46E-02
			gamma-Chlordane	5.22E-08	--	5.22E-08	Liver	1.04E-03		1.04E-03
			Heptachlor epoxide	9.92E-07	--	9.92E-07	Liver	2.93E-02		2.93E-02
			Hexachlorobenzene	7.97E-08	--	7.97E-08	Liver	2.18E-04		2.18E-04
			Mirex	1.99E-07		1.99E-07	Endocrine, Liver	1.94E-04		1.94E-04
			Oxychlordane	6.19E-08	--	6.19E-08	Liver	1.24E-03		1.24E-03
			trans-Nonachlor	7.04E-07	--	7.04E-07	Liver	1.41E-02		1.41E-02
			PCBs							
			Total PCBs	9.99E-05	--	9.99E-05	Ocular/eye, Nails, Immune	8.75E+00		8.75E+00
			PCB-TEQ	1.41E-04	--	1.41E-04	Reproductive, Developmental	5.42E+00		5.42E+00
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						1.23E-04				9.35E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						1.64E-04				6.02E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Potomac								
			Inorganics							
			Arsenic	1.99E-05	--	1.99E-05	Skin, Vascular	1.55E-01		1.55E-01
			Arsenic, organic	NA	--	NA	Bladder	2.09E-02		2.09E-02
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.38E-01		1.38E-01
			Pesticides							
			4,4'-DDD	6.40E-08	--	6.40E-08	Liver	3.11E-02		3.11E-02
			4,4'-DDE	4.48E-07	--	4.48E-07	Liver, Developmental	1.54E-02		1.54E-02
			alpha-Chlordane	1.73E-07	--	1.73E-07	Liver	3.47E-03		3.47E-03
			Dieldrin	3.40E-06	--	3.40E-06	Liver	1.49E-02		1.49E-02
			gamma-Chlordane	8.97E-08	--	8.97E-08	Liver	1.79E-03		1.79E-03
			Heptachlor epoxide	9.10E-07	--	9.10E-07	Liver	2.69E-02		2.69E-02
			Oxychlordane	4.34E-08	--	4.34E-08	Liver	8.69E-04		8.69E-04
			trans-Nonachlor	2.18E-07	--	2.18E-07	Liver	4.37E-03		4.37E-03
			PCBs							
			Total PCBs	1.57E-05	--	1.57E-05	Ocular/eye, Nails, Immune	1.37E+00		1.37E+00
			PCB-TEQ	1.80E-05	--	1.80E-05	Reproductive, Developmental	6.92E-01		6.92E-01
Fish Tissue Total - Lower Potomac (Total PCBs)[3]						4.09E-05				1.78E+00
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]						4.32E-05				1.10E+00

Table H-2-7. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Non-Tidal Anacostia								
			Dioxin							
			2,3,7,8-TCDD-TEQ	3.95E-07	--	3.95E-07	Reproductive, Developmental	1.52E-02		1.52E-02
			Inorganics							
			Arsenic	4.06E-07	--	4.06E-07	Skin, Vascular	3.16E-03		3.16E-03
			Arsenic, organic	NA	--	NA	Bladder	4.26E-04		4.26E-04
			Cobalt	NA	--	NA	Thyroid	6.75E-03		6.75E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.73E-01		3.73E-01
			Thallium	NA	--	NA	Hair	4.81E-02		4.81E-02
			Pesticides							
			Chlordane	2.94E-07	--	2.94E-07	Liver	5.87E-03		5.87E-03
			Dieldrin	1.01E-06	--	1.01E-06	Liver	4.44E-03		4.44E-03
			Heptachlor epoxide	5.02E-07	--	5.02E-07	Liver	1.48E-02		1.48E-02
			PCBs		--					
			Total PCBs	2.06E-06		2.06E-06	Ocular/eye, Nails, Immune	1.80E-01		1.80E-01
			PCB-TEQ	2.89E-06	--	2.89E-06	Reproductive, Developmental	1.11E-01		1.11E-01
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]						4.67E-06				6.51E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]						5.50E-06				5.82E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Anacostia								
			Metals							
			Arsenic	1.31E-06	--	1.31E-06	Skin, Vascular	1.02E-02		1.02E-02
			Arsenic, organic	NA	--	NA	Bladder	1.38E-03		1.38E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.22E-01		1.22E-01
			Pesticides							
			4,4'-DDD	2.56E-07	--	2.56E-07	Liver	1.25E-01		1.25E-01
			4,4'-DDE	7.23E-07	--	7.23E-07	Liver, Developmental	2.48E-02		2.48E-02
			Aldrin	2.20E-07	--	2.20E-07	Liver	1.51E-03		1.51E-03
			alpha-Chlordane	4.05E-07	--	4.05E-07	Liver	8.11E-03		8.11E-03
			cis-Nonachlor	1.74E-07	--	1.74E-07	Liver	3.48E-03		3.48E-03
			Dieldrin	9.15E-06	--	9.15E-06	Liver	4.01E-02		4.01E-02
			gamma-Chlordane	2.23E-07	--	2.23E-07	Liver	4.46E-03		4.46E-03
			Heptachlor epoxide	1.25E-06	--	1.25E-06	Liver	3.69E-02		3.69E-02
			Mirex	2.27E-07		2.27E-07	Endocrine, Liver	2.21E-04		2.21E-04
			Oxychlordane	9.15E-08	--	9.15E-08	Liver	1.83E-03		1.83E-03
			trans-Nonachlor	5.04E-07	--	5.04E-07	Liver	1.01E-02		1.01E-02
			PCBs							
			Total PCBs	3.28E-05	--	3.28E-05	Ocular/eye, Nails, Immune	2.87E+00		2.87E+00
			PCB-TEQ	4.62E-05	--	4.62E-05	Reproductive, Developmental	1.78E+00		1.78E+00
Fish Tissue Total - Lower Anacostia (Total PCBs)[2]						4.73E-05				3.26E+00
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[3]						6.07E-05				2.16E+00
Receptor Total - Upper Potomac Fish (Total PCBs)[2]						1.23E-04				9.35E+00
Receptor Total - Upper Potomac Fish (PCB-TEQs)[3]						1.64E-04				6.02E+00
Receptor Total - Lower Potomac Fish (Total PCBs)[2]						4.09E-05				1.78E+00
Receptor Total -Lower Potomac Fish (PCB-TEQs)[3]						4.32E-05				1.10E+00
Receptor Total - Non-Tidal Anacostia Fish (Total PCBs)[2]						4.67E-06				6.51E-01
Receptor Total - Non-Tidal Anacostia Fish (PCB-TEQs)[3]						5.50E-06				5.82E-01
Receptor Total - Lower Anacostia Fish (Total PCBs)[2]						4.73E-05				3.26E+00
Receptor Total - Lower Anacostia Fish (PCB-TEQs)[3]						6.07E-05				2.16E+00

Table H-2-7. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Teen

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

Notes
NA - Not applicable.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Upper Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	2.24E-03	2E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	5.51E+00	6E+00
Endocrine	Mirex	1.94E-04	2E-04
Eye	Total PCBs	8.75E+00	9E+00
Immune	Total PCBs	8.75E+00	9E+00
Liver	Pesticides	3.81E-01	4E-01
Nails	Total PCBs	8.75E+00	9E+00
Neurological	Methyl Mercury	2.01E-01	2E-01
Reproductive	PCB-TEQ, TCDD-TEQ	5.42E+00	5E+00
Skin	Arsenic	1.66E-02	2E-02
Vascular	Arsenic	1.66E-02	2E-02

Target Organ HI - Lower Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	2.09E-02	2E-02
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	7.07E-01	7E-01
Eye	Total PCBs	1.37E+00	1E+00
Immune	Total PCBs	1.37E+00	1E+00
Liver	Pesticides	9.88E-02	1E-01
Nails	Total PCBs	1.37E+00	1E+00
Neurological	Methyl Mercury	1.38E-01	1E-01
Reproductive	PCB-TEQ, TCDD-TEQ	6.92E-01	7E-01
Skin	Arsenic	1.55E-01	2E-01
Vascular	Arsenic	1.55E-01	2E-01

Target Organ HI - Lower Anacostia

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	1.38E-03	1E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.80E+00	2E+00
Endocrine	Mirex	2.21E-04	2E-04
Eye	Total PCBs	2.87E+00	3E+00
Immune	Total PCBs	2.87E+00	3E+00
Liver	Pesticides	2.56E-01	3E-01
Nails	Total PCBs	2.87E+00	3E+00
Neurological	Methyl Mercury	1.22E-01	1E-01
Reproductive	PCB-TEQ, TCDD-TEQ	1.78E+00	2E+00
Skin	Arsenic	1.02E-02	1E-02
Vascular	Arsenic	1.02E-02	1E-02

Target Organ HI - Non-Tidal Anacostia Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	4.26E-04	4E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.26E-01	1E-01
Eye	Total PCBs	1.80E-01	2E-01
Hair	Thallium	4.81E-02	5E-02
Immune	Total PCBs	1.80E-01	2E-01
Liver	Pesticides	2.52E-02	3E-02
Nails	Total PCBs	1.80E-01	2E-01
Neurological	Methyl Mercury	3.73E-01	4E-01
Reproductive	PCB-TEQ, TCDD-TEQ	1.26E-01	1E-01
Skin	Arsenic	3.16E-03	3E-03
Thyroid	Cobalt	6.75E-03	7E-03
Vascular	Arsenic	3.16E-03	3E-03

Table H-2-8. RME
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Potomac								
			Metals							
			Arsenic	1.26E-06	--	1.26E-06	Skin, Vascular	1.63E-02		1.63E-02
			Arsenic, organic	NA	--	NA	Bladder	2.20E-03		2.20E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.97E-01		1.97E-01
			Pesticides							
			4,4'-DDD	1.92E-07	--	1.92E-07	Liver	1.55E-01		1.55E-01
			4,4'-DDE	1.56E-06	--	1.56E-06	Liver, Developmental	8.94E-02		8.94E-02
			Aldrin	3.86E-07	--	3.86E-07	Liver	4.42E-03		4.42E-03
			alpha-Chlordane	3.38E-07	--	3.38E-07	Liver	1.13E-02		1.13E-02
			beta-BHC	5.89E-08	--	5.89E-08	NA	NA		NA
			cis-Nonachlor	1.46E-07	--	1.46E-07	Liver	4.86E-03		4.86E-03
			Dieldrin	8.69E-06	--	8.69E-06	Liver	6.34E-02		6.34E-02
			gamma-Chlordane	3.07E-08	--	3.07E-08	Liver	1.02E-03		1.02E-03
			Heptachlor epoxide	5.84E-07	--	5.84E-07	Liver	2.88E-02		2.88E-02
			Hexachlorobenzene	4.69E-08	--	4.69E-08	Liver	2.14E-04		2.14E-04
			Mirex	1.17E-07		1.17E-07	Endocrine, Liver	1.90E-04		1.90E-04
			Oxychlordane	3.64E-08	--	3.64E-08	Liver	1.21E-03		1.21E-03
			trans-Nonachlor	4.15E-07	--	4.15E-07	Liver	1.38E-02		1.38E-02
			PCBs							
			Total PCBs	5.88E-05	--	5.88E-05	Ocular/eye, Nails, Immune	8.58E+00		8.58E+00
			PCB-TEQ	8.29E-05	--	8.29E-05	Reproductive, Developmental	5.32E+00		5.32E+00
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						7.27E-05				9.17E+00
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						9.68E-05				5.91E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Potomac								
			Metals							
			Arsenic	1.17E-05	--	1.17E-05	Skin, Vascular	1.52E-01		1.52E-01
			Arsenic, organic	NA	--	NA	Bladder	2.05E-02		2.05E-02
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.35E-01		1.35E-01
			Pesticides							
			4,4'-DDD	3.76E-08	--	3.76E-08	Liver	3.05E-02		3.05E-02
			4,4'-DDE	2.64E-07	--	2.64E-07	Liver, Developmental	1.51E-02		1.51E-02
			alpha-Chlordane	1.02E-07	--	1.02E-07	Liver	3.40E-03		3.40E-03
			Dieldrin	2.00E-06	--	2.00E-06	Liver	1.46E-02		1.46E-02
			gamma-Chlordane	5.28E-08	--	5.28E-08	Liver	1.76E-03		1.76E-03
			Heptachlor epoxide	5.36E-07	--	5.36E-07	Liver	2.64E-02		2.64E-02
			Oxychlordane	2.56E-08	--	2.56E-08	Liver	8.52E-04		8.52E-04
			trans-Nonachlor	1.28E-07	--	1.28E-07	Liver	4.28E-03		4.28E-03
			PCBs							
			Total PCBs	9.22E-06	--	9.22E-06	Ocular/eye, Nails, Immune	1.34E+00		1.34E+00
			PCB-TEQ	1.06E-05	--	1.06E-05	Reproductive, Developmental	6.79E-01		6.79E-01
Fish Tissue Total - Lower Potomac (Total PCBs)[3]						2.41E-05				1.75E+00
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]						2.54E-05				1.08E+00

Table H-2-8. RME
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upstream Non-Tidal Anacostia								
			Dioxin							
			2,3,7,8-TCDD-TEQ	2.32E-07	--	2.32E-07	Reproductive, Developmental	1.49E-02		1.49E-02
			Metals					0.00E+00		
			Arsenic	2.39E-07	--	2.39E-07	Skin, Vascular	3.10E-03		3.10E-03
			Arsenic, organic	NA	--	NA	Bladder	4.18E-04		4.18E-04
			Cobalt	NA	--	NA	Thyroid	6.62E-03		6.62E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.65E-01		3.65E-01
			Thallium	NA	--	NA	Hair	4.72E-02		4.72E-02
			Pesticides					0.00E+00		
			Chlordane	1.73E-07	--	1.73E-07	Liver	5.76E-03		5.76E-03
			Dieldrin	5.97E-07	--	5.97E-07	Liver	4.35E-03		4.35E-03
			Heptachlor epoxide	2.95E-07	--	2.95E-07	Liver	1.46E-02		1.46E-02
			PCBs		--			0.00E+00		
			Total PCBs	1.21E-06		1.21E-06	Ocular/eye, Nails, Immune	1.77E-01		1.77E-01
			PCB-TEQ	1.70E-06	--	1.70E-06	Reproductive, Developmental	1.09E-01		1.09E-01
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]						2.75E-06				6.39E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]						3.24E-06				5.71E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Anacostia								
			Metals							
			Arsenic	7.73E-07	--	7.73E-07	Skin, Vascular	1.00E-02		1.00E-02
			Arsenic, organic	NA	--	NA	Bladder	1.35E-03		1.35E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.20E-01		1.20E-01
			Pesticides							
			4,4'-DDD	1.51E-07	--	1.51E-07	Liver	1.22E-01		1.22E-01
			4,4'-DDE	4.26E-07	--	4.26E-07	Liver, Developmental	2.44E-02		2.44E-02
			Aldrin	1.29E-07	--	1.29E-07	Liver	1.48E-03		1.48E-03
			alpha-Chlordane	2.39E-07	--	2.39E-07	Liver	7.96E-03		7.96E-03
			cis-Nonachlor	1.02E-07	--	1.02E-07	Liver	3.41E-03		3.41E-03
			Dieldrin	5.39E-06	--	5.39E-06	Liver	3.93E-02		3.93E-02
			gamma-Chlordane	1.31E-07	--	1.31E-07	Liver	4.38E-03		4.38E-03
			Heptachlor epoxide	7.35E-07	--	7.35E-07	Liver	3.62E-02		3.62E-02
			Mirex	1.34E-07		1.34E-07	Endocrine, Liver	2.16E-04		2.16E-04
			Oxychlordane	5.38E-08	--	5.38E-08	Liver	1.79E-03		1.79E-03
			trans-Nonachlor	2.97E-07	--	2.97E-07	Liver	9.89E-03		9.89E-03
			PCBs							
			Total PCBs	1.93E-05	--	1.93E-05	Ocular/eye, Nails, Immune	2.82E+00		2.82E+00
			PCB-TEQ	2.72E-05	--	2.72E-05	Reproductive, Developmental	1.74E+00		1.74E+00
Fish Tissue Total - Lower Anacostia (Total PCBs)[2]						2.79E-05				3.20E+00
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[3]						3.57E-05				2.12E+00
Receptor Total - Upper Potomac Fish (Total PCBs)[2]						7.27E-05				9.17E+00
Receptor Total - Upper Potomac Fish (PCB-TEQs)[3]						9.68E-05				5.91E+00
Receptor Total - Lower Potomac Fish (Total PCBs)[2]						2.41E-05				1.75E+00
Receptor Total -Lower Potomac Fish (PCB-TEQs)[3]						2.54E-05				1.08E+00
Receptor Total - Non-Tidal Anacostia Fish (Total PCBs)[2]						2.75E-06				6.39E-01
Receptor Total - Non-Tidal Anacostia Fish (PCB-TEQs)[3]						3.24E-06				5.71E-01
Receptor Total - Lower Anacostia Fish (Total PCBs)[2]						2.79E-05				3.20E+00
Receptor Total - Lower Anacostia Fish (PCB-TEQs)[3]						3.57E-05				2.12E+00

Table H-2-8. RME
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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

Notes
NA - Not applicable.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Upper Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	2.20E-03	2E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	5.41E+00	5E+00
Endocrine	Mirex	1.90E-04	2E-04
Eye	Total PCBs	8.58E+00	9E+00
Immune	Total PCBs	8.58E+00	9E+00
Liver	Pesticides	3.74E-01	4E-01
Nails	Total PCBs	8.58E+00	9E+00
Neurological	Methyl Mercury	1.97E-01	2E-01
Reproductive	PCB-TEQ, TCDD-TEQ	5.32E+00	5E+00
Skin	Arsenic	1.63E-02	2E-02
Vascular	Arsenic	1.63E-02	2E-02

Target Organ HI - Lower Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	2.05E-02	2E-02
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	6.94E-01	7E-01
Eye	Total PCBs	1.34E+00	1E+00
Immune	Total PCBs	1.34E+00	1E+00
Liver	Pesticides	9.69E-02	1E-01
Nails	Total PCBs	1.34E+00	1E+00
Neurological	Methyl Mercury	1.35E-01	1E-01
Reproductive	PCB-TEQ, TCDD-TEQ	6.79E-01	7E-01
Skin	Arsenic	1.52E-01	2E-01
Vascular	Arsenic	1.52E-01	2E-01

Target Organ HI - Lower Anacostia

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	1.35E-03	1E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.77E+00	2E+00
Endocrine	Mirex	2.16E-04	2E-04
Eye	Total PCBs	2.82E+00	3E+00
Immune	Total PCBs	2.82E+00	3E+00
Liver	Pesticides	2.51E-01	3E-01
Nails	Total PCBs	2.82E+00	3E+00
Neurological	Methyl Mercury	1.20E-01	1E-01
Reproductive	PCB-TEQ, TCDD-TEQ	1.74E+00	2E+00
Skin	Arsenic	1.00E-02	1E-02
Vascular	Arsenic	1.00E-02	1E-02

Target Organ HI - Non-Tidal Anacostia Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	4.18E-04	4E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.24E-01	1E-01
Eye	Total PCBs	1.77E-01	2E-01
Hair	Thallium	4.72E-02	5E-02
Immune	Total PCBs	1.77E-01	2E-01
Liver	Pesticides	2.47E-02	2E-02
Nails	Total PCBs	1.77E-01	2E-01
Neurological	Methyl Mercury	3.65E-01	4E-01
Reproductive	PCB-TEQ, TCDD-TEQ	1.24E-01	1E-01
Skin	Arsenic	3.10E-03	3E-03
Thyroid	Cobalt	6.62E-03	7E-03
Vascular	Arsenic	3.10E-03	3E-03

Table H-2-9. RME
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Potomac								
			Metals							
			Arsenic	1.05E-06	--	1.05E-06	Skin, Vascular	2.73E-02		2.73E-02
			Arsenic, organic	NA	--	NA	Bladder	3.69E-03		3.69E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.31E-01		3.31E-01
			Pesticides							
			4,4'-DDD	1.61E-07	--	1.61E-07	Liver	2.61E-01		2.61E-01
			4,4'-DDE	1.31E-06	--	1.31E-06	Liver, Developmental	1.50E-01		1.50E-01
			Aldrin	3.24E-07	--	3.24E-07	Liver	7.41E-03		7.41E-03
			alpha-Chlordane	2.84E-07	--	2.84E-07	Liver	1.89E-02		1.89E-02
			beta-BHC	4.95E-08	--	4.95E-08	NA	NA		NA
			cis-Nonachlor	1.22E-07	--	1.22E-07	Liver	8.15E-03		8.15E-03
			Dieldrin	7.29E-06	--	7.29E-06	Liver	1.06E-01		1.06E-01
			gamma-Chlordane	2.58E-08	--	2.58E-08	Liver	1.72E-03		1.72E-03
			Heptachlor epoxide	4.90E-07	--	4.90E-07	Liver	4.83E-02		4.83E-02
			Hexachlorobenzene	3.94E-08	--	3.94E-08	Liver	3.59E-04		3.59E-04
			Mirex	9.85E-08		9.85E-08	Endocrine, Liver	3.19E-04		3.19E-04
			Oxychlordane	3.06E-08	--	3.06E-08	Liver	2.04E-03		2.04E-03
			trans-Nonachlor	3.48E-07	--	3.48E-07	Liver	2.32E-02		2.32E-02
			PCBs							
			Total PCBs	4.94E-05	--	4.94E-05	Ocular/eye, Nails, Immune	1.44E+01		1.44E+01
			PCB-TEQ	6.96E-05	--	6.96E-05	Reproductive, Developmental	8.92E+00		8.92E+00
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						6.10E-05				1.54E+01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						8.12E-05				9.91E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Potomac								
			Metals							
			Arsenic	9.82E-06	--	9.82E-06	Skin, Vascular	2.55E-01		2.55E-01
			Arsenic, organic	NA	--	NA	Bladder	3.44E-02		3.44E-02
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.26E-01		2.26E-01
			Pesticides							
			4,4'-DDD	3.16E-08	--	3.16E-08	Liver	5.12E-02		5.12E-02
			4,4'-DDE	2.21E-07	--	2.21E-07	Liver, Developmental	2.53E-02		2.53E-02
			alpha-Chlordane	8.56E-08	--	8.56E-08	Liver	5.71E-03		5.71E-03
			Dieldrin	1.68E-06	--	1.68E-06	Liver	2.45E-02		2.45E-02
			gamma-Chlordane	4.43E-08	--	4.43E-08	Liver	2.95E-03		2.95E-03
			Heptachlor epoxide	4.49E-07	--	4.49E-07	Liver	4.43E-02		4.43E-02
			Oxychlordane	2.15E-08	--	2.15E-08	Liver	1.43E-03		1.43E-03
			trans-Nonachlor	1.08E-07	--	1.08E-07	Liver	7.19E-03		7.19E-03
			PCBs							
			Total PCBs	7.74E-06	--	7.74E-06	Ocular/eye, Nails, Immune	2.26E+00		2.26E+00
			PCB-TEQ	8.89E-06	--	8.89E-06	Reproductive, Developmental	1.14E+00		1.14E+00
Fish Tissue Total - Lower Potomac (Total PCBs)[3]						2.02E-05				2.94E+00
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]						2.14E-05				1.82E+00

Table H-2-9. RME
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upstream Non-Tidal Anacostia								
			Dioxin							
			2,3,7,8-TCDD-TEQ	1.95E-07	--	1.95E-07	Reproductive, Developmental	2.50E-02		2.50E-02
			Metals							
			Arsenic	2.01E-07	--	2.01E-07	Skin, Vascular	5.20E-03		5.20E-03
			Arsenic, organic	NA	--	NA	Bladder	7.02E-04		7.02E-04
			Cobalt	NA	--	NA	Thyroid	1.11E-02		1.11E-02
			Mercury	NA	--	NA	Neurological (methyl mercury)	6.14E-01		6.14E-01
			Thallium	NA	--	NA	Hair	7.93E-02		7.93E-02
			Pesticides							
			Chlordane	9.95E-08	--	9.95E-08	Liver	1.61E-01		1.61E-01
			Dieldrin	1.06E-08	--	1.06E-08	Liver	1.22E-03		1.22E-03
			Heptachlor epoxide	4.63E-07	--	4.63E-07	Liver	1.06E-02		1.06E-02
			PCBs		--					
			Total PCBs	1.02E-06		1.02E-06	Ocular/eye, Nails, Immune	2.97E-01		2.97E-01
			PCB-TEQ	1.43E-06	--	1.43E-06	Reproductive, Developmental	1.83E-01		1.83E-01
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]						1.99E-06				1.20E+00
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]						2.40E-06				1.09E+00
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Anacostia								
			Metals							
			Arsenic	6.49E-07	--	6.49E-07	Skin, Vascular	1.68E-02		1.68E-02
			Arsenic, organic	NA	--	NA	Bladder	2.27E-03		2.27E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.01E-01		2.01E-01
			Pesticides							
			4,4'-DDD	1.27E-07	--	1.27E-07	Liver	2.05E-01		2.05E-01
			4,4'-DDE	3.57E-07	--	3.57E-07	Liver, Developmental	4.09E-02		4.09E-02
			Aldrin	1.09E-07	--	1.09E-07	Liver	2.48E-03		2.48E-03
			alpha-Chlordane	2.00E-07	--	2.00E-07	Liver	1.34E-02		1.34E-02
			cis-Nonachlor	8.59E-08	--	8.59E-08	Liver	5.73E-03		5.73E-03
			Dieldrin	4.52E-06	--	4.52E-06	Liver	6.60E-02		6.60E-02
			gamma-Chlordane	1.10E-07	--	1.10E-07	Liver	7.35E-03		7.35E-03
			Heptachlor epoxide	6.17E-07	--	6.17E-07	Liver	6.08E-02		6.08E-02
			Mirex	1.12E-07		1.12E-07	Endocrine, Liver	3.63E-04		3.63E-04
			Oxychlordane	4.52E-08	--	4.52E-08	Liver	3.01E-03		3.01E-03
			trans-Nonachlor	2.49E-07	--	2.49E-07	Liver	1.66E-02		1.66E-02
			PCBs							
			Total PCBs	1.62E-05	--	1.62E-05	Ocular/eye, Nails, Immune	4.73E+00		4.73E+00
			PCB-TEQ	2.28E-05	--	2.28E-05	Reproductive, Developmental	2.92E+00		2.92E+00
Fish Tissue Total - Lower Anacostia (Total PCBs)[2]						2.34E-05				5.37E+00
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[3]						3.00E-05				3.57E+00
Receptor Total - Upper Potomac Fish (Total PCBs)[2]						6.10E-05				1.54E+01
Receptor Total - Upper Potomac Fish (PCB-TEQs)[3]						8.12E-05				9.91E+00
Receptor Total - Lower Potomac Fish (Total PCBs)[2]						2.02E-05				2.94E+00
Receptor Total -Lower Potomac Fish (PCB-TEQs)[3]						2.14E-05				1.82E+00
Receptor Total - Non-Tidal Anacostia Fish (Total PCBs)[2]						1.99E-06				1.20E+00
Receptor Total - Non-Tidal Anacostia Fish (PCB-TEQs)[3]						2.40E-06				1.09E+00
Receptor Total - Lower Anacostia Fish (Total PCBs)[2]						2.34E-05				5.37E+00
Receptor Total - Lower Anacostia Fish (PCB-TEQs)[3]						3.00E-05				3.57E+00

Table H-2-9. RME
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet) - Regional Areas
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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

Notes
NA - Not applicable.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Upper Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	3.69E-03	4E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	9.07E+00	9E+00
Endocrine	Mirex	3.19E-04	3E-04
Eye	Total PCBs	1.44E+01	1E+01
Immune	Total PCBs	1.44E+01	1E+01
Liver	Pesticides	6.28E-01	6E-01
Nails	Total PCBs	1.44E+01	1E+01
Neurological	Methyl Mercury	3.31E-01	3E-01
Reproductive	PCB-TEQ, TCDD-TEQ	8.92E+00	9E+00
Skin	Arsenic	2.73E-02	3E-02
Vascular	Arsenic	2.73E-02	3E-02

Target Organ HI - Lower Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	3.44E-02	3E-02
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.16E+00	1E+00
Eye	Total PCBs	2.26E+00	2E+00
Immune	Total PCBs	2.26E+00	2E+00
Liver	Pesticides	1.63E-01	2E-01
Nails	Total PCBs	2.26E+00	2E+00
Neurological	Methyl Mercury	2.26E-01	2E-01
Reproductive	PCB-TEQ, TCDD-TEQ	1.14E+00	1E+00
Skin	Arsenic	2.55E-01	3E-01
Vascular	Arsenic	2.55E-01	3E-01

Target Organ HI - Lower Anacostia

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	2.27E-03	2E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	2.96E+00	3E+00
Endocrine	Mirex	3.63E-04	4E-04
Eye	Total PCBs	4.73E+00	5E+00
Immune	Total PCBs	4.73E+00	5E+00
Liver	Pesticides	4.22E-01	4E-01
Nails	Total PCBs	4.73E+00	5E+00
Neurological	Methyl Mercury	2.01E-01	2E-01
Reproductive	PCB-TEQ, TCDD-TEQ	2.92E+00	3E+00
Skin	Arsenic	1.68E-02	2E-02
Vascular	Arsenic	1.68E-02	2E-02

Target Organ HI - Non-Tidal Anacostia Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	7.02E-04	7E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	2.08E-01	2E-01
Eye	Total PCBs	2.97E-01	3E-01
Hair	Thallium	7.93E-02	8E-02
Immune	Total PCBs	2.97E-01	3E-01
Liver	Pesticides	1.73E-01	2E-01
Nails	Total PCBs	2.97E-01	3E-01
Neurological	Methyl Mercury	6.14E-01	6E-01
Reproductive	PCB-TEQ, TCDD-TEQ	2.08E-01	2E-01
Skin	Arsenic	5.20E-03	5E-03
Thyroid	Cobalt	1.11E-02	1E-02
Vascular	Arsenic	5.20E-03	5E-03

Table H-2-10. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.76E-07	1.20E-07	2.96E-07	Reproductive, Developmental	6.76E-03	4.63E-03	1.14E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.99E-04	NA	1.99E-04
			Antimony	NA	NA	NA	Mortality, Blood	3.58E-04	NA	3.58E-04
			Arsenic	3.75E-08	4.27E-08	8.02E-08	Skin, Vascular	2.92E-04	3.32E-04	6.24E-04
			Cobalt	NA	NA	NA	Thyroid	1.22E-03	NA	1.22E-03
			Cyanide	NA	NA	NA	Reproductive	1.20E-04	NA	1.20E-04
			Manganese	NA	NA	NA	Neurological	2.17E-04	NA	2.17E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	6.69E-05	NA	6.69E-05
			Thallium	NA	NA	NA	Hair	5.30E-04	NA	5.30E-04
			Vanadium	NA	NA	NA	Hair	6.58E-04	NA	6.58E-04
			PCBs							
			Total PCBs	7.54E-09	2.41E-08	3.16E-08	Ocular/eye, Nails, Immune	6.60E-04	2.11E-03	2.77E-03
			SVOCs							
			Benzo(a)anthracene	7.96E-10	2.36E-09	3.15E-09	NA	NA	NA	NA
			Benzo(a)pyrene	4.85E-09	1.44E-08	1.92E-08	Developmental	5.65E-05	1.68E-04	2.24E-04
			Benzo(b)fluoranthene	7.12E-10	2.11E-09	2.82E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	2.59E-11	7.67E-11	1.03E-10	NA	NA	NA	NA
			Chrysene	6.42E-12	1.90E-11	2.55E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	1.14E-09	3.37E-09	4.51E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	4.17E-10	1.23E-09	1.65E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	2.78E-04	NA	2.78E-04
			Chemical Total	2.29E-07	2.11E-07	4.39E-07		1.14E-02	7.23E-03	1.86E-02
		Exposure Point Total				4.39E-07				1.86E-02
	Exposure Medium Total					4.39E-07				1.86E-02
Sediment Total						4.39E-07				1.86E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.59E-10	4.36E-07	4.36E-07	Reproductive, Developmental	1.38E-05	1.68E-02	1.68E-02
			Metals							
			Arsenic	6.24E-09	1.84E-09	8.07E-09	Skin, Vascular	4.85E-05	1.43E-05	6.28E-05
			Cobalt	NA	NA	NA	Thyroid	5.48E-05	6.45E-06	6.12E-05
			Manganese	NA	NA	NA	Neurological	9.73E-05	7.16E-04	8.13E-04
			Pesticides							
			4,4'-DDT	2.46E-12	1.72E-09	1.72E-09	Liver	5.06E-08	3.54E-05	3.55E-05
			PCBs							
			Total PCBs	1.70E-11	1.42E-08	1.42E-08	Ocular/eye, Nails, Immune	7.43E-06	6.20E-03	6.21E-03
			Chemical Total	6.62E-09	4.54E-07	4.60E-07		2.22E-04	2.37E-02	2.40E-02
		Exposure Point Total				4.60E-07				2.40E-02
	Exposure Medium Total					4.60E-07				2.40E-02
Surface Water Total						4.60E-07				2.40E-02
Receptor Total						9.00E-07				4.26E-02

Table H-2-10. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index		
		Sediment	Surface Water	Total
Blood	Antimony, DRO	6.35E-04	--	6.35E-04
Decreased body and organ weights	Nickel	6.69E-05	--	6.69E-05
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	1.16E-02	1.68E-02	2.84E-02
Eye	Total PCBs	2.77E-03	6.21E-03	8.97E-03
Hair	Thallium, Vanadium	1.19E-03	--	1.19E-03
Immune	Total PCBs, Nickel	2.77E-03	6.21E-03	8.97E-03
Kidney	DRO	2.78E-04	--	2.78E-04
Liver	4,4'-DDT, DRO	2.78E-04	3.55E-05	3.13E-04
Mortality	Antimony	3.58E-04	--	3.58E-04
Nails	Total PCBs	2.77E-03	6.21E-03	8.97E-03
Neurological	Aluminum, manganese	4.16E-04	8.13E-04	1.23E-03
Reproductive	TCDD-TEQ, Cyanide	1.15E-02	1.68E-02	2.83E-02
Skin	Arsenic	6.24E-04	6.28E-05	6.87E-04
Thyroid	Cobalt	1.22E-03	6.12E-05	1.28E-03
Vascular	Arsenic	6.24E-04	6.28E-05	6.87E-04

Table H-2-11. RME
Summary of Receptor Risks and Hazards for COPCs - Teen Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.18E-07	1.29E-07	4.48E-07	Reproductive, Developmental	2.04E-02	8.30E-03	2.87E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	5.99E-04	NA	5.99E-04
			Antimony	NA	NA	NA	Mortality, Blood	1.08E-03	NA	1.08E-03
			Arsenic	6.79E-08	4.60E-08	1.14E-07	Skin, Vascular	8.80E-04	5.96E-04	1.48E-03
			Cobalt	NA	NA	NA	Thyroid	3.68E-03	NA	3.68E-03
			Cyanide	NA	NA	NA	Reproductive	3.63E-04	NA	3.63E-04
			Manganese	NA	NA	NA	Neurological	6.56E-04	NA	6.56E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	2.02E-04	NA	2.02E-04
			Thallium	NA	NA	NA	Hair	1.60E-03	NA	1.60E-03
			Vanadium	NA	NA	NA	Hair	1.99E-03	NA	1.99E-03
			PCBs							
			Total PCBs	1.37E-08	2.59E-08	3.96E-08	Ocular/eye, Nails, Immune	1.99E-03	3.78E-03	5.77E-03
			SVOCs							
			Benzo(a)anthracene	3.60E-09	6.35E-09	9.95E-09	NA	NA	NA	NA
			Benzo(a)pyrene	2.19E-08	3.87E-08	6.06E-08	Developmental	1.71E-04	3.01E-04	4.71E-04
			Benzo(b)fluoranthene	3.22E-09	5.68E-09	8.90E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	1.17E-10	2.06E-10	3.24E-10	NA	NA	NA	NA
			Chrysene	2.91E-11	5.12E-11	8.03E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	5.16E-09	9.08E-09	1.42E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.89E-09	3.32E-09	5.21E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	8.38E-04	NA	8.38E-04
			Chemical Total	4.36E-07	2.65E-07	7.01E-07		3.45E-02	1.30E-02	4.74E-02
		Exposure Point Total				7.01E-07				4.74E-02
	Exposure Medium Total					7.01E-07				4.74E-02
Sediment Total						7.01E-07				4.74E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	6.51E-10	Outside EPD	6.51E-10	Reproductive, Developmental	4.17E-05	Outside EPD	4.17E-05
			Metals							
			Arsenic	1.13E-08	2.36E-09	1.37E-08	Skin, Vascular	1.46E-04	3.06E-05	1.77E-04
			Cobalt	NA	NA	NA	Thyroid	1.65E-04	1.38E-05	1.79E-04
			Manganese	NA	NA	NA	Neurological	2.94E-04	1.53E-03	1.83E-03
			Pesticides							
			4,4'-DDT	4.45E-12	Outside EPD	4.45E-12	Liver	1.53E-07	Outside EPD	1.53E-07
			PCBs							
			Total PCBs	3.08E-11	Outside EPD	3.08E-11	Ocular/eye, Nails, Immune	2.24E-05	Outside EPD	2.24E-05
			Chemical Total	1.20E-08	2.36E-09	1.43E-08		6.70E-04	1.58E-03	2.25E-03
		Exposure Point Total				1.43E-08				2.25E-03
	Exposure Medium Total					1.43E-08				2.25E-03
Surface Water Total						1.43E-08				2.25E-03
Receptor Total						7.15E-07				4.97E-02

Table H-2-11. RME
Summary of Receptor Risks and Hazards for COPCs - Teen Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index Sediment	Surface Water	Total
Blood	Antimony, DRO	1.92E-03	--	1.92E-03
Decreased body and organ weights	Nickel	2.02E-04	--	2.02E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	2.92E-02	4.17E-05	2.92E-02
Eye	Total PCBs	5.77E-03	2.24E-05	5.79E-03
Hair	Thallium, Vanadium	3.59E-03	--	3.59E-03
Immune	Total PCBs, Nickel	5.77E-03	2.24E-05	5.79E-03
Kidney	DRO	8.38E-04	--	8.38E-04
Liver	4,4'-DDT, DRO	8.38E-04	1.53E-07	8.38E-04
Mortality	Antimony	1.08E-03	--	1.08E-03
Nails	Total PCBs	5.77E-03	2.24E-05	5.79E-03
Neurological	Aluminum, manganese	1.26E-03	1.83E-03	3.08E-03
Reproductive	TCDD-TEQ, Cyanide	2.91E-02	4.17E-05	2.91E-02
Skin	Arsenic	1.48E-03	1.77E-04	1.65E-03
Thyroid	Cobalt	3.68E-03	1.79E-04	3.86E-03
Vascular	Arsenic	1.48E-03	1.77E-04	1.65E-03

Table H-2-12. RME
Summary of Receptor Risks and Hazards for COPCs - Child Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	4.96E-07	8.58E-08	5.82E-07	Reproductive, Developmental	6.36E-02	1.10E-02	7.46E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.87E-03	NA	1.87E-03
			Antimony	NA	NA	NA	Mortality, Blood	3.37E-03	NA	3.37E-03
			Arsenic	1.06E-07	3.05E-08	1.36E-07	Skin, Vascular	2.74E-03	7.90E-04	3.53E-03
			Cobalt	NA	NA	NA	Thyroid	1.15E-02	NA	1.15E-02
			Cyanide	NA	NA	NA	Reproductive	1.13E-03	NA	1.13E-03
			Manganese	NA	NA	NA	Neurological	2.05E-03	NA	2.05E-03
			Nickel	NA	NA	NA	Decreased body and organ weights	6.30E-04	NA	6.30E-04
			Thallium	NA	NA	NA	Hair	4.99E-03	NA	4.99E-03
			Vanadium	NA	NA	NA	Hair	6.19E-03	NA	6.19E-03
			PCBs							
			Total PCBs	2.13E-08	1.72E-08	3.85E-08	Ocular/eye, Nails, Immune	6.21E-03	5.01E-03	1.12E-02
			SVOCs							
			Benzo(a)anthracene	9.44E-09	7.06E-09	1.65E-08	NA	NA	NA	NA
			Benzo(a)pyrene	5.75E-08	4.30E-08	1.01E-07	Developmental	5.32E-04	3.98E-04	9.31E-04
			Benzo(b)fluoranthene	8.44E-09	6.32E-09	1.48E-08	NA	NA	NA	NA
			Benzo(k)fluoranthene	3.07E-10	2.30E-10	5.37E-10	NA	NA	NA	NA
			Chrysene	7.62E-11	5.70E-11	1.33E-10	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	1.35E-08	1.01E-08	2.36E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	4.94E-09	3.70E-09	8.64E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	2.61E-03	NA	2.61E-03
			Chemical Total	7.18E-07	2.04E-07	9.22E-07		1.07E-01	1.72E-02	1.25E-01
		Exposure Point Total				9.22E-07				1.25E-01
	Exposure Medium Total					9.22E-07				1.25E-01
Sediment Total						9.22E-07				1.25E-01
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	8.57E-10	Outside EPD	8.57E-10	Reproductive, Developmental	1.10E-04	Outside EPD	1.10E-04
			Metals							
			Arsenic	1.49E-08	9.30E-10	1.58E-08	Skin, Vascular	3.86E-04	2.41E-05	4.10E-04
			Cobalt	NA	NA	NA	Thyroid	4.36E-04	1.09E-05	4.47E-04
			Manganese	NA	NA	NA	Neurological	7.74E-04	1.21E-03	1.98E-03
			Pesticides							
			4,4'-DDT	5.86E-12	Outside EPD	5.86E-12	Liver	4.02E-07	Outside EPD	4.02E-07
			PCBs							
			Total PCBs	4.05E-11	Outside EPD	4.05E-11	Ocular/eye, Nails, Immune	5.91E-05	Outside EPD	5.91E-05
			Chemical Total	1.58E-08	9.30E-10	1.67E-08		1.76E-03	1.24E-03	3.01E-03
		Exposure Point Total				1.67E-08				3.01E-03
	Exposure Medium Total					1.67E-08				3.01E-03
Surface Water Total						1.67E-08				3.01E-03
Receptor Total						9.38E-07				1.28E-01

Table H-2-12. RME
Summary of Receptor Risks and Hazards for COPCs - Child Swimmer
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index		
		Sediment	Surface Water	Total
Blood	Antimony, DRO	5.98E-03	--	5.98E-03
Decreased body and organ weights	Nickel	6.30E-04	--	6.30E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	7.56E-02	1.10E-04	7.57E-02
Eye	Total PCBs	1.12E-02	5.91E-05	1.13E-02
Hair	Thallium, Vanadium	1.12E-02	--	1.12E-02
Immune	Total PCBs, Nickel	1.12E-02	5.91E-05	1.13E-02
Kidney	DRO	2.61E-03	--	2.61E-03
Liver	4,4'-DDT, DRO	2.61E-03	4.02E-07	2.61E-03
Mortality	Antimony	3.37E-03	--	3.37E-03
Nails	Total PCBs	1.12E-02	5.91E-05	1.13E-02
Neurological	Aluminum, manganese	3.91E-03	1.98E-03	5.90E-03
Reproductive	TCDD-TEQ, Cyanide	7.58E-02	1.10E-04	7.59E-02
Skin	Arsenic	3.53E-03	4.10E-04	3.94E-03
Thyroid	Cobalt	1.15E-02	4.47E-04	1.19E-02
Vascular	Arsenic	3.53E-03	4.10E-04	3.94E-03

Table H-2-13. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	4.73E-07	3.24E-07	7.97E-07	Reproductive, Developmental	1.82E-02	1.25E-02	3.07E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	5.35E-04	NA	5.35E-04
			Antimony	NA	NA	NA	Mortality, Blood	9.63E-04	NA	9.63E-04
			Arsenic	1.01E-07	1.15E-07	2.16E-07	Skin, Vascular	7.85E-04	8.95E-04	1.68E-03
			Cobalt	NA	NA	NA	Thyroid	3.29E-03	NA	3.29E-03
			Cyanide	NA	NA	NA	Reproductive	3.24E-04	NA	3.24E-04
			Manganese	NA	NA	NA	Neurological	5.85E-04	NA	5.85E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	1.80E-04	NA	1.80E-04
			Thallium	NA	NA	NA	Hair	1.43E-03	NA	1.43E-03
			Vanadium	NA	NA	NA	Hair	1.77E-03	NA	1.77E-03
			PCBs							
			Total PCBs	2.03E-08	6.48E-08	8.51E-08	Ocular/eye, Nails, Immune	1.78E-03	5.67E-03	7.45E-03
			SVOCs							
			Benzo(a)anthracene	2.14E-09	6.35E-09	8.49E-09	NA	NA	NA	NA
			Benzo(a)pyrene	1.30E-08	3.87E-08	5.17E-08	Developmental	1.52E-04	4.51E-04	6.03E-04
			Benzo(b)fluoranthene	1.92E-09	5.68E-09	7.60E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	6.97E-11	2.07E-10	2.76E-10	NA	NA	NA	NA
			Chrysene	1.73E-11	5.13E-11	6.86E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	3.07E-09	9.08E-09	1.21E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.12E-09	3.32E-09	4.45E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	7.47E-04	NA	7.47E-04
			Chemical Total	6.16E-07	5.67E-07	1.18E-06		3.07E-02	1.95E-02	5.02E-02
		Exposure Point Total				1.18E-06				5.02E-02
	Exposure Medium Total					1.18E-06				5.02E-02
Sediment Total						1.18E-06				5.02E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.54E-10	3.02E-07	3.02E-07	Reproductive, Developmental	1.36E-05	1.16E-02	1.16E-02
			Metals							
			Arsenic	6.15E-09	1.80E-09	7.95E-09	Skin, Vascular	4.78E-05	1.40E-05	6.18E-05
			Cobalt	NA	NA	NA	Thyroid	5.40E-05	6.32E-06	6.03E-05
			Manganese	NA	NA	NA	Neurological	9.59E-05	7.01E-04	7.97E-04
			Pesticides							
			4,4'-DDT	2.42E-12	1.19E-09	1.19E-09	Liver	4.99E-08	2.45E-05	2.46E-05
			PCBs							
			Total PCBs	1.67E-11	9.81E-09	9.82E-09	Ocular/eye, Nails, Immune	7.32E-06	4.29E-03	4.30E-03
			Chemical Total	6.52E-09	3.15E-07	3.21E-07		2.19E-04	1.66E-02	1.69E-02
		Exposure Point Total				3.21E-07				1.69E-02
	Exposure Medium Total					3.21E-07				1.69E-02
Surface Water Total						3.21E-07				1.69E-02
Receptor Total						1.50E-06				6.71E-02

Table H-2-13. RME
Summary of Receptor Risks and Hazards for COPCs - Adult Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index: Sediment	Surface Water	Total
Blood	Antimony, DRO	1.71E-03	--	1.71E-03
Decreased body and organ weights	Nickel	1.80E-04	--	1.80E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	3.13E-02	1.16E-02	4.29E-02
Eye	Total PCBs	7.45E-03	4.30E-03	1.17E-02
Hair	Thallium, Vanadium	3.20E-03	--	3.20E-03
Immune	Total PCBs, Nickel	7.45E-03	4.30E-03	1.17E-02
Kidney	DRO	7.47E-04	--	7.47E-04
Liver	4,4'-DDT, DRO	7.47E-04	2.46E-05	7.72E-04
Mortality	Antimony	9.63E-04	--	9.63E-04
Nails	Total PCBs	7.45E-03	4.30E-03	1.17E-02
Neurological	Aluminum, manganese	1.12E-03	7.97E-04	1.92E-03
Reproductive	TCDD-TEQ, Cyanide	3.10E-02	1.16E-02	4.26E-02
Skin	Arsenic	1.68E-03	6.18E-05	1.74E-03
Thyroid	Cobalt	3.29E-03	6.03E-05	3.35E-03
Vascular	Arsenic	1.68E-03	6.18E-05	1.74E-03

Table H-2-14. RME
Summary of Receptor Risks and Hazards for COPCs - Teen Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	5.27E-07	2.14E-07	7.41E-07	Reproductive, Developmental	3.38E-02	1.37E-02	4.75E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	9.91E-04	NA	9.91E-04
			Antimony	NA	NA	NA	Mortality, Blood	1.79E-03	NA	1.79E-03
			Arsenic	1.12E-07	7.61E-08	1.88E-07	Skin, Vascular	1.46E-03	9.86E-04	2.44E-03
			Cobalt	NA	NA	NA	Thyroid	6.09E-03	NA	6.09E-03
			Cyanide	NA	NA	NA	Reproductive	6.00E-04	NA	6.00E-04
			Manganese	NA	NA	NA	Neurological	1.09E-03	NA	1.09E-03
			Nickel	NA	NA	NA	Decreased body and organ weights	3.34E-04	NA	3.34E-04
			Thallium	NA	NA	NA	Hair	2.65E-03	NA	2.65E-03
			Vanadium	NA	NA	NA	Hair	3.29E-03	NA	3.29E-03
			PCBs							
			Total PCBs	2.26E-08	4.29E-08	6.55E-08	Ocular/eye, Nails, Immune	3.30E-03	6.25E-03	9.55E-03
			SVOCs							
			Benzo(a)anthracene	5.96E-09	1.05E-08	1.65E-08	NA	NA	NA	NA
			Benzo(a)pyrene	3.63E-08	6.39E-08	1.00E-07	Developmental	2.82E-04	4.97E-04	7.80E-04
			Benzo(b)fluoranthene	5.33E-09	9.39E-09	1.47E-08	NA	NA	NA	NA
			Benzo(k)fluoranthene	1.94E-10	3.41E-10	5.35E-10	NA	NA	NA	NA
			Chrysene	4.81E-11	8.47E-11	1.33E-10	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	8.53E-09	1.50E-08	2.35E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.12E-09	5.50E-09	8.62E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	1.39E-03	NA	1.39E-03
			Chemical Total	7.21E-07	4.38E-07	1.16E-06		5.70E-02	2.15E-02	7.85E-02
		Exposure Point Total				1.16E-06				7.85E-02
	Exposure Medium Total					1.16E-06				7.85E-02
Sediment Total						1.16E-06				7.85E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.94E-10	Outside EPD	3.94E-10	Reproductive, Developmental	2.53E-05	Outside EPD	2.53E-05
			Metals							
			Arsenic	6.84E-09	1.43E-09	8.27E-09	Skin, Vascular	8.87E-05	1.85E-05	1.07E-04
			Cobalt	NA	NA	NA	Thyroid	1.00E-04	8.35E-06	1.09E-04
			Manganese	NA	NA	NA	Neurological	1.78E-04	9.27E-04	1.10E-03
			Pesticides							
			4,4'-DDT	2.69E-12	Outside EPD	2.69E-12	Liver	9.25E-08	Outside EPD	9.25E-08
			PCBs							
			Total PCBs	1.86E-11	Outside EPD	1.86E-11	Ocular/eye, Nails, Immune	1.36E-05	Outside EPD	1.36E-05
			Chemical Total	7.26E-09	1.43E-09	8.69E-09		4.06E-04	9.54E-04	1.36E-03
		Exposure Point Total				8.69E-09				1.36E-03
	Exposure Medium Total					8.69E-09				1.36E-03
Surface Water Total						8.69E-09				1.36E-03
Receptor Total						1.17E-06				7.98E-02

Table H-2-14. RME
Summary of Receptor Risks and Hazards for COPCs - Teen Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

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

Notes

NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index		
		Sediment	Surface Water	Total
Blood	Antimony, DRO	3.17E-03	--	3.17E-03
Decreased body and organ weights	Nickel	3.34E-04	--	3.34E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	4.83E-02	2.53E-05	4.83E-02
Eye	Total PCBs	9.55E-03	1.36E-05	9.56E-03
Hair	Thallium, Vanadium	5.93E-03	--	5.93E-03
Immune	Total PCBs, Nickel	9.55E-03	1.36E-05	9.56E-03
Kidney	DRO	1.39E-03	--	1.39E-03
Liver	4,4'-DDT, DRO	1.39E-03	9.25E-08	1.39E-03
Mortality	Antimony	1.79E-03	--	1.79E-03
Nails	Total PCBs	9.55E-03	1.36E-05	9.56E-03
Neurological	Aluminum, manganese	2.08E-03	1.10E-03	3.18E-03
Reproductive	TCDD-TEQ, Cyanide	4.81E-02	2.53E-05	4.81E-02
Skin	Arsenic	2.44E-03	1.07E-04	2.55E-03
Thyroid	Cobalt	6.09E-03	1.09E-04	6.20E-03
Vascular	Arsenic	2.44E-03	1.07E-04	2.55E-03

Table H-2-15. RME
Summary of Receptor Risks and Hazards for COPCs - Child Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.34E-06	2.31E-07	1.57E-06	Reproductive, Developmental	1.71E-01	2.96E-02	2.01E-01
			Metals							
			Aluminum	NA	NA	NA	Neurological	5.03E-03	NA	5.03E-03
			Antimony	NA	NA	NA	Mortality, Blood	9.06E-03	NA	9.06E-03
			Arsenic	2.85E-07	8.21E-08	3.67E-07	Skin, Vascular	7.39E-03	2.13E-03	9.51E-03
			Cobalt	NA	NA	NA	Thyroid	3.09E-02	NA	3.09E-02
			Cyanide	NA	NA	NA	Reproductive	3.05E-03	NA	3.05E-03
			Manganese	NA	NA	NA	Neurological	5.51E-03	NA	5.51E-03
			Nickel	NA	NA	NA	Decreased body and organ weights	1.70E-03	NA	1.70E-03
			Thallium	NA	NA	NA	Hair	1.34E-02	NA	1.34E-02
			Vanadium	NA	NA	NA	Hair	1.67E-02	NA	1.67E-02
			PCBs							
			Total PCBs	5.73E-08	4.62E-08	1.04E-07	Ocular/eye, Nails, Immune	1.67E-02	1.35E-02	3.02E-02
			SVOCs							
			Benzo(a)anthracene	2.54E-08	1.90E-08	4.44E-08	NA	NA	NA	NA
			Benzo(a)pyrene	1.55E-07	1.16E-07	2.71E-07	Developmental	1.43E-03	1.07E-03	2.51E-03
			Benzo(b)fluoranthene	2.27E-08	1.70E-08	3.97E-08	NA	NA	NA	NA
			Benzo(k)fluoranthene	8.26E-10	6.19E-10	1.45E-09	NA	NA	NA	NA
			Chrysene	2.05E-10	1.54E-10	3.59E-10	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	3.63E-08	2.72E-08	6.36E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.33E-08	9.96E-09	2.33E-08	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	7.03E-03	NA	7.03E-03
			Chemical Total	1.93E-06	5.49E-07	2.48E-06		2.89E-01	4.63E-02	3.36E-01
		Exposure Point Total				2.48E-06				3.36E-01
	Exposure Medium Total					2.48E-06				3.36E-01
Sediment Total						2.48E-06				3.36E-01
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	5.00E-10	Outside EPD	5.00E-10	Reproductive, Developmental	6.41E-05	Outside EPD	6.41E-05
			Metals							
			Arsenic	8.68E-09	1.37E-09	1.01E-08	Skin, Vascular	2.25E-04	3.56E-05	2.61E-04
			Cobalt	NA	NA	NA	Thyroid	2.54E-04	1.61E-05	2.70E-04
			Manganese	NA	NA	NA	Neurological	4.51E-04	1.79E-03	2.24E-03
			Pesticides							
			4,4'-DDT	3.42E-12	Outside EPD	3.42E-12	Liver	2.35E-07	Outside EPD	2.35E-07
			PCBs							
			Total PCBs	2.36E-11	Outside EPD	2.36E-11	Ocular/eye, Nails, Immune	3.45E-05	Outside EPD	3.45E-05
			Chemical Total	9.21E-09	1.37E-09	1.06E-08		1.03E-03	1.84E-03	2.87E-03
		Exposure Point Total				1.06E-08				2.87E-03
	Exposure Medium Total					1.06E-08				2.87E-03
Surface Water Total						1.06E-08				2.87E-03
Receptor Total						2.49E-06				3.38E-01

Table H-2-15. RME
Summary of Receptor Risks and Hazards for COPCs - Child Wader
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index: Sediment	Surface Water	Total
Blood	Antimony, DRO	1.61E-02	--	1.61E-02
Decreased body and organ weights	Nickel	1.70E-03	--	1.70E-03
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	2.03E-01	6.41E-05	2.04E-01
Eye	Total PCBs	3.02E-02	3.45E-05	3.02E-02
Hair	Thallium, Vanadium	3.01E-02	--	3.01E-02
Immune	Total PCBs, Nickel	3.02E-02	3.45E-05	3.02E-02
Kidney	DRO	7.03E-03	--	7.03E-03
Liver	4,4'-DDT, DRO	7.03E-03	2.35E-07	7.03E-03
Mortality	Antimony	9.06E-03	--	9.06E-03
Nails	Total PCBs	3.02E-02	3.45E-05	3.02E-02
Neurological	Aluminum, manganese	1.05E-02	2.24E-03	1.28E-02
Reproductive	TCDD-TEQ, Cyanide	2.04E-01	6.41E-05	2.04E-01
Skin	Arsenic	9.51E-03	2.61E-04	9.77E-03
Thyroid	Cobalt	3.09E-02	2.70E-04	3.12E-02
Vascular	Arsenic	9.51E-03	2.61E-04	9.77E-03

Table H-2-16. RME
Summary of Receptor Risks and Hazards for COPCs - Shoreline Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Shoreline 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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.69E-06	5.37E-07	2.23E-06	Reproductive, Developmental	5.20E-02	1.65E-02	6.85E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.53E-03	NA	1.53E-03
			Antimony	NA	NA	NA	Mortality, Blood	2.75E-03	NA	2.75E-03
			Arsenic	3.60E-07	1.91E-07	5.51E-07	Skin, Vascular	2.24E-03	1.19E-03	3.43E-03
			Cobalt	NA	NA	NA	Thyroid	9.39E-03	NA	9.39E-03
			Cyanide	NA	NA	NA	Reproductive	9.25E-04	NA	9.25E-04
			Manganese	NA	NA	NA	Neurological	1.67E-03	NA	1.67E-03
			Nickel	NA	NA	NA	Decreased body and organ weights	5.15E-04	NA	5.15E-04
			Thallium	NA	NA	NA	Hair	4.08E-03	NA	4.08E-03
			Vanadium	NA	NA	NA	Hair	5.06E-03	NA	5.06E-03
			PCBs							
			Total PCBs	7.25E-08	1.07E-07	1.80E-07	Ocular/eye, Nails, Immune	5.08E-03	7.52E-03	1.26E-02
			SVOCs							
			Benzo(a)anthracene	7.65E-09	1.05E-08	1.82E-08	NA	NA	NA	NA
			Benzo(a)pyrene	4.66E-08	6.41E-08	1.11E-07	Developmental	4.35E-04	5.98E-04	1.03E-03
			Benzo(b)fluoranthene	6.84E-09	9.41E-09	1.63E-08	NA	NA	NA	NA
			Benzo(k)fluoranthene	2.49E-10	3.42E-10	5.91E-10	NA	NA	NA	NA
			Chrysene	6.18E-11	8.50E-11	1.47E-10	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	1.09E-08	1.51E-08	2.60E-08	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	4.01E-09	5.51E-09	9.52E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	2.14E-03	NA	2.14E-03
			Chemical Total	2.20E-06	9.40E-07	3.14E-06		8.78E-02	2.58E-02	1.14E-01
		Exposure Point Total				3.14E-06				1.14E-01
	Exposure Medium Total					3.14E-06				1.14E-01
Sediment Total						3.14E-06				1.14E-01
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	6.33E-10	7.07E-07	7.08E-07	Reproductive, Developmental	1.95E-05	2.18E-02	2.18E-02
			Metals							
			Arsenic	1.10E-08	5.96E-09	1.69E-08	Skin, Vascular	6.83E-05	3.71E-05	1.05E-04
			Cobalt	NA	NA	NA	Thyroid	7.72E-05	1.67E-05	9.39E-05
			Manganese	NA	NA	NA	Neurological	1.37E-04	1.86E-03	2.00E-03
			Pesticides							
			4,4'-DDT	4.32E-12	2.79E-09	2.79E-09	Liver	7.12E-08	4.60E-05	4.60E-05
			PCBs							
			Total PCBs	2.99E-11	2.30E-08	2.30E-08	Ocular/eye, Nails, Immune	1.05E-05	8.05E-03	8.06E-03
			Chemical Total	1.16E-08	7.39E-07	7.51E-07		3.12E-04	3.18E-02	3.21E-02
		Exposure Point Total				7.51E-07				3.21E-02
	Exposure Medium Total					7.51E-07				3.21E-02
Surface Water Total						7.51E-07				3.21E-02
Receptor Total						3.89E-06				1.46E-01

Table H-2-16. RME
Summary of Receptor Risks and Hazards for COPCs - Shoreline Worker
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Shoreline 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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index: Sediment	Surface Water	Total
Blood	Antimony, DRO	4.89E-03	--	4.89E-03
Decreased body and organ weights	Nickel	5.15E-04	--	5.15E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	6.96E-02	2.18E-02	9.13E-02
Eye	Total PCBs	1.26E-02	8.06E-03	2.07E-02
Hair	Thallium, Vanadium	9.14E-03	--	9.14E-03
Immune	Total PCBs, Nickel	1.26E-02	8.06E-03	2.07E-02
Kidney	DRO	2.14E-03	--	2.14E-03
Liver	4,4'-DDT, DRO	2.14E-03	4.60E-05	2.18E-03
Mortality	Antimony	2.75E-03	--	2.75E-03
Nails	Total PCBs	1.26E-02	8.06E-03	2.07E-02
Neurological	Aluminum, manganese	3.20E-03	2.00E-03	5.19E-03
Reproductive	TCDD-TEQ, Cyanide	6.95E-02	2.18E-02	9.12E-02
Skin	Arsenic	3.43E-03	1.05E-04	3.53E-03
Thyroid	Cobalt	9.39E-03	9.39E-05	9.48E-03
Vascular	Arsenic	3.43E-03	1.05E-04	3.53E-03

Central Tendency Exposure (CTE)

pepco
An Exelon Company

Risk Calculation Tables (CTE)

Table H-1-1. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC (1)		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (2)	Risk	Value	Units	Value	Units	Quotient
Soil	Soil		Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.30E+05	kg-day/mg		4.20E-04	2.26E-07	mg/kg-day	7.00E-10	mg/kg-day	3.23E+02
				Inorganics													
				Arsenic	1.00E+00	mg/kg	1.94E-09	mg/kg-day	1.50E+00	kg-day/mg		2.91E-09	1.36E-07	mg/kg-day	3.00E-04	mg/kg-day	4.52E-04
				Cobalt	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	3.00E-04	mg/kg-day	7.53E-04
				Manganese	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	2.40E-02	mg/kg-day	9.42E-06
				Nickel	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	2.00E-02	mg/kg-day	1.13E-05
				Thallium	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	1.00E-05	mg/kg-day	2.26E-02
				Vanadium	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	5.04E-03	mg/kg-day	4.48E-05
				PCBs													
				Total PCBs	1.00E+00	mg/kg	3.23E-09	mg/kg-day	2.00E+00	kg-day/mg		6.46E-09	2.26E-07	mg/kg-day	5.00E-05	mg/kg-day	4.52E-03
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E-01	kg-day/mg	1	3.23E-10	2.26E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E+00	kg-day/mg	1	3.23E-09	2.26E-07	mg/kg-day	3.00E-04	mg/kg-day	7.53E-04
				Benzo(b)fluoranthene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E-01	kg-day/mg	1	3.23E-10	2.26E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E-02	kg-day/mg	1	3.23E-11	2.26E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E-03	kg-day/mg	1	3.23E-12	2.26E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E+00	kg-day/mg	1	3.23E-09	2.26E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	1.00E-01	kg-day/mg	1	3.23E-10	2.26E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	2.00E-02	mg/kg-day	1.13E-05
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	3.23E-09	mg/kg-day	NA	kg-day/mg		NA	2.26E-07	mg/kg-day	1.00E-02	mg/kg-day	2.26E-05
			Exp. Route Total									(3)					(3)
Soil	Sol		Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	3.11E-10	mg/kg-day	1.30E+05	kg-day/mg		4.04E-05	2.17E-08	mg/kg-day	7.00E-10	mg/kg-day	3.11E+01
				Inorganics													
				Arsenic	1.00E+00	mg/kg	3.11E-10	mg/kg-day	1.50E+00	kg-day/mg		4.66E-10	2.17E-08	mg/kg-day	3.00E-04	mg/kg-day	7.25E-05
				Cobalt	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Manganese	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	1.00E+00	mg/kg	1.45E-09	mg/kg-day	2.00E+00	kg-day/mg		2.90E-09	1.01E-07	mg/kg-day	5.00E-05	mg/kg-day	2.03E-03
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E-01	kg-day/mg	1	1.35E-10	9.42E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.35E-09	9.42E-08	mg/kg-day	3.00E-04	mg/kg-day	3.14E-04
				Benzo(b)fluoranthene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E-01	kg-day/mg	1	1.35E-10	9.42E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E-02	kg-day/mg	1	1.35E-11	9.42E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E-03	kg-day/mg	1	1.35E-12	9.42E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.35E-09	9.42E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	1.00E-01	kg-day/mg	1	1.35E-10	9.42E-08	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	1.35E-09	mg/kg-day	NA	kg-day/mg		NA	9.42E-08	mg/kg-day	2.00E-02	mg/kg-day	4.71E-06
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									(3)					(3)

Table H-1-1. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC (1)		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (2)	Risk	Value	Units	Value	Units	Quotient
Soil	Outdoor air		Inhalation														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/m3	2.61E-04	mg/m3	3.80E+01	mg/m3		9.92E-03	1.83E-02	mg/m3	4.00E-08	mg/m3	4.57E+05
				Inorganics													
				Arsenic	1.00E+00	mg/m3	2.61E-04	mg/m3	4.30E-03	mg/m3		1.12E-06	1.83E-02	mg/m3	1.50E-05	mg/m3	1.22E+03
				Cobalt	1.00E+00	mg/m3	2.61E-04	mg/m3	9.00E-03	mg/m3		2.35E-06	1.83E-02	mg/m3	6.00E-06	mg/m3	3.04E+03
				Manganese	1.00E+00	mg/m3	2.61E-04	mg/m3	NA	mg/m3		NA	1.83E-02	mg/m3	5.00E-05	mg/m3	3.65E+02
				Nickel	1.00E+00	mg/m3	2.61E-04	mg/m3	2.60E-04	mg/m3		6.78E-08	1.83E-02	mg/m3	9.00E-05	mg/m3	2.03E+02
				Thallium	1.00E+00	mg/m3	2.61E-04	mg/m3	NA	mg/m3		NA	1.83E-02	mg/m3	NA	mg/m3	NA
				Vanadium	1.00E+00	mg/m3	2.61E-04	mg/m3	NA	mg/m3		NA	1.83E-02	mg/m3	1.00E-04	mg/m3	1.83E+02
				PCBs													
				Total PCBs	1.00E+00	mg/m3	2.61E-04	mg/m3	5.71E-04	mg/m3		1.49E-07	1.83E-02	mg/m3	NA	mg/m3	NA
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-05	mg/m3	1	1.57E-08	1.83E-02	mg/m3	NA	mg/m3	NA
				Benzo(a)pyrene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-04	mg/m3	1	1.57E-07	1.83E-02	mg/m3	2.00E-06	mg/m3	9.13E+03
				Benzo(b)fluoranthene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-05	mg/m3	1	1.57E-08	1.83E-02	mg/m3	NA	mg/m3	NA
				Benzo(k)fluoranthene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-06	mg/m3	1	1.57E-09	1.83E-02	mg/m3	NA	mg/m3	NA
				Chrysene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-07	mg/m3	1	1.57E-10	1.83E-02	mg/m3	NA	mg/m3	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-04	mg/m3	1	1.57E-07	1.83E-02	mg/m3	NA	mg/m3	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/m3	2.61E-04	mg/m3	6.00E-05	mg/m3	1	1.57E-08	1.83E-02	mg/m3	NA	mg/m3	NA
				Naphthalene	1.00E+00	mg/m3	2.61E-04	mg/m3	3.40E-05	mg/m3		8.87E-09	1.83E-02	mg/m3	3.00E-03	mg/m3	6.09E+00
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/m3	2.61E-04	mg/m3	NA	mg/m3		NA	1.83E-02	mg/m3	1.00E-01	mg/m3	1.83E-01
			Exp. Route Total									(3)					(3)
		Exposure Point Total										(3)					(3)
	Exposure Medium Total											(3)					(3)
Soil Total												(3)					(3)
Groundwater	Trench Air		Inhalation														
				VOCs													
				Bromodichloromethane	1.00E+00	mg/m3	6.52E-05	mg/m3	3.70E-05	mg/m3		2.41E-09	4.57E-03	mg/m3	NA	mg/m3	NA
				Butyl alcohol, tert-	1.00E+00	mg/m3	6.52E-05	mg/m3	NA	mg/m3		NA	4.57E-03	mg/m3	2.00E-01	mg/m3	2.28E-02
				Chloroform	1.00E+00	mg/m3	6.52E-05	mg/m3	2.30E-05	mg/m3		1.50E-09	4.57E-03	mg/m3	9.80E-02	mg/m3	4.66E-02
				Methyl tert-Butyl Ether (MTBE)	1.00E+00	mg/m3	6.52E-05	mg/m3	2.60E-07	mg/m3		1.70E-11	4.57E-03	mg/m3	3.00E+00	mg/m3	1.52E-03
				Tetrachloroethylene	1.00E+00	mg/m3	6.52E-05	mg/m3	2.60E-07	mg/m3		1.70E-11	4.57E-03	mg/m3	4.00E-02	mg/m3	1.14E-01
				Trichloroethene	1.00E+00	mg/m3	6.52E-05	mg/m3	4.10E-06	mg/m3	1	2.67E-10	4.57E-03	mg/m3	2.00E-03	mg/m3	2.28E+00
				Vinyl Chloride	1.00E+00	mg/m3	6.52E-05	mg/m3	4.40E-06	mg/m3		2.87E-10	4.57E-03	mg/m3	1.00E-01	mg/m3	4.57E-02
			Exp. Route Total									(3)					(3)
		Exposure Point Total										(3)					(3)
	Exposure Medium Total											(3)					(3)
Groundwater												(3)					(3)
Total Receptor Risk/Hazard												(3)					(3)

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.

(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(3) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-1-2. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC [1]		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [2]	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Surface Soil		Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.30E+05	kg-day/mg		4.60E-03	3.75E-07	mg/kg-day	7.00E-10	mg/kg-day	5.36E+02
				Inorganics													
				Arsenic	1.00E+00	mg/kg	2.12E-08	mg/kg-day	1.50E+00	kg-day/mg		3.18E-08	2.25E-07	mg/kg-day	3.00E-04	mg/kg-day	7.50E-04
				Cobalt	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	3.00E-04	mg/kg-day	1.25E-03
				Manganese	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	2.40E-02	mg/kg-day	1.56E-05
				Nickel	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	2.00E-02	mg/kg-day	1.88E-05
				Thallium	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	1.00E-05	mg/kg-day	3.75E-02
				Vanadium	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	5.04E-03	mg/kg-day	7.44E-05
				PCBs													
				Total PCBs	1.00E+00	mg/kg	3.54E-08	mg/kg-day	2.00E+00	kg-day/mg		7.07E-08	3.75E-07	mg/kg-day	2.00E-05	mg/kg-day	1.88E-02
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.54E-09	3.75E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E+00	kg-day/mg	1	3.54E-08	3.75E-07	mg/kg-day	3.00E-04	mg/kg-day	1.25E-03
				Benzo(b)fluoranthene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.54E-09	3.75E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E-02	kg-day/mg	1	3.54E-10	3.75E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E-03	kg-day/mg	1	3.54E-11	3.75E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E+00	kg-day/mg	1	3.54E-08	3.75E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.54E-09	3.75E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	2.00E-02	mg/kg-day	1.88E-05
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	3.54E-08	mg/kg-day	NA	kg-day/mg		NA	3.75E-07	mg/kg-day	1.00E-02	mg/kg-day	3.75E-05
			Exp. Route Total									(3)					(3)
Surface Soil	Surface Soil		Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/kg	8.98E-09	mg/kg-day	1.30E+05	kg-day/mg		1.17E-03	9.52E-08	mg/kg-day	7.00E-10	mg/kg-day	1.36E+02
				Inorganics													
				Arsenic	1.00E+00	mg/kg	8.98E-09	mg/kg-day	1.50E+00	kg-day/mg		1.35E-08	9.52E-08	mg/kg-day	3.00E-04	mg/kg-day	3.17E-04
				Cobalt	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Manganese	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	1.00E+00	mg/kg	4.19E-08	mg/kg-day	2.00E+00	kg-day/mg		8.38E-08	4.44E-07	mg/kg-day	2.00E-05	mg/kg-day	2.22E-02
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.89E-09	4.13E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E+00	kg-day/mg	1	3.89E-08	4.13E-07	mg/kg-day	3.00E-04	mg/kg-day	1.38E-03
				Benzo(b)fluoranthene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.89E-09	4.13E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E-02	kg-day/mg	1	3.89E-10	4.13E-07	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E-03	kg-day/mg	1	3.89E-11	4.13E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E+00	kg-day/mg	1	3.89E-08	4.13E-07	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	1.00E-01	kg-day/mg	1	3.89E-09	4.13E-07	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.00E+00	mg/kg	3.89E-08	mg/kg-day	NA	kg-day/mg		NA	4.13E-07	mg/kg-day	2.00E-02	mg/kg-day	2.06E-05
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									(3)					(3)

Table H-1-2. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards Based on Unit Concentrations - Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

							Cancer Risk Calculations - Based on Unit Concentration						Noncancer Hazard Calculations - Based on Unit Concentration				
	Exposure	Exposure	Exposure	Chemical of	Unit EPC (1)		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (2)	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Outdoor air		Inhalation														
				Dioxin													
				2,3,7,8-TCDD-TEQ	1.00E+00	mg/m3	1.89E-02	mg/m3	3.80E+01	mg/m3		7.17E-01	2.00E-01	mg/m3	4.00E-08	mg/m3	5.00E+06
				Inorganics													
				Arsenic	1.00E+00	mg/m3	1.89E-02	mg/m3	4.30E-03	mg/m3		8.11E-05	2.00E-01	mg/m3	1.50E-05	mg/m3	1.33E+04
				Cobalt	1.00E+00	mg/m3	1.89E-02	mg/m3	9.00E-03	mg/m3		1.70E-04	2.00E-01	mg/m3	6.00E-06	mg/m3	3.33E+04
				Manganese	1.00E+00	mg/m3	1.89E-02	mg/m3	NA	mg/m3		NA	2.00E-01	mg/m3	5.00E-05	mg/m3	4.00E+03
				Nickel	1.00E+00	mg/m3	1.89E-02	mg/m3	2.60E-04	mg/m3		4.90E-06	2.00E-01	mg/m3	9.00E-05	mg/m3	2.22E+03
				Thallium	1.00E+00	mg/m3	1.89E-02	mg/m3	NA	mg/m3		NA	2.00E-01	mg/m3	NA	mg/m3	NA
				Vanadium	1.00E+00	mg/m3	1.89E-02	mg/m3	NA	mg/m3		NA	2.00E-01	mg/m3	1.00E-04	mg/m3	2.00E+03
				PCBs													
				Total PCBs	1.00E+00	mg/m3	1.89E-02	mg/m3	5.71E-04	mg/m3		1.08E-05	2.00E-01	mg/m3	NA	mg/m3	NA
				SVOCs													
				Benzo(a)anthracene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-05	mg/m3	1	1.13E-06	2.00E-01	mg/m3	NA	mg/m3	NA
				Benzo(a)pyrene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-04	mg/m3	1	1.13E-05	2.00E-01	mg/m3	2.00E-06	mg/m3	1.00E+05
				Benzo(b)fluoranthene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-05	mg/m3	1	1.13E-06	2.00E-01	mg/m3	NA	mg/m3	NA
				Benzo(k)fluoranthene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-06	mg/m3	1	1.13E-07	2.00E-01	mg/m3	NA	mg/m3	NA
				Chrysene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-07	mg/m3	1	1.13E-08	2.00E-01	mg/m3	NA	mg/m3	NA
				Dibenzo(a,h)anthracene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-04	mg/m3	1	1.13E-05	2.00E-01	mg/m3	NA	mg/m3	NA
				Indeno(1,2,3-cd)pyrene	1.00E+00	mg/m3	1.89E-02	mg/m3	6.00E-05	mg/m3	1	1.13E-06	2.00E-01	mg/m3	NA	mg/m3	NA
				Naphthalene	1.00E+00	mg/m3	1.89E-02	mg/m3	3.40E-05	mg/m3		6.41E-07	2.00E-01	mg/m3	3.00E-03	mg/m3	6.67E+01
				TPH													
				Diesel Range Organics (C10-C20)	1.00E+00	mg/m3	1.89E-02	mg/m3	NA	mg/m3		NA	2.00E-01	mg/m3	1.00E-01	mg/m3	2.00E+00
			Exp. Route Total									(3)					(3)
		Exposure Point Total										(3)					(3)
	Exposure Medium Total											(3)					(3)
Surface Soil Total												(3)					(3)
Total Receptor Risk/Hazard												(3)					(3)

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(3) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-1-3. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Recreational Visitor
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Surface Soil	Hypothetical Future Park Land/Green Space	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	1.89E-06	mg/kg	3.98E-15	mg/kg-day	1.30E+05	kg-day/mg		5.17E-10	4.64E-14	mg/kg-day	7.00E-10	mg/kg-day	6.63E-05
				Inorganics													
				Arsenic	2.20E+00	mg/kg	2.78E-09	mg/kg-day	1.50E+00	kg-day/mg		4.17E-09	3.24E-08	mg/kg-day	3.00E-04	mg/kg-day	1.08E-04
				Cobalt	1.11E+02	mg/kg	2.34E-07	mg/kg-day	NA	kg-day/mg		NA	2.73E-06	mg/kg-day	3.00E-04	mg/kg-day	9.09E-03
				Manganese	1.18E+02	mg/kg	2.48E-07	mg/kg-day	NA	kg-day/mg		NA	2.90E-06	mg/kg-day	2.40E-02	mg/kg-day	1.21E-04
				Nickel	1.04E+01	mg/kg	2.18E-08	mg/kg-day	NA	kg-day/mg		NA	2.54E-07	mg/kg-day	2.00E-02	mg/kg-day	1.27E-05
				Thallium	ND	mg/kg	ND	mg/kg-day	NA	kg-day/mg		ND	ND	mg/kg-day	1.00E-05	mg/kg-day	ND
				Vanadium	3.70E+01	mg/kg	7.79E-08	mg/kg-day	NA	kg-day/mg		NA	9.09E-07	mg/kg-day	5.04E-03	mg/kg-day	1.80E-04
				PCBs													
				Total PCBs	4.42E-02	mg/kg	9.30E-11	mg/kg-day	2.00E+00	kg-day/mg		1.86E-10	1.09E-09	mg/kg-day	2.00E-05	mg/kg-day	5.43E-05
				SVOCs													
				Benzo(a)anthracene	1.37E-01	mg/kg	2.88E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	7.21E-11	3.36E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.55E-01	mg/kg	3.26E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	8.16E-10	3.81E-09	mg/kg-day	3.00E-04	mg/kg-day	1.27E-05
				Benzo(b)fluoranthene	1.65E-01	mg/kg	3.47E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	8.68E-11	4.05E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	6.80E-02	mg/kg	1.43E-10	mg/kg-day	1.00E-02	kg-day/mg	2.5	3.58E-12	1.67E-09	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.53E-01	mg/kg	3.22E-10	mg/kg-day	1.00E-03	kg-day/mg	2.5	8.05E-13	3.76E-09	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	3.23E-02	mg/kg	6.80E-11	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.70E-10	7.93E-10	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.04E-01	mg/kg	2.19E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.47E-11	2.55E-09	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.22E-02	mg/kg	2.57E-11	mg/kg-day	NA	kg-day/mg		NA	3.00E-10	mg/kg-day	2.00E-02	mg/kg-day	1.50E-08
				TPH													
				Diesel Range Organics (C10-C20)	1.30E+01	mg/kg	2.74E-08	mg/kg-day	NA	kg-day/mg		NA	3.19E-07	mg/kg-day	1.00E-02	mg/kg-day	3.19E-05
			Exp. Route Total									6.07E-09					9.67E-03
Surface Soil	Surface Soil	Hypothetical Future Park Land/Green Space	Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	1.89E-06	mg/kg	1.89E-16	mg/kg-day	1.30E+05	kg-day/mg		2.45E-11	2.20E-15	mg/kg-day	7.00E-10	mg/kg-day	3.14E-06
				Inorganics													
				Arsenic	2.20E+00	mg/kg	2.19E-10	mg/kg-day	1.50E+00	kg-day/mg		3.29E-10	2.56E-09	mg/kg-day	3.00E-04	mg/kg-day	8.53E-06
				Cobalt	1.11E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Manganese	1.18E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	1.04E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	ND	mg/kg	ND	mg/kg-day	NA	kg-day/mg		ND	ND	mg/kg-day	1.00E-05	mg/kg-day	ND
				Vanadium	3.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.42E-02	mg/kg	2.06E-11	mg/kg-day	2.00E+00	kg-day/mg		4.11E-11	2.40E-10	mg/kg-day	2.00E-05	mg/kg-day	1.20E-05
				SVOCs													
				Benzo(a)anthracene	1.37E-01	mg/kg	5.92E-11	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.48E-11	6.91E-10	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	1.55E-01	mg/kg	6.70E-11	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.67E-10	7.82E-10	mg/kg-day	3.00E-04	mg/kg-day	2.61E-06
				Benzo(b)fluoranthene	1.65E-01	mg/kg	7.13E-11	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.78E-11	8.32E-10	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	6.80E-02	mg/kg	2.94E-11	mg/kg-day	1.00E-02	kg-day/mg	2.5	7.35E-13	3.43E-10	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	1.53E-01	mg/kg	6.61E-11	mg/kg-day	1.00E-03	kg-day/mg	2.5	1.65E-13	7.72E-10	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	3.23E-02	mg/kg	1.40E-11	mg/kg-day	1.00E+00	kg-day/mg	2.5	3.49E-11	1.63E-10	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	1.04E-01	mg/kg	4.50E-11	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.12E-11	5.24E-10	mg/kg-day	NA	mg/kg-day	NA
				Naphthalene	1.22E-02	mg/kg	5.27E-12	mg/kg-day	NA	kg-day/mg		NA	6.15E-11	mg/kg-day	2.00E-02	mg/kg-day	3.08E-09
				TPH													
				Diesel Range Organics (C10-C20)	1.30E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									6.42E-10					2.63E-05

Table H-1-3. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Recreational Visitor
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF/IUR			Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Surface Soil	Outdoor air	Hypothetical Future Park Land/Green Space	Inhalation	**Dioxin**													
				2,3,7,8-TCDD-TEQ	3.31E-15	mg/m3	6.15E-19	mg/m3	3.80E+01	mg/m3		2.34E-17	7.17E-18	mg/m3	4.00E-08	mg/m3	1.79E-10
				Inorganics													
				Arsenic	3.85E-09	mg/m3	7.15E-13	mg/m3	4.30E-03	mg/m3		3.08E-15	8.35E-12	mg/m3	1.50E-05	mg/m3	5.56E-07
				Cobalt	1.94E-07	mg/m3	3.61E-11	mg/m3	9.00E-03	mg/m3		3.25E-13	4.21E-10	mg/m3	6.00E-06	mg/m3	7.02E-05
				Manganese	2.06E-07	mg/m3	3.84E-11	mg/m3	NA	mg/m3		NA	4.48E-10	mg/m3	5.00E-05	mg/m3	8.95E-06
				Nickel	1.81E-08	mg/m3	3.37E-12	mg/m3	2.60E-04	mg/m3		8.75E-16	3.93E-11	mg/m3	9.00E-05	mg/m3	4.36E-07
				Thallium	ND	mg/m3	ND	mg/m3	NA	mg/m3		ND	ND	mg/m3	NA	mg/m3	ND
				Vanadium	6.47E-08	mg/m3	1.20E-11	mg/m3	NA	mg/m3		NA	1.40E-10	mg/m3	1.00E-04	mg/m3	1.40E-06
				PCBs													
				Total PCBs	7.73E-11	mg/m3	1.44E-14	mg/m3	5.71E-04	mg/m3		8.21E-18	1.68E-13	mg/m3	NA	mg/m3	NA
				SVOCs													
				Benzo(a)anthracene	2.40E-10	mg/m3	4.45E-14	mg/m3	6.00E-05	mg/m3	2.5	6.68E-18	5.20E-13	mg/m3	NA	mg/m3	NA
				Benzo(a)pyrene	2.71E-10	mg/m3	5.04E-14	mg/m3	6.00E-04	mg/m3	2.5	7.56E-17	5.88E-13	mg/m3	2.00E-06	mg/m3	2.94E-07
				Benzo(b)fluoranthene	2.89E-10	mg/m3	5.37E-14	mg/m3	6.00E-05	mg/m3	2.5	8.05E-18	6.26E-13	mg/m3	NA	mg/m3	NA
				Benzo(k)fluoranthene	1.19E-10	mg/m3	2.21E-14	mg/m3	6.00E-06	mg/m3	2.5	3.32E-19	2.58E-13	mg/m3	NA	mg/m3	NA
				Chrysene	2.68E-10	mg/m3	4.97E-14	mg/m3	6.00E-07	mg/m3	2.5	7.46E-20	5.80E-13	mg/m3	NA	mg/m3	NA
				Dibenzo(a,h)anthracene	5.65E-11	mg/m3	1.05E-14	mg/m3	6.00E-04	mg/m3	2.5	1.58E-17	1.23E-13	mg/m3	NA	mg/m3	NA
				Indeno(1,2,3-cd)pyrene	1.82E-10	mg/m3	3.38E-14	mg/m3	6.00E-05	mg/m3	2.5	5.07E-18	3.95E-13	mg/m3	NA	mg/m3	NA
				Naphthalene	2.13E-11	mg/m3	3.97E-15	mg/m3	3.40E-05	mg/m3		1.35E-19	4.63E-14	mg/m3	3.00E-03	mg/m3	1.54E-11
				TPH													
				Diesel Range Organics (C10-C20)	2.27E-08	mg/m3	4.23E-12	mg/m3	NA	mg/m3		NA	4.93E-11	mg/m3	1.00E-01	mg/m3	4.93E-10
			Exp. Route Total									3.29E-13					8.18E-05
		Exposure Point Total										6.72E-09					9.78E-03
	Exposure Medium Total											6.72E-09					9.78E-03
Surface Soil Total												6.72E-09					9.78E-03
Total Receptor Risk/Hazard												6.72E-09					9.78E-03

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable/no dose-response value.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-4. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.15E-13	mg/kg-day	1.30E+05	kg-day/mg		1.50E-08	8.06E-13	mg/kg-day	7.00E-10	mg/kg-day	1.15E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	1.28E-05	mg/kg-day	NA	kg-day/mg		NA	8.98E-05	mg/kg-day	1.00E+00	mg/kg-day	8.98E-05
				Antimony	1.93E+00	mg/kg	3.07E-09	mg/kg-day	NA	kg-day/mg		NA	2.15E-08	mg/kg-day	4.00E-04	mg/kg-day	5.37E-05
				Arsenic	5.56E+00	mg/kg	5.30E-09	mg/kg-day	1.50E+00	kg-day/mg		7.95E-09	3.71E-08	mg/kg-day	3.00E-04	mg/kg-day	1.24E-04
				Cobalt	1.51E+01	mg/kg	2.40E-08	mg/kg-day	NA	kg-day/mg		NA	1.68E-07	mg/kg-day	3.00E-04	mg/kg-day	5.60E-04
				Cyanide	8.76E-01	mg/kg	1.39E-09	mg/kg-day	NA	kg-day/mg		NA	9.74E-09	mg/kg-day	6.30E-04	mg/kg-day	1.55E-05
				Manganese	2.10E+02	mg/kg	3.34E-07	mg/kg-day	NA	kg-day/mg		NA	2.34E-06	mg/kg-day	2.40E-02	mg/kg-day	9.73E-05
				Nickel	5.07E+01	mg/kg	8.06E-08	mg/kg-day	NA	kg-day/mg		NA	5.64E-07	mg/kg-day	2.00E-02	mg/kg-day	2.82E-05
				Thallium	2.10E-01	mg/kg	3.34E-10	mg/kg-day	NA	kg-day/mg		NA	2.34E-09	mg/kg-day	1.00E-05	mg/kg-day	2.34E-04
				Vanadium	8.70E+01	mg/kg	1.38E-07	mg/kg-day	NA	kg-day/mg		NA	9.68E-07	mg/kg-day	5.04E-03	mg/kg-day	1.92E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	7.10E-10	mg/kg-day	2.00E+00	kg-day/mg		1.42E-09	4.97E-09	mg/kg-day	2.00E-05	mg/kg-day	2.49E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	9.37E-10	mg/kg-day	1.00E-01	kg-day/mg	1	9.37E-11	6.56E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	1.03E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.03E-09	7.23E-09	mg/kg-day	3.00E-04	mg/kg-day	2.41E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	1.54E-09	mg/kg-day	1.00E-01	kg-day/mg	1	1.54E-10	1.08E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	5.64E-10	mg/kg-day	1.00E-02	kg-day/mg	1	5.64E-12	3.95E-09	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	8.76E-01	mg/kg	1.39E-09	mg/kg-day	1.00E-03	kg-day/mg	1	1.39E-12	9.74E-09	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	2.35E-10	mg/kg-day	1.00E+00	kg-day/mg	1	2.35E-10	1.65E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	9.06E-10	mg/kg-day	1.00E-01	kg-day/mg	1	9.06E-11	6.34E-09	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	1.45E-07	mg/kg-day	NA	kg-day/mg		NA	1.01E-06	mg/kg-day	1.00E-02	mg/kg-day	1.01E-04
			Exp. Route Total									2.60E-08					2.92E-03

Table H-1-4. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Dermal														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.58E-13	mg/kg-day	1.30E+05	kg-day/mg		2.05E-08	1.10E-12	mg/kg-day	7.00E-10	mg/kg-day	1.58E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	0.00E+00	mg/kg-day	NA	kg-day/mg		NA	0.00E+00	mg/kg-day	NA	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	1.21E-08	mg/kg-day	1.50E+00	kg-day/mg		1.81E-08	8.46E-08	mg/kg-day	3.00E-04	mg/kg-day	2.82E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	0.00E+00	mg/kg-day	NA	kg-day/mg		NA	0.00E+00	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	4.53E-09	mg/kg-day	2.00E+00	kg-day/mg		9.07E-09	3.17E-08	mg/kg-day	2.00E-05	mg/kg-day	1.59E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	5.56E-09	mg/kg-day	1.00E-01	kg-day/mg	1	5.56E-10	3.89E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	6.12E-09	mg/kg-day	1.00E+00	kg-day/mg	1	6.12E-09	4.29E-08	mg/kg-day	3.00E-04	mg/kg-day	1.43E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	9.14E-09	mg/kg-day	1.00E-01	kg-day/mg	1	9.14E-10	6.40E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	3.34E-09	mg/kg-day	1.00E-02	kg-day/mg	1	3.34E-11	2.34E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	8.76E-01	mg/kg	8.25E-09	mg/kg-day	1.00E-03	kg-day/mg	1	8.25E-12	5.78E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	1.39E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.39E-09	9.76E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	5.37E-09	mg/kg-day	1.00E-01	kg-day/mg	1	5.37E-10	3.76E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									5.72E-08					3.59E-03
		Exposure Point Total										8.32E-08					6.51E-03
	Exposure Medium Total											8.32E-08					6.51E-03
Sediment Total												8.32E-08					6.51E-03

Table H-1-4. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.04E-16	mg/kg-day	1.30E+05	kg-day/mg		1.35E-11	7.26E-16	mg/kg-day	7.00E-10	mg/kg-day	1.04E-06
				Metals													
				Arsenic	7.80E-01	ug/L	1.98E-10	mg/kg-day	1.50E+00	kg-day/mg		2.97E-10	1.39E-09	mg/kg-day	3.00E-04	mg/kg-day	4.63E-06
				Cobalt	9.80E-01	ug/L	2.49E-10	mg/kg-day	NA	kg-day/mg		NA	1.74E-09	mg/kg-day	3.00E-04	mg/kg-day	5.81E-06
				Manganese	1.40E+02	ug/L	3.56E-08	mg/kg-day	NA	kg-day/mg		NA	2.49E-07	mg/kg-day	2.40E-02	mg/kg-day	1.04E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	3.30E-13	mg/kg-day	3.40E-01	kg-day/mg		1.12E-13	2.31E-12	mg/kg-day	5.00E-04	mg/kg-day	4.63E-09
				PCBs													
				Total PCBs	9.40E-03	ug/L	2.39E-12	mg/kg-day	4.00E-01	kg-day/mg		9.56E-13	1.67E-11	mg/kg-day	2.00E-05	mg/kg-day	8.36E-07
			Exp. Route Total									3.12E-10					2.27E-05
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	9.42E-11	mg/kg-day	1.50E+00	kg-day/mg		1.41E-10	6.59E-10	mg/kg-day	3.00E-04	mg/kg-day	2.20E-06
				Cobalt	9.80E-01	ug/L	4.73E-11	mg/kg-day	NA	kg-day/mg		NA	3.31E-10	mg/kg-day	3.00E-04	mg/kg-day	1.10E-06
				Manganese	1.40E+02	ug/L	1.69E-08	mg/kg-day	NA	kg-day/mg		NA	1.18E-07	mg/kg-day	9.60E-04	mg/kg-day	1.23E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.41E-10					1.27E-04
		Exposure Point Total										4.53E-10					1.49E-04
	Exposure Medium Total											4.53E-10					1.49E-04
Surface Water Total												4.53E-10					1.49E-04
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Upper Anacostia	Ingestion														
				Metals													
				Mercury	1.08E-01	mg/kg	4.83E-07	mg/kg-day	NA	kg-day/mg		NA	3.38E-06	mg/kg-day	1.00E-04	mg/kg-day	3.38E-02
				Pesticides													
				4,4'-DDD	5.47E-03	mg/kg	1.66E-08	mg/kg-day	2.40E-01	kg-day/mg		3.99E-09	1.16E-07	mg/kg-day	3.00E-05	mg/kg-day	3.88E-03
				4,4'-DDE	1.56E-02	mg/kg	4.72E-08	mg/kg-day	3.40E-01	kg-day/mg		1.61E-08	3.31E-07	mg/kg-day	3.00E-04	mg/kg-day	1.10E-03
				Aldrin	1.46E-04	mg/kg	4.43E-10	mg/kg-day	1.70E+01	kg-day/mg		7.53E-09	3.10E-09	mg/kg-day	3.00E-05	mg/kg-day	1.03E-04
				alpha-Chlordane	9.58E-03	mg/kg	2.91E-08	mg/kg-day	3.50E-01	kg-day/mg		1.02E-08	2.04E-07	mg/kg-day	5.00E-04	mg/kg-day	4.07E-04
				cis-Nonachlor	4.13E-03	mg/kg	1.26E-08	mg/kg-day	3.50E-01	kg-day/mg		4.39E-09	8.79E-08	mg/kg-day	5.00E-04	mg/kg-day	1.76E-04
				Dieldrin	2.89E-03	mg/kg	8.77E-09	mg/kg-day	1.60E+01	kg-day/mg		1.40E-07	6.14E-08	mg/kg-day	5.00E-05	mg/kg-day	1.23E-03
				gamma-Chlordane	3.47E-03	mg/kg	1.05E-08	mg/kg-day	3.50E-01	kg-day/mg		3.69E-09	7.38E-08	mg/kg-day	5.00E-04	mg/kg-day	1.48E-04
				Heptachlor epoxide	1.31E-03	mg/kg	3.99E-09	mg/kg-day	9.10E+00	kg-day/mg		3.63E-08	2.79E-08	mg/kg-day	1.30E-05	mg/kg-day	2.15E-03
				Mirex	1.76E-04	mg/kg	5.34E-10	mg/kg-day	1.80E+01	kg-day/mg		9.62E-09	3.74E-09	mg/kg-day	2.00E-04	mg/kg-day	1.87E-05
				Oxychlordane	1.82E-03	mg/kg	5.52E-09	mg/kg-day	3.50E-01	kg-day/mg		1.93E-09	3.86E-08	mg/kg-day	5.00E-04	mg/kg-day	7.72E-05
				trans-Nonachlor	1.07E-02	mg/kg	3.24E-08	mg/kg-day	3.50E-01	kg-day/mg		1.13E-08	2.26E-07	mg/kg-day	5.00E-04	mg/kg-day	4.53E-04
				PCBs													
				Total PCBs	1.92E-01	mg/kg	5.99E-07	mg/kg-day	2.00E+00	kg-day/mg		1.20E-06	4.19E-06	mg/kg-day	2.00E-05	mg/kg-day	2.10E-01
				PCB-TEQ	1.30E-06	mg/kg	3.02E-12	mg/kg-day	1.30E+05	kg-day/mg		3.92E-07	2.11E-11	mg/kg-day	7.00E-10	mg/kg-day	3.02E-02
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]												1.44E-06					2.53E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]												6.37E-07					7.37E-02
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)												**1.53E-06**					**2.60E-01**
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)												**7.21E-07**					**8.03E-02**

Table H-1-4. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF		ADAF (1)	Cancer Risk	Intake/Exposure Concentration		RfD		Hazard Quotient
					Value	Units	Value	Units	Value	Units			Value	Units	Value	Units	

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
EPD - Effective Predictive Domain.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Fish consumption Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Fish consumption Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-5. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.04E-13	mg/kg-day	1.30E+05	kg-day/mg		1.36E-08	1.22E-12	mg/kg-day	7.00E-10	mg/kg-day	1.74E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	1.16E-05	mg/kg-day	NA	kg-day/mg		NA	1.35E-04	mg/kg-day	1.00E+00	mg/kg-day	1.35E-04
				Antimony	8.07E+03	mg/kg	1.16E-05	mg/kg-day	NA	kg-day/mg		NA	1.35E-04	mg/kg-day	1.00E+00	mg/kg-day	1.35E-04
				Arsenic	5.56E+00	mg/kg	4.80E-09	mg/kg-day	1.50E+00	kg-day/mg		7.20E-09	5.60E-08	mg/kg-day	3.00E-04	mg/kg-day	1.87E-04
				Cobalt	1.51E+01	mg/kg	2.17E-08	mg/kg-day	NA	kg-day/mg		NA	2.53E-07	mg/kg-day	3.00E-04	mg/kg-day	8.45E-04
				Cyanide	8.76E-01	mg/kg	1.26E-09	mg/kg-day	NA	kg-day/mg		NA	1.47E-08	mg/kg-day	6.30E-04	mg/kg-day	2.33E-05
				Manganese	2.10E+02	mg/kg	3.02E-07	mg/kg-day	NA	kg-day/mg		NA	3.53E-06	mg/kg-day	2.40E-02	mg/kg-day	1.47E-04
				Nickel	5.07E+01	mg/kg	7.30E-08	mg/kg-day	NA	kg-day/mg		NA	8.51E-07	mg/kg-day	2.00E-02	mg/kg-day	4.26E-05
				Thallium	2.10E-01	mg/kg	3.02E-10	mg/kg-day	NA	kg-day/mg		NA	3.53E-09	mg/kg-day	1.00E-05	mg/kg-day	3.53E-04
				Vanadium	8.70E+01	mg/kg	1.25E-07	mg/kg-day	NA	kg-day/mg		NA	1.46E-06	mg/kg-day	5.04E-03	mg/kg-day	2.90E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	6.43E-10	mg/kg-day	2.00E+00	kg-day/mg		1.29E-09	7.50E-09	mg/kg-day	2.00E-05	mg/kg-day	3.75E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	8.49E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	2.12E-10	9.90E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	9.35E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	2.34E-09	1.09E-08	mg/kg-day	3.00E-04	mg/kg-day	3.64E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	1.40E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.49E-10	1.63E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	5.11E-10	mg/kg-day	1.00E-02	kg-day/mg	2.5	1.28E-11	5.96E-09	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	8.76E-01	mg/kg	1.26E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	3.15E-12	1.47E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	2.13E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	5.32E-10	2.48E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	8.20E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	2.05E-10	9.57E-09	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	1.31E-07	mg/kg-day	NA	kg-day/mg		NA	1.53E-06	mg/kg-day	1.00E-02	mg/kg-day	1.53E-04
			Exp. Route Total									2.57E-08					4.46E-03
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	8.48E-14	mg/kg-day	1.30E+05	kg-day/mg		1.10E-08	9.89E-13	mg/kg-day	7.00E-10	mg/kg-day	1.41E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	6.50E-09	mg/kg-day	1.50E+00	kg-day/mg		9.76E-09	7.59E-08	mg/kg-day	3.00E-04	mg/kg-day	2.53E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	2.44E-09	mg/kg-day	2.00E+00	kg-day/mg		4.88E-09	2.85E-08	mg/kg-day	2.00E-05	mg/kg-day	1.42E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	2.99E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	7.48E-10	3.49E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	3.30E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	8.24E-09	3.84E-08	mg/kg-day	3.00E-04	mg/kg-day	1.28E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	4.92E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.23E-09	5.74E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.80E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	4.50E-11	2.10E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	8.76E-01	mg/kg	4.44E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	1.11E-11	5.18E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	7.50E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.88E-09	8.75E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	2.89E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	7.22E-10	3.37E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									3.85E-08					3.22E-03
		Exposure Point Total										6.42E-08					7.68E-03
	Exposure Medium Total											6.42E-08					7.68E-03
Sediment Total												6.42E-08					7.68E-03

Table H-1-5. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	9.39E-17	mg/kg-day	1.30E+05	kg-day/mg		1.22E-11	1.10E-15	mg/kg-day	7.00E-10	mg/kg-day	1.57E-06
				Metals													
				Arsenic	7.80E-01	ug/L	1.80E-10	mg/kg-day	1.50E+00	kg-day/mg		2.69E-10	2.10E-09	mg/kg-day	3.00E-04	mg/kg-day	6.98E-06
				Cobalt	9.80E-01	ug/L	2.26E-10	mg/kg-day	NA	kg-day/mg		NA	2.63E-09	mg/kg-day	3.00E-04	mg/kg-day	8.77E-06
				Manganese	1.40E+02	ug/L	3.22E-08	mg/kg-day	NA	kg-day/mg		NA	3.76E-07	mg/kg-day	2.40E-02	mg/kg-day	1.57E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	2.99E-13	mg/kg-day	3.40E-01	kg-day/mg		1.02E-13	3.49E-12	mg/kg-day	5.00E-04	mg/kg-day	6.98E-09
				PCBs													
				Total PCBs	9.40E-03	ug/L	2.16E-12	mg/kg-day	4.00E-01	kg-day/mg		8.66E-13	2.52E-11	mg/kg-day	2.00E-05	mg/kg-day	1.26E-06
			Exp. Route Total									2.83E-10					3.43E-05
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	6.08E-11	mg/kg-day	1.50E+00	kg-day/mg		9.12E-11	7.10E-10	mg/kg-day	3.00E-04	mg/kg-day	2.37E-06
				Cobalt	9.80E-01	ug/L	3.06E-11	mg/kg-day	NA	kg-day/mg		NA	3.57E-10	mg/kg-day	3.00E-04	mg/kg-day	1.19E-06
				Manganese	1.40E+02	ug/L	1.09E-08	mg/kg-day	NA	kg-day/mg		NA	1.27E-07	mg/kg-day	9.60E-04	mg/kg-day	1.33E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									9.12E-11					1.36E-04
		Exposure Point Total										3.74E-10					1.71E-04
	Exposure Medium Total											3.74E-10					1.71E-04
Surface Water Total												3.74E-10					1.71E-04
Fish Tissue	Fish Fillet Tissue - Mixed Diet [(2)]	Upper Anacostia	Ingestion														
				Metals													
				Mercury	1.08E-01	mg/kg	3.06E-07	mg/kg-day	NA	kg-day/mg		NA	3.57E-06	mg/kg-day	1.00E-04	mg/kg-day	3.57E-02
				Pesticides													
				4,4'-DDD	5.47E-03	mg/kg	1.05E-08	mg/kg-day	2.40E-01	kg-day/mg		2.53E-09	1.23E-07	mg/kg-day	3.00E-05	mg/kg-day	4.10E-03
				4,4'-DDE	1.56E-02	mg/kg	2.99E-08	mg/kg-day	3.40E-01	kg-day/mg		1.02E-08	3.49E-07	mg/kg-day	3.00E-04	mg/kg-day	1.16E-03
				Aldrin	1.46E-04	mg/kg	2.81E-10	mg/kg-day	1.70E+01	kg-day/mg		4.78E-09	3.28E-09	mg/kg-day	3.00E-05	mg/kg-day	1.09E-04
				alpha-Chlordane	9.58E-03	mg/kg	1.84E-08	mg/kg-day	3.50E-01	kg-day/mg		6.45E-09	2.15E-07	mg/kg-day	5.00E-04	mg/kg-day	4.30E-04
				cis-Nonachlor	4.13E-03	mg/kg	7.96E-09	mg/kg-day	3.50E-01	kg-day/mg		2.78E-09	9.28E-08	mg/kg-day	5.00E-04	mg/kg-day	1.86E-04
				Dieldrin	2.89E-03	mg/kg	5.56E-09	mg/kg-day	1.60E+01	kg-day/mg		8.89E-08	6.49E-08	mg/kg-day	5.00E-05	mg/kg-day	1.30E-03
				gamma-Chlordane	3.47E-03	mg/kg	6.69E-09	mg/kg-day	3.50E-01	kg-day/mg		2.34E-09	7.80E-08	mg/kg-day	5.00E-04	mg/kg-day	1.56E-04
				Heptachlor epoxide	1.31E-03	mg/kg	2.53E-09	mg/kg-day	9.10E+00	kg-day/mg		2.30E-08	2.95E-08	mg/kg-day	1.30E-05	mg/kg-day	2.27E-03
				Mirex	1.76E-04	mg/kg	3.39E-10	mg/kg-day	1.80E+01	kg-day/mg		6.10E-09	3.95E-09	mg/kg-day	2.00E-04	mg/kg-day	1.98E-05
				Oxychlordane	1.82E-03	mg/kg	3.50E-09	mg/kg-day	3.50E-01	kg-day/mg		1.22E-09	4.08E-08	mg/kg-day	5.00E-04	mg/kg-day	8.16E-05
				trans-Nonachlor	1.07E-02	mg/kg	2.05E-08	mg/kg-day	3.50E-01	kg-day/mg		7.18E-09	2.39E-07	mg/kg-day	5.00E-04	mg/kg-day	4.79E-04
				PCBs													
				Total PCBs	1.92E-01	mg/kg	3.80E-07	mg/kg-day	2.00E+00	kg-day/mg		7.60E-07	4.43E-06	mg/kg-day	2.00E-05	mg/kg-day	2.22E-01
				PCB-TEQ	1.30E-06	mg/kg	1.91E-12	mg/kg-day	1.30E+05	kg-day/mg		2.49E-07	2.23E-11	mg/kg-day	7.00E-10	mg/kg-day	3.19E-02
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]												9.15E-07					2.68E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]												4.04E-07					7.79E-02
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)												**9.80E-07**					**2.75E-01**
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)												**4.69E-07**					**8.57E-02**

Table H-1-5. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF		ADAF [(1)]	Cancer Risk	Intake/Exposure Concentration		RfD		Hazard Quotient
					Value	Units	Value	Units	Value	Units			Value	Units	Value	Units	

Notes:

ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
EPD - Effective Predictive Domain.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Fish consumption Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Fish consumption Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-6. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	2.17E-13	mg/kg-day	1.30E+05	kg-day/mg		2.82E-08	7.59E-12	mg/kg-day	7.00E-10	mg/kg-day	1.08E-02
				Metals													
				Aluminum	8.07E+03	mg/kg	2.41E-05	mg/kg-day	NA	kg-day/mg		NA	8.45E-04	mg/kg-day	1.00E+00	mg/kg-day	8.45E-04
				Antimony	1.93E+00	mg/kg	5.77E-09	mg/kg-day	NA	kg-day/mg		NA	2.02E-07	mg/kg-day	4.00E-04	mg/kg-day	5.05E-04
				Arsenic	5.56E+00	mg/kg	9.98E-09	mg/kg-day	1.50E+00	kg-day/mg		1.50E-08	3.49E-07	mg/kg-day	3.00E-04	mg/kg-day	1.16E-03
				Cobalt	1.51E+01	mg/kg	4.52E-08	mg/kg-day	NA	kg-day/mg		NA	1.58E-06	mg/kg-day	3.00E-04	mg/kg-day	5.27E-03
				Cyanide	8.76E-01	mg/kg	2.62E-09	mg/kg-day	NA	kg-day/mg		NA	9.17E-08	mg/kg-day	6.30E-04	mg/kg-day	1.46E-04
				Manganese	2.10E+02	mg/kg	6.28E-07	mg/kg-day	NA	kg-day/mg		NA	2.20E-05	mg/kg-day	2.40E-02	mg/kg-day	9.16E-04
				Nickel	5.07E+01	mg/kg	1.52E-07	mg/kg-day	NA	kg-day/mg		NA	5.31E-06	mg/kg-day	2.00E-02	mg/kg-day	2.65E-04
				Thallium	2.10E-01	mg/kg	6.28E-10	mg/kg-day	NA	kg-day/mg		NA	2.20E-08	mg/kg-day	1.00E-05	mg/kg-day	2.20E-03
				Vanadium	8.70E+01	mg/kg	2.60E-07	mg/kg-day	NA	kg-day/mg		NA	9.11E-06	mg/kg-day	5.04E-03	mg/kg-day	1.81E-03
				PCBs													
				Total PCBs	4.47E-01	mg/kg	1.34E-09	mg/kg-day	2.00E+00	kg-day/mg		2.67E-09	4.68E-08	mg/kg-day	2.00E-05	mg/kg-day	2.34E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	1.76E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	7.41E-10	6.18E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	1.94E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	8.16E-09	6.80E-08	mg/kg-day	3.00E-04	mg/kg-day	2.27E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	2.90E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.22E-09	1.02E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.06E-09	mg/kg-day	1.00E-02	kg-day/mg	4.2	4.46E-11	3.72E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	8.76E-01	mg/kg	2.62E-09	mg/kg-day	1.00E-03	kg-day/mg	4.2	1.10E-11	9.17E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	4.43E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.86E-09	1.55E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	1.70E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	7.16E-10	5.97E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	2.72E-07	mg/kg-day	NA	kg-day/mg		NA	9.53E-06	mg/kg-day	1.00E-02	mg/kg-day	9.53E-04
			Exp. Route Total									5.86E-08					2.75E-02
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	7.49E-14	mg/kg-day	1.30E+05	kg-day/mg		9.74E-09	2.62E-12	mg/kg-day	7.00E-10	mg/kg-day	3.75E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	5.75E-09	mg/kg-day	1.50E+00	kg-day/mg		8.62E-09	2.01E-07	mg/kg-day	3.00E-04	mg/kg-day	6.70E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	2.16E-09	mg/kg-day	2.00E+00	kg-day/mg		4.31E-09	7.55E-08	mg/kg-day	2.00E-05	mg/kg-day	3.77E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	2.64E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.11E-09	9.25E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	2.91E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.22E-08	1.02E-07	mg/kg-day	3.00E-04	mg/kg-day	3.40E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	4.34E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.82E-09	1.52E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.59E-09	mg/kg-day	1.00E-02	kg-day/mg	4.2	6.68E-11	5.56E-08	mg/kg-day	NA	mg/kg-day	NA
				Chrysene	8.76E-01	mg/kg	3.92E-09	mg/kg-day	1.00E-03	kg-day/mg	4.2	1.65E-11	1.37E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	6.63E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	2.78E-09	2.32E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	2.55E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.07E-09	8.93E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									4.18E-08					8.53E-03
		Exposure Point Total										1.00E-07					3.60E-02
	Exposure Medium Total											1.00E-07					3.60E-02
Sediment Total												1.00E-07					3.60E-02

Table H-1-6. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1,2]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.90E-15	mg/kg-day	1.30E+05	kg-day/mg		2.48E-10	2.22E-14	mg/kg-day	7.00E-10	mg/kg-day	3.17E-05
				Metals													
				Arsenic	7.80E-01	ug/L	3.64E-09	mg/kg-day	1.50E+00	kg-day/mg		5.46E-09	4.25E-08	mg/kg-day	3.00E-04	mg/kg-day	1.42E-04
				Cobalt	9.80E-01	ug/L	4.58E-09	mg/kg-day	NA	kg-day/mg		NA	5.34E-08	mg/kg-day	3.00E-04	mg/kg-day	1.78E-04
				Manganese	1.40E+02	ug/L	6.54E-07	mg/kg-day	NA	kg-day/mg		NA	7.63E-06	mg/kg-day	2.40E-02	mg/kg-day	3.18E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	6.07E-12	mg/kg-day	3.40E-01	kg-day/mg		2.06E-12	7.08E-11	mg/kg-day	5.00E-04	mg/kg-day	1.42E-07
				PCBs													
				Total PCBs	9.40E-03	ug/L	4.39E-11	mg/kg-day	4.00E-01	kg-day/mg		1.76E-11	5.12E-10	mg/kg-day	2.00E-05	mg/kg-day	2.56E-05
			Exp. Route Total									5.73E-09					6.95E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	5.76E-10	mg/kg-day	1.50E+00	kg-day/mg		8.64E-10	6.72E-09	mg/kg-day	3.00E-04	mg/kg-day	2.24E-05
				Cobalt	9.80E-01	ug/L	2.90E-10	mg/kg-day	NA	kg-day/mg		NA	3.38E-09	mg/kg-day	3.00E-04	mg/kg-day	1.13E-05
				Manganese	1.40E+02	ug/L	1.03E-07	mg/kg-day	NA	kg-day/mg		NA	1.21E-06	mg/kg-day	9.60E-04	mg/kg-day	1.26E-03
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									8.64E-10					1.29E-03
		Exposure Point Total										6.59E-09					1.99E-03
	Exposure Medium Total											6.59E-09					1.99E-03
Surface Water Total												6.59E-09					1.99E-03
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Upper Anacostia	Ingestion														
				Metals													
				Mercury	1.08E-01	mg/kg	1.36E-07	mg/kg-day	NA	kg-day/mg		NA	4.77E-06	mg/kg-day	1.00E-04	mg/kg-day	4.77E-02
				Pesticides													
				4,4'-DDD	5.47E-03	mg/kg	4.69E-09	mg/kg-day	2.40E-01	kg-day/mg		1.13E-09	1.64E-07	mg/kg-day	3.00E-05	mg/kg-day	5.47E-03
				4,4'-DDE	1.56E-02	mg/kg	1.33E-08	mg/kg-day	3.40E-01	kg-day/mg		4.53E-09	4.67E-07	mg/kg-day	3.00E-04	mg/kg-day	1.56E-03
				Aldrin	1.46E-04	mg/kg	1.25E-10	mg/kg-day	1.70E+01	kg-day/mg		2.13E-09	4.38E-09	mg/kg-day	3.00E-05	mg/kg-day	1.46E-04
				alpha-Chlordane	9.58E-03	mg/kg	8.21E-09	mg/kg-day	3.50E-01	kg-day/mg		2.87E-09	2.87E-07	mg/kg-day	5.00E-04	mg/kg-day	5.75E-04
				cis-Nonachlor	4.13E-03	mg/kg	3.54E-09	mg/kg-day	3.50E-01	kg-day/mg		1.24E-09	1.24E-07	mg/kg-day	5.00E-04	mg/kg-day	2.48E-04
				Dieldrin	2.89E-03	mg/kg	2.48E-09	mg/kg-day	1.60E+01	kg-day/mg		3.96E-08	8.67E-08	mg/kg-day	5.00E-05	mg/kg-day	1.73E-03
				gamma-Chlordane	3.47E-03	mg/kg	2.98E-09	mg/kg-day	3.50E-01	kg-day/mg		1.04E-09	1.04E-07	mg/kg-day	5.00E-04	mg/kg-day	2.08E-04
				Heptachlor epoxide	1.31E-03	mg/kg	1.13E-09	mg/kg-day	9.10E+00	kg-day/mg		1.02E-08	3.94E-08	mg/kg-day	1.30E-05	mg/kg-day	3.03E-03
				Mirex	1.76E-04	mg/kg	1.51E-10	mg/kg-day	1.80E+01	kg-day/mg		2.72E-09	5.28E-09	mg/kg-day	2.00E-04	mg/kg-day	2.64E-05
				Oxychlordane	1.82E-03	mg/kg	1.56E-09	mg/kg-day	3.50E-01	kg-day/mg		5.45E-10	5.45E-08	mg/kg-day	5.00E-04	mg/kg-day	1.09E-04
				trans-Nonachlor	1.07E-02	mg/kg	9.13E-09	mg/kg-day	3.50E-01	kg-day/mg		3.20E-09	3.20E-07	mg/kg-day	5.00E-04	mg/kg-day	6.39E-04
				PCBs													
				Total PCBs	1.92E-01	mg/kg	1.69E-07	mg/kg-day	2.00E+00	kg-day/mg		3.38E-07	5.92E-06	mg/kg-day	2.00E-05	mg/kg-day	2.96E-01
				PCB-TEQ	1.30E-06	mg/kg	8.52E-13	mg/kg-day	1.30E+05	kg-day/mg		1.11E-07	2.98E-11	mg/kg-day	7.00E-10	mg/kg-day	4.26E-02
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]												4.08E-07					3.58E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]												1.80E-07					1.04E-01
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)												**5.15E-07**					**3.96E-01**
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)												**2.87E-07**					**1.42E-01**

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-7. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upper Potomac	Ingestion														
				Inorganics													
				Arsenic	2.39E-02	mg/kg	1.07E-07	mg/kg-day	1.50E+00	kg-day/mg		1.60E-07	7.47E-07	mg/kg-day	3.00E-04	mg/kg-day	2.49E-03
				Arsenic, organic	2.15E-01	mg/kg	9.60E-07	mg/kg-day	NA	kg-day/mg		NA	6.72E-06	mg/kg-day	2.00E-02	mg/kg-day	3.36E-04
				Mercury	1.23E-01	mg/kg	5.49E-07	mg/kg-day	NA	kg-day/mg		NA	3.84E-06	mg/kg-day	1.00E-04	mg/kg-day	3.84E-02
				Pesticides													
				4,4'-DDD	1.03E-02	mg/kg	3.13E-08	mg/kg-day	2.40E-01	kg-day/mg		7.50E-09	2.19E-07	mg/kg-day	3.00E-05	mg/kg-day	7.30E-03
				4,4'-DDE	6.24E-02	mg/kg	1.89E-07	mg/kg-day	3.40E-01	kg-day/mg		6.44E-08	1.33E-06	mg/kg-day	3.00E-04	mg/kg-day	4.42E-03
				Aldrin	2.21E-04	mg/kg	6.72E-10	mg/kg-day	1.70E+01	kg-day/mg		1.14E-08	4.70E-09	mg/kg-day	3.00E-05	mg/kg-day	1.57E-04
				alpha-Chlordane	1.23E-02	mg/kg	3.73E-08	mg/kg-day	3.50E-01	kg-day/mg		1.31E-08	2.61E-07	mg/kg-day	5.00E-04	mg/kg-day	5.23E-04
				beta-BHC	6.91E-04	mg/kg	2.10E-09	mg/kg-day	1.80E+00	kg-day/mg		3.78E-09	1.47E-08	mg/kg-day	NA	mg/kg-day	NA
				cis-Nonachlor	3.87E-03	mg/kg	1.17E-08	mg/kg-day	3.50E-01	kg-day/mg		4.11E-09	8.22E-08	mg/kg-day	5.00E-04	mg/kg-day	1.64E-04
				Dieldrin	7.28E-03	mg/kg	2.21E-08	mg/kg-day	1.60E+01	kg-day/mg		3.54E-07	1.55E-07	mg/kg-day	5.00E-05	mg/kg-day	3.09E-03
				gamma-Chlordane	2.54E-03	mg/kg	7.71E-09	mg/kg-day	3.50E-01	kg-day/mg		2.70E-09	5.40E-08	mg/kg-day	5.00E-04	mg/kg-day	1.08E-04
				Heptachlor epoxide	1.97E-03	mg/kg	5.98E-09	mg/kg-day	9.10E+00	kg-day/mg		5.44E-08	4.19E-08	mg/kg-day	1.30E-05	mg/kg-day	3.22E-03
				Hexachlorobenzene	7.46E-04	mg/kg	2.26E-09	mg/kg-day	1.60E+00	kg-day/mg		3.62E-09	1.59E-08	mg/kg-day	8.00E-04	mg/kg-day	1.98E-05
				Mirex	1.75E-04	mg/kg	5.30E-10	mg/kg-day	1.80E+01	kg-day/mg		9.54E-09	3.71E-09	mg/kg-day	2.00E-04	mg/kg-day	1.86E-05
				Oxychlordane	1.87E-03	mg/kg	5.68E-09	mg/kg-day	3.50E-01	kg-day/mg		1.99E-09	3.97E-08	mg/kg-day	5.00E-04	mg/kg-day	7.95E-05
				trans-Nonachlor	1.05E-02	mg/kg	3.19E-08	mg/kg-day	3.50E-01	kg-day/mg		1.12E-08	2.23E-07	mg/kg-day	5.00E-04	mg/kg-day	4.46E-04
				PCBs													
				Total PCBs	4.59E-01	mg/kg	1.43E-06	mg/kg-day	2.00E+00	kg-day/mg		2.87E-06	1.00E-05	mg/kg-day	2.00E-05	mg/kg-day	5.02E-01
				PCB-TEQ	1.48E-05	mg/kg	3.43E-11	mg/kg-day	1.30E+05	kg-day/mg		4.46E-06	2.40E-10	mg/kg-day	7.00E-10	mg/kg-day	3.43E-01
Fish Tissue Total - Upper Potomac (Total PCBs)[3]												3.57E-06					5.63E-01
Fish Tissue Total - Upper Potomac (PCB-TEQ)[4]												5.16E-06					4.04E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Potomac	Ingestion														
				Inorganics													
				Arsenic	5.03E-02	mg/kg	2.25E-07	mg/kg-day	1.50E+00	kg-day/mg		3.37E-07	1.57E-06	mg/kg-day	3.00E-04	mg/kg-day	5.24E-03
				Arsenic, organic	4.53E-01	mg/kg	2.02E-06	mg/kg-day	NA	kg-day/mg		NA	1.42E-05	mg/kg-day	2.00E-02	mg/kg-day	7.08E-04
				Mercury	8.31E-02	mg/kg	3.71E-07	mg/kg-day	NA	kg-day/mg		NA	2.60E-06	mg/kg-day	1.00E-04	mg/kg-day	2.60E-02
				Pesticides													
				4,4'-DDD	3.46E-03	mg/kg	1.05E-08	mg/kg-day	2.40E-01	kg-day/mg		2.52E-09	7.35E-08	mg/kg-day	3.00E-05	mg/kg-day	2.45E-03
				4,4'-DDE	1.71E-02	mg/kg	5.19E-08	mg/kg-day	3.40E-01	kg-day/mg		1.76E-08	3.63E-07	mg/kg-day	3.00E-04	mg/kg-day	1.21E-03
				alpha-Chlordane	5.71E-03	mg/kg	1.73E-08	mg/kg-day	3.50E-01	kg-day/mg		6.07E-09	1.21E-07	mg/kg-day	5.00E-04	mg/kg-day	2.43E-04
				Dieldrin	3.82E-03	mg/kg	1.16E-08	mg/kg-day	1.60E+01	kg-day/mg		1.86E-07	8.12E-08	mg/kg-day	5.00E-05	mg/kg-day	1.62E-03
				gamma-Chlordane	2.79E-03	mg/kg	8.47E-09	mg/kg-day	3.50E-01	kg-day/mg		2.96E-09	5.93E-08	mg/kg-day	5.00E-04	mg/kg-day	1.19E-04
				Heptachlor epoxide	1.37E-03	mg/kg	4.16E-09	mg/kg-day	9.10E+00	kg-day/mg		3.78E-08	2.91E-08	mg/kg-day	1.30E-05	mg/kg-day	2.24E-03
				Oxychlordane	1.68E-03	mg/kg	5.10E-09	mg/kg-day	3.50E-01	kg-day/mg		1.79E-09	3.57E-08	mg/kg-day	5.00E-04	mg/kg-day	7.14E-05
				trans-Nonachlor	7.81E-03	mg/kg	2.37E-08	mg/kg-day	3.50E-01	kg-day/mg		8.30E-09	1.66E-07	mg/kg-day	5.00E-04	mg/kg-day	3.32E-04
				PCBs													
				Total PCBs	1.64E-01	mg/kg	5.12E-07	mg/kg-day	2.00E+00	kg-day/mg		1.02E-06	3.58E-06	mg/kg-day	2.00E-05	mg/kg-day	1.79E-01
				PCB-TEQ	3.41E-06	mg/kg	7.91E-12	mg/kg-day	1.30E+05	kg-day/mg		1.03E-06	5.54E-11	mg/kg-day	7.00E-10	mg/kg-day	7.91E-02
Fish Tissue Total - Lower Potomac (Total PCBs)[3]												1.62E-06					2.19E-01
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]												1.63E-06					1.19E-01

Table H-1-7. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Non-Tidal Anacostia	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	9.74E-08	mg/kg	2.26E-13	mg/kg-day	1.30E+05	kg-day/mg		2.94E-08	1.58E-12	mg/kg-day	7.00E-10	mg/kg-day	2.26E-03
				Inorganics													
				Arsenic	6.43E-03	mg/kg	2.87E-08	mg/kg-day	1.50E+00	kg-day/mg		4.31E-08	2.01E-07	mg/kg-day	3.00E-04	mg/kg-day	6.70E-04
				Arsenic, organic	5.79E-02	mg/kg	2.58E-07	mg/kg-day	NA	kg-day/mg		NA	1.81E-06	mg/kg-day	2.00E-02	mg/kg-day	9.05E-05
				Cobalt	1.21E-02	mg/kg	5.40E-08	mg/kg-day	NA	kg-day/mg		NA	3.78E-07	mg/kg-day	3.00E-04	mg/kg-day	1.26E-03
				Mercury	2.57E-01	mg/kg	1.15E-06	mg/kg-day	NA	kg-day/mg		NA	8.03E-06	mg/kg-day	1.00E-04	mg/kg-day	8.03E-02
				Thallium	3.43E-03	mg/kg	1.53E-08	mg/kg-day	NA	kg-day/mg		NA	1.07E-07	mg/kg-day	1.00E-05	mg/kg-day	1.07E-02
				Pesticides													
				Chlordane	2.16E-02	mg/kg	6.55E-08	mg/kg-day	3.50E-01	kg-day/mg		2.29E-08	4.59E-07	mg/kg-day	5.00E-04	mg/kg-day	9.18E-04
				Dieldrin	1.54E-03	mg/kg	4.68E-09	mg/kg-day	1.60E+01	kg-day/mg		7.48E-08	3.27E-08	mg/kg-day	5.00E-05	mg/kg-day	6.55E-04
				Heptachlor epoxide	1.24E-03	mg/kg	3.76E-09	mg/kg-day	9.10E+00	kg-day/mg		3.42E-08	2.63E-08	mg/kg-day	1.30E-05	mg/kg-day	2.02E-03
				PCBs													
				Total PCBs	2.84E-02	mg/kg	8.88E-08	mg/kg-day	2.00E+00	kg-day/mg		1.78E-07	6.21E-07	mg/kg-day	2.00E-05	mg/kg-day	3.11E-02
				PCB-TEQ	6.65E-07	mg/kg	1.54E-12	mg/kg-day	1.30E+05	kg-day/mg		2.01E-07	1.08E-11	mg/kg-day	7.00E-10	mg/kg-day	1.54E-02
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]												3.82E-07					1.30E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]												4.05E-07					1.14E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Lower Anacostia	Ingestion														
				Metals													
				Arsenic	2.45E-02	mg/kg	1.09E-07	mg/kg-day	1.50E+00	kg-day/mg		1.64E-07	7.66E-07	mg/kg-day	3.00E-04	mg/kg-day	2.55E-03
				Arsenic, organic	2.21E-01	mg/kg	9.84E-07	mg/kg-day	NA	kg-day/mg		NA	6.89E-06	mg/kg-day	2.00E-02	mg/kg-day	3.45E-04
				Mercury	7.20E-02	mg/kg	3.21E-07	mg/kg-day	NA	kg-day/mg		NA	2.25E-06	mg/kg-day	1.00E-04	mg/kg-day	2.25E-02
				Pesticides													
				4,4'-DDD	1.08E-02	mg/kg	3.29E-08	mg/kg-day	2.40E-01	kg-day/mg		7.89E-09	2.30E-07	mg/kg-day	3.00E-05	mg/kg-day	7.67E-03
				4,4'-DDE	3.63E-02	mg/kg	1.10E-07	mg/kg-day	3.40E-01	kg-day/mg		3.75E-08	7.72E-07	mg/kg-day	3.00E-04	mg/kg-day	2.57E-03
				Aldrin	2.04E-04	mg/kg	6.19E-10	mg/kg-day	1.70E+01	kg-day/mg		1.05E-08	4.34E-09	mg/kg-day	3.00E-05	mg/kg-day	1.45E-04
				alpha-Chlordane	1.89E-02	mg/kg	5.74E-08	mg/kg-day	3.50E-01	kg-day/mg		2.01E-08	4.02E-07	mg/kg-day	5.00E-04	mg/kg-day	8.04E-04
				cis-Nonachlor	7.13E-03	mg/kg	2.16E-08	mg/kg-day	3.50E-01	kg-day/mg		7.57E-09	1.51E-07	mg/kg-day	5.00E-04	mg/kg-day	3.03E-04
				Dieldrin	6.21E-03	mg/kg	1.89E-08	mg/kg-day	1.60E+01	kg-day/mg		3.02E-07	1.32E-07	mg/kg-day	5.00E-05	mg/kg-day	2.64E-03
				gamma-Chlordane	9.07E-03	mg/kg	2.75E-08	mg/kg-day	3.50E-01	kg-day/mg		9.64E-09	1.93E-07	mg/kg-day	5.00E-04	mg/kg-day	3.86E-04
				Heptachlor epoxide	2.35E-03	mg/kg	7.14E-09	mg/kg-day	9.10E+00	kg-day/mg		6.49E-08	5.00E-08	mg/kg-day	1.30E-05	mg/kg-day	3.84E-03
				Mirex	2.12E-04	mg/kg	6.44E-10	mg/kg-day	1.80E+01	kg-day/mg		1.16E-08	4.51E-09	mg/kg-day	2.00E-04	mg/kg-day	2.25E-05
				Oxychlordane	3.51E-03	mg/kg	1.07E-08	mg/kg-day	3.50E-01	kg-day/mg		3.73E-09	7.46E-08	mg/kg-day	5.00E-04	mg/kg-day	1.49E-04
				trans-Nonachlor	1.97E-02	mg/kg	5.98E-08	mg/kg-day	3.50E-01	kg-day/mg		2.09E-08	4.18E-07	mg/kg-day	5.00E-04	mg/kg-day	8.37E-04
				PCBs													
				Total PCBs	3.17E-01	mg/kg	9.90E-07	mg/kg-day	2.00E+00	kg-day/mg		1.98E-06	6.93E-06	mg/kg-day	2.00E-05	mg/kg-day	3.46E-01
				PCB-TEQ	8.15E-06	mg/kg	1.89E-11	mg/kg-day	1.30E+05	kg-day/mg		2.46E-06	1.32E-10	mg/kg-day	7.00E-10	mg/kg-day	1.89E-01
Fish Tissue Total - Lower Anacostia (Total PCBs)[3]												2.64E-06					3.91E-01
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[4]												3.12E-06					2.34E-01
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Potomac (Total PCBs)[3]												**3.57E-06**					**5.63E-01**
Total Receptor Risk/Hazard - Upper Potomac (PCB-TEQ)[4]												**5.16E-06**					**4.04E-01**
Total Receptor Risk/Hazard - Lower Potomac (Total PCBs)[3]												**1.62E-06**					**2.19E-01**
Total Receptor Risk/Hazard - Lower Potomac (PCB-TEQ)[4]												**1.63E-06**					**1.19E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (Total PCBs)[3]												**3.82E-07**					**1.30E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (PCB-TEQ)[4]												**4.05E-07**					**1.14E-01**
Total Receptor Risk/Hazard - Lower Anacostia (Total PCBs)[3]												**2.64E-06**					**3.91E-01**
Total Receptor Risk/Hazard - Lower Anacostia (PCB-TEQ)[4]												**3.12E-06**					**2.34E-01**

Table H-1-7. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-8. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upper Potomac	Ingestion														
				Metals													
				Arsenic	2.39E-02	mg/kg	6.76E-08	mg/kg-day	1.50E+00	kg-day/mg		1.01E-07	7.89E-07	mg/kg-day	3.00E-04	mg/kg-day	2.63E-03
				Arsenic, organic	2.15E-01	mg/kg	6.08E-07	mg/kg-day	NA	kg-day/mg		NA	7.10E-06	mg/kg-day	2.00E-02	mg/kg-day	3.55E-04
				Mercury	1.23E-01	mg/kg	3.48E-07	mg/kg-day	NA	kg-day/mg		NA	4.06E-06	mg/kg-day	1.00E-04	mg/kg-day	4.06E-02
				Pesticides													
				4,4'-DDD	1.03E-02	mg/kg	1.98E-08	mg/kg-day	2.40E-01	kg-day/mg		4.76E-09	2.31E-07	mg/kg-day	3.00E-05	mg/kg-day	7.71E-03
				4,4'-DDE	6.24E-02	mg/kg	1.20E-07	mg/kg-day	3.40E-01	kg-day/mg		4.08E-08	1.40E-06	mg/kg-day	3.00E-04	mg/kg-day	4.67E-03
				Aldrin	2.21E-04	mg/kg	4.26E-10	mg/kg-day	1.70E+01	kg-day/mg		7.24E-09	4.97E-09	mg/kg-day	3.00E-05	mg/kg-day	1.66E-04
				alpha-Chlordane	1.23E-02	mg/kg	2.37E-08	mg/kg-day	3.50E-01	kg-day/mg		8.29E-09	2.76E-07	mg/kg-day	5.00E-04	mg/kg-day	5.52E-04
				beta-BHC	6.91E-04	mg/kg	1.33E-09	mg/kg-day	1.80E+00	kg-day/mg		2.39E-09	1.55E-08	mg/kg-day	NA	mg/kg-day	NA
				cis-Nonachlor	3.87E-03	mg/kg	7.45E-09	mg/kg-day	3.50E-01	kg-day/mg		2.61E-09	8.69E-08	mg/kg-day	5.00E-04	mg/kg-day	1.74E-04
				Dieldrin	7.28E-03	mg/kg	1.40E-08	mg/kg-day	1.60E+01	kg-day/mg		2.24E-07	1.63E-07	mg/kg-day	5.00E-05	mg/kg-day	3.27E-03
				gamma-Chlordane	2.54E-03	mg/kg	4.89E-09	mg/kg-day	3.50E-01	kg-day/mg		1.71E-09	5.70E-08	mg/kg-day	5.00E-04	mg/kg-day	1.14E-04
				Heptachlor epoxide	1.97E-03	mg/kg	3.79E-09	mg/kg-day	9.10E+00	kg-day/mg		3.45E-08	4.42E-08	mg/kg-day	1.30E-05	mg/kg-day	3.40E-03
				Hexachlorobenzene	7.46E-04	mg/kg	1.44E-09	mg/kg-day	1.60E+00	kg-day/mg		2.30E-09	1.67E-08	mg/kg-day	8.00E-04	mg/kg-day	2.09E-05
				Mirex	1.75E-04	mg/kg	3.36E-10	mg/kg-day	1.80E+01	kg-day/mg		6.05E-09	3.92E-09	mg/kg-day	2.00E-04	mg/kg-day	1.96E-05
				Oxychlordane	1.87E-03	mg/kg	3.60E-09	mg/kg-day	3.50E-01	kg-day/mg		1.26E-09	4.20E-08	mg/kg-day	5.00E-04	mg/kg-day	8.40E-05
				trans-Nonachlor	1.05E-02	mg/kg	2.02E-08	mg/kg-day	3.50E-01	kg-day/mg		7.07E-09	2.36E-07	mg/kg-day	5.00E-04	mg/kg-day	4.72E-04
				PCBs													
				Total PCBs	4.59E-01	mg/kg	9.09E-07	mg/kg-day	2.00E+00	kg-day/mg		1.82E-06	1.06E-05	mg/kg-day	2.00E-05	mg/kg-day	5.30E-01
				PCB-TEQ	1.48E-05	mg/kg	2.17E-11	mg/kg-day	1.30E+05	kg-day/mg		2.83E-06	2.54E-10	mg/kg-day	7.00E-10	mg/kg-day	3.62E-01
Fish Tissue Total - Upper Potomac (Total PCBs)[3]												2.26E-06					5.94E-01
Fish Tissue Total - Upper Potomac (PCB-TEQ)[4]												3.27E-06					4.27E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Potomac	Ingestion														
				Metals													
				Arsenic	5.03E-02	mg/kg	1.42E-07	mg/kg-day	1.50E+00	kg-day/mg		2.14E-07	1.66E-06	mg/kg-day	3.00E-04	mg/kg-day	5.54E-03
				Arsenic, organic	4.53E-01	mg/kg	1.28E-06	mg/kg-day	NA	kg-day/mg		NA	1.50E-05	mg/kg-day	2.00E-02	mg/kg-day	7.48E-04
				Mercury	8.31E-02	mg/kg	2.35E-07	mg/kg-day	NA	kg-day/mg		NA	2.74E-06	mg/kg-day	1.00E-04	mg/kg-day	2.74E-02
				Pesticides													
				4,4'-DDD	3.46E-03	mg/kg	6.66E-09	mg/kg-day	2.40E-01	kg-day/mg		1.60E-09	7.77E-08	mg/kg-day	3.00E-05	mg/kg-day	2.59E-03
				4,4'-DDE	1.71E-02	mg/kg	3.29E-08	mg/kg-day	3.40E-01	kg-day/mg		1.12E-08	3.84E-07	mg/kg-day	3.00E-04	mg/kg-day	1.28E-03
				alpha-Chlordane	5.71E-03	mg/kg	1.10E-08	mg/kg-day	3.50E-01	kg-day/mg		3.85E-09	1.28E-07	mg/kg-day	5.00E-04	mg/kg-day	2.56E-04
				Dieldrin	3.82E-03	mg/kg	7.35E-09	mg/kg-day	1.60E+01	kg-day/mg		1.18E-07	8.58E-08	mg/kg-day	5.00E-05	mg/kg-day	1.72E-03
				gamma-Chlordane	2.79E-03	mg/kg	5.37E-09	mg/kg-day	3.50E-01	kg-day/mg		1.88E-09	6.26E-08	mg/kg-day	5.00E-04	mg/kg-day	1.25E-04
				Heptachlor epoxide	1.37E-03	mg/kg	2.64E-09	mg/kg-day	9.10E+00	kg-day/mg		2.40E-08	3.08E-08	mg/kg-day	1.30E-05	mg/kg-day	2.37E-03
				Oxychlordane	1.68E-03	mg/kg	3.23E-09	mg/kg-day	3.50E-01	kg-day/mg		1.13E-09	3.77E-08	mg/kg-day	5.00E-04	mg/kg-day	7.54E-05
				trans-Nonachlor	7.81E-03	mg/kg	1.50E-08	mg/kg-day	3.50E-01	kg-day/mg		5.26E-09	1.75E-07	mg/kg-day	5.00E-04	mg/kg-day	3.51E-04
				PCBs	0.00E+00												
				Total PCBs	1.64E-01	mg/kg	3.24E-07	mg/kg-day	2.00E+00	kg-day/mg		6.49E-07	3.78E-06	mg/kg-day	2.00E-05	mg/kg-day	1.89E-01
				PCB-TEQ	3.41E-06	mg/kg	5.02E-12	mg/kg-day	1.30E+05	kg-day/mg		6.52E-07	5.85E-11	mg/kg-day	7.00E-10	mg/kg-day	8.36E-02
Fish Tissue Total - Lower Potomac (Total PCBs)[3]												1.03E-06					2.32E-01
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]												1.03E-06					1.26E-01

Table H-1-8. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Upstream Non-Tidal Anacostia	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	9.74E-08	mg/kg	1.43E-13	mg/kg-day	1.30E+05	kg-day/mg		1.86E-08	1.67E-12	mg/kg-day	7.00E-10	mg/kg-day	2.39E-03
				Metals													
				Arsenic	6.43E-03	mg/kg	1.82E-08	mg/kg-day	1.50E+00	kg-day/mg		2.73E-08	2.12E-07	mg/kg-day	3.00E-04	mg/kg-day	7.08E-04
				Arsenic, organic	5.79E-02	mg/kg	1.64E-07	mg/kg-day	NA	kg-day/mg		NA	1.91E-06	mg/kg-day	2.00E-02	mg/kg-day	9.56E-05
				Cobalt	1.21E-02	mg/kg	3.42E-08	mg/kg-day	NA	kg-day/mg		NA	4.00E-07	mg/kg-day	3.00E-04	mg/kg-day	1.33E-03
				Mercury	2.57E-01	mg/kg	7.27E-07	mg/kg-day	NA	kg-day/mg		NA	8.49E-06	mg/kg-day	3.00E-04	mg/kg-day	2.83E-02
				Thallium	3.43E-03	mg/kg	9.71E-09	mg/kg-day	NA	kg-day/mg		NA	1.13E-07	mg/kg-day	1.00E-05	mg/kg-day	1.13E-02
				Pesticides													
				Chlordane	2.16E-02	mg/kg	4.16E-08	mg/kg-day	3.50E-01	kg-day/mg		1.45E-08	4.85E-07	mg/kg-day	5.00E-04	mg/kg-day	9.70E-04
				Dieldrin	1.54E-03	mg/kg	2.97E-09	mg/kg-day	1.60E+01	kg-day/mg		4.75E-08	3.46E-08	mg/kg-day	5.00E-05	mg/kg-day	6.92E-04
				Heptachlor epoxide	1.24E-03	mg/kg	2.38E-09	mg/kg-day	9.10E+00	kg-day/mg		2.17E-08	2.78E-08	mg/kg-day	1.30E-05	mg/kg-day	2.14E-03
				PCBs													
				Total PCBs	2.84E-02	mg/kg	5.63E-08	mg/kg-day	2.00E+00	kg-day/mg		1.13E-07	6.56E-07	mg/kg-day	2.00E-05	mg/kg-day	3.28E-02
				PCB-TEQ	6.65E-07	mg/kg	9.78E-13	mg/kg-day	1.30E+05	kg-day/mg		1.27E-07	1.14E-11	mg/kg-day	7.00E-10	mg/kg-day	1.63E-02
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]												2.23E-07					7.84E-02
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]												2.38E-07					6.19E-02
Fish Tissue	Fish Fillet Tissue - Mixed Diet [2]	Lower Anacostia	Ingestion														
				Metals													
				Arsenic	2.45E-02	mg/kg	6.93E-08	mg/kg-day	1.50E+00	kg-day/mg		1.04E-07	8.09E-07	mg/kg-day	3.00E-04	mg/kg-day	2.70E-03
				Arsenic, organic	2.21E-01	mg/kg	6.24E-07	mg/kg-day	NA	kg-day/mg		NA	7.28E-06	mg/kg-day	2.00E-02	mg/kg-day	3.64E-04
				Mercury	7.20E-02	mg/kg	2.04E-07	mg/kg-day	NA	kg-day/mg		NA	2.38E-06	mg/kg-day	1.00E-04	mg/kg-day	2.38E-02
				Pesticides													
				4,4'-DDD	1.08E-02	mg/kg	2.08E-08	mg/kg-day	2.40E-01	kg-day/mg		5.00E-09	2.43E-07	mg/kg-day	3.00E-05	mg/kg-day	8.10E-03
				4,4'-DDE	3.63E-02	mg/kg	6.99E-08	mg/kg-day	3.40E-01	kg-day/mg		2.38E-08	8.16E-07	mg/kg-day	3.00E-04	mg/kg-day	2.72E-03
				Aldrin	2.04E-04	mg/kg	3.93E-10	mg/kg-day	1.70E+01	kg-day/mg		6.67E-09	4.58E-09	mg/kg-day	3.00E-05	mg/kg-day	1.53E-04
				alpha-Chlordane	1.89E-02	mg/kg	3.64E-08	mg/kg-day	3.50E-01	kg-day/mg		1.27E-08	4.25E-07	mg/kg-day	5.00E-04	mg/kg-day	8.49E-04
				cis-Nonachlor	7.13E-03	mg/kg	1.37E-08	mg/kg-day	3.50E-01	kg-day/mg		4.80E-09	1.60E-07	mg/kg-day	5.00E-04	mg/kg-day	3.20E-04
				Dieldrin	6.21E-03	mg/kg	1.20E-08	mg/kg-day	1.60E+01	kg-day/mg		1.91E-07	1.39E-07	mg/kg-day	5.00E-05	mg/kg-day	2.79E-03
				gamma-Chlordane	9.07E-03	mg/kg	1.75E-08	mg/kg-day	3.50E-01	kg-day/mg		6.11E-09	2.04E-07	mg/kg-day	5.00E-04	mg/kg-day	4.07E-04
				Heptachlor epoxide	2.35E-03	mg/kg	4.52E-09	mg/kg-day	9.10E+00	kg-day/mg		4.12E-08	5.28E-08	mg/kg-day	1.30E-05	mg/kg-day	4.06E-03
				Mirex	2.12E-04	mg/kg	4.08E-10	mg/kg-day	1.80E+01	kg-day/mg		7.34E-09	4.76E-09	mg/kg-day	2.00E-04	mg/kg-day	2.38E-05
				Oxychlordane	3.51E-03	mg/kg	6.76E-09	mg/kg-day	3.50E-01	kg-day/mg		2.37E-09	7.89E-08	mg/kg-day	5.00E-04	mg/kg-day	1.58E-04
				trans-Nonachlor	1.97E-02	mg/kg	3.79E-08	mg/kg-day	3.50E-01	kg-day/mg		1.33E-08	4.42E-07	mg/kg-day	5.00E-04	mg/kg-day	8.84E-04
				PCBs													
				Total PCBs	3.17E-01	mg/kg	6.27E-07	mg/kg-day	2.00E+00	kg-day/mg		1.25E-06	7.32E-06	mg/kg-day	2.00E-05	mg/kg-day	3.66E-01
				PCB-TEQ	8.15E-06	mg/kg	1.20E-11	mg/kg-day	1.30E+05	kg-day/mg		1.56E-06	1.40E-10	mg/kg-day	7.00E-10	mg/kg-day	2.00E-01
Fish Tissue Total - Lower Anacostia (Total PCBs)[3]												1.67E-06					4.13E-01
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[4]												1.98E-06					2.47E-01
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Potomac (Total PCBs)[3]												**2.26E-06**					**5.94E-01**
Total Receptor Risk/Hazard - Upper Potomac (PCB-TEQ)[4]												**3.27E-06**					**4.27E-01**
Total Receptor Risk/Hazard - Lower Potomac (Total PCBs)[3]												**1.03E-06**					**2.32E-01**
Total Receptor Risk/Hazard - Lower Potomac (PCB-TEQ)[4]												**1.03E-06**					**1.26E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (Total PCBs)[3]												**2.23E-07**					**7.84E-02**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (PCB-TEQ)[4]												**2.38E-07**					**6.19E-02**
Total Receptor Risk/Hazard - Lower Anacostia (Total PCBs)[3]												**1.67E-06**					**4.13E-01**
Total Receptor Risk/Hazard - Lower Anacostia (PCB-TEQ)[4]												**1.98E-06**					**2.47E-01**

Table H-1-8. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-9. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upper Potomac	Ingestion	**Metals**													
				Arsenic	2.39E-02	mg/kg	3.01E-08	mg/kg-day	1.50E+00	kg-day/mg		4.52E-08	1.05E-06	mg/kg-day	3.00E-04	mg/kg-day	3.51E-03
				Arsenic, organic	2.15E-01	mg/kg	2.71E-07	mg/kg-day	NA	kg-day/mg		NA	9.49E-06	mg/kg-day	2.00E-02	mg/kg-day	4.74E-04
				Mercury	1.23E-01	mg/kg	1.55E-07	mg/kg-day	NA	kg-day/mg		NA	5.43E-06	mg/kg-day	1.00E-04	mg/kg-day	5.43E-02
				Pesticides													
				4,4'-DDD	1.03E-02	mg/kg	8.83E-09	mg/kg-day	2.40E-01	kg-day/mg		2.12E-09	3.09E-07	mg/kg-day	3.00E-05	mg/kg-day	1.03E-02
				4,4'-DDE	6.24E-02	mg/kg	5.35E-08	mg/kg-day	3.40E-01	kg-day/mg		1.82E-08	1.87E-06	mg/kg-day	3.00E-04	mg/kg-day	6.24E-03
				Aldrin	2.21E-04	mg/kg	1.90E-10	mg/kg-day	1.70E+01	kg-day/mg		3.22E-09	6.64E-09	mg/kg-day	3.00E-05	mg/kg-day	2.21E-04
				alpha-Chlordane	1.23E-02	mg/kg	1.05E-08	mg/kg-day	3.50E-01	kg-day/mg		3.69E-09	3.69E-07	mg/kg-day	5.00E-04	mg/kg-day	7.38E-04
				beta-BHC	6.91E-04	mg/kg	5.92E-10	mg/kg-day	1.80E+00	kg-day/mg		1.07E-09	2.07E-08	mg/kg-day	NA	mg/kg-day	NA
				cis-Nonachlor	3.87E-03	mg/kg	3.32E-09	mg/kg-day	3.50E-01	kg-day/mg		1.16E-09	1.16E-07	mg/kg-day	5.00E-04	mg/kg-day	2.32E-04
				Dieldrin	7.28E-03	mg/kg	6.24E-09	mg/kg-day	1.60E+01	kg-day/mg		9.98E-08	2.18E-07	mg/kg-day	5.00E-05	mg/kg-day	4.37E-03
				gamma-Chlordane	2.54E-03	mg/kg	2.18E-09	mg/kg-day	3.50E-01	kg-day/mg		7.62E-10	7.62E-08	mg/kg-day	5.00E-04	mg/kg-day	1.52E-04
				Heptachlor epoxide	1.97E-03	mg/kg	1.69E-09	mg/kg-day	9.10E+00	kg-day/mg		1.54E-08	5.91E-08	mg/kg-day	1.30E-05	mg/kg-day	4.55E-03
				Hexachlorobenzene	7.46E-04	mg/kg	6.39E-10	mg/kg-day	1.60E+00	kg-day/mg		1.02E-09	2.24E-08	mg/kg-day	8.00E-04	mg/kg-day	2.80E-05
				Mirex	1.75E-04	mg/kg	1.50E-10	mg/kg-day	1.80E+01	kg-day/mg		2.69E-09	5.24E-09	mg/kg-day	2.00E-04	mg/kg-day	2.62E-05
				Oxychlordane	1.87E-03	mg/kg	1.60E-09	mg/kg-day	3.50E-01	kg-day/mg		5.61E-10	5.61E-08	mg/kg-day	5.00E-04	mg/kg-day	1.12E-04
				trans-Nonachlor	1.05E-02	mg/kg	9.00E-09	mg/kg-day	3.50E-01	kg-day/mg		3.15E-09	3.15E-07	mg/kg-day	5.00E-04	mg/kg-day	6.30E-04
				PCBs													
				Total PCBs	4.59E-01	mg/kg	4.05E-07	mg/kg-day	2.00E+00	kg-day/mg		8.10E-07	1.42E-05	mg/kg-day	2.00E-05	mg/kg-day	7.08E-01
				PCB-TEQ	1.48E-05	mg/kg	9.69E-12	mg/kg-day	1.30E+05	kg-day/mg		1.26E-06	3.39E-10	mg/kg-day	7.00E-10	mg/kg-day	4.84E-01
Fish Tissue Total - Upper Potomac (Total PCBs)[3]												1.01E-06					7.94E-01
Fish Tissue Total - Upper Potomac (PCB-TEQ)[4]												1.46E-06					5.70E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Potomac	Ingestion	**Metals**													
				Arsenic	5.03E-02	mg/kg	6.34E-08	mg/kg-day	1.50E+00	kg-day/mg		9.51E-08	2.22E-06	mg/kg-day	3.00E-04	mg/kg-day	7.40E-03
				Arsenic, organic	4.53E-01	mg/kg	5.71E-07	mg/kg-day	NA	kg-day/mg		NA	2.00E-05	mg/kg-day	2.00E-02	mg/kg-day	9.99E-04
				Mercury	8.31E-02	mg/kg	1.05E-07	mg/kg-day	NA	kg-day/mg		NA	3.67E-06	mg/kg-day	1.00E-04	mg/kg-day	3.67E-02
				Pesticides													
				4,4'-DDD	3.46E-03	mg/kg	2.97E-09	mg/kg-day	2.40E-01	kg-day/mg		7.12E-10	1.04E-07	mg/kg-day	3.00E-05	mg/kg-day	3.46E-03
				4,4'-DDE	1.71E-02	mg/kg	1.47E-08	mg/kg-day	3.40E-01	kg-day/mg		4.98E-09	5.13E-07	mg/kg-day	3.00E-04	mg/kg-day	1.71E-03
				alpha-Chlordane	5.71E-03	mg/kg	4.89E-09	mg/kg-day	3.50E-01	kg-day/mg		1.71E-09	1.71E-07	mg/kg-day	5.00E-04	mg/kg-day	3.43E-04
				Dieldrin	3.82E-03	mg/kg	3.27E-09	mg/kg-day	1.60E+01	kg-day/mg		5.24E-08	1.15E-07	mg/kg-day	5.00E-05	mg/kg-day	2.29E-03
				gamma-Chlordane	2.79E-03	mg/kg	2.39E-09	mg/kg-day	3.50E-01	kg-day/mg		8.37E-10	8.37E-08	mg/kg-day	5.00E-04	mg/kg-day	1.67E-04
				Heptachlor epoxide	1.37E-03	mg/kg	1.17E-09	mg/kg-day	9.10E+00	kg-day/mg		1.07E-08	4.11E-08	mg/kg-day	1.30E-05	mg/kg-day	3.16E-03
				Oxychlordane	1.68E-03	mg/kg	1.44E-09	mg/kg-day	3.50E-01	kg-day/mg		5.04E-10	5.04E-08	mg/kg-day	5.00E-04	mg/kg-day	1.01E-04
				trans-Nonachlor	7.81E-03	mg/kg	6.69E-09	mg/kg-day	3.50E-01	kg-day/mg		2.34E-09	2.34E-07	mg/kg-day	5.00E-04	mg/kg-day	4.69E-04
				PCBs													
				Total PCBs	1.64E-01	mg/kg	1.44E-07	mg/kg-day	2.00E+00	kg-day/mg		2.89E-07	5.06E-06	mg/kg-day	2.00E-05	mg/kg-day	2.53E-01
				PCB-TEQ	3.41E-06	mg/kg	2.23E-12	mg/kg-day	1.30E+05	kg-day/mg		2.90E-07	7.82E-11	mg/kg-day	7.00E-10	mg/kg-day	1.12E-01
Fish Tissue Total - Lower Potomac (Total PCBs)[3]												4.58E-07					3.10E-01
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]												4.60E-07					1.68E-01

Table H-1-9. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Upstream Non-Tidal Anacostia	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	9.74E-08	mg/kg	6.38E-14	mg/kg-day	1.30E+05	kg-day/mg		8.30E-09	2.23E-12	mg/kg-day	7.00E-10	mg/kg-day	3.19E-03
				Metals													
				Arsenic	6.43E-03	mg/kg	8.11E-09	mg/kg-day	1.50E+00	kg-day/mg		1.22E-08	2.84E-07	mg/kg-day	3.00E-04	mg/kg-day	9.46E-04
				Arsenic, organic	5.79E-02	mg/kg	7.30E-08	mg/kg-day	NA	kg-day/mg		NA	2.55E-06	mg/kg-day	2.00E-02	mg/kg-day	1.28E-04
				Cobalt	1.21E-02	mg/kg	1.53E-08	mg/kg-day	NA	kg-day/mg		NA	5.34E-07	mg/kg-day	3.00E-04	mg/kg-day	1.78E-03
				Mercury	2.57E-01	mg/kg	3.24E-07	mg/kg-day	NA	kg-day/mg		NA	1.13E-05	mg/kg-day	1.00E-04	mg/kg-day	1.13E-01
				Thallium	3.43E-03	mg/kg	4.32E-09	mg/kg-day	NA	kg-day/mg		NA	1.51E-07	mg/kg-day	1.00E-05	mg/kg-day	1.51E-02
				Pesticides													
				Chlordane	2.16E-02	mg/kg	1.85E-08	mg/kg-day	3.50E-01	kg-day/mg		6.48E-09	6.48E-07	mg/kg-day	5.00E-04	mg/kg-day	1.30E-03
				Dieldrin	1.54E-03	mg/kg	1.32E-09	mg/kg-day	1.60E+01	kg-day/mg		2.11E-08	4.62E-08	mg/kg-day	5.00E-05	mg/kg-day	9.25E-04
				Heptachlor epoxide	1.24E-03	mg/kg	1.06E-09	mg/kg-day	9.10E+00	kg-day/mg		9.65E-09	3.71E-08	mg/kg-day	1.30E-05	mg/kg-day	2.85E-03
				PCBs													
				Total PCBs	2.84E-02	mg/kg	2.51E-08	mg/kg-day	2.00E+00	kg-day/mg		5.01E-08	8.77E-07	mg/kg-day	2.00E-05	mg/kg-day	4.39E-02
				PCB-TEQ	6.65E-07	mg/kg	4.36E-13	mg/kg-day	1.30E+05	kg-day/mg		5.66E-08	1.53E-11	mg/kg-day	7.00E-10	mg/kg-day	2.18E-02
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]												1.08E-07					1.83E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]												1.14E-07					1.61E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (2)	Lower Anacostia	Ingestion														
				Metals													
				Arsenic	2.45E-02	mg/kg	3.09E-08	mg/kg-day	1.50E+00	kg-day/mg		4.63E-08	1.08E-06	mg/kg-day	3.00E-04	mg/kg-day	3.60E-03
				Arsenic, organic	2.21E-01	mg/kg	2.78E-07	mg/kg-day	NA	kg-day/mg		NA	9.73E-06	mg/kg-day	2.00E-02	mg/kg-day	4.86E-04
				Mercury	7.20E-02	mg/kg	9.08E-08	mg/kg-day	NA	kg-day/mg		NA	3.18E-06	mg/kg-day	1.00E-04	mg/kg-day	3.18E-02
				Pesticides													
				4,4'-DDD	1.08E-02	mg/kg	9.28E-09	mg/kg-day	2.40E-01	kg-day/mg		2.23E-09	3.25E-07	mg/kg-day	3.00E-05	mg/kg-day	1.08E-02
				4,4'-DDE	3.63E-02	mg/kg	3.11E-08	mg/kg-day	3.40E-01	kg-day/mg		1.06E-08	1.09E-06	mg/kg-day	3.00E-04	mg/kg-day	3.63E-03
				Aldrin	2.04E-04	mg/kg	1.75E-10	mg/kg-day	1.70E+01	kg-day/mg		2.97E-09	6.12E-09	mg/kg-day	3.00E-05	mg/kg-day	2.04E-04
				alpha-Chlordane	1.89E-02	mg/kg	1.62E-08	mg/kg-day	3.50E-01	kg-day/mg		5.67E-09	5.67E-07	mg/kg-day	5.00E-04	mg/kg-day	1.13E-03
				cis-Nonachlor	7.13E-03	mg/kg	6.11E-09	mg/kg-day	3.50E-01	kg-day/mg		2.14E-09	2.14E-07	mg/kg-day	5.00E-04	mg/kg-day	4.28E-04
				Dieldrin	6.21E-03	mg/kg	5.32E-09	mg/kg-day	1.60E+01	kg-day/mg		8.52E-08	1.86E-07	mg/kg-day	5.00E-05	mg/kg-day	3.73E-03
				gamma-Chlordane	9.07E-03	mg/kg	7.78E-09	mg/kg-day	3.50E-01	kg-day/mg		2.72E-09	2.72E-07	mg/kg-day	5.00E-04	mg/kg-day	5.44E-04
				Heptachlor epoxide	2.35E-03	mg/kg	2.01E-09	mg/kg-day	9.10E+00	kg-day/mg		1.83E-08	7.05E-08	mg/kg-day	1.30E-05	mg/kg-day	5.42E-03
				Mirex	2.12E-04	mg/kg	1.82E-10	mg/kg-day	1.80E+01	kg-day/mg		3.27E-09	6.36E-09	mg/kg-day	2.00E-04	mg/kg-day	3.18E-05
				Oxychlordane	3.51E-03	mg/kg	3.01E-09	mg/kg-day	3.50E-01	kg-day/mg		1.05E-09	1.05E-07	mg/kg-day	5.00E-04	mg/kg-day	2.11E-04
				trans-Nonachlor	1.97E-02	mg/kg	1.69E-08	mg/kg-day	3.50E-01	kg-day/mg		5.90E-09	5.90E-07	mg/kg-day	5.00E-04	mg/kg-day	1.18E-03
			``	**PCBs**													
				Total PCBs	3.17E-01	mg/kg	2.79E-07	mg/kg-day	2.00E+00	kg-day/mg		5.59E-07	9.78E-06	mg/kg-day	2.00E-05	mg/kg-day	4.89E-01
				PCB-TEQ	8.15E-06	mg/kg	5.34E-12	mg/kg-day	1.30E+05	kg-day/mg		6.94E-07	1.87E-10	mg/kg-day	7.00E-10	mg/kg-day	2.67E-01
Fish Tissue Total - Lower Anacostia (Total PCBs)[3]												7.45E-07					5.52E-01
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[4]												8.81E-07					3.30E-01
Receptor Totals																	
Total Receptor Risk/Hazard - Upper Potomac (Total PCBs)[3]												**1.01E-06**					**7.94E-01**
Total Receptor Risk/Hazard - Upper Potomac (PCB-TEQ)[4]												**1.46E-06**					**5.70E-01**
Total Receptor Risk/Hazard - Lower Potomac (Total PCBs)[3]												**4.58E-07**					**3.10E-01**
Total Receptor Risk/Hazard - Lower Potomac (PCB-TEQ)[4]												**4.60E-07**					**1.68E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (Total PCBs)[3]												**1.08E-07**					**1.83E-01**
Total Receptor Risk/Hazard - Non-Tidal Anacostia (PCB-TEQ)[4]												**1.14E-07**					**1.61E-01**
Total Receptor Risk/Hazard - Lower Anacostia (Total PCBs)[3]												**7.45E-07**					**5.52E-01**
Total Receptor Risk/Hazard - Lower Anacostia (PCB-TEQ)[4]												**8.81E-07**					**3.30E-01**

Table H-1-9. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.
(2) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(3) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(4) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Table H-1-10. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	5.76E-14	mg/kg-day	1.30E+05	kg-day/mg		7.49E-09	4.03E-13	mg/kg-day	7.00E-10	mg/kg-day	5.76E-04
				Metals													
				Aluminum	8.07E+03	mg/kg	6.41E-06	mg/kg-day	NA	kg-day/mg		NA	4.49E-05	mg/kg-day	1.00E+00	mg/kg-day	4.49E-05
				Antimony	1.93E+00	mg/kg	1.53E-09	mg/kg-day	NA	kg-day/mg		NA	1.07E-08	mg/kg-day	4.00E-04	mg/kg-day	2.68E-05
				Arsenic	5.56E+00	mg/kg	2.65E-09	mg/kg-day	1.50E+00	kg-day/mg		3.98E-09	1.86E-08	mg/kg-day	3.00E-04	mg/kg-day	6.18E-05
				Cobalt	1.51E+01	mg/kg	1.20E-08	mg/kg-day	NA	kg-day/mg		NA	8.40E-08	mg/kg-day	3.00E-04	mg/kg-day	2.80E-04
				Cyanide	8.76E-01	mg/kg	6.96E-10	mg/kg-day	NA	kg-day/mg		NA	4.87E-09	mg/kg-day	6.30E-04	mg/kg-day	7.73E-06
				Manganese	2.10E+02	mg/kg	1.67E-07	mg/kg-day	NA	kg-day/mg		NA	1.17E-06	mg/kg-day	2.40E-02	mg/kg-day	4.87E-05
				Nickel	5.07E+01	mg/kg	4.03E-08	mg/kg-day	NA	kg-day/mg		NA	2.82E-07	mg/kg-day	2.00E-02	mg/kg-day	1.41E-05
				Thallium	2.10E-01	mg/kg	1.67E-10	mg/kg-day	NA	kg-day/mg		NA	1.17E-09	mg/kg-day	1.00E-05	mg/kg-day	1.17E-04
				Vanadium	8.70E+01	mg/kg	6.91E-08	mg/kg-day	NA	kg-day/mg		NA	4.84E-07	mg/kg-day	5.04E-03	mg/kg-day	9.60E-05
				PCBs													
				Total PCBs	4.47E-01	mg/kg	3.55E-10	mg/kg-day	2.00E+00	kg-day/mg		7.10E-10	2.49E-09	mg/kg-day	2.00E-05	mg/kg-day	1.24E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	4.69E-10	mg/kg-day	1.00E-01	kg-day/mg	1	4.69E-11	3.28E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	5.16E-10	mg/kg-day	1.00E+00	kg-day/mg	1	5.16E-10	3.61E-09	mg/kg-day	3.00E-04	mg/kg-day	1.20E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	7.71E-10	mg/kg-day	1.00E-01	kg-day/mg	1	7.71E-11	5.39E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	2.82E-10	mg/kg-day	1.00E-02	kg-day/mg	1	2.82E-12	1.97E-09	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	6.96E-10	mg/kg-day	1.00E-03	kg-day/mg	1	6.96E-13	4.87E-09	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	1.18E-10	mg/kg-day	1.00E+00	kg-day/mg	1	1.18E-10	8.23E-10	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	4.53E-10	mg/kg-day	1.00E-01	kg-day/mg	1	4.53E-11	3.17E-09	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	7.23E-08	mg/kg-day	NA	kg-day/mg		NA	5.06E-07	mg/kg-day	1.00E-02	mg/kg-day	5.06E-05
			Exp. Route Total									1.30E-08					1.46E-03

Table H-1-10. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe	Waterside	Dermal														
	Surface	Investigation		**Dioxin**													
	Sediment	Area		2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	7.88E-14	mg/kg-day	1.30E+05	kg-day/mg		1.02E-08	5.52E-13	mg/kg-day	7.00E-10	mg/kg-day	7.88E-04
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	6.04E-09	mg/kg-day	1.50E+00	kg-day/mg		9.06E-09	4.23E-08	mg/kg-day	3.00E-04	mg/kg-day	1.41E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	2.27E-09	mg/kg-day	2.00E+00	kg-day/mg		4.53E-09	1.59E-08	mg/kg-day	2.00E-05	mg/kg-day	7.93E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	2.78E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.78E-10	1.94E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	3.06E-09	mg/kg-day	1.00E+00	kg-day/mg	1	3.06E-09	2.14E-08	mg/kg-day	3.00E-04	mg/kg-day	7.14E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	4.57E-09	mg/kg-day	1.00E-01	kg-day/mg	1	4.57E-10	3.20E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.67E-09	mg/kg-day	1.00E-02	kg-day/mg	1	1.67E-11	1.17E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	4.13E-09	mg/kg-day	1.00E-03	kg-day/mg	1	4.13E-12	2.89E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	6.97E-10	mg/kg-day	1.00E+00	kg-day/mg	1	6.97E-10	4.88E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	2.68E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.68E-10	1.88E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									2.86E-08					1.79E-03
		Exposure Point Total										4.16E-08					3.25E-03
	Exposure Medium Total											4.16E-08					3.25E-03
Sediment Total												4.16E-08					3.25E-03

Table H-1-10. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF		ADAF (1)	Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units		Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	6.81E-17	mg/kg-day	1.30E+05	kg-day/mg		8.85E-12	4.76E-16	mg/kg-day	7.00E-10	mg/kg-day	6.81E-07
				Metals													
				Arsenic	7.80E-01	ug/L	1.30E-10	mg/kg-day	1.50E+00	kg-day/mg		1.95E-10	9.11E-10	mg/kg-day	3.00E-04	mg/kg-day	3.04E-06
				Cobalt	9.80E-01	ug/L	1.63E-10	mg/kg-day	NA	kg-day/mg		NA	1.14E-09	mg/kg-day	3.00E-04	mg/kg-day	3.81E-06
				Manganese	1.40E+02	ug/L	2.34E-08	mg/kg-day	NA	kg-day/mg		NA	1.63E-07	mg/kg-day	2.40E-02	mg/kg-day	6.81E-06
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	2.17E-13	mg/kg-day	3.40E-01	kg-day/mg		7.37E-14	1.52E-12	mg/kg-day	5.00E-04	mg/kg-day	3.04E-09
				PCBs													
				Total PCBs	9.40E-03	ug/L	1.57E-12	mg/kg-day	4.00E-01	kg-day/mg		6.27E-13	1.10E-11	mg/kg-day	2.00E-05	mg/kg-day	5.49E-07
			Exp. Route Total									2.05E-10					1.49E-05
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	1.30E-10	mg/kg-day	1.50E+00	kg-day/mg		1.94E-10	9.07E-10	mg/kg-day	3.00E-04	mg/kg-day	3.02E-06
				Cobalt	9.80E-01	ug/L	6.51E-11	mg/kg-day	NA	kg-day/mg		NA	4.56E-10	mg/kg-day	3.00E-04	mg/kg-day	1.52E-06
				Manganese	1.40E+02	ug/L	2.32E-08	mg/kg-day	NA	kg-day/mg		NA	1.63E-07	mg/kg-day	9.60E-04	mg/kg-day	1.69E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.94E-10					1.74E-04
		Exposure Point Total										3.99E-10					1.89E-04
	Exposure Medium Total											3.99E-10					1.89E-04
Surface Water Total												3.99E-10					1.89E-04
Total Receptor Risk/Hazard												4.20E-08					3.44E-03

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-11. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer: Intake/Exposure Concentration Value	Cancer: Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Noncancer: Intake/Exposure Concentration Value	Noncancer: Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.04E-13	mg/kg-day	1.30E+05	kg-day/mg		1.36E-08	1.22E-12	mg/kg-day	7.00E-10	mg/kg-day	1.74E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	1.16E-05	mg/kg-day	NA	kg-day/mg		NA	1.35E-04	mg/kg-day	1.00E+00	mg/kg-day	1.35E-04
				Antimony	1.93E+00	mg/kg	2.78E-09	mg/kg-day	NA	kg-day/mg		NA	3.24E-08	mg/kg-day	4.00E-04	mg/kg-day	8.10E-05
				Arsenic	5.56E+00	mg/kg	4.80E-09	mg/kg-day	1.50E+00	kg-day/mg		7.20E-09	5.60E-08	mg/kg-day	3.00E-04	mg/kg-day	1.87E-04
				Cobalt	1.51E+01	mg/kg	2.17E-08	mg/kg-day	NA	kg-day/mg		NA	2.53E-07	mg/kg-day	3.00E-04	mg/kg-day	8.45E-04
				Cyanide	8.76E-01	mg/kg	1.26E-09	mg/kg-day	NA	kg-day/mg		NA	1.47E-08	mg/kg-day	6.30E-04	mg/kg-day	2.33E-05
				Manganese	2.10E+02	mg/kg	3.02E-07	mg/kg-day	NA	kg-day/mg		NA	3.53E-06	mg/kg-day	2.40E-02	mg/kg-day	1.47E-04
				Nickel	5.07E+01	mg/kg	7.30E-08	mg/kg-day	NA	kg-day/mg		NA	8.51E-07	mg/kg-day	2.00E-02	mg/kg-day	4.26E-05
				Thallium	2.10E-01	mg/kg	3.02E-10	mg/kg-day	NA	kg-day/mg		NA	3.53E-09	mg/kg-day	1.00E-05	mg/kg-day	3.53E-04
				Vanadium	8.70E+01	mg/kg	1.25E-07	mg/kg-day	NA	kg-day/mg		NA	1.46E-06	mg/kg-day	5.04E-03	mg/kg-day	2.90E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	6.43E-10	mg/kg-day	2.00E+00	kg-day/mg		1.29E-09	7.50E-09	mg/kg-day	2.00E-05	mg/kg-day	3.75E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	8.49E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	2.12E-10	9.90E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	9.35E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	2.34E-09	1.09E-08	mg/kg-day	3.00E-04	mg/kg-day	3.64E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	1.40E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.49E-10	1.63E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	5.11E-10	mg/kg-day	1.00E-02	kg-day/mg	2.5	1.28E-11	5.96E-09	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	1.26E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	3.15E-12	1.47E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	2.13E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	5.32E-10	2.48E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	8.20E-10	mg/kg-day	1.00E-01	kg-day/mg	2.5	2.05E-10	9.57E-09	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	1.31E-07	mg/kg-day	NA	kg-day/mg		NA	1.53E-06	mg/kg-day	1.00E-02	mg/kg-day	1.53E-04
			Exp. Route Total									2.57E-08					4.41E-03

Table H-1-11. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	8.48E-14	mg/kg-day	1.30E+05	kg-day/mg		1.10E-08	9.89E-13	mg/kg-day	7.00E-10	mg/kg-day	1.41E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	6.50E-09	mg/kg-day	1.50E+00	kg-day/mg		9.76E-09	7.59E-08	mg/kg-day	3.00E-04	mg/kg-day	2.53E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	2.44E-09	mg/kg-day	2.00E+00	kg-day/mg		4.88E-09	2.85E-08	mg/kg-day	2.00E-05	mg/kg-day	1.42E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	2.99E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	7.48E-10	3.49E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	3.30E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	8.24E-09	3.84E-08	mg/kg-day	3.00E-04	mg/kg-day	1.28E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	4.92E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.23E-09	5.74E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.80E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	4.50E-11	2.10E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	4.44E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	1.11E-11	5.18E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	7.50E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.88E-09	8.75E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	2.89E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	7.22E-10	3.37E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									3.85E-08					3.22E-03
		Exposure Point Total										6.42E-08					7.62E-03
	Exposure Medium Total											6.42E-08					7.62E-03
Sediment Total												6.42E-08					7.62E-03

Table H-1-11. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	2.88E-16	mg/kg-day	1.30E+05	kg-day/mg		3.74E-11	3.36E-15	mg/kg-day	7.00E-10	mg/kg-day	4.79E-06
				Metals													
				Arsenic	7.80E-01	ug/L	5.50E-10	mg/kg-day	1.50E+00	kg-day/mg		8.25E-10	6.42E-09	mg/kg-day	3.00E-04	mg/kg-day	2.14E-05
				Cobalt	9.80E-01	ug/L	6.91E-10	mg/kg-day	NA	kg-day/mg		NA	8.06E-09	mg/kg-day	3.00E-04	mg/kg-day	2.69E-05
				Manganese	1.40E+02	ug/L	9.87E-08	mg/kg-day	NA	kg-day/mg		NA	1.15E-06	mg/kg-day	2.40E-02	mg/kg-day	4.80E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	9.17E-13	mg/kg-day	3.40E-01	kg-day/mg		3.12E-13	1.07E-11	mg/kg-day	5.00E-04	mg/kg-day	2.14E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	6.63E-12	mg/kg-day	4.00E-01	kg-day/mg		2.65E-12	7.73E-11	mg/kg-day	2.00E-05	mg/kg-day	3.87E-06
			Exp. Route Total									8.65E-10					1.05E-04
			Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	1.66E-10	mg/kg-day	1.50E+00	kg-day/mg		2.50E-10	1.94E-09	mg/kg-day	3.00E-04	mg/kg-day	6.47E-06
				Cobalt	9.80E-01	ug/L	8.36E-11	mg/kg-day	NA	kg-day/mg		NA	9.76E-10	mg/kg-day	3.00E-04	mg/kg-day	3.25E-06
				Manganese	1.40E+02	ug/L	2.99E-08	mg/kg-day	NA	kg-day/mg		NA	3.48E-07	mg/kg-day	9.60E-04	mg/kg-day	3.63E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									2.50E-10					3.73E-04
		Exposure Point Total										1.11E-09					4.78E-04
	Exposure Medium Total											1.11E-09					4.78E-04
Surface Water Total												1.11E-09					4.78E-04
Total Receptor Risk/Hazard												6.53E-08					8.10E-03

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-12. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [(1)]	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.08E-13	mg/kg-day	1.30E+05	kg-day/mg		1.41E-08	3.79E-12	mg/kg-day	7.00E-10	mg/kg-day	5.42E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	1.21E-05	mg/kg-day	NA	kg-day/mg		NA	4.22E-04	mg/kg-day	1.00E+00	mg/kg-day	4.22E-04
				Antimony	1.93E+00	mg/kg	2.89E-09	mg/kg-day	NA	kg-day/mg		NA	1.01E-07	mg/kg-day	4.00E-04	mg/kg-day	2.53E-04
				Arsenic	5.56E+00	mg/kg	4.99E-09	mg/kg-day	1.50E+00	kg-day/mg		7.48E-09	1.75E-07	mg/kg-day	3.00E-04	mg/kg-day	5.82E-04
				Cobalt	1.51E+01	mg/kg	2.26E-08	mg/kg-day	NA	kg-day/mg		NA	7.90E-07	mg/kg-day	3.00E-04	mg/kg-day	2.63E-03
				Cyanide	8.76E-01	mg/kg	1.31E-09	mg/kg-day	NA	kg-day/mg		NA	4.59E-08	mg/kg-day	6.30E-04	mg/kg-day	7.28E-05
				Manganese	2.10E+02	mg/kg	3.14E-07	mg/kg-day	NA	kg-day/mg		NA	1.10E-05	mg/kg-day	2.40E-02	mg/kg-day	4.58E-04
				Nickel	5.07E+01	mg/kg	7.58E-08	mg/kg-day	NA	kg-day/mg		NA	2.65E-06	mg/kg-day	2.00E-02	mg/kg-day	1.33E-04
				Thallium	2.10E-01	mg/kg	3.14E-10	mg/kg-day	NA	kg-day/mg		NA	1.10E-08	mg/kg-day	1.00E-05	mg/kg-day	1.10E-03
				Vanadium	8.70E+01	mg/kg	1.30E-07	mg/kg-day	NA	kg-day/mg		NA	4.55E-06	mg/kg-day	5.04E-03	mg/kg-day	9.03E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	6.68E-10	mg/kg-day	2.00E+00	kg-day/mg		1.34E-09	2.34E-08	mg/kg-day	2.00E-05	mg/kg-day	1.17E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	8.82E-10	mg/kg-day	1.00E-01	kg-day/mg	4.2	3.71E-10	3.09E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	9.72E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	4.08E-09	3.40E-08	mg/kg-day	3.00E-04	mg/kg-day	1.13E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	1.45E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	6.09E-10	5.08E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	5.31E-10	mg/kg-day	1.00E-02	kg-day/mg	4.2	2.23E-11	1.86E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	1.31E-09	mg/kg-day	1.00E-03	kg-day/mg	4.2	5.50E-12	4.58E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	2.21E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	9.30E-10	7.75E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	8.52E-10	mg/kg-day	1.00E-01	kg-day/mg	4.2	3.58E-10	2.98E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	1.36E-07	mg/kg-day	NA	kg-day/mg		NA	4.76E-06	mg/kg-day	1.00E-02	mg/kg-day	4.76E-04
			Exp. Route Total									2.93E-08					1.37E-02

Table H-1-12. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	3.75E-14	mg/kg-day	1.30E+05	kg-day/mg		4.87E-09	1.31E-12	mg/kg-day	7.00E-10	mg/kg-day	1.87E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	2.87E-09	mg/kg-day	1.50E+00	kg-day/mg		4.31E-09	1.01E-07	mg/kg-day	3.00E-04	mg/kg-day	3.35E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	1.08E-09	mg/kg-day	2.00E+00	kg-day/mg		2.16E-09	3.77E-08	mg/kg-day	2.00E-05	mg/kg-day	1.89E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	1.32E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	5.55E-10	4.62E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	1.46E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	6.11E-09	5.09E-08	mg/kg-day	3.00E-04	mg/kg-day	1.70E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	2.17E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	9.12E-10	7.60E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	7.95E-10	mg/kg-day	1.00E-02	kg-day/mg	4.2	3.34E-11	2.78E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	1.96E-09	mg/kg-day	1.00E-03	kg-day/mg	4.2	8.24E-12	6.87E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	3.31E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.39E-09	1.16E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	1.28E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	5.36E-10	4.47E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									2.09E-08					4.26E-03
		Exposure Point Total										5.02E-08					1.80E-02
	Exposure Medium Total											5.02E-08					1.80E-02
Sediment Total												5.02E-08					1.80E-02

Table H-1-12. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.49E-16	mg/kg-day	1.30E+05	kg-day/mg		1.94E-11	5.23E-15	mg/kg-day	7.00E-10	mg/kg-day	7.47E-06
				Metals													
				Arsenic	7.80E-01	ug/L	2.86E-10	mg/kg-day	1.50E+00	kg-day/mg		4.29E-10	1.00E-08	mg/kg-day	3.00E-04	mg/kg-day	3.33E-05
				Cobalt	9.80E-01	ug/L	3.59E-10	mg/kg-day	NA	kg-day/mg		NA	1.26E-08	mg/kg-day	3.00E-04	mg/kg-day	4.19E-05
				Manganese	1.40E+02	ug/L	5.13E-08	mg/kg-day	NA	kg-day/mg		NA	1.80E-06	mg/kg-day	2.40E-02	mg/kg-day	7.48E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	4.76E-13	mg/kg-day	3.40E-01	kg-day/mg		1.62E-13	1.67E-11	mg/kg-day	5.00E-04	mg/kg-day	3.33E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	3.44E-12	mg/kg-day	4.00E-01	kg-day/mg		1.38E-12	1.21E-10	mg/kg-day	2.00E-05	mg/kg-day	6.03E-06
			Exp. Route Total									4.50E-10					1.64E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	4.37E-11	mg/kg-day	1.50E+00	kg-day/mg		6.56E-11	1.53E-09	mg/kg-day	3.00E-04	mg/kg-day	5.10E-06
				Cobalt	9.80E-01	ug/L	2.20E-11	mg/kg-day	NA	kg-day/mg		NA	7.69E-10	mg/kg-day	3.00E-04	mg/kg-day	2.56E-06
				Manganese	1.40E+02	ug/L	7.85E-09	mg/kg-day	NA	kg-day/mg		NA	2.75E-07	mg/kg-day	9.60E-04	mg/kg-day	2.86E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									6.56E-11					2.94E-04
		Exposure Point Total										5.15E-10					4.57E-04
	Exposure Medium Total											5.15E-10					4.57E-04
Surface Water Total												5.15E-10					4.57E-04
Total Receptor Risk/Hazard												5.07E-08					1.85E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-13. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Adult

							Cancer Risk Calculations							Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [1]	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.53E-13	mg/kg-day	1.30E+05	kg-day/mg		1.99E-08	1.07E-12	mg/kg-day	7.00E-10	mg/kg-day	1.53E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	1.71E-05	mg/kg-day	NA	kg-day/mg		NA	1.19E-04	mg/kg-day	1.00E+00	mg/kg-day	1.19E-04
				Antimony	1.93E+00	mg/kg	4.08E-09	mg/kg-day	NA	kg-day/mg		NA	2.86E-08	mg/kg-day	4.00E-04	mg/kg-day	7.14E-05
				Arsenic	5.56E+00	mg/kg	7.05E-09	mg/kg-day	1.50E+00	kg-day/mg		1.06E-08	4.94E-08	mg/kg-day	3.00E-04	mg/kg-day	1.65E-04
				Cobalt	1.51E+01	mg/kg	3.19E-08	mg/kg-day	NA	kg-day/mg		NA	2.24E-07	mg/kg-day	3.00E-04	mg/kg-day	7.45E-04
				Cyanide	8.76E-01	mg/kg	1.85E-09	mg/kg-day	NA	kg-day/mg		NA	1.30E-08	mg/kg-day	6.30E-04	mg/kg-day	2.06E-05
				Manganese	2.10E+02	mg/kg	4.44E-07	mg/kg-day	NA	kg-day/mg		NA	3.11E-06	mg/kg-day	2.40E-02	mg/kg-day	1.30E-04
				Nickel	5.07E+01	mg/kg	1.07E-07	mg/kg-day	NA	kg-day/mg		NA	7.51E-07	mg/kg-day	2.00E-02	mg/kg-day	3.75E-05
				Thallium	2.10E-01	mg/kg	4.44E-10	mg/kg-day	NA	kg-day/mg		NA	3.11E-09	mg/kg-day	1.00E-05	mg/kg-day	3.11E-04
				Vanadium	8.70E+01	mg/kg	1.84E-07	mg/kg-day	NA	kg-day/mg		NA	1.29E-06	mg/kg-day	5.04E-03	mg/kg-day	2.56E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	9.45E-10	mg/kg-day	2.00E+00	kg-day/mg		1.89E-09	6.62E-09	mg/kg-day	2.00E-05	mg/kg-day	3.31E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	1.25E-09	mg/kg-day	1.00E-01	kg-day/mg	1	1.25E-10	8.73E-09	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	1.37E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.37E-09	9.62E-09	mg/kg-day	3.00E-04	mg/kg-day	3.21E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	2.05E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.05E-10	1.44E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	7.51E-10	mg/kg-day	1.00E-02	kg-day/mg	1	7.51E-12	5.26E-09	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	1.85E-09	mg/kg-day	1.00E-03	kg-day/mg	1	1.85E-12	1.30E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	3.13E-10	mg/kg-day	1.00E+00	kg-day/mg	1	3.13E-10	2.19E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	1.21E-09	mg/kg-day	1.00E-01	kg-day/mg	1	1.21E-10	8.44E-09	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	1.92E-07	mg/kg-day	NA	kg-day/mg		NA	1.35E-06	mg/kg-day	1.00E-02	mg/kg-day	1.35E-04
			Exp. Route Total									3.46E-08					3.89E-03

Table H-1-13. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Adult

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	2.10E-13	mg/kg-day	1.30E+05	kg-day/mg		2.73E-08	1.47E-12	mg/kg-day	7.00E-10	mg/kg-day	2.10E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	1.61E-08	mg/kg-day	1.50E+00	kg-day/mg		2.41E-08	1.13E-07	mg/kg-day	3.00E-04	mg/kg-day	3.75E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	6.03E-09	mg/kg-day	2.00E+00	kg-day/mg		1.21E-08	4.22E-08	mg/kg-day	2.00E-05	mg/kg-day	2.11E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	7.40E-09	mg/kg-day	1.00E-01	kg-day/mg	1	7.40E-10	5.18E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	8.15E-09	mg/kg-day	1.00E+00	kg-day/mg	1	8.15E-09	5.70E-08	mg/kg-day	3.00E-04	mg/kg-day	1.90E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	1.22E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.22E-09	8.51E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	4.45E-09	mg/kg-day	1.00E-02	kg-day/mg	1	4.45E-11	3.12E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	1.10E-08	mg/kg-day	1.00E-03	kg-day/mg	1	1.10E-11	7.69E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	1.86E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.86E-09	1.30E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	7.15E-09	mg/kg-day	1.00E-01	kg-day/mg	1	7.15E-10	5.00E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									7.62E-08					4.77E-03
		Exposure Point Total										1.11E-07					8.66E-03
	Exposure Medium Total											1.11E-07					8.66E-03
Sediment Total												1.11E-07					8.66E-03

Table H-1-13. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Adult Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Intake/Exposure Concentration Value	Cancer Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Intake/Exposure Concentration Value	Noncancer Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.38E-16	mg/kg-day	1.30E+05	kg-day/mg		1.79E-11	9.66E-16	mg/kg-day	7.00E-10	mg/kg-day	1.38E-06
				Metals													
				Arsenic	7.80E-01	ug/L	2.64E-10	mg/kg-day	1.50E+00	kg-day/mg		3.96E-10	1.85E-09	mg/kg-day	3.00E-04	mg/kg-day	6.16E-06
				Cobalt	9.80E-01	ug/L	3.32E-10	mg/kg-day	NA	kg-day/mg		NA	2.32E-09	mg/kg-day	3.00E-04	mg/kg-day	7.74E-06
				Manganese	1.40E+02	ug/L	4.74E-08	mg/kg-day	NA	kg-day/mg		NA	3.32E-07	mg/kg-day	2.40E-02	mg/kg-day	1.38E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	4.40E-13	mg/kg-day	3.40E-01	kg-day/mg		1.50E-13	3.08E-12	mg/kg-day	5.00E-04	mg/kg-day	6.16E-09
				PCBs													
				Total PCBs	9.40E-03	ug/L	3.18E-12	mg/kg-day	4.00E-01	kg-day/mg		1.27E-12	2.23E-11	mg/kg-day	2.00E-05	mg/kg-day	1.11E-06
			Exp. Route Total									4.15E-10					3.02E-05
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	1.25E-10	mg/kg-day	1.50E+00	kg-day/mg		1.88E-10	8.78E-10	mg/kg-day	3.00E-04	mg/kg-day	2.93E-06
				Cobalt	9.80E-01	ug/L	6.30E-11	mg/kg-day	NA	kg-day/mg		NA	4.41E-10	mg/kg-day	3.00E-04	mg/kg-day	1.47E-06
				Manganese	1.40E+02	ug/L	2.25E-08	mg/kg-day	NA	kg-day/mg		NA	1.58E-07	mg/kg-day	9.60E-04	mg/kg-day	1.64E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.88E-10					1.68E-04
		Exposure Point Total										6.03E-10					1.99E-04
	Exposure Medium Total											6.03E-10					1.99E-04
Surface Water Total												6.03E-10					1.99E-04
Total Receptor Risk/Hazard												1.11E-07					8.86E-03

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-14. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.77E-13	mg/kg-day	1.30E+05	kg-day/mg		2.30E-08	2.06E-12	mg/kg-day	7.00E-10	mg/kg-day	2.94E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	1.97E-05	mg/kg-day	NA	kg-day/mg		NA	2.29E-04	mg/kg-day	1.00E+00	mg/kg-day	2.29E-04
				Antimony	1.93E+00	mg/kg	4.70E-09	mg/kg-day	NA	kg-day/mg		NA	5.49E-08	mg/kg-day	4.00E-04	mg/kg-day	1.37E-04
				Arsenic	5.56E+00	mg/kg	8.13E-09	mg/kg-day	1.50E+00	kg-day/mg		1.22E-08	9.48E-08	mg/kg-day	3.00E-04	mg/kg-day	3.16E-04
				Cobalt	1.51E+01	mg/kg	3.68E-08	mg/kg-day	NA	kg-day/mg		NA	4.29E-07	mg/kg-day	3.00E-04	mg/kg-day	1.43E-03
				Cyanide	8.76E-01	mg/kg	2.14E-09	mg/kg-day	NA	kg-day/mg		NA	2.49E-08	mg/kg-day	6.30E-04	mg/kg-day	3.95E-05
				Manganese	2.10E+02	mg/kg	5.12E-07	mg/kg-day	NA	kg-day/mg		NA	5.97E-06	mg/kg-day	2.40E-02	mg/kg-day	2.49E-04
				Nickel	5.07E+01	mg/kg	1.24E-07	mg/kg-day	NA	kg-day/mg		NA	1.44E-06	mg/kg-day	2.00E-02	mg/kg-day	7.21E-05
				Thallium	2.10E-01	mg/kg	5.12E-10	mg/kg-day	NA	kg-day/mg		NA	5.97E-09	mg/kg-day	1.00E-05	mg/kg-day	5.97E-04
				Vanadium	8.70E+01	mg/kg	2.12E-07	mg/kg-day	NA	kg-day/mg		NA	2.47E-06	mg/kg-day	5.04E-03	mg/kg-day	4.91E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	1.09E-09	mg/kg-day	2.00E+00	kg-day/mg		2.18E-09	1.27E-08	mg/kg-day	2.00E-05	mg/kg-day	6.35E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	1.44E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.59E-10	1.68E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	1.58E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	3.96E-09	1.85E-08	mg/kg-day	3.00E-04	mg/kg-day	6.16E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	2.36E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	5.91E-10	2.76E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	8.65E-10	mg/kg-day	1.00E-02	kg-day/mg	2.5	2.16E-11	1.01E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	2.13E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	5.34E-12	2.49E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	3.61E-10	mg/kg-day	1.00E+00	kg-day/mg	2.5	9.02E-10	4.21E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	1.39E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	3.47E-10	1.62E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	2.22E-07	mg/kg-day	NA	kg-day/mg		NA	2.59E-06	mg/kg-day	1.00E-02	mg/kg-day	2.59E-04
			Exp. Route Total									4.35E-08					7.46E-03

Table H-1-14. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.44E-13	mg/kg-day	1.30E+05	kg-day/mg		1.87E-08	1.68E-12	mg/kg-day	7.00E-10	mg/kg-day	2.39E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	1.10E-08	mg/kg-day	1.50E+00	kg-day/mg		1.65E-08	1.29E-07	mg/kg-day	3.00E-04	mg/kg-day	4.28E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	4.13E-09	mg/kg-day	2.00E+00	kg-day/mg		8.27E-09	4.82E-08	mg/kg-day	2.00E-05	mg/kg-day	2.41E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	5.07E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.27E-09	5.91E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	5.58E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	1.40E-08	6.51E-08	mg/kg-day	3.00E-04	mg/kg-day	2.17E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	8.33E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	2.08E-09	9.72E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	3.05E-09	mg/kg-day	1.00E-02	kg-day/mg	2.5	7.62E-11	3.56E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	7.52E-09	mg/kg-day	1.00E-03	kg-day/mg	2.5	1.88E-11	8.77E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	1.27E-09	mg/kg-day	1.00E+00	kg-day/mg	2.5	3.18E-09	1.48E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	4.89E-09	mg/kg-day	1.00E-01	kg-day/mg	2.5	1.22E-09	5.71E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									6.53E-08					5.45E-03
		Exposure Point Total										1.09E-07					1.29E-02
	Exposure Medium Total											1.09E-07					1.29E-02
Sediment Total												1.09E-07					1.29E-02

Table H-1-14. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Teen Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.59E-16	mg/kg-day	1.30E+05	kg-day/mg		2.07E-11	1.86E-15	mg/kg-day	7.00E-10	mg/kg-day	2.65E-06
				Metals													
				Arsenic	7.80E-01	ug/L	3.04E-10	mg/kg-day	1.50E+00	kg-day/mg		4.56E-10	3.55E-09	mg/kg-day	3.00E-04	mg/kg-day	1.18E-05
				Cobalt	9.80E-01	ug/L	3.82E-10	mg/kg-day	NA	kg-day/mg		NA	4.46E-09	mg/kg-day	3.00E-04	mg/kg-day	1.49E-05
				Manganese	1.40E+02	ug/L	5.46E-08	mg/kg-day	NA	kg-day/mg		NA	6.37E-07	mg/kg-day	2.40E-02	mg/kg-day	2.65E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	5.07E-13	mg/kg-day	3.40E-01	kg-day/mg		1.72E-13	5.91E-12	mg/kg-day	5.00E-04	mg/kg-day	1.18E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	3.67E-12	mg/kg-day	4.00E-01	kg-day/mg		1.47E-12	4.28E-11	mg/kg-day	2.00E-05	mg/kg-day	2.14E-06
			Exp. Route Total									4.79E-10					5.80E-05
			Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	1.03E-10	mg/kg-day	1.50E+00	kg-day/mg		1.55E-10	1.20E-09	mg/kg-day	3.00E-04	mg/kg-day	4.01E-06
				Cobalt	9.80E-01	ug/L	5.18E-11	mg/kg-day	NA	kg-day/mg		NA	6.04E-10	mg/kg-day	3.00E-04	mg/kg-day	2.01E-06
				Manganese	1.40E+02	ug/L	1.85E-08	mg/kg-day	NA	kg-day/mg		NA	2.16E-07	mg/kg-day	9.60E-04	mg/kg-day	2.25E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									1.55E-10					2.31E-04
		Exposure Point Total										6.33E-10					2.89E-04
	Exposure Medium Total											6.33E-10					2.89E-04
Surface Water Total												6.33E-10					2.89E-04
Total Receptor Risk/Hazard												1.09E-07					1.32E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-15. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	2.89E-13	mg/kg-day	1.30E+05	kg-day/mg		3.75E-08	1.01E-11	mg/kg-day	7.00E-10	mg/kg-day	1.44E-02
				Metals													
				Aluminum	8.07E+03	mg/kg	3.21E-05	mg/kg-day	NA	kg-day/mg		NA	1.12E-03	mg/kg-day	1.00E+00	mg/kg-day	1.12E-03
				Antimony	1.93E+00	mg/kg	7.68E-09	mg/kg-day	NA	kg-day/mg		NA	2.69E-07	mg/kg-day	4.00E-04	mg/kg-day	6.72E-04
				Arsenic	5.56E+00	mg/kg	1.33E-08	mg/kg-day	1.50E+00	kg-day/mg		1.99E-08	4.65E-07	mg/kg-day	3.00E-04	mg/kg-day	1.55E-03
				Cobalt	1.51E+01	mg/kg	6.01E-08	mg/kg-day	NA	kg-day/mg		NA	2.10E-06	mg/kg-day	3.00E-04	mg/kg-day	7.01E-03
				Cyanide	8.76E-01	mg/kg	3.49E-09	mg/kg-day	NA	kg-day/mg		NA	1.22E-07	mg/kg-day	6.30E-04	mg/kg-day	1.94E-04
				Manganese	2.10E+02	mg/kg	8.36E-07	mg/kg-day	NA	kg-day/mg		NA	2.93E-05	mg/kg-day	2.40E-02	mg/kg-day	1.22E-03
				Nickel	5.07E+01	mg/kg	2.02E-07	mg/kg-day	NA	kg-day/mg		NA	7.06E-06	mg/kg-day	2.00E-02	mg/kg-day	3.53E-04
				Thallium	2.10E-01	mg/kg	8.36E-10	mg/kg-day	NA	kg-day/mg		NA	2.93E-08	mg/kg-day	1.00E-05	mg/kg-day	2.93E-03
				Vanadium	8.70E+01	mg/kg	3.46E-07	mg/kg-day	NA	kg-day/mg		NA	1.21E-05	mg/kg-day	5.04E-03	mg/kg-day	2.40E-03
				PCBs													
				Total PCBs	4.47E-01	mg/kg	1.78E-09	mg/kg-day	2.00E+00	kg-day/mg		3.56E-09	6.23E-08	mg/kg-day	2.00E-05	mg/kg-day	3.11E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	2.35E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	9.86E-10	8.22E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	2.59E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.09E-08	9.06E-08	mg/kg-day	3.00E-04	mg/kg-day	3.02E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	3.86E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.62E-09	1.35E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.41E-09	mg/kg-day	1.00E-02	kg-day/mg	4.2	5.94E-11	4.95E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	3.49E-09	mg/kg-day	1.00E-03	kg-day/mg	4.2	1.46E-11	1.22E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	5.89E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	2.47E-09	2.06E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	2.27E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	9.53E-10	7.94E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	3.62E-07	mg/kg-day	NA	kg-day/mg		NA	1.27E-05	mg/kg-day	1.00E-02	mg/kg-day	1.27E-03
			Exp. Route Total									7.80E-08					3.66E-02

Table H-1-15. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF [1]	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	9.97E-14	mg/kg-day	1.30E+05	kg-day/mg		1.30E-08	3.49E-12	mg/kg-day	7.00E-10	mg/kg-day	4.99E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	7.65E-09	mg/kg-day	1.50E+00	kg-day/mg		1.15E-08	2.68E-07	mg/kg-day	3.00E-04	mg/kg-day	8.92E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	2.87E-09	mg/kg-day	2.00E+00	kg-day/mg		5.74E-09	1.00E-07	mg/kg-day	2.00E-05	mg/kg-day	5.02E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	3.52E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.48E-09	1.23E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	3.87E-09	mg/kg-day	1.00E+00	kg-day/mg	4.2	1.63E-08	1.36E-07	mg/kg-day	3.00E-04	mg/kg-day	4.52E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	5.78E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	2.43E-09	2.02E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	2.12E-09	mg/kg-day	1.00E-02	kg-day/mg	4.2	8.89E-11	7.41E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	5.22E-09	mg/kg-day	1.00E-03	kg-day/mg	4.2	2.19E-11	1.83E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	8.82E-10	mg/kg-day	1.00E+00	kg-day/mg	4.2	3.71E-09	3.09E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	3.40E-09	mg/kg-day	1.00E-01	kg-day/mg	4.2	1.43E-09	1.19E-07	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									5.56E-08					1.14E-02
		Exposure Point Total										1.34E-07					4.79E-02
	Exposure Medium Total											1.34E-07					4.79E-02
Sediment Total												1.34E-07					4.79E-02

Table H-1-15. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Child Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF [(1)]	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.30E-16	mg/kg-day	1.30E+05	kg-day/mg		1.69E-11	4.55E-15	mg/kg-day	7.00E-10	mg/kg-day	6.50E-06
				Metals													
				Arsenic	7.80E-01	ug/L	2.48E-10	mg/kg-day	1.50E+00	kg-day/mg		3.73E-10	8.69E-09	mg/kg-day	3.00E-04	mg/kg-day	2.90E-05
				Cobalt	9.80E-01	ug/L	3.12E-10	mg/kg-day	NA	kg-day/mg		NA	1.09E-08	mg/kg-day	3.00E-04	mg/kg-day	3.64E-05
				Manganese	1.40E+02	ug/L	4.46E-08	mg/kg-day	NA	kg-day/mg		NA	1.56E-06	mg/kg-day	2.40E-02	mg/kg-day	6.50E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	4.14E-13	mg/kg-day	3.40E-01	kg-day/mg		1.41E-13	1.45E-11	mg/kg-day	5.00E-04	mg/kg-day	2.90E-08
				PCBs													
				Total PCBs	9.40E-03	ug/L	2.99E-12	mg/kg-day	4.00E-01	kg-day/mg		1.20E-12	1.05E-10	mg/kg-day	2.00E-05	mg/kg-day	5.24E-06
			Exp. Route Total									3.91E-10					1.42E-04
			Dermal														
				Dioxin													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	6.39E-11	mg/kg-day	1.50E+00	kg-day/mg		9.58E-11	2.24E-09	mg/kg-day	3.00E-04	mg/kg-day	7.45E-06
				Cobalt	9.80E-01	ug/L	3.21E-11	mg/kg-day	NA	kg-day/mg		NA	1.12E-09	mg/kg-day	3.00E-04	mg/kg-day	3.74E-06
				Manganese	1.40E+02	ug/L	1.15E-08	mg/kg-day	NA	kg-day/mg		NA	4.01E-07	mg/kg-day	9.60E-04	mg/kg-day	4.18E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									9.58E-11					4.29E-04
		Exposure Point Total										4.87E-10					5.71E-04
	Exposure Medium Total											4.87E-10					5.71E-04
Surface Water Total												4.87E-10					5.71E-04
Total Receptor Risk/Hazard												1.34E-07					4.85E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Table H-1-16. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Shoreline Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	ADAF (1)	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Ingestion														
				Dioxin													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	2.93E-13	mg/kg-day	1.30E+05	kg-day/mg		3.80E-08	3.10E-12	mg/kg-day	7.00E-10	mg/kg-day	4.43E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	3.26E-05	mg/kg-day	NA	kg-day/mg		NA	3.45E-04	mg/kg-day	1.00E+00	mg/kg-day	3.45E-04
				Antimony	1.93E+00	mg/kg	7.79E-09	mg/kg-day	NA	kg-day/mg		NA	8.26E-08	mg/kg-day	4.00E-04	mg/kg-day	2.07E-04
				Arsenic	5.56E+00	mg/kg	1.35E-08	mg/kg-day	1.50E+00	kg-day/mg		2.02E-08	1.43E-07	mg/kg-day	3.00E-04	mg/kg-day	4.76E-04
				Cobalt	1.51E+01	mg/kg	6.09E-08	mg/kg-day	NA	kg-day/mg		NA	6.46E-07	mg/kg-day	3.00E-04	mg/kg-day	2.15E-03
				Cyanide	8.76E-01	mg/kg	3.54E-09	mg/kg-day	NA	kg-day/mg		NA	3.75E-08	mg/kg-day	6.30E-04	mg/kg-day	5.95E-05
				Manganese	2.10E+02	mg/kg	8.48E-07	mg/kg-day	NA	kg-day/mg		NA	8.99E-06	mg/kg-day	2.40E-02	mg/kg-day	3.75E-04
				Nickel	5.07E+01	mg/kg	2.05E-07	mg/kg-day	NA	kg-day/mg		NA	2.17E-06	mg/kg-day	2.00E-02	mg/kg-day	1.09E-04
				Thallium	2.10E-01	mg/kg	8.48E-10	mg/kg-day	NA	kg-day/mg		NA	8.99E-09	mg/kg-day	1.00E-05	mg/kg-day	8.99E-04
				Vanadium	8.70E+01	mg/kg	3.51E-07	mg/kg-day	NA	kg-day/mg		NA	3.72E-06	mg/kg-day	5.04E-03	mg/kg-day	7.39E-04
				PCBs													
				Total PCBs	4.47E-01	mg/kg	1.80E-09	mg/kg-day	2.00E+00	kg-day/mg		3.61E-09	1.91E-08	mg/kg-day	2.00E-05	mg/kg-day	9.57E-04
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	2.38E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.38E-10	2.53E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	2.62E-09	mg/kg-day	1.00E+00	kg-day/mg	1	2.62E-09	2.78E-08	mg/kg-day	3.00E-04	mg/kg-day	9.28E-05
				Benzo(b)fluoranthene	9.70E-01	mg/kg	3.92E-09	mg/kg-day	1.00E-01	kg-day/mg	1	3.92E-10	4.15E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	1.43E-09	mg/kg-day	1.00E-02	kg-day/mg	1	1.43E-11	1.52E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	3.54E-09	mg/kg-day	1.00E-03	kg-day/mg	1	3.54E-12	3.75E-08	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	5.97E-10	mg/kg-day	1.00E+00	kg-day/mg	1	5.97E-10	6.34E-09	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	2.30E-09	mg/kg-day	1.00E-01	kg-day/mg	1	2.30E-10	2.44E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	3.67E-07	mg/kg-day	NA	kg-day/mg		NA	3.90E-06	mg/kg-day	1.00E-02	mg/kg-day	3.90E-04
			Exp. Route Total									6.59E-08					1.12E-02

Table H-1-16. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Shoreline Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF		ADAF [1]	Cancer Risk	Intake/Exposure Concentration		RfD		Hazard Quotient
					Value	Units	Value	Units	Value	Units			Value	Units	Value	Units	
Sediment	Fringe Surface Sediment	Waterside Investigation Area	Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	7.25E-05	mg/kg	1.86E-13	mg/kg-day	1.30E+05	kg-day/mg		2.42E-08	1.97E-12	mg/kg-day	7.00E-10	mg/kg-day	2.81E-03
				Metals													
				Aluminum	8.07E+03	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E+00	mg/kg-day	NA
				Antimony	1.93E+00	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	6.00E-05	mg/kg-day	NA
				Arsenic	5.56E+00	mg/kg	1.42E-08	mg/kg-day	1.50E+00	kg-day/mg		2.14E-08	1.51E-07	mg/kg-day	3.00E-04	mg/kg-day	5.04E-04
				Cobalt	1.51E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	3.00E-04	mg/kg-day	NA
				Cyanide	8.76E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	NA	mg/kg-day	NA
				Manganese	2.10E+02	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	9.60E-04	mg/kg-day	NA
				Nickel	5.07E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	8.00E-04	mg/kg-day	NA
				Thallium	2.10E-01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-05	mg/kg-day	NA
				Vanadium	8.70E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.31E-04	mg/kg-day	NA
				PCBs													
				Total PCBs	4.47E-01	mg/kg	5.35E-09	mg/kg-day	2.00E+00	kg-day/mg		1.07E-08	5.67E-08	mg/kg-day	2.00E-05	mg/kg-day	2.83E-03
				SVOCs													
				Benzo(a)anthracene	5.90E-01	mg/kg	6.55E-09	mg/kg-day	1.00E-01	kg-day/mg	1	6.55E-10	6.95E-08	mg/kg-day	NA	mg/kg-day	NA
				Benzo(a)pyrene	6.50E-01	mg/kg	7.22E-09	mg/kg-day	1.00E+00	kg-day/mg	1	7.22E-09	7.65E-08	mg/kg-day	3.00E-04	mg/kg-day	2.55E-04
				Benzo(b)fluoranthene	9.70E-01	mg/kg	1.08E-08	mg/kg-day	1.00E-01	kg-day/mg	1	1.08E-09	1.14E-07	mg/kg-day	NA	mg/kg-day	NA
				Benzo(k)fluoranthene	3.55E-01	mg/kg	3.94E-09	mg/kg-day	1.00E-02	kg-day/mg	1	3.94E-11	4.18E-08	mg/kg-day	NA	mg/kg-day	NA
				chrysene	8.76E-01	mg/kg	9.73E-09	mg/kg-day	1.00E-03	kg-day/mg	1	9.73E-12	1.03E-07	mg/kg-day	NA	mg/kg-day	NA
				Dibenzo(a,h)anthracene	1.48E-01	mg/kg	1.64E-09	mg/kg-day	1.00E+00	kg-day/mg	1	1.64E-09	1.74E-08	mg/kg-day	NA	mg/kg-day	NA
				Indeno(1,2,3-cd)pyrene	5.70E-01	mg/kg	6.33E-09	mg/kg-day	1.00E-01	kg-day/mg	1	6.33E-10	6.71E-08	mg/kg-day	NA	mg/kg-day	NA
				TPH													
				Diesel Range Organics (C10-C20)	9.10E+01	mg/kg	NA	mg/kg-day	NA	kg-day/mg		NA	NA	mg/kg-day	1.00E-02	mg/kg-day	NA
			Exp. Route Total									6.75E-08					6.41E-03
		Exposure Point Total										1.33E-07					1.76E-02
	Exposure Medium Total											1.33E-07					1.76E-02
Sediment Total												1.33E-07					1.76E-02

Table H-1-16. CTE
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Shoreline Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

							Cancer Risk Calculations						Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF			Cancer	Intake/Exposure Concentration		RfD		Hazard
Medium	Medium	Point	Route	Potential Concern	Value	Units	Value	Units	Value	Units	ADAF (1)	Risk	Value	Units	Value	Units	Quotient
Surface Water	Surface Water	Waterside Investigation Area	Ingestion	**Dioxin**													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	1.32E-16	mg/kg-day	1.30E+05	kg-day/mg		1.71E-11	1.40E-15	mg/kg-day	7.00E-10	mg/kg-day	2.00E-06
				Metals													
				Arsenic	7.80E-01	ug/L	2.52E-10	mg/kg-day	1.50E+00	kg-day/mg		3.78E-10	2.67E-09	mg/kg-day	3.00E-04	mg/kg-day	8.90E-06
				Cobalt	9.80E-01	ug/L	3.16E-10	mg/kg-day	NA	kg-day/mg		NA	3.36E-09	mg/kg-day	3.00E-04	mg/kg-day	1.12E-05
				Manganese	1.40E+02	ug/L	4.52E-08	mg/kg-day	NA	kg-day/mg		NA	4.79E-07	mg/kg-day	2.40E-02	mg/kg-day	2.00E-05
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	4.20E-13	mg/kg-day	3.40E-01	kg-day/mg		1.43E-13	4.45E-12	mg/kg-day	5.00E-04	mg/kg-day	8.90E-09
				PCBs													
				Total PCBs	9.40E-03	ug/L	3.04E-12	mg/kg-day	4.00E-01	kg-day/mg		1.21E-12	3.22E-11	mg/kg-day	2.00E-05	mg/kg-day	1.61E-06
			Exp. Route Total									3.96E-10					4.37E-05
			Dermal	**Dioxin**													
				2,3,7,8-TCDD-TEQ	4.08E-07	ug/L	Outside EPD	mg/kg-day	1.30E+05	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	7.00E-10	mg/kg-day	Outside EPD
				Metals													
				Arsenic	7.80E-01	ug/L	2.22E-10	mg/kg-day	1.50E+00	kg-day/mg		3.33E-10	2.36E-09	mg/kg-day	3.00E-04	mg/kg-day	7.85E-06
				Cobalt	9.80E-01	ug/L	1.12E-10	mg/kg-day	NA	kg-day/mg		NA	1.18E-09	mg/kg-day	3.00E-04	mg/kg-day	3.95E-06
				Manganese	1.40E+02	ug/L	3.99E-08	mg/kg-day	NA	kg-day/mg		NA	4.23E-07	mg/kg-day	9.60E-04	mg/kg-day	4.40E-04
				Pesticides													
				4,4'-DDT	1.30E-03	ug/L	Outside EPD	mg/kg-day	3.40E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	5.00E-04	mg/kg-day	Outside EPD
				PCBs													
				Total PCBs	9.40E-03	ug/L	Outside EPD	mg/kg-day	4.00E-01	kg-day/mg		Outside EPD	Outside EPD	mg/kg-day	2.00E-05	mg/kg-day	Outside EPD
			Exp. Route Total									3.33E-10					4.52E-04
		Exposure Point Total										7.29E-10					4.96E-04
	Exposure Medium Total											7.29E-10					4.96E-04
Surface Water Total												7.29E-10					4.96E-04
Total Receptor Risk/Hazard												1.34E-07					1.81E-02

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Age-Dependent Adjustment Factor (ADAF) is used for chemicals with a mutagenic mode of action for carcinogenesis. The cancer risk is adjusted by multiplying the calculated risk by the ADAF. See Text for explanation.

Risk Summary Tables (CTE)

Table H-2a-1. CTE
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations- Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil		**Dioxin**									
			2,3,7,8-TCDD-TEQ	4.20E-04	--	4.04E-05	4.60E-04	Reproductive, Developmental	3.23E+02	--	3.11E+01	3.54E+02
			Inorganics									
			Arsenic	2.91E-09	--	4.66E-10	3.37E-09	Skin, Vascular	4.52E-04	--	7.25E-05	5.25E-04
			Cobalt	NA	--	NA	NA	Thyroid	7.53E-04	--	NA	7.53E-04
			Manganese	NA	--	NA	NA	Neurological	9.42E-06	--	NA	9.42E-06
			Nickel	NA	--	NA	NA	Decreased body and organ weights	1.13E-05	--	NA	1.13E-05
			Thallium	NA	--	NA	NA	Hair	2.26E-02	--	NA	2.26E-02
			Vanadium	NA	--	NA	NA	Hair	4.48E-05	--	NA	4.48E-05
			PCBs									
			Total PCBs	6.46E-09	--	2.90E-09	9.36E-09	Ocular/eye, Nails, Immune	4.52E-03	--	2.03E-03	6.55E-03
			SVOCs									
			Benzo(a)anthracene	3.23E-10	--	1.35E-10	4.57E-10	NA	NA	--	NA	NA
			Benzo(a)pyrene	3.23E-09	--	1.35E-09	4.57E-09	Developmental	7.53E-04	--	3.14E-04	1.07E-03
			Benzo(b)fluoranthene	3.23E-10	--	1.35E-10	4.57E-10	NA	NA	--	NA	NA
			Benzo(k)fluoranthene	3.23E-11	--	1.35E-11	4.57E-11	NA	NA	--	NA	NA
			Chrysene	3.23E-12	--	1.35E-12	4.57E-12	NA	NA	--	NA	NA
			Dibenzo(a,h)anthracene	3.23E-09	--	1.35E-09	4.57E-09	NA	NA	--	NA	NA
			Indeno(1,2,3-cd)pyrene	3.23E-10	--	1.35E-10	4.57E-10	NA	NA	--	NA	NA
			Naphthalene	NA	--	NA	NA	Developmental	1.13E-05	--	4.71E-06	1.60E-05
			TPH									
			Diesel Range Organics (C10-C20)	NA	--	NA	NA	Liver, Kidney, Blood	2.26E-05	--	NA	2.26E-05
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)

Table H-2a-1. CTE
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations- Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Outdoor Air											
			Dioxin									
			2,3,7,8-TCDD-TEQ	--	9.92E-03	--	9.92E-03	Liver, reproductive, developmental, endocrine, respiratory, blood	--	4.57E+05	--	4.57E+05
			Inorganics									
			Arsenic	--	1.12E-06	--	1.12E-06	Neurological, developmental	--	1.22E+03	--	1.22E+03
			Cobalt	--	2.35E-06	--	2.35E-06	Respiratory	--	3.04E+03	--	3.04E+03
			Manganese	--	NA	--	NA	Neurological	--	3.65E+02	--	3.65E+02
			Nickel	--	6.78E-08	--	6.78E-08	Respiratory	--	2.03E+02	--	2.03E+02
			Thallium	--	NA	--	NA	NA	--	NA	--	NA
			Vanadium	--	NA	--	NA	Respiratory	--	1.83E+02	--	1.83E+02
			PCBs									
			Total PCBs	--	1.49E-07	--	1.49E-07	NA	--	NA	--	NA
			SVOCs									
			Benzo(a)anthracene	--	1.57E-08	--	1.57E-08	NA	--	NA	--	NA
			Benzo(a)pyrene	--	1.57E-07	--	1.57E-07	Developmental	--	9.13E+03	--	9.13E+03
			Benzo(b)fluoranthene	--	1.57E-08	--	1.57E-08	NA	--	NA	--	NA
			Benzo(k)fluoranthene	--	1.57E-09	--	1.57E-09	NA	--	NA	--	NA
			Chrysene	--	1.57E-10	--	1.57E-10	NA	--	NA	--	NA
			Dibenzo(a,h)anthracene	--	1.57E-07	--	1.57E-07	NA	--	NA	--	NA
			Indeno(1,2,3-cd)pyrene	--	1.57E-08	--	1.57E-08	NA	--	NA	--	NA
			Naphthalene	--	8.87E-09	--	8.87E-09	Neurological and Respiratory	--	6.09E+00	--	6.09E+00
			TPH									
			Diesel Range Organics (C10-C20)	--	NA	--	NA	Respiratory	--	1.83E-01	--	1.83E-01
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)
Soil							(2)					(2)
Groundwater	Trench Air		**VOCs**									
			Bromodichloromethane	NA	2.41E-09	NA	2.41E-09	NA	NA	NA	NA	NA
			Butyl alcohol, tert-	NA	NA	NA	NA	Reproductive	NA	2.28E-02	NA	2.28E-02
			Chloroform	NA	1.50E-09	NA	1.50E-09	Liver	NA	4.66E-02	NA	4.66E-02
			Methyl tert-Butyl Ether (MTBE)	NA	1.70E-11	NA	1.70E-11	Liver, Kidney, Ocular	NA	1.52E-03	NA	1.52E-03
			Tetrachloroethylene	NA	1.70E-11	NA	1.70E-11	Neurological, Ocular	NA	1.14E-01	NA	1.14E-01
			Trichloroethene	NA	2.67E-10	NA	2.67E-10	Thyroid Vascular	NA	2.28E+00	NA	2.28E+00
			Vinyl Chloride	NA	2.87E-10	NA	2.87E-10	Liver	NA	4.57E-02	NA	4.57E-02
Receptor Total							(2)					(2)

Notes:
NA - Not Applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land /Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	4.60E-04	3.54E+02	Reproductive, Developmental	1.14E-06	mg/kg	5.24E-10	4.03E-04	1.35E-05	mg/kg	6.22E-09	4.78E-03
		Inorganics											
		Arsenic	3.37E-09	5.25E-04	Skin, Vascular	1.81E+00	mg/kg	6.10E-09	9.48E-04	1.40E+01	mg/kg	4.72E-08	7.35E-03
		Cobalt	NA	7.53E-04	Thyroid	5.85E+01	mg/kg	NA	4.41E-02	1.41E+01	mg/kg	NA	1.06E-02
		Manganese	NA	9.42E-06	Neurological	2.09E+02	mg/kg	NA	1.97E-03	3.12E+02	mg/kg	NA	2.94E-03
		Nickel	NA	1.13E-05	Decreased body and organ weights	7.08E+00	mg/kg	NA	8.00E-05	3.20E+02	mg/kg	NA	3.62E-03
		Thallium	NA	2.26E-02	Hair	4.50E-02	mg/kg	NA	1.02E-03	1.46E-01	mg/kg	NA	3.30E-03
		Vanadium	NA	4.48E-05	Hair	2.37E+01	mg/kg	NA	1.06E-03	1.47E+03	mg/kg	NA	6.60E-02
		PCBs											
		Total PCBs	9.36E-09	6.55E-03	Ocular/eye, Nails, Immune	1.42E-02	mg/kg	1.33E-10	9.30E-05	1.16E+00	mg/kg	1.09E-08	7.62E-03
		SVOCs											
		Benzo(a)anthracene	4.57E-10	NA	NA	1.05E-01	mg/kg	4.80E-11	NA	1.02E+00	mg/kg	4.66E-10	NA
		Benzo(a)pyrene	4.57E-09	1.07E-03	Developmental	1.04E-01	mg/kg	4.76E-10	1.11E-04	9.08E-01	mg/kg	4.15E-09	9.69E-04
		Benzo(b)fluoranthene	4.57E-10	NA	NA	1.24E-01	mg/kg	5.67E-11	NA	1.11E+00	mg/kg	5.06E-10	NA
		Benzo(k)fluoranthene	4.57E-11	NA	NA	5.03E-01	mg/kg	2.30E-11	NA	3.99E-01	mg/kg	1.83E-11	NA
		Chrysene	4.57E-12	NA	NA	1.13E-01	mg/kg	5.17E-13	NA	1.15E+00	mg/kg	5.26E-12	NA
		Dibenzo(a,h)anthracene	4.57E-09	NA	NA	2.30E-02	mg/kg	1.05E-10	NA	1.99E-01	mg/kg	9.10E-10	NA
		Indeno(1,2,3-cd)pyrene	4.57E-10	NA	NA	7.09E-02	mg/kg	3.24E-11	NA	5.70E-01	mg/kg	2.61E-10	NA
		Naphthalene	NA	1.60E-05	Developmental	7.97E-03	mg/kg	NA	1.28E-07	7.16E-02	mg/kg	NA	1.15E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.26E-05	Liver, Kidney, Blood	1.30E+01	mg/kg	NA	2.94E-04	6.53E+02	mg/kg	NA	1.48E-02
		Exposure Point Total						7.49E-09	5.00E-02			7.07E-08	1.22E-01
	Exposure Medium Total							7.49E-09	5.00E-02			7.07E-08	1.22E-01

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land /Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.92E-03	4.57E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	1.58E-12	mg/m3	1.57E-14	7.22E-07	1.88E-11	mg/m3	1.86E-13	8.58E-06
		Inorganics											
		Arsenic	1.12E-06	1.22E+03	Neurological, developmental	2.51E-06	mg/m3	2.82E-12	3.06E-03	1.95E-05	mg/m3	2.19E-11	2.37E-02
		Cobalt	2.35E-06	3.04E+03	Respiratory	8.13E-05	mg/m3	1.91E-10	2.48E-01	1.96E-05	mg/m3	4.60E-11	5.96E-02
		Manganese	NA	3.65E+02	Neurological	2.91E-04	mg/m3	NA	1.06E-01	4.33E-04	mg/m3	NA	1.58E-01
		Nickel	6.78E-08	2.03E+02	Respiratory	9.84E-06	mg/m3	6.67E-13	2.00E-03	4.45E-04	mg/m3	3.02E-11	9.03E-02
		Thallium	NA	NA	NA	6.26E-08	mg/m3	NA	NA	2.03E-07	mg/m3	NA	NA
		Vanadium	NA	1.83E+02	Respiratory	3.29E-05	mg/m3	NA	6.01E-03	2.05E-03	mg/m3	NA	3.74E-01
		PCBs											
		Total PCBs	1.49E-07	NA	NA	1.97E-08	mg/m3	2.94E-15	NA	1.62E-06	mg/m3	2.41E-13	NA
		SVOCs											
		Benzo(a)anthracene	1.57E-08	NA	NA	1.46E-07	mg/m3	2.29E-15	NA	1.42E-06	mg/m3	2.22E-14	NA
		Benzo(a)pyrene	1.57E-07	9.13E+03	Developmental	1.45E-07	mg/m3	2.26E-14	1.32E-03	1.26E-06	mg/m3	1.98E-13	1.15E-02
		Benzo(b)fluoranthene	1.57E-08	NA	NA	1.72E-07	mg/m3	2.70E-15	NA	1.54E-06	mg/m3	2.41E-14	NA
		Benzo(k)fluoranthene	1.57E-09	NA	NA	6.99E-07	mg/m3	1.10E-15	NA	5.55E-07	mg/m3	8.69E-16	NA
		Chrysene	1.57E-10	NA	NA	1.57E-07	mg/m3	2.46E-17	NA	1.60E-06	mg/m3	2.50E-16	NA
		Dibenzo(a,h)anthracene	1.57E-07	NA	NA	3.20E-08	mg/m3	5.01E-15	NA	2.77E-07	mg/m3	4.33E-14	NA
		Indeno(1,2,3-cd)pyrene	1.57E-08	NA	NA	9.86E-08	mg/m3	1.54E-15	NA	7.93E-07	mg/m3	1.24E-14	NA
		Naphthalene	8.87E-09	6.09E+00	Neurological and Respiratory	1.11E-08	mg/m3	9.83E-17	6.75E-08	9.96E-08	mg/m3	8.83E-16	6.06E-07
		TPH											
		Diesel Range Organics (C10-C20)	NA	1.83E-01	Respiratory	1.81E-05	mg/m3	NA	3.30E-06	9.08E-04	mg/m3	NA	1.66E-04
		Exposure Point Total						1.95E-10	3.66E-01			9.88E-11	7.18E-01
	Exposure Medium Total							1.95E-10	3.66E-01			9.88E-11	7.18E-01
Soil								7.69E-09	4.16E-01			7.08E-08	8.40E-01

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land /Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	2.41E-09	NA	NA	ND	mg/m3	ND	ND	2.29E-03	mg/m3	5.53E-12	NA
		Butyl alcohol, tert-	NA	2.28E-02	Reproductive	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Chloroform	1.50E-09	4.66E-02	Liver	2.31E-03	mg/m3	3.47E-12	1.08E-04	5.71E-03	mg/m3	8.57E-12	2.66E-04
		Methyl tert-Butyl Ether (MTBE)	1.70E-11	1.52E-03	Liver, Kidney, Ocular	6.10E-03	mg/m3	1.03E-13	9.28E-06	7.71E-03	mg/m3	1.31E-13	1.17E-05
		Tetrachloroethylene	1.70E-11	1.14E-01	Neurological, Ocular	2.44E-02	mg/m3	4.13E-13	2.78E-03	7.63E-03	mg/m3	1.29E-13	8.71E-04
		Trichloroethene	2.67E-10	2.28E+00	Thyroid Vascular	5.53E-03	mg/m3	1.48E-12	1.26E-02	4.80E-03	mg/m3	1.28E-12	1.09E-02
		Vinyl Chloride	2.87E-10	4.57E-02	Liver	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Exposure Point Total						5.46E-12	1.55E-02			1.56E-11	1.21E-02
	Exposure Medium Total							5.46E-12	1.55E-02			1.56E-11	1.21E-02
Groundwater								5.46E-12	1.55E-02			1.56E-11	1.21E-02
Receptor Total								7.69E-09	4.32E-01			7.08E-08	8.52E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.
(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. CTE and G-2a-1. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation (Park Land) Organ	Endpoint HI	Target Endpoint Evaluation (Warehouse) Organ	Endpoint HI
Blood	2.95E-04	Blood	1.48E-02
Decreased body and organ weights	8.00E-05	Decreased body and organ weights	3.62E-03
Endocrine	7.22E-07	Endocrine	8.58E-06
Developmental	4.90E-03	Developmental	4.10E-02
Hair	2.08E-03	Hair	6.93E-02
Immune	9.30E-05	Immune	7.62E-03
Kidney	3.03E-04	Kidney	1.48E-02
Liver	4.12E-04	Liver	1.50E-02
Nails	9.30E-05	Nails	7.62E-03
Neurological	1.14E-01	Neurological	1.86E-01
Ocular	2.88E-03	Ocular	8.51E-03
Reproductive	4.03E-04	Reproductive	4.79E-03
Respiratory	2.56E-01	Respiratory	5.24E-01
Skin	9.48E-04	Skin	7.35E-03
Thyroid	5.67E-02	Thyroid	2.16E-02
Vascular	1.36E-02	Vascular	1.83E-02

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	4.60E-04	3.54E+02	Reproductive, Developmental	4.87E-05	mg/kg	2.24E-08	1.72E-02	5.51E-06	mg/kg	2.53E-09	1.95E-03
		Inorganics											
		Arsenic	3.37E-09	5.25E-04	Skin, Vascular	5.42E+00	mg/kg	1.83E-08	2.84E-03	4.49E+00	mg/kg	1.51E-08	2.36E-03
		Cobalt	NA	7.53E-04	Thyroid	6.11E+00	mg/kg	NA	4.60E-03	3.99E+00	mg/kg	NA	3.01E-03
		Manganese	NA	9.42E-06	Neurological	1.42E+02	mg/kg	NA	1.34E-03	1.18E+02	mg/kg	NA	1.11E-03
		Nickel	NA	1.13E-05	Decreased body and organ weights	1.08E+01	mg/kg	NA	1.22E-04	9.05E+00	mg/kg	NA	1.02E-04
		Thallium	NA	2.26E-02	Hair	1.30E-01	mg/kg	NA	2.94E-03	9.16E-02	mg/kg	NA	2.07E-03
		Vanadium	NA	4.48E-05	Hair	2.37E+01	mg/kg	NA	1.06E-03	1.99E+01	mg/kg	NA	8.93E-04
		PCBs											
		Total PCBs	9.36E-09	6.55E-03	Ocular/eye, Nails, Immune	6.59E-01	mg/kg	6.17E-09	4.32E-03	4.94E-01	mg/kg	4.62E-09	3.24E-03
		SVOCs											
		Benzo(a)anthracene	4.57E-10	NA	NA	1.02E+01	mg/kg	4.68E-09	NA	1.13E+00	mg/kg	5.17E-10	NA
		Benzo(a)pyrene	4.57E-09	1.07E-03	Developmental	8.48E+00	mg/kg	3.88E-08	9.05E-03	6.65E-01	mg/kg	3.04E-09	7.10E-04
		Benzo(b)fluoranthene	4.57E-10	NA	NA	1.03E+01	mg/kg	4.71E-09	NA	1.18E+00	mg/kg	5.38E-10	NA
		Benzo(k)fluoranthene	4.57E-11	NA	NA	4.03E+00	mg/kg	1.84E-10	NA	3.02E-01	mg/kg	1.38E-11	NA
		Chrysene	4.57E-12	NA	NA	9.11E+00	mg/kg	4.17E-11	NA	1.07E+00	mg/kg	4.88E-12	NA
		Dibenzo(a,h)anthracene	4.57E-09	NA	NA	1.10E+00	mg/kg	5.01E-09	NA	1.28E-01	mg/kg	5.86E-10	NA
		Indeno(1,2,3-cd)pyrene	4.57E-10	NA	NA	5.45E+00	mg/kg	2.49E-09	NA	3.87E-01	mg/kg	1.77E-10	NA
		Naphthalene	NA	1.60E-05	Developmental	1.80E+00	mg/kg	NA	2.88E-05	5.77E-02	mg/kg	NA	9.24E-07
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.26E-05	Liver, Kidney, Blood	6.63E+02	mg/kg	NA	1.50E-02	5.15E+01	mg/kg	NA	1.16E-03
		Exposure Point Total						1.03E-07	5.85E-02			2.72E-08	1.66E-02
	Exposure Medium Total							1.03E-07	5.85E-02			2.72E-08	1.66E-02

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

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

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.92E-03	4.57E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	6.78E-11	mg/m3	6.72E-13	3.09E-05	7.66E-12	mg/m3	7.59E-14	3.50E-06
		Inorganics											
		Arsenic	1.12E-06	1.22E+03	Neurological, developmental	7.54E-06	mg/m3	8.46E-12	9.18E-03	6.25E-06	mg/m3	7.01E-12	7.60E-03
		Cobalt	2.35E-06	3.04E+03	Respiratory	8.50E-06	mg/m3	2.00E-11	2.59E-02	5.55E-06	mg/m3	1.30E-11	1.69E-02
		Manganese	NA	3.65E+02	Neurological	1.98E-04	mg/m3	NA	7.22E-02	1.64E-04	mg/m3	NA	5.99E-02
		Nickel	6.78E-08	2.03E+02	Respiratory	1.50E-05	mg/m3	1.02E-12	3.05E-03	1.26E-05	mg/m3	8.53E-13	2.55E-03
		Thallium	NA	NA	NA	1.81E-07	mg/m3	NA	NA	1.27E-07	mg/m3	NA	NA
		Vanadium	NA	1.83E+02	Respiratory	3.29E-05	mg/m3	NA	6.01E-03	2.77E-05	mg/m3	NA	5.06E-03
		PCBs											
		Total PCBs	1.49E-07	NA	NA	9.16E-07	mg/m3	1.37E-13	NA	6.87E-07	mg/m3	1.02E-13	NA
		SVOCs											
		Benzo(a)anthracene	1.57E-08	NA	NA	1.42E-05	mg/m3	2.23E-13	NA	1.57E-06	mg/m3	2.46E-14	NA
		Benzo(a)pyrene	1.57E-07	9.13E+03	Developmental	1.18E-05	mg/m3	1.85E-12	1.08E-01	9.25E-07	mg/m3	1.45E-13	8.45E-03
		Benzo(b)fluoranthene	1.57E-08	NA	NA	1.43E-05	mg/m3	2.24E-13	NA	1.64E-06	mg/m3	2.56E-14	NA
		Benzo(k)fluoranthene	1.57E-09	NA	NA	5.60E-06	mg/m3	8.76E-15	NA	4.20E-07	mg/m3	6.57E-16	NA
		Chrysene	1.57E-10	NA	NA	1.27E-05	mg/m3	1.98E-15	NA	1.48E-06	mg/m3	2.32E-16	NA
		Dibenzo(a,h)anthracene	1.57E-07	NA	NA	1.52E-06	mg/m3	2.39E-13	NA	1.78E-07	mg/m3	2.79E-14	NA
		Indeno(1,2,3-cd)pyrene	1.57E-08	NA	NA	7.58E-06	mg/m3	1.19E-13	NA	5.38E-07	mg/m3	8.43E-15	NA
		Naphthalene	8.87E-09	6.09E+00	Neurological and Respiratory	2.50E-06	mg/m3	2.22E-14	1.52E-05	8.02E-08	mg/m3	7.12E-16	4.89E-07
		TPH											
		Diesel Range Organics (C10-C20)	NA	1.83E-01	Respiratory	9.22E-04	mg/m3	NA	1.68E-04	7.15E-05	mg/m3	NA	1.31E-05
		Exposure Point Total						3.29E-11	2.24E-01			2.13E-11	1.00E-01
	Exposure Medium Total							3.29E-11	2.24E-01			2.13E-11	1.00E-01
Soil								1.03E-07	2.83E-01			2.72E-08	1.17E-01

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	2.41E-09	NA	NA	ND	mg/m3	ND	ND	1.65E-02	mg/m3	3.99E-11	NA
		Butyl alcohol, tert-	NA	2.28E-02	Reproductive	ND	mg/m3	ND	ND	1.33E-01	mg/m3	NA	3.03E-03
		Chloroform	1.50E-09	4.66E-02	Liver	ND	mg/m3	ND	ND	1.18E-02	mg/m3	1.78E-11	5.51E-04
		Methyl tert-Butyl Ether (MTBE)	1.70E-11	1.52E-03	Liver, Kidney, Ocular	1.26E-02	mg/m3	2.14E-13	1.92E-05	7.03E-02	mg/m3	1.19E-12	1.07E-04
		Tetrachloroethylene	1.70E-11	1.14E-01	Neurological, Ocular	1.55E-03	mg/m3	2.63E-14	1.77E-04	1.49E-02	mg/m3	2.53E-13	1.70E-03
		Trichloroethene	2.67E-10	2.28E+00	Thyroid Vascular	ND	mg/m3	ND	ND	2.79E-03	mg/m3	7.46E-13	6.37E-03
		Vinyl Chloride	2.87E-10	4.57E-02	Liver	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Exposure Point Total						2.40E-13	1.96E-04			5.99E-11	1.18E-02
	Exposure Medium Total							2.40E-13	1.96E-04			5.99E-11	1.18E-02
Groundwater								2.40E-13	1.96E-04			5.99E-11	1.18E-02
Receptor Total								1.03E-07	2.83E-01			2.73E-08	1.29E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.
(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. CTE and G-2a-1. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation		Target Endpoint Evaluation	
Organ	**Endpoint HI**	**Organ**	**Endpoint HI**
Blood	1.50E-02	Blood	1.17E-03
Decreased body and organ weights	1.22E-04	Decreased body and organ weights	1.02E-04
Endocrine	3.09E-05	Endocrine	3.50E-06
Developmental	1.43E-01	Developmental	1.87E-02
Hair	4.00E-03	Hair	2.96E-03
Immune	4.32E-03	Immune	3.24E-03
Kidney	1.50E-02	Kidney	1.27E-03
Liver	1.50E-02	Liver	1.82E-03
Nails	4.32E-03	Nails	3.24E-03
Neurological	8.29E-02	Neurological	7.03E-02
Ocular	4.51E-03	Ocular	5.05E-03
Reproductive	1.73E-02	Reproductive	4.99E-03
Respiratory	3.51E-02	Respiratory	2.45E-02
Skin	2.84E-03	Skin	2.36E-03
Thyroid	4.60E-03	Thyroid	9.37E-03
Vascular	2.84E-03	Vascular	8.72E-03

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	4.60E-04	3.54E+02	Reproductive, Developmental	6.57E-06	mg/kg	3.02E-09	2.33E-03	2.37E-06	mg/kg	1.09E-09	8.37E-04
		Inorganics											
		Arsenic	3.37E-09	5.25E-04	Skin, Vascular	3.08E+00	mg/kg	1.04E-08	1.62E-03	6.64E+00	mg/kg	2.24E-08	3.48E-03
		Cobalt	NA	7.53E-04	Thyroid	8.25E+00	mg/kg	NA	6.22E-03	3.79E+00	mg/kg	NA	2.85E-03
		Manganese	NA	9.42E-06	Neurological	2.05E+02	mg/kg	NA	1.93E-03	1.34E+02	mg/kg	NA	1.26E-03
		Nickel	NA	1.13E-05	Decreased body and organ weights	1.83E+01	mg/kg	NA	2.07E-04	7.56E+00	mg/kg	NA	8.54E-05
		Thallium	NA	2.26E-02	Hair	8.89E-02	mg/kg	NA	2.01E-03	6.44E-02	mg/kg	NA	1.46E-03
		Vanadium	NA	4.48E-05	Hair	2.42E+01	mg/kg	NA	1.08E-03	1.60E+01	mg/kg	NA	7.18E-04
		PCBs											
		Total PCBs	9.36E-09	6.55E-03	Ocular/eye, Nails, Immune	1.08E-01	mg/kg	1.01E-09	7.07E-04	2.41E-01	mg/kg	2.25E-09	1.58E-03
		SVOCs											
		Benzo(a)anthracene	4.57E-10	NA	NA	1.07E+01	mg/kg	4.88E-09	NA	1.71E-01	mg/kg	7.82E-11	NA
		Benzo(a)pyrene	4.57E-09	1.07E-03	Developmental	9.48E+00	mg/kg	4.34E-08	1.01E-02	1.36E-01	mg/kg	6.22E-10	1.45E-04
		Benzo(b)fluoranthene	4.57E-10	NA	NA	9.11E+00	mg/kg	4.17E-09	NA	2.99E-01	mg/kg	1.37E-10	NA
		Benzo(k)fluoranthene	4.57E-11	NA	NA	6.15E+00	mg/kg	2.82E-10	NA	1.54E-01	mg/kg	7.05E-12	NA
		Chrysene	4.57E-12	NA	NA	9.54E+00	mg/kg	4.36E-11	NA	2.99E-01	mg/kg	1.37E-12	NA
		Dibenzo(a,h)anthracene	4.57E-09	NA	NA	1.80E+00	mg/kg	8.23E-09	NA	4.04E-02	mg/kg	1.85E-10	NA
		Indeno(1,2,3-cd)pyrene	4.57E-10	NA	NA	6.29E+00	mg/kg	2.88E-09	NA	1.26E-01	mg/kg	5.76E-11	NA
		Naphthalene	NA	1.60E-05	Developmental	1.06E+00	mg/kg	NA	1.70E-05	1.41E-02	mg/kg	NA	2.26E-07
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.26E-05	Liver, Kidney, Blood	2.30E+01	mg/kg	NA	5.20E-04	2.00E+01	mg/kg	NA	4.52E-04
		Exposure Point Total						7.83E-08	2.67E-02			2.68E-08	1.29E-02
	Exposure Medium Total							7.83E-08	2.67E-02			2.68E-08	1.29E-02

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.92E-03	4.57E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	9.14E-12	mg/m3	9.06E-14	4.17E-06	3.29E-12	mg/m3	3.26E-14	1.50E-06
		Inorganics											
		Arsenic	1.12E-06	1.22E+03	Neurological, developmental	4.29E-06	mg/m3	4.81E-12	5.22E-03	9.23E-06	mg/m3	1.04E-11	1.12E-02
		Cobalt	2.35E-06	3.04E+03	Respiratory	1.15E-05	mg/m3	2.69E-11	3.49E-02	5.26E-06	mg/m3	1.24E-11	1.60E-02
		Manganese	NA	3.65E+02	Neurological	2.84E-04	mg/m3	NA	1.04E-01	1.86E-04	mg/m3	NA	6.79E-02
		Nickel	6.78E-08	2.03E+02	Respiratory	2.55E-05	mg/m3	1.73E-12	5.17E-03	1.05E-05	mg/m3	7.13E-13	2.13E-03
		Thallium	NA	NA	NA	1.24E-07	mg/m3	NA	NA	8.96E-08	mg/m3	NA	NA
		Vanadium	NA	1.83E+02	Respiratory	3.36E-05	mg/m3	NA	6.14E-03	2.23E-05	mg/m3	NA	4.07E-03
		PCBs											
		Total PCBs	1.49E-07	NA	NA	1.50E-07	mg/m3	2.24E-14	NA	3.35E-07	mg/m3	5.00E-14	NA
		SVOCs											
		Benzo(a)anthracene	1.57E-08	NA	NA	1.48E-05	mg/m3	2.32E-13	NA	2.38E-07	mg/m3	3.72E-15	NA
		Benzo(a)pyrene	1.57E-07	9.13E+03	Developmental	1.32E-05	mg/m3	2.06E-12	1.20E-01	1.89E-07	mg/m3	2.96E-14	1.73E-03
		Benzo(b)fluoranthene	1.57E-08	NA	NA	1.27E-05	mg/m3	1.98E-13	NA	4.16E-07	mg/m3	6.51E-15	NA
		Benzo(k)fluoranthene	1.57E-09	NA	NA	8.56E-06	mg/m3	1.34E-14	NA	2.14E-07	mg/m3	3.35E-16	NA
		Chrysene	1.57E-10	NA	NA	1.33E-05	mg/m3	2.08E-15	NA	4.16E-07	mg/m3	6.51E-17	NA
		Dibenzo(a,h)anthracene	1.57E-07	NA	NA	2.50E-06	mg/m3	3.92E-13	NA	5.62E-08	mg/m3	8.80E-15	NA
		Indeno(1,2,3-cd)pyrene	1.57E-08	NA	NA	8.74E-06	mg/m3	1.37E-13	NA	1.75E-07	mg/m3	2.74E-15	NA
		Naphthalene	8.87E-09	6.09E+00	Neurological and Respiratory	1.47E-06	mg/m3	1.31E-14	8.97E-06	1.96E-08	mg/m3	1.74E-16	1.19E-07
		TPH											
		Diesel Range Organics (C10-C20)	NA	1.83E-01	Respiratory	3.20E-05	mg/m3	NA	5.84E-06	2.78E-05	mg/m3	NA	5.08E-06
		Exposure Point Total						3.66E-11	2.76E-01			2.36E-11	1.03E-01
	Exposure Medium Total							3.66E-11	2.76E-01			2.36E-11	1.03E-01
Soil								7.83E-08	3.02E-01			2.68E-08	1.16E-01

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	2.41E-09	NA	NA	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Butyl alcohol, tert-	NA	2.28E-02	Reproductive	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Chloroform	1.50E-09	4.66E-02	Liver	3.46E-03	mg/m3	5.19E-12	1.61E-04	ND	mg/m3	ND	ND
		Methyl tert-Butyl Ether (MTBE)	1.70E-11	1.52E-03	Liver, Kidney, Ocular	9.48E-03	mg/m3	1.61E-13	1.44E-05	4.93E-02	mg/m3	8.37E-13	7.51E-05
		Tetrachloroethylene	1.70E-11	1.14E-01	Neurological, Ocular	7.21E-01	mg/m3	1.22E-11	8.23E-02	4.43E-03	mg/m3	7.51E-14	5.06E-04
		Trichloroethene	2.67E-10	2.28E+00	Thyroid Vascular	6.69E-02	mg/m3	1.79E-11	1.53E-01	1.23E-03	mg/m3	3.29E-13	2.81E-03
		Vinyl Chloride	2.87E-10	4.57E-02	Liver	5.59E-02	mg/m3	1.60E-11	2.55E-03	ND	mg/m3	ND	ND
		Exposure Point Total						5.15E-11	2.38E-01			1.24E-12	3.39E-03
	Exposure Medium Total							5.15E-11	2.38E-01			1.24E-12	3.39E-03
Groundwater								5.15E-11	2.38E-01			1.24E-12	3.39E-03
Receptor Total								7.84E-08	5.40E-01			2.68E-08	1.19E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.
(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. CTE and G-2a-1. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation		Target Endpoint Evaluation	
Organ	**Endpoint HI**	**Organ**	**Endpoint HI**
Blood	5.24E-04	Blood	4.54E-04
Decreased body and organ weights	2.07E-04	Decreased body and organ weights	8.54E-05
Endocrine	4.17E-06	Endocrine	1.50E-06
Developmental	1.38E-01	Developmental	1.39E-02
Hair	3.09E-03	Hair	2.17E-03
Immune	7.07E-04	Immune	1.58E-03
Kidney	5.34E-04	Kidney	5.27E-04
Liver	3.25E-03	Liver	5.29E-04
Nails	7.07E-04	Nails	1.58E-03
Neurological	1.93E-01	Neurological	8.09E-02
Ocular	8.30E-02	Ocular	2.16E-03
Reproductive	2.33E-03	Reproductive	8.39E-04
Respiratory	4.63E-02	Respiratory	2.22E-02
Skin	1.62E-03	Skin	3.48E-03
Thyroid	1.59E-01	Thyroid	5.66E-03
Vascular	1.54E-01	Vascular	6.29E-03

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Soil	**Dioxin**											
		2,3,7,8-TCDD-TEQ	4.60E-04	3.54E+02	Reproductive, Developmental	ND	mg/kg	ND	ND	ND	mg/kg	ND	ND
		Inorganics											
		Arsenic	3.37E-09	5.25E-04	Skin, Vascular	3.40E+00	mg/kg	1.15E-08	1.78E-03	2.48E+00	mg/kg	8.36E-09	1.30E-03
		Cobalt	NA	7.53E-04	Thyroid	3.47E+00	mg/kg	NA	2.61E-03	5.52E+00	mg/kg	NA	4.16E-03
		Manganese	NA	9.42E-06	Neurological	1.57E+02	mg/kg	NA	1.47E-03	1.41E+02	mg/kg	NA	1.33E-03
		Nickel	NA	1.13E-05	Decreased body and organ weights	1.39E+01	mg/kg	NA	1.57E-04	6.34E+00	mg/kg	NA	7.17E-05
		Thallium	NA	2.26E-02	Hair	1.13E-01	mg/kg	NA	2.55E-03	1.03E-01	mg/kg	NA	2.33E-03
		Vanadium	NA	4.48E-05	Hair	1.66E+01	mg/kg	NA	7.43E-04	2.18E+01	mg/kg	NA	9.78E-04
		PCBs											
		Total PCBs	9.36E-09	6.55E-03	Ocular/eye, Nails, Immune	7.46E+01	mg/kg	6.98E-07	4.89E-01	2.32E-02	mg/kg	2.17E-10	1.52E-04
		SVOCs											
		Benzo(a)anthracene	4.57E-10	NA	NA	2.23E+00	mg/kg	1.02E-09	NA	3.73E-01	mg/kg	1.71E-10	NA
		Benzo(a)pyrene	4.57E-09	1.07E-03	Developmental	1.87E+00	mg/kg	8.57E-09	2.00E-03	3.28E-01	mg/kg	1.50E-09	3.50E-04
		Benzo(b)fluoranthene	4.57E-10	NA	NA	2.44E+00	mg/kg	1.11E-09	NA	4.40E-01	mg/kg	2.01E-10	NA
		Benzo(k)fluoranthene	4.57E-11	NA	NA	9.18E-01	mg/kg	4.20E-11	NA	1.26E-01	mg/kg	5.76E-12	NA
		Chrysene	4.57E-12	NA	NA	2.05E+00	mg/kg	9.40E-12	NA	3.91E-01	mg/kg	1.79E-12	NA
		Dibenzo(a,h)anthracene	4.57E-09	NA	NA	4.25E-01	mg/kg	1.94E-09	NA	7.31E-02	mg/kg	3.34E-10	NA
		Indeno(1,2,3-cd)pyrene	4.57E-10	NA	NA	1.38E+00	mg/kg	6.32E-10	NA	2.11E-01	mg/kg	9.65E-11	NA
		Naphthalene	NA	1.60E-05	Developmental	9.91E-02	mg/kg	NA	1.59E-06	7.18E-02	mg/kg	NA	1.15E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.26E-05	Liver, Kidney, Blood	1.86E+01	mg/kg	NA	4.21E-04	7.07E+01	mg/kg	NA	1.60E-03
		Exposure Point Total						7.23E-07	5.00E-01			1.09E-08	1.23E-02
	Exposure Medium Total							7.23E-07	5.00E-01			1.09E-08	1.23E-02

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	9.92E-03	4.57E+05	Liver, reproductive, developmental, endocrine, respiratory, blood	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Inorganics											
		Arsenic	1.12E-06	1.22E+03	Neurological, developmental	4.73E-06	mg/m3	5.31E-12	5.76E-03	3.45E-06	mg/m3	3.87E-12	4.20E-03
		Cobalt	2.35E-06	3.04E+03	Respiratory	4.82E-06	mg/m3	1.13E-11	1.47E-02	7.68E-06	mg/m3	1.80E-11	2.34E-02
		Manganese	NA	3.65E+02	Neurological	2.18E-04	mg/m3	NA	7.95E-02	1.96E-04	mg/m3	NA	7.16E-02
		Nickel	6.78E-08	2.03E+02	Respiratory	1.94E-05	mg/m3	1.31E-12	3.93E-03	8.82E-06	mg/m3	5.98E-13	1.79E-03
		Thallium	NA	NA	NA	1.57E-07	mg/m3	NA	NA	1.43E-07	mg/m3	NA	NA
		Vanadium	NA	1.83E+02	Respiratory	2.30E-05	mg/m3	NA	4.21E-03	3.03E-05	mg/m3	NA	5.54E-03
		PCBs											
		Total PCBs	1.49E-07	NA	NA	1.04E-04	mg/m3	1.55E-11	NA	3.23E-08	mg/m3	4.81E-15	NA
		SVOCs											
		Benzo(a)anthracene	1.57E-08	NA	NA	3.09E-06	mg/m3	4.84E-14	NA	5.19E-07	mg/m3	8.12E-15	NA
		Benzo(a)pyrene	1.57E-07	9.13E+03	Developmental	2.60E-06	mg/m3	4.08E-13	2.38E-02	4.56E-07	mg/m3	7.14E-14	4.17E-03
		Benzo(b)fluoranthene	1.57E-08	NA	NA	3.39E-06	mg/m3	5.30E-14	NA	6.12E-07	mg/m3	9.58E-15	NA
		Benzo(k)fluoranthene	1.57E-09	NA	NA	1.28E-06	mg/m3	2.00E-15	NA	1.75E-07	mg/m3	2.74E-16	NA
		Chrysene	1.57E-10	NA	NA	2.86E-06	mg/m3	4.47E-16	NA	5.44E-07	mg/m3	8.51E-17	NA
		Dibenzo(a,h)anthracene	1.57E-07	NA	NA	5.91E-07	mg/m3	9.25E-14	NA	1.02E-07	mg/m3	1.59E-14	NA
		Indeno(1,2,3-cd)pyrene	1.57E-08	NA	NA	1.92E-06	mg/m3	3.01E-14	NA	2.93E-07	mg/m3	4.59E-15	NA
		Naphthalene	8.87E-09	6.09E+00	Neurological and Respiratory	1.38E-07	mg/m3	1.22E-15	8.39E-07	9.98E-08	mg/m3	8.86E-16	6.08E-07
		TPH											
		Diesel Range Organics (C10-C20)	NA	1.83E-01	Respiratory	2.59E-05	mg/m3	NA	4.73E-06	9.83E-05	mg/m3	NA	1.80E-05
		Exposure Point Total						3.40E-11	1.32E-01			2.26E-11	1.11E-01
	Exposure Medium Total							3.40E-11	1.32E-01			2.26E-11	1.11E-01
Soil								7.23E-07	6.32E-01			1.09E-08	1.23E-01

Table H-2b-1. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Construction Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total: Unit Cancer Risk	Unit Risk/HQ - Exposure Routes Total: Unit Hazard Quotient	Primary Target Organ(s)	Transformer Shop: EPC Value	Transformer Shop: EPC Units	Transformer Shop: Cancer Risk (1)	Transformer Shop: Hazard Quotient (1)	Vehicle Refueling Area: EPC Value	Vehicle Refueling Area: EPC Units	Vehicle Refueling Area: Cancer Risk (1)	Vehicle Refueling Area: Hazard Quotient (1)
Groundwater	Trench Air	**VOCs**											
		Bromodichloromethane	2.41E-09	NA	NA	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Butyl alcohol, tert-	NA	2.28E-02	Reproductive	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Chloroform	1.50E-09	4.66E-02	Liver	3.31E-03	mg/m3	4.97E-12	1.54E-04	2.48E-02	mg/m3	3.73E-11	1.16E-03
		Methyl tert-Butyl Ether (MTBE)	1.70E-11	1.52E-03	Liver, Kidney, Ocular	ND	mg/m3	ND	ND	9.14E-03	mg/m3	1.55E-13	1.39E-05
		Tetrachloroethylene	1.70E-11	1.14E-01	Neurological, Ocular	1.29E-03	mg/m3	2.19E-14	1.48E-04	1.68E-03	mg/m3	2.85E-14	1.92E-04
		Trichloroethene	2.67E-10	2.28E+00	Thyroid Vascular	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Vinyl Chloride	2.87E-10	4.57E-02	Liver	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Exposure Point Total						4.99E-12	3.02E-04			3.74E-11	1.36E-03
	Exposure Medium Total							4.99E-12	3.02E-04			3.74E-11	1.36E-03
Groundwater								4.99E-12	3.02E-04			3.74E-11	1.36E-03
Receptor Total								7.23E-07	6.33E-01			1.10E-08	1.24E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not Applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.
(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-1. CTE and G-2a-1. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation: Organ	Transformer Shop: Endpoint HI	Vehicle Refueling Area: Endpoint HI
Blood	4.21E-04	1.60E-03
Decreased body and organ weights	1.57E-04	7.17E-05
Endocrine	--	--
Developmental	3.15E-02	8.72E-03
Hair	3.30E-03	3.31E-03
Immune	4.89E-01	1.52E-04
Kidney	4.21E-04	1.61E-03
Liver	5.75E-04	2.77E-03
Nails	4.89E-01	1.52E-04
Neurological	8.69E-02	7.73E-02
Ocular	4.89E-01	3.58E-04
Reproductive	--	--
Respiratory	2.28E-02	3.07E-02
Skin	1.78E-03	1.30E-03
Thyroid	2.61E-03	4.16E-03
Vascular	1.78E-03	1.30E-03

Table H-2a-2. CTE
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations - Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil		**Dioxin**									
			2,3,7,8-TCDD-TEQ	4.60E-03	--	1.17E-03	5.76E-03	Reproductive, Developmental	5.36E+02	--	1.36E+02	6.72E+02
			Inorganics									
			Arsenic	3.18E-08	--	1.35E-08	4.53E-08	Skin, Vascular	7.50E-04	--	3.17E-04	1.07E-03
			Cobalt	NA	--	NA	NA	Thyroid	1.25E-03	--	NA	1.25E-03
			Manganese	NA	--	NA	NA	Neurological	1.56E-05	--	NA	1.56E-05
			Nickel	NA	--	NA	NA	Decreased body and organ weights	1.88E-05	--	NA	1.88E-05
			Thallium	NA	--	NA	NA	Hair	3.75E-02	--	NA	3.75E-02
			Vanadium	NA	--	NA	NA	Hair	7.44E-05	--	NA	7.44E-05
			PCBs									
			Total PCBs	7.07E-08	--	8.38E-08	1.55E-07	Ocular/eye, Nails, Immune	1.88E-02	--	2.22E-02	4.10E-02
			SVOCs									
			Benzo(a)anthracene	3.54E-09	--	3.89E-09	7.43E-09	NA	NA	--	NA	NA
			Benzo(a)pyrene	3.54E-08	--	3.89E-08	7.43E-08	Developmental	1.25E-03	--	1.38E-03	2.63E-03
			Benzo(b)fluoranthene	3.54E-09	--	3.89E-09	7.43E-09	NA	NA	--	NA	NA
			Benzo(k)fluoranthene	3.54E-10	--	3.89E-10	7.43E-10	NA	NA	--	NA	NA
			Chrysene	3.54E-11	--	3.89E-11	7.43E-11	NA	NA	--	NA	NA
			Dibenzo(a,h)anthracene	3.54E-08	--	3.89E-08	7.43E-08	NA	NA	--	NA	NA
			Indeno(1,2,3-cd)pyrene	3.54E-09	--	3.89E-09	7.43E-09	NA	NA	--	NA	NA
			Naphthalene	NA	--	NA	NA	Developmental	1.88E-05	--	2.06E-05	3.94E-05
			TPH									
			Diesel Range Organics (C10-C20)	NA	--	NA	NA	Liver, Kidney, Blood	3.75E-05	--	NA	3.75E-05
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)

Table H-2a-2. CTE
Summary of Receptor Risks and Hazards for COPCs Based on Unit Concentrations - Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk - Based on Unit Concentration (1)				Non-Carcinogenic Hazard Quotient - Based on Unit Concentration (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Outdoor Air											
			Dioxin									
			2,3,7,8-TCDD-TEQ	--	7.17E-01	--	7.17E-01	Liver, reproductive, developmental, endocrine, respiratory, blood	--	5.00E+06	--	5.00E+06
			Inorganics									
			Arsenic	--	8.11E-05	--	8.11E-05	Neurological, developmental	--	1.33E+04	--	1.33E+04
			Cobalt	--	1.70E-04	--	1.70E-04	Respiratory	--	3.33E+04	--	3.33E+04
			Manganese	--	NA	--	NA	Neurological	--	4.00E+03	--	4.00E+03
			Nickel	--	4.90E-06	--	4.90E-06	Respiratory	--	2.22E+03	--	2.22E+03
			Thallium	--	NA	--	NA	NA	--	NA	--	NA
			Vanadium	--	NA	--	NA	Respiratory	--	2.00E+03	--	2.00E+03
			PCBs									
			Total PCBs	--	1.08E-05	--	1.08E-05	NA	--	NA	--	NA
			SVOCs									
			Benzo(a)anthracene	--	1.13E-06	--	1.13E-06	NA	--	NA	--	NA
			Benzo(a)pyrene	--	1.13E-05	--	1.13E-05	Developmental	--	1.00E+05	--	1.00E+05
			Benzo(b)fluoranthene	--	1.13E-06	--	1.13E-06	NA	--	NA	--	NA
			Benzo(k)fluoranthene	--	1.13E-07	--	1.13E-07	NA	--	NA	--	NA
			Chrysene	--	1.13E-08	--	1.13E-08	NA	--	NA	--	NA
			Dibenzo(a,h)anthracene	--	1.13E-05	--	1.13E-05	NA	--	NA	--	NA
			Indeno(1,2,3-cd)pyrene	--	1.13E-06	--	1.13E-06	NA	--	NA	--	NA
			Naphthalene	--	6.41E-07	--	6.41E-07	Neurological and Respiratory	--	6.67E+01	--	6.67E+01
			TPH									
			Diesel Range Organics (C10-C20)	--	NA	--	NA	Respiratory	--	2.00E+00	--	2.00E+00
		Exposure Point Total					(2)					(2)
	Exposure Medium Total						(2)					(2)
Surface Soil							(2)					(2)
Receptor Total							(2)					(2)

Notes:
ADAF - Age-Dependent Adjustment Factor.
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
(1) Due to the multiple soil areas, a unit soil concentration of 1 mg/kg and a unit air concentration of 1 mg/m3 is used to calculate a potential excess lifetime cancer risk (ELCR) and noncancer hazard quotient (HQ) based on a unit soil concentration. Potential ELCRs and HQs calculated based on a unit concentration will be adjusted based on the area-specific EPCs in a scaling table.
(2) Totals not provided here; potential risks and hazards are based on the unit concentration. Totals are provided in the scaling table.

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	5.76E-03	6.72E+02	Reproductive, Developmental	1.89E-06	mg/kg	1.09E-08	1.27E-03	1.51E-05	mg/kg	8.71E-08	1.02E-02
		Inorganics											
		Arsenic	4.53E-08	1.07E-03	Skin, Vascular	2.20E+00	mg/kg	9.96E-08	2.35E-03	1.83E+01	mg/kg	8.29E-07	1.95E-02
		Cobalt	NA	1.25E-03	Thyroid	1.11E+02	mg/kg	NA	1.39E-01	1.95E+01	mg/kg	NA	2.44E-02
		Manganese	NA	1.56E-05	Neurological	1.18E+02	mg/kg	NA	1.84E-03	3.99E+02	mg/kg	NA	6.23E-03
		Nickel	NA	1.88E-05	Decreased body and organ weights	1.04E+01	mg/kg	NA	1.94E-04	5.13E+02	mg/kg	NA	9.62E-03
		Thallium	NA	3.75E-02	Hair	ND	mg/kg	ND	ND	1.31E-01	mg/kg	NA	4.91E-03
		Vanadium	NA	7.44E-05	Hair	3.70E+01	mg/kg	NA	2.75E-03	2.24E+03	mg/kg	NA	1.67E-01
		PCBs											
		Total PCBs	1.55E-07	4.10E-02	Ocular/eye, Nails, Immune	4.42E-02	mg/kg	6.83E-09	1.81E-03	1.28E+00	mg/kg	1.97E-07	5.22E-02
		SVOCs											
		Benzo(a)anthracene	7.43E-09	NA	NA	1.37E-01	mg/kg	1.02E-09	NA	4.36E-01	mg/kg	3.24E-09	NA
		Benzo(a)pyrene	7.43E-08	2.63E-03	Developmental	1.55E-01	mg/kg	1.15E-08	4.07E-04	4.31E-01	mg/kg	3.20E-08	1.13E-03
		Benzo(b)fluoranthene	7.43E-09	NA	NA	1.65E-01	mg/kg	1.23E-09	NA	5.16E-01	mg/kg	3.83E-09	NA
		Benzo(k)fluoranthene	7.43E-10	NA	NA	6.80E-02	mg/kg	5.05E-11	NA	1.95E-01	mg/kg	1.45E-10	NA
		Chrysene	7.43E-11	NA	NA	1.53E-01	mg/kg	1.14E-11	NA	4.90E-01	mg/kg	3.64E-11	NA
		Dibenzo(a,h)anthracene	7.43E-08	NA	NA	3.23E-02	mg/kg	2.40E-09	NA	9.93E-02	mg/kg	7.37E-09	NA
		Indeno(1,2,3-cd)pyrene	7.43E-09	NA	NA	1.04E-01	mg/kg	7.72E-10	NA	3.19E-01	mg/kg	2.37E-09	NA
		Naphthalene	NA	3.94E-05	Developmental	1.22E-02	mg/kg	NA	4.80E-07	6.76E-02	mg/kg	NA	2.66E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.75E-05	Liver, Kidney, Blood	1.30E+01	mg/kg	NA	4.88E-04	9.62E+01	mg/kg	NA	3.61E-03
		Exposure Point Total						1.34E-07	1.50E-01			1.16E-06	2.98E-01
	Exposure Medium Total							1.34E-07	1.50E-01			1.16E-06	2.98E-01

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Hypothetical Future Park Land/Green Space				Warehouse and Laydown Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	7.17E-01	5.00E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	3.31E-15	mg/m3	2.37E-15	1.65E-08	2.64E-14	mg/m3	1.89E-14	1.32E-07
		Inorganics											
		Arsenic	8.11E-05	1.33E+04	Neurological, developmental	3.85E-09	mg/m3	3.12E-13	5.13E-05	3.20E-08	mg/m3	2.60E-12	4.27E-04
		Cobalt	1.70E-04	3.33E+04	Respiratory	1.94E-07	mg/m3	3.29E-11	6.47E-03	3.41E-08	mg/m3	5.79E-12	1.14E-03
		Manganese	NA	4.00E+03	Neurological	2.06E-07	mg/m3	NA	8.26E-04	6.98E-07	mg/m3	NA	2.79E-03
		Nickel	4.90E-06	2.22E+03	Respiratory	1.81E-08	mg/m3	8.88E-14	4.02E-05	8.97E-07	mg/m3	4.40E-12	1.99E-03
		Thallium	NA	NA	NA	ND	mg/m3	ND	ND	2.29E-10	mg/m3	NA	NA
		Vanadium	NA	2.00E+03	Respiratory	6.47E-08	mg/m3	NA	1.29E-04	3.92E-06	mg/m3	NA	7.84E-03
		PCBs											
		Total PCBs	1.08E-05	NA	NA	7.73E-11	mg/m3	8.33E-16	NA	2.23E-09	mg/m3	2.40E-14	NA
		SVOCs											
		Benzo(a)anthracene	1.13E-06	NA	NA	2.40E-10	mg/m3	2.71E-16	NA	7.63E-10	mg/m3	8.63E-16	NA
		Benzo(a)pyrene	1.13E-05	1.00E+05	Developmental	2.71E-10	mg/m3	3.07E-15	2.71E-05	7.54E-10	mg/m3	8.53E-15	7.54E-05
		Benzo(b)fluoranthene	1.13E-06	NA	NA	2.89E-10	mg/m3	3.27E-16	NA	9.02E-10	mg/m3	1.02E-15	NA
		Benzo(k)fluoranthene	1.13E-07	NA	NA	1.19E-10	mg/m3	1.35E-17	NA	3.41E-10	mg/m3	3.86E-17	NA
		Chrysene	1.13E-08	NA	NA	2.68E-10	mg/m3	3.03E-18	NA	8.57E-10	mg/m3	9.70E-18	NA
		Dibenzo(a,h)anthracene	1.13E-05	NA	NA	5.65E-11	mg/m3	6.39E-16	NA	1.74E-10	mg/m3	1.97E-15	NA
		Indeno(1,2,3-cd)pyrene	1.13E-06	NA	NA	1.82E-10	mg/m3	2.06E-16	NA	5.58E-10	mg/m3	6.31E-16	NA
		Naphthalene	6.41E-07	6.67E+01	Neurological and Respiratory	2.13E-11	mg/m3	1.37E-17	1.42E-09	1.18E-10	mg/m3	7.58E-17	7.88E-09
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.00E+00	Respiratory	2.27E-08	mg/m3	NA	4.55E-08	1.68E-07	mg/m3	NA	3.36E-07
		Exposure Point Total						3.34E-11	7.55E-03			1.28E-11	1.43E-02
	Exposure Medium Total							3.34E-11	7.55E-03			1.28E-11	1.43E-02
Surface Soil								1.34E-07	1.57E-01			1.16E-06	3.13E-01
Receptor Total								1.34E-07	1.57E-01			1.16E-06	3.13E-01

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. CTE and G-2a-2. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation		**Target Endpoint Evaluation**	
Organ	**Endpoint HI**	**Organ**	**Endpoint HI**
Blood	4.88E-04	Blood	3.61E-03
Decreased body and organ weights	1.94E-04	Decreased body and organ weights	9.62E-03
Developmental	1.76E-03	Developmental	1.18E-02
Endocrine	1.65E-08	Endocrine	1.32E-07
Eye	1.81E-03	Eye	5.22E-02
Hair	2.75E-03	Hair	1.72E-01
Immune	1.81E-03	Immune	5.22E-02
Kidney	4.88E-04	Kidney	3.61E-03
Liver	4.88E-04	Liver	3.61E-03
Nails	1.81E-03	Nails	5.22E-02
Neurological	2.72E-03	Neurological	9.45E-03
Reproductive	1.27E-03	Reproductive	1.02E-02
Respiratory	6.64E-03	Respiratory	1.10E-02
Skin	2.35E-03	Skin	1.95E-02
Thyroid	1.39E-01	Thyroid	2.44E-02
Vascular	2.35E-03	Vascular	1.95E-02

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	5.76E-03	6.72E+02	Reproductive, Developmental	6.10E-05	mg/kg	3.52E-07	4.10E-02	6.19E-06	mg/kg	3.57E-08	4.16E-03
		Inorganics											
		Arsenic	4.53E-08	1.07E-03	Skin, Vascular	1.14E+01	mg/kg	5.15E-07	1.21E-02	5.25E+00	mg/kg	2.38E-07	5.60E-03
		Cobalt	NA	1.25E-03	Thyroid	1.03E+01	mg/kg	NA	1.29E-02	4.48E+00	mg/kg	NA	5.59E-03
		Manganese	NA	1.56E-05	Neurological	2.77E+02	mg/kg	NA	4.32E-03	1.18E+02	mg/kg	NA	1.84E-03
		Nickel	NA	1.88E-05	Decreased body and organ weights	1.69E+01	mg/kg	NA	3.17E-04	1.13E+01	mg/kg	NA	2.12E-04
		Thallium	NA	3.75E-02	Hair	1.80E-01	mg/kg	NA	6.75E-03	1.03E-01	mg/kg	NA	3.86E-03
		Vanadium	NA	7.44E-05	Hair	2.47E+01	mg/kg	NA	1.84E-03	2.08E+01	mg/kg	NA	1.54E-03
		PCBs											
		Total PCBs	1.55E-07	4.10E-02	Ocular/eye, Nails, Immune	1.14E+00	mg/kg	1.77E-07	4.69E-02	6.80E-01	mg/kg	1.05E-07	2.79E-02
		SVOCs											
		Benzo(a)anthracene	7.43E-09	NA	NA	8.21E-01	mg/kg	6.10E-09	NA	2.42E-01	mg/kg	1.80E-09	NA
		Benzo(a)pyrene	7.43E-08	2.63E-03	Developmental	7.80E-01	mg/kg	5.79E-08	2.05E-03	2.49E-01	mg/kg	1.85E-08	6.54E-04
		Benzo(b)fluoranthene	7.43E-09	NA	NA	1.17E+00	mg/kg	8.67E-09	NA	3.24E-01	mg/kg	2.41E-09	NA
		Benzo(k)fluoranthene	7.43E-10	NA	NA	3.57E-01	mg/kg	2.65E-10	NA	1.32E-01	mg/kg	9.80E-11	NA
		Chrysene	7.43E-11	NA	NA	8.58E-01	mg/kg	6.37E-11	NA	3.02E-01	mg/kg	2.24E-11	NA
		Dibenzo(a,h)anthracene	7.43E-08	NA	NA	1.42E-01	mg/kg	1.05E-08	NA	5.68E-02	mg/kg	4.22E-09	NA
		Indeno(1,2,3-cd)pyrene	7.43E-09	NA	NA	5.90E-01	mg/kg	4.38E-09	NA	1.92E-01	mg/kg	1.43E-09	NA
		Naphthalene	NA	3.94E-05	Developmental	1.12E-01	mg/kg	NA	4.41E-06	2.78E-02	mg/kg	NA	1.09E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.75E-05	Liver, Kidney, Blood	1.30E+03	mg/kg	NA	4.87E-02	3.98E+01	mg/kg	NA	1.49E-03
		Exposure Point Total						1.13E-06	1.77E-01			4.07E-07	5.28E-02
	Exposure Medium Total							1.13E-06	1.77E-01			4.07E-07	5.28E-02

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Salvage Yard and Waste Storage Area				Stores and Fleet Maintenance Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	7.17E-01	5.00E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	1.07E-13	mg/m3	7.65E-14	5.33E-07	1.08E-14	mg/m3	7.76E-15	5.42E-08
		Inorganics											
		Arsenic	8.11E-05	1.33E+04	Neurological, developmental	1.99E-08	mg/m3	1.61E-12	2.65E-04	9.18E-09	mg/m3	7.45E-13	1.22E-04
		Cobalt	1.70E-04	3.33E+04	Respiratory	1.81E-08	mg/m3	3.07E-12	6.02E-04	7.83E-09	mg/m3	1.33E-12	2.61E-04
		Manganese	NA	4.00E+03	Neurological	4.84E-07	mg/m3	NA	1.94E-03	2.06E-07	mg/m3	NA	8.25E-04
		Nickel	4.90E-06	2.22E+03	Respiratory	2.96E-08	mg/m3	1.45E-13	6.58E-05	1.98E-08	mg/m3	9.72E-14	4.40E-05
		Thallium	NA	NA	NA	3.15E-10	mg/m3	NA	NA	1.80E-10	mg/m3	NA	NA
		Vanadium	NA	2.00E+03	Respiratory	4.31E-08	mg/m3	NA	8.63E-05	3.63E-08	mg/m3	NA	7.26E-05
		PCBs											
		Total PCBs	1.08E-05	NA	NA	2.00E-09	mg/m3	2.16E-14	NA	1.19E-09	mg/m3	1.28E-14	NA
		SVOCs											
		Benzo(a)anthracene	1.13E-06	NA	NA	1.44E-09	mg/m3	1.62E-15	NA	4.23E-10	mg/m3	4.79E-16	NA
		Benzo(a)pyrene	1.13E-05	1.00E+05	Developmental	1.36E-09	mg/m3	1.54E-14	1.36E-04	4.36E-10	mg/m3	4.93E-15	4.36E-05
		Benzo(b)fluoranthene	1.13E-06	NA	NA	2.04E-09	mg/m3	2.31E-15	NA	5.67E-10	mg/m3	6.41E-16	NA
		Benzo(k)fluoranthene	1.13E-07	NA	NA	6.24E-10	mg/m3	7.06E-17	NA	2.31E-10	mg/m3	2.61E-17	NA
		Chrysene	1.13E-08	NA	NA	1.50E-09	mg/m3	1.70E-17	NA	5.28E-10	mg/m3	5.98E-18	NA
		Dibenzo(a,h)anthracene	1.13E-05	NA	NA	2.48E-10	mg/m3	2.81E-15	NA	9.93E-11	mg/m3	1.12E-15	NA
		Indeno(1,2,3-cd)pyrene	1.13E-06	NA	NA	1.03E-09	mg/m3	1.17E-15	NA	3.36E-10	mg/m3	3.80E-16	NA
		Naphthalene	6.41E-07	6.67E+01	Neurological and Respiratory	1.96E-10	mg/m3	1.26E-16	1.31E-08	4.86E-11	mg/m3	3.12E-17	3.24E-09
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.00E+00	Respiratory	2.27E-06	mg/m3	NA	4.54E-06	6.96E-08	mg/m3	NA	1.39E-07
		Exposure Point Total						4.95E-12	3.10E-03			2.20E-12	1.37E-03
	Exposure Medium Total							4.95E-12	3.10E-03			2.20E-12	1.37E-03
Surface Soil								1.13E-06	1.80E-01			4.07E-07	5.42E-02
Receptor Total								1.13E-06	1.80E-01			4.07E-07	5.42E-02

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. CTE and G-2a-2. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation (Salvage Yard and Waste Storage Area) Organ	Endpoint HI	Target Endpoint Evaluation (Stores and Fleet Maintenance Area) Organ	Endpoint HI
Blood	4.87E-02	Blood	1.49E-03
Decreased body and organ weights	3.17E-04	Decreased body and organ weights	2.12E-04
Developmental	4.34E-02	Developmental	4.98E-03
Endocrine	5.33E-07	Endocrine	5.42E-08
Eye	4.69E-02	Eye	2.79E-02
Hair	8.59E-03	Hair	5.41E-03
Immune	4.69E-02	Immune	2.79E-02
Kidney	4.87E-02	Kidney	1.49E-03
Liver	4.87E-02	Liver	1.49E-03
Nails	4.69E-02	Nails	2.79E-02
Neurological	6.52E-03	Neurological	2.79E-03
Reproductive	4.10E-02	Reproductive	4.16E-03
Respiratory	7.59E-04	Respiratory	3.78E-04
Skin	1.21E-02	Skin	5.60E-03
Thyroid	1.29E-02	Thyroid	5.59E-03
Vascular	1.21E-02	Vascular	5.60E-03

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	5.76E-03	6.72E+02	Reproductive, Developmental	9.63E-06	mg/kg	5.55E-08	6.47E-03	4.37E-06	mg/kg	2.52E-08	2.94E-03
		Inorganics											
		Arsenic	4.53E-08	1.07E-03	Skin, Vascular	2.97E+00	mg/kg	1.34E-07	3.17E-03	1.00E+01	mg/kg	4.53E-07	1.07E-02
		Cobalt	NA	1.25E-03	Thyroid	6.87E+00	mg/kg	NA	8.58E-03	4.03E+00	mg/kg	NA	5.03E-03
		Manganese	NA	1.56E-05	Neurological	1.87E+02	mg/kg	NA	2.92E-03	1.98E+02	mg/kg	NA	3.09E-03
		Nickel	NA	1.88E-05	Decreased body and organ weights	2.27E+01	mg/kg	NA	4.25E-04	1.04E+01	mg/kg	NA	1.95E-04
		Thallium	NA	3.75E-02	Hair	ND	mg/kg	ND	ND	1.38E-01	mg/kg	NA	5.18E-03
		Vanadium	NA	7.44E-05	Hair	1.93E+01	mg/kg	NA	1.44E-03	1.46E+01	mg/kg	NA	1.09E-03
		PCBs											
		Total PCBs	1.55E-07	4.10E-02	Ocular/eye, Nails, Immune	2.34E-01	mg/kg	3.62E-08	9.59E-03	4.62E-01	mg/kg	7.14E-08	1.89E-02
		SVOCs											
		Benzo(a)anthracene	7.43E-09	NA	NA	1.24E+00	mg/kg	9.18E-09	NA	4.01E-01	mg/kg	2.98E-09	NA
		Benzo(a)pyrene	7.43E-08	2.63E-03	Developmental	1.11E+00	mg/kg	8.21E-08	2.90E-03	3.17E-01	mg/kg	2.35E-08	8.32E-04
		Benzo(b)fluoranthene	7.43E-09	NA	NA	1.33E+00	mg/kg	9.88E-09	NA	7.13E-01	mg/kg	5.30E-09	NA
		Benzo(k)fluoranthene	7.43E-10	NA	NA	5.25E-01	mg/kg	3.90E-10	NA	3.65E-01	mg/kg	2.71E-10	NA
		Chrysene	7.43E-11	NA	NA	1.17E+00	mg/kg	8.66E-11	NA	7.10E-01	mg/kg	5.27E-11	NA
		Dibenzo(a,h)anthracene	7.43E-08	NA	NA	2.47E-01	mg/kg	1.83E-08	NA	9.44E-02	mg/kg	7.01E-09	NA
		Indeno(1,2,3-cd)pyrene	7.43E-09	NA	NA	7.78E-01	mg/kg	5.78E-09	NA	2.95E-01	mg/kg	2.19E-09	NA
		Naphthalene	NA	3.94E-05	Developmental	3.93E-02	mg/kg	NA	1.55E-06	2.70E-02	mg/kg	NA	1.06E-06
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.75E-05	Liver, Kidney, Blood	ND	mg/kg	ND	ND	1.90E+01	mg/kg	NA	7.13E-04
		Exposure Point Total						3.52E-07	3.55E-02			5.91E-07	4.87E-02
	Exposure Medium Total							3.52E-07	3.55E-02			5.91E-07	4.87E-02

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Offices and Parking Lot				Substation #7			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	7.17E-01	5.00E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	1.68E-14	mg/m3	1.21E-14	8.42E-08	7.64E-15	mg/m3	5.48E-15	3.82E-08
		Inorganics											
		Arsenic	8.11E-05	1.33E+04	Neurological, developmental	5.19E-09	mg/m3	4.21E-13	6.92E-05	1.75E-08	mg/m3	1.42E-12	2.33E-04
		Cobalt	1.70E-04	3.33E+04	Respiratory	1.20E-08	mg/m3	2.04E-12	4.00E-04	7.04E-09	mg/m3	1.19E-12	2.35E-04
		Manganese	NA	4.00E+03	Neurological	3.27E-07	mg/m3	NA	1.31E-03	3.45E-07	mg/m3	NA	1.38E-03
		Nickel	4.90E-06	2.22E+03	Respiratory	3.97E-08	mg/m3	1.94E-13	8.81E-05	1.82E-08	mg/m3	8.92E-14	4.04E-05
		Thallium	NA	NA	NA	ND	mg/m3	ND	ND	2.41E-10	mg/m3	NA	NA
		Vanadium	NA	2.00E+03	Respiratory	3.38E-08	mg/m3	NA	6.76E-05	2.55E-08	mg/m3	NA	5.11E-05
		PCBs											
		Total PCBs	1.08E-05	NA	NA	4.09E-10	mg/m3	4.41E-15	NA	8.08E-10	mg/m3	8.71E-15	NA
		SVOCs											
		Benzo(a)anthracene	1.13E-06	NA	NA	2.16E-09	mg/m3	2.45E-15	NA	7.01E-10	mg/m3	7.94E-16	NA
		Benzo(a)pyrene	1.13E-05	1.00E+05	Developmental	1.93E-09	mg/m3	2.19E-14	1.93E-04	5.54E-10	mg/m3	6.27E-15	5.54E-05
		Benzo(b)fluoranthene	1.13E-06	NA	NA	2.33E-09	mg/m3	2.63E-15	NA	1.25E-09	mg/m3	1.41E-15	NA
		Benzo(k)fluoranthene	1.13E-07	NA	NA	9.18E-10	mg/m3	1.04E-16	NA	6.38E-10	mg/m3	7.22E-17	NA
		Chrysene	1.13E-08	NA	NA	2.04E-09	mg/m3	2.31E-17	NA	1.24E-09	mg/m3	1.41E-17	NA
		Dibenzo(a,h)anthracene	1.13E-05	NA	NA	4.32E-10	mg/m3	4.89E-15	NA	1.65E-10	mg/m3	1.87E-15	NA
		Indeno(1,2,3-cd)pyrene	1.13E-06	NA	NA	1.36E-09	mg/m3	1.54E-15	NA	5.16E-10	mg/m3	5.84E-16	NA
		Naphthalene	6.41E-07	6.67E+01	Neurological and Respiratory	6.87E-11	mg/m3	4.41E-17	4.58E-09	4.72E-11	mg/m3	3.03E-17	3.15E-09
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.00E+00	Respiratory	ND	mg/m3	ND	ND	3.32E-08	mg/m3	NA	6.65E-08
		Exposure Point Total						2.70E-12	2.12E-03			2.73E-12	2.00E-03
	Exposure Medium Total							2.70E-12	2.12E-03			2.73E-12	2.00E-03
Surface Soil								3.52E-07	3.76E-02			5.91E-07	5.07E-02
Receptor Total								3.52E-07	3.76E-02			5.91E-07	5.07E-02

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. CTE and G-2a-2. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation (Offices and Parking Lot) Organ	Endpoint HI	Target Endpoint Evaluation (Substation #7) Organ	Endpoint HI
Blood	8.42E-08	Blood	7.13E-04
Decreased body and organ weights	4.25E-04	Decreased body and organ weights	1.95E-04
Developmental	9.63E-03	Developmental	4.06E-03
Endocrine	8.42E-08	Endocrine	3.82E-08
Eye	9.59E-03	Eye	1.89E-02
Hair	1.44E-03	Hair	6.26E-03
Immune	9.59E-03	Immune	1.89E-02
Kidney	--	Kidney	7.13E-04
Liver	8.42E-08	Liver	7.13E-04
Nails	9.59E-03	Nails	1.89E-02
Neurological	4.29E-03	Neurological	4.70E-03
Reproductive	6.47E-03	Reproductive	2.94E-03
Respiratory	5.56E-04	Respiratory	3.26E-04
Skin	3.17E-03	Skin	1.07E-02
Thyroid	8.58E-03	Thyroid	5.03E-03
Vascular	3.17E-03	Vascular	1.07E-02

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total		Primary Target Organ(s)	Transformer Shop				Vehicle Refueling Area			
			Unit Cancer Risk	Unit Hazard Quotient		EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)	EPC Value	EPC Units	Cancer Risk (1)	Hazard Quotient (1)
Surface Soil	Surface Soil												
		Dioxin											
		2,3,7,8-TCDD-TEQ	5.76E-03	6.72E+02	Reproductive, Developmental	ND	mg/kg	ND	ND	ND	mg/kg	ND	ND
		Inorganics											
		Arsenic	4.53E-08	1.07E-03	Skin, Vascular	1.70E+00	mg/kg	7.70E-08	1.81E-03	ND	mg/kg	ND	ND
		Cobalt	NA	1.25E-03	Thyroid	2.70E+00	mg/kg	NA	3.38E-03	ND	mg/kg	ND	ND
		Manganese	NA	1.56E-05	Neurological	2.60E+02	mg/kg	NA	4.06E-03	ND	mg/kg	ND	ND
		Nickel	NA	1.88E-05	Decreased body and organ weights	1.60E+01	mg/kg	NA	3.00E-04	ND	mg/kg	ND	ND
		Thallium	NA	3.75E-02	Hair	ND	mg/kg	ND	ND	ND	mg/kg	ND	ND
		Vanadium	NA	7.44E-05	Hair	9.70E+00	mg/kg	NA	7.22E-04	ND	mg/kg	ND	ND
		PCBs											
		Total PCBs	1.55E-07	4.10E-02	Ocular/eye, Nails, Immune	1.89E+02	mg/kg	2.92E-05	7.76E+00	7.40E-02	mg/kg	1.14E-08	3.03E-03
		SVOCs											
		Benzo(a)anthracene	7.43E-09	NA	NA	3.24E-01	mg/kg	2.41E-09	NA	1.75E+00	mg/kg	1.30E-08	NA
		Benzo(a)pyrene	7.43E-08	2.63E-03	Developmental	2.86E-01	mg/kg	2.12E-08	7.51E-04	8.85E-01	mg/kg	6.57E-08	2.32E-03
		Benzo(b)fluoranthene	7.43E-09	NA	NA	3.80E-01	mg/kg	2.82E-09	NA	1.48E+00	mg/kg	1.10E-08	NA
		Benzo(k)fluoranthene	7.43E-10	NA	NA	1.42E-01	mg/kg	1.05E-10	NA	4.60E-01	mg/kg	3.42E-10	NA
		Chrysene	7.43E-11	NA	NA	3.23E-01	mg/kg	2.40E-11	NA	1.71E+00	mg/kg	1.27E-10	NA
		Dibenzo(a,h)anthracene	7.43E-08	NA	NA	7.51E-02	mg/kg	5.58E-09	NA	2.15E-01	mg/kg	1.60E-08	NA
		Indeno(1,2,3-cd)pyrene	7.43E-09	NA	NA	2.41E-01	mg/kg	1.79E-09	NA	5.55E-01	mg/kg	4.12E-09	NA
		Naphthalene	NA	3.94E-05	Developmental	1.70E-02	mg/kg	NA	6.70E-07	3.43E-01	mg/kg	NA	1.35E-05
		TPH											
		Diesel Range Organics (C10-C20)	NA	3.75E-05	Liver, Kidney, Blood	8.00E+01	mg/kg	NA	3.00E-03	3.80E+02	mg/kg	NA	1.43E-02
		Exposure Point Total						2.94E-05	7.77E+00			1.22E-07	1.96E-02
	Exposure Medium Total							2.94E-05	7.77E+00			1.22E-07	1.96E-02

Table H-2b-2. CTE
Summary of Receptor Risks and Hazards for COPCs - Future Outdoor Industrial Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Outdoor Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Chemical of Potential Concern	Unit Risk/HQ - Exposure Routes Total: Unit Cancer Risk	Unit Risk/HQ - Exposure Routes Total: Unit Hazard Quotient	Primary Target Organ(s)	Transformer Shop: EPC Value	Transformer Shop: EPC Units	Transformer Shop: Cancer Risk (1)	Transformer Shop: Hazard Quotient (1)	Vehicle Refueling Area: EPC Value	Vehicle Refueling Area: EPC Units	Vehicle Refueling Area: Cancer Risk (1)	Vehicle Refueling Area: Hazard Quotient (1)
Surface Soil	Outdoor Air												
		Dioxin											
		2,3,7,8-TCDD-TEQ	7.17E-01	5.00E+06	Liver, reproductive, developmental, endocrine, respiratory, blood	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Inorganics											
		Arsenic	8.11E-05	1.33E+04	Neurological, developmental	2.97E-09	mg/m3	2.41E-13	3.96E-05	ND	mg/m3	ND	ND
		Cobalt	1.70E-04	3.33E+04	Respiratory	4.72E-09	mg/m3	8.01E-13	1.57E-04	ND	mg/m3	ND	ND
		Manganese	NA	4.00E+03	Neurological	4.55E-07	mg/m3	NA	1.82E-03	ND	mg/m3	ND	ND
		Nickel	4.90E-06	2.22E+03	Respiratory	2.80E-08	mg/m3	1.37E-13	6.22E-05	ND	mg/m3	ND	ND
		Thallium	NA	NA	NA	ND	mg/m3	ND	ND	ND	mg/m3	ND	ND
		Vanadium	NA	2.00E+03	Respiratory	1.70E-08	mg/m3	NA	3.39E-05	ND	mg/m3	ND	ND
		PCBs											
		Total PCBs	1.08E-05	NA	NA	3.31E-07	mg/m3	3.57E-12	NA	1.29E-10	mg/m3	1.39E-15	NA
		SVOCs											
		Benzo(a)anthracene	1.13E-06	NA	NA	5.67E-10	mg/m3	6.41E-16	NA	3.07E-09	mg/m3	3.47E-15	NA
		Benzo(a)pyrene	1.13E-05	1.00E+05	Developmental	5.00E-10	mg/m3	5.66E-15	5.00E-05	1.55E-09	mg/m3	1.75E-14	1.55E-04
		Benzo(b)fluoranthene	1.13E-06	NA	NA	6.65E-10	mg/m3	7.52E-16	NA	2.58E-09	mg/m3	2.92E-15	NA
		Benzo(k)fluoranthene	1.13E-07	NA	NA	2.48E-10	mg/m3	2.81E-17	NA	8.05E-10	mg/m3	9.10E-17	NA
		Chrysene	1.13E-08	NA	NA	5.65E-10	mg/m3	6.39E-18	NA	2.99E-09	mg/m3	3.38E-17	NA
		Dibenzo(a,h)anthracene	1.13E-05	NA	NA	1.31E-10	mg/m3	1.49E-15	NA	3.76E-10	mg/m3	4.25E-15	NA
		Indeno(1,2,3-cd)pyrene	1.13E-06	NA	NA	4.22E-10	mg/m3	4.77E-16	NA	9.71E-10	mg/m3	1.10E-15	NA
		Naphthalene	6.41E-07	6.67E+01	Neurological and Respiratory	2.97E-11	mg/m3	1.91E-17	1.98E-09	6.00E-10	mg/m3	3.85E-16	4.00E-08
		TPH											
		Diesel Range Organics (C10-C20)	NA	2.00E+00	Respiratory	1.40E-07	mg/m3	NA	2.80E-07	6.65E-07	mg/m3	NA	1.33E-06
		Exposure Point Total						4.76E-12	2.16E-03			3.12E-14	1.56E-04
	Exposure Medium Total							4.76E-12	2.16E-03			3.12E-14	1.56E-04
Surface Soil								2.94E-05	7.77E+00			1.22E-07	1.98E-02
Receptor Total								2.94E-05	7.77E+00			1.22E-07	1.98E-02

Notes:
EPC - Exposure Point Concentration.
NA - Not applicable; no dose-response value.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.
VOC - Volatile Organic Compound.

(1) The potential carcinogenic risk and noncarcinogenic hazard quotients are calculated per exposure area by multiplying the soil or air EPCs associated with each EA by the unit risks and hazard quotients calculated in the Tables G-1-2. CTE and G-2a-2. CTE based on a unit soil or air concentration.

Target Endpoint Evaluation (Transformer Shop): Organ	Endpoint HI	Target Endpoint Evaluation (Vehicle Refueling Area): Organ	Endpoint HI
Blood	3.00E-03	Blood	1.43E-02
Decreased body and organ weights	3.00E-04	Decreased body and organ weights	--
Developmental	8.41E-04	Developmental	2.49E-03
Endocrine	--	Endocrine	--
Eye	7.76E+00	Eye	3.03E-03
Hair	7.22E-04	Hair	--
Immune	7.76E+00	Immune	3.03E-03
Kidney	3.00E-03	Kidney	1.43E-02
Liver	3.00E-03	Liver	1.43E-02
Nails	7.76E+00	Nails	3.03E-03
Neurological	5.92E-03	Neurological	4.00E-08
Reproductive	--	Reproductive	--
Respiratory	2.54E-04	Respiratory	1.37E-06
Skin	1.81E-03	Skin	--
Thyroid	3.38E-03	Thyroid	--
Vascular	1.81E-03	Vascular	--

Table H-2-3. CTE
Summary of Receptor Risks and Hazards for COPCs - Recreational Visitor
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Hypothetical Future Park Land/Green Space	**Dioxin**									
			2,3,7,8-TCDD-TEQ	5.17E-10	--	2.45E-11	5.42E-10	Reproductive, Developmental	6.63E-05	--	3.14E-06	6.94E-05
			Inorganics									
			Arsenic	4.17E-09	--	3.29E-10	4.50E-09	Skin, Vascular	1.08E-04	--	8.53E-06	1.17E-04
			Cobalt	NA	--	NA	NA	Thyroid	9.09E-03	--	NA	9.09E-03
			Manganese	NA	--	NA	NA	Neurological	1.21E-04	--	NA	1.21E-04
			Nickel	NA	--	NA	NA	Decreased body and organ weights	1.27E-05	--	NA	1.27E-05
			Thallium	ND	--	ND	ND	Hair	ND	--	ND	ND
			Vanadium	NA	--	NA	NA	Hair	1.80E-04	--	NA	1.80E-04
			PCBs									
			Total PCBs	1.86E-10	--	4.11E-11	2.27E-10	Ocular/eye, Nails, Immune	5.43E-05	--	1.20E-05	6.63E-05
			SVOCs									
			Benzo(a)anthracene	7.21E-11	--	1.48E-11	8.69E-11	NA	NA	--	NA	NA
			Benzo(a)pyrene	8.16E-10	--	1.67E-10	9.83E-10	Developmental	1.27E-05	--	2.61E-06	1.53E-05
			Benzo(b)fluoranthene	8.68E-11	--	1.78E-11	1.05E-10	NA	NA	--	NA	NA
			Benzo(k)fluoranthene	3.58E-12	--	7.35E-13	4.31E-12	NA	NA	--	NA	NA
			Chrysene	8.05E-13	--	1.65E-13	9.70E-13	NA	NA	--	NA	NA
			Dibenzo(a,h)anthracene	1.70E-10	--	3.49E-11	2.05E-10	NA	NA	--	NA	NA
			Indeno(1,2,3-cd)pyrene	5.47E-11	--	1.12E-11	6.60E-11	NA	NA	--	NA	NA
			Naphthalene	NA	--	NA	NA	Developmental	1.50E-08	--	3.08E-09	1.81E-08
			TPH									
			Diesel Range Organics (C10-C20)	NA	--	NA	NA	Liver, Kidney, Blood	3.19E-05	--	NA	3.19E-05
		Exposure Point Total					6.72E-09					9.70E-03
	Exposure Medium Total						6.72E-09					9.70E-03

Table H-2-3. CTE
Summary of Receptor Risks and Hazards for COPCs - Recreational Visitor
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Future
Receptor Population: Recreational Visitor
Receptor Age: Older Child/Teen (7 to <19 years)

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Outdoor Air	Hypothetical Future Park Land/Green Space										
			Dioxin									
			2,3,7,8-TCDD-TEQ	--	2.34E-17	--	2.34E-17	Liver, reproductive, developmental, endocrine, respiratory, blood	--	1.79E-10	--	1.79E-10
			Inorganics									
			Arsenic	--	3.08E-15	--	3.08E-15	Neurological, developmental	--	5.56E-07	--	5.56E-07
			Cobalt	--	3.25E-13	--	3.25E-13	Respiratory	--	7.02E-05	--	7.02E-05
			Manganese	--	NA	--	NA	Neurological	--	8.95E-06	--	8.95E-06
			Nickel	--	8.75E-16	--	8.75E-16	Respiratory	--	4.36E-07	--	4.36E-07
			Thallium	--	ND	--	ND	NA	--	ND	--	ND
			Vanadium	--	NA	--	NA	Respiratory	--	1.40E-06	--	1.40E-06
			PCBs									
			Total PCBs	--	8.21E-18	--	8.21E-18	NA	--	NA	--	NA
			SVOCs									
			Benzo(a)anthracene	--	6.68E-18	--	6.68E-18	NA	--	NA	--	NA
			Benzo(a)pyrene	--	7.56E-17	--	7.56E-17	Developmental	--	2.94E-07	--	2.94E-07
			Benzo(b)fluoranthene	--	8.05E-18	--	8.05E-18	NA	--	NA	--	NA
			Benzo(k)fluoranthene	--	3.32E-19	--	3.32E-19	NA	--	NA	--	NA
			Chrysene	--	7.46E-20	--	7.46E-20	NA	--	NA	--	NA
			Dibenzo(a,h)anthracene	--	1.58E-17	--	1.58E-17	NA	--	NA	--	NA
			Indeno(1,2,3-cd)pyrene	--	5.07E-18	--	5.07E-18	NA	--	NA	--	NA
			Naphthalene	--	1.35E-19	--	1.35E-19	Neurological and Respiratory	--	1.54E-11	--	1.54E-11
			TPH									
			Diesel Range Organics (C10-C20)	--	NA	--	NA	Respiratory	--	4.93E-10	--	4.93E-10
		Exposure Point Total					3.29E-13					8.18E-05
	Exposure Medium Total						3.29E-13					8.18E-05
Surface Soil							6.72E-09					9.78E-03
Receptor Total							6.72E-09					9.78E-03

Notes:
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
NA - Not applicable/no dose-response value.
ND - Not Detected in this area.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-TCDD Toxicity Equivalence.

Target Organ	Target Organ Hazard Index			
	Chemical (ing/dermal)	**Chemical (inhalation)**	**Surface Soil**	**Total**
Blood	DRO	TCDD-TEQ	3.19E-05	3.19E-05
Decreased body and organ weights	Nickel	--	1.27E-05	1.27E-05
Developmental	TCDD-TEQ, BaP, Naphthalene	TCDD-TEQ, Arsenic, Benzo(a)pyrene	8.56E-05	8.56E-05
Endocrine	--	TCDD-TEQ	1.79E-10	1.79E-10
Eye	Total PCBs	--	6.63E-05	6.63E-05
Hair	Thallium, Vanadium	--	1.80E-04	1.80E-04
Immune	Total PCBs	--	6.63E-05	6.63E-05
Kidney	DRO	--	3.19E-05	3.19E-05
Liver	DRO	TCDD-TEQ	3.19E-05	3.19E-05
Nails	Total PCBs	--	6.63E-05	6.63E-05
Nervous System	--	--	--	--
Reproductive	TCDD-TEQ	TCDD-TEQ	6.94E-05	6.94E-05
Respiratory	--	Cobalt, DRO, Nickel, Vanadium,	7.20E-05	7.20E-05
Skin	Arsenic	--	1.17E-04	1.17E-04
Thyroid	Cobalt	--	9.09E-03	9.09E-03
Vascular	Arsenic	--	1.17E-04	1.17E-04

Table H-2-4. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.50E-08	2.05E-08	3.55E-08	Reproductive, Developmental	1.15E-03	1.58E-03	2.73E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	8.98E-05	NA	8.98E-05
			Antimony	NA	NA	NA	Mortality, Blood	5.37E-05	NA	5.37E-05
			Arsenic	7.95E-09	1.81E-08	2.61E-08	Skin, Vascular	1.24E-04	2.82E-04	4.06E-04
			Cobalt	NA	NA	NA	Thyroid	5.60E-04	NA	5.60E-04
			Cyanide	NA	NA	NA	Reproductive	1.55E-05	NA	1.55E-05
			Manganese	NA	NA	NA	Neurological	9.73E-05	NA	9.73E-05
			Nickel	NA	NA	NA	Decreased body and organ weights	2.82E-05	NA	2.82E-05
			Thallium	NA	NA	NA	Hair	2.34E-04	NA	2.34E-04
			Vanadium	NA	NA	NA	Hair	1.92E-04	NA	1.92E-04
			PCBs							
			Total PCBs	1.42E-09	9.07E-09	1.05E-08	Ocular/eye, Nails, Immune	2.49E-04	1.59E-03	1.84E-03
			SVOCs							
			Benzo(a)anthracene	9.37E-11	5.56E-10	6.49E-10	NA	NA	NA	NA
			Benzo(a)pyrene	1.03E-09	6.12E-09	7.15E-09	Developmental	2.41E-05	1.43E-04	1.67E-04
			Benzo(b)fluoranthene	1.54E-10	9.14E-10	1.07E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	5.64E-12	3.34E-11	3.91E-11	NA	NA	NA	NA
			Chrysene	1.39E-12	8.25E-12	9.64E-12	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	2.35E-10	1.39E-09	1.63E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	9.06E-11	5.37E-10	6.27E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	1.01E-04	NA	1.01E-04
			Chemical Total	2.60E-08	5.72E-08	8.32E-08		2.92E-03	3.59E-03	6.51E-03
		Exposure Point Total				8.32E-08				6.51E-03
	Exposure Medium Total					8.32E-08				6.51E-03
Sediment Total						8.32E-08				6.51E-03
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.35E-11	Outside EPD	1.35E-11	Reproductive, Developmental	1.04E-06	Outside EPD	1.04E-06
			Metals							
			Arsenic	2.97E-10	1.41E-10	4.39E-10	Skin, Vascular	4.63E-06	2.20E-06	6.82E-06
			Cobalt	NA	NA	NA	Thyroid	5.81E-06	1.10E-06	6.92E-06
			Manganese	NA	NA	NA	Neurological	1.04E-05	1.23E-04	1.34E-04
			Pesticides							
			4,4'-DDT	1.12E-13	Outside EPD	1.12E-13	Liver	4.63E-09	Outside EPD	4.63E-09
			PCBs							
			Total PCBs	9.56E-13	Outside EPD	9.56E-13	Ocular/eye, Nails, Immune	8.36E-07	Outside EPD	8.36E-07
			Chemical Total	3.12E-10	1.41E-10	4.53E-10		2.27E-05	1.27E-04	1.49E-04
		Exposure Point Total				4.53E-10				1.49E-04
	Exposure Medium Total					4.53E-10				1.49E-04
Surface Water Total						4.53E-10				1.49E-04

Table H-2-4. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Anacostia								
			Metals							
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.38E-02		3.38E-02
			Pesticides							
			4,4'-DDD	3.99E-09	--	3.99E-09	Liver	3.88E-03		3.88E-03
			4,4'-DDE	1.61E-08	--	1.61E-08	Liver, Developmental	1.10E-03		1.10E-03
			Aldrin	7.53E-09	--	7.53E-09	Liver	1.03E-04		1.03E-04
			alpha-Chlordane	1.02E-08	--	1.02E-08	Liver	4.07E-04		4.07E-04
			cis-Nonachlor	4.39E-09	--	4.39E-09	Liver	1.76E-04		1.76E-04
			Dieldrin	1.40E-07	--	1.40E-07	Liver	1.23E-03		1.23E-03
			gamma-Chlordane	3.69E-09	--	3.69E-09	Liver	1.48E-04		1.48E-04
			Heptachlor epoxide	3.63E-08	--	3.63E-08	Liver	2.15E-03		2.15E-03
			Mirex	9.62E-09		9.62E-09	Endocrine, Liver	1.87E-05		1.87E-05
			Oxychlordane	1.93E-09	--	1.93E-09	Liver	7.72E-05		7.72E-05
			trans-Nonachlor	1.13E-08	--	1.13E-08	Liver	4.53E-04		4.53E-04
			PCBs							
			Total PCBs	1.20E-06	--	1.20E-06	Ocular/eye, Nails, Immune	2.10E-01		2.10E-01
			PCB-TEQ	3.92E-07	--	3.92E-07	Reproductive, Developmental	3.02E-02		3.02E-02
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						1.44E-06				2.53E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						6.37E-07				7.37E-02
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)						1.53E-06				2.60E-01
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)						7.21E-07				8.03E-02

Notes
NA - Not applicable.
EPD - Effective Predictive Domain.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Sediment, Surface Water, and Upper Anacostia Fish					
Organ	**Chemical**	**Sediment**	**Surface Water**	**Fish Tissue**	**Total**
Blood	Antimony, DRO	1.55E-04	--	--	2E-04
Decreased body and organ weights	Nickel	2.82E-05	--	--	3E-05
Developmental	TCDD-TEQ, PCB-TEQ, Benzo(a)pyrene, 4,4-DDE	2.89E-03	1.04E-06	3.13E-02	3E-02
Endocrine	Mirex	--	--	1.87E-05	2E-05
Eye	Total PCBs	1.84E-03	8.36E-07	2.10E-01	2E-01
Hair	Thallium, Vanadium	4.26E-04	--	--	4E-04
Immune	Total PCBs	1.84E-03	8.36E-07	2.10E-01	2E-01
Kidney	DRO	1.01E-04	--	--	1E-04
Liver	Pesticides, DRO	1.01E-04	4.63E-09	9.74E-03	1E-02
Mortality	Antimony	5.37E-05	--	--	5E-05
Nails	Total PCBs	1.84E-03	8.36E-07	2.10E-01	2E-01
Neurological	Aluminum, Manganese, Methyl Mercury	1.87E-04	1.34E-04	3.38E-02	3E-02
Reproductive	TCDD-TEQ, PCB-TEQ, Cyanide	2.74E-03	1.04E-06	3.02E-02	3E-02
Skin	Arsenic	4.06E-04	6.82E-06	--	4E-04
Thyroid	Cobalt	5.60E-04	6.92E-06	--	6E-04
Vascular	Arsenic	4.06E-04	6.82E-06	--	4E-04

Table H-2-5. CTE
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.36E-08	1.10E-08	2.46E-08	Reproductive, Developmental	1.74E-03	1.41E-03	3.15E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.35E-04	NA	1.35E-04
			Antimony	NA	NA	NA	Mortality, Blood	1.35E-04	NA	1.35E-04
			Arsenic	7.20E-09	9.76E-09	1.70E-08	Skin, Vascular	1.87E-04	2.53E-04	4.40E-04
			Cobalt	NA	NA	NA	Thyroid	8.45E-04	NA	8.45E-04
			Cyanide	NA	NA	NA	Reproductive	2.33E-05	NA	2.33E-05
			Manganese	NA	NA	NA	Neurological	1.47E-04	NA	1.47E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	4.26E-05	NA	4.26E-05
			Thallium	NA	NA	NA	Hair	3.53E-04	NA	3.53E-04
			Vanadium	NA	NA	NA	Hair	2.90E-04	NA	2.90E-04
			PCBs							
			Total PCBs	1.29E-09	4.88E-09	6.17E-09	Ocular/eye, Nails, Immune	3.75E-04	1.42E-03	1.80E-03
			SVOCs							
			Benzo(a)anthracene	2.12E-10	7.48E-10	9.60E-10	NA	NA	NA	NA
			Benzo(a)pyrene	2.34E-09	8.24E-09	1.06E-08	Developmental	3.64E-05	1.28E-04	1.65E-04
			Benzo(b)fluoranthene	3.49E-10	1.23E-09	1.58E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	1.28E-11	4.50E-11	5.78E-11	NA	NA	NA	NA
			Chrysene	3.15E-12	1.11E-11	1.43E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	5.32E-10	1.88E-09	2.41E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	2.05E-10	7.22E-10	9.27E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C2	NA	NA	NA	Liver, Kidney, Blood	1.53E-04	NA	1.53E-04
			Chemical Total	2.57E-08	3.85E-08	6.42E-08		4.46E-03	3.22E-03	7.68E-03
		Exposure Point Total				6.42E-08				7.68E-03
	Exposure Medium Total					6.42E-08				7.68E-03
Sediment Total						6.42E-08				7.68E-03
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.22E-11	Outside EPD	1.22E-11	Reproductive, Developmental	1.57E-06	Outside EPD	1.57E-06
			Metals							
			Arsenic	2.69E-10	9.12E-11	3.61E-10	Skin, Vascular	6.98E-06	2.37E-06	9.35E-06
			Cobalt	NA	NA	NA	Thyroid	8.77E-06	1.19E-06	9.96E-06
			Manganese	NA	NA	NA	Neurological	1.57E-05	1.33E-04	1.48E-04
			Pesticides							
			4,4'-DDT	1.02E-13	Outside EPD	1.02E-13	Liver	6.98E-09	Outside EPD	6.98E-09
			PCBs							
			Total PCBs	8.66E-13	Outside EPD	8.66E-13	Ocular/eye, Nails, Immune	1.26E-06	Outside EPD	1.26E-06
			Chemical Total	2.83E-10	9.12E-11	3.74E-10		3.43E-05	1.36E-04	1.71E-04
		Exposure Point Total				3.74E-10				1.71E-04
	Exposure Medium Total					3.74E-10				1.71E-04
Surface Water Total						3.74E-10				1.71E-04

Table H-2-5. CTE
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet)
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Anacostia								
			Metals							
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.57E-02		3.57E-02
			Pesticides							
			4,4'-DDD	2.53E-09	--	2.53E-09	Liver	4.10E-03		4.10E-03
			4,4'-DDE	1.02E-08	--	1.02E-08	Liver, Developmental	1.16E-03		1.16E-03
			Aldrin	4.78E-09	--	4.78E-09	Liver	1.09E-04		1.09E-04
			alpha-Chlordane	6.45E-09	--	6.45E-09	Liver	4.30E-04		4.30E-04
			cis-Nonachlor	2.78E-09	--	2.78E-09	Liver	1.86E-04		1.86E-04
			Dieldrin	8.89E-08	--	8.89E-08	Liver	1.30E-03		1.30E-03
			gamma-Chlordane	2.34E-09	--	2.34E-09	Liver	1.56E-04		1.56E-04
			Heptachlor epoxide	2.30E-08	--	2.30E-08	Liver	2.27E-03		2.27E-03
			Mirex	6.10E-09		6.10E-09	Endocrine, Liver	1.98E-05		1.98E-05
			Oxychlordane	1.22E-09	--	1.22E-09	Liver	8.16E-05		8.16E-05
			trans-Nonachlor	7.18E-09	--	7.18E-09	Liver	4.79E-04		4.79E-04
			PCBs							
			Total PCBs	7.60E-07	--	7.60E-07	Ocular/eye, Nails, Immune	2.22E-01		2.22E-01
			PCB-TEQ	2.49E-07	--	2.49E-07	Reproductive, Developmental	3.19E-02		3.19E-02
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						9.15E-07				2.68E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						4.04E-07				7.79E-02
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)						9.80E-07				2.75E-01
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)						4.69E-07				8.57E-02

Notes
NA - Not applicable.
EPD - Effective Predictive Domain.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.
SVOC - Semivolatile Organic Compound.
TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Sediment, Surface Water, and Upper Anacostia Fish					
Organ	**Chemical**	**Sediment**	**Surface Water**	**Fish Tissue**	**Total**
Blood	Antimony, DRO	2.88E-04	--	--	3E-04
Decreased body and organ weights	Nickel	4.26E-05	--	--	4E-05
Developmental	TCDD-TEQ, PCB-TEQ, Benzo(a)pyrene,	3.32E-03	1.57E-06	3.30E-02	4E-02
Endocrine	Mirex	--	--	1.98E-05	2E-05
Eye	Total PCBs	1.80E-03	1.26E-06	2.22E-01	2E-01
Hair	Thallium, Vanadium	6.42E-04	--	--	6E-04
Immune	Total PCBs	1.80E-03	1.26E-06	2.22E-01	2E-01
Kidney	DRO	1.53E-04	--	--	2E-04
Liver	Pesticides, DRO	1.53E-04	6.98E-09	1.03E-02	1E-02
Mortality	Antimony	1.35E-04	--	--	1E-04
Nails	Total PCBs	1.80E-03	1.26E-06	2.22E-01	2E-01
Neurological	Aluminum, Manganese, Methyl Mercury	2.82E-04	1.48E-04	3.57E-02	4E-02
Reproductive	TCDD-TEQ, PCB-TEQ, Cyanide	3.18E-03	1.57E-06	3.19E-02	4E-02
Skin	Arsenic	4.40E-04	9.35E-06	--	4E-04
Thyroid	Cobalt	8.45E-04	9.96E-06	--	9E-04
Vascular	Arsenic	4.40E-04	9.35E-06	--	4E-04

Table H-2-6. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	2.82E-08	9.74E-09	3.79E-08	Reproductive, Developmental	1.08E-02	3.75E-03	1.46E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	8.45E-04	NA	8.45E-04
			Antimony	NA	NA	NA	Mortality, Blood	5.05E-04	NA	5.05E-04
			Arsenic	1.50E-08	8.62E-09	2.36E-08	Skin, Vascular	1.16E-03	6.70E-04	1.83E-03
			Cobalt	NA	NA	NA	Thyroid	5.27E-03	NA	5.27E-03
			Cyanide	NA	NA	NA	Reproductive	1.46E-04	NA	1.46E-04
			Manganese	NA	NA	NA	Neurological	9.16E-04	NA	9.16E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	2.65E-04	NA	2.65E-04
			Thallium	NA	NA	NA	Hair	2.20E-03	NA	2.20E-03
			Vanadium	NA	NA	NA	Hair	1.81E-03	NA	1.81E-03
			PCBs							
			Total PCBs	2.67E-09	4.31E-09	6.99E-09	Ocular/eye, Nails, Immune	2.34E-03	3.77E-03	6.11E-03
			SVOCs							
			Benzo(a)anthracene	7.41E-10	1.11E-09	1.85E-09	NA	NA	NA	NA
			Benzo(a)pyrene	8.16E-09	1.22E-08	2.04E-08	Developmental	2.27E-04	3.40E-04	5.66E-04
			Benzo(b)fluoranthene	1.22E-09	1.82E-09	3.04E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	4.46E-11	6.68E-11	1.11E-10	NA	NA	NA	NA
			Chrysene	1.10E-11	1.65E-11	2.75E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	1.86E-09	2.78E-09	4.64E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	7.16E-10	1.07E-09	1.79E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C2	NA	NA	NA	Liver, Kidney, Blood	9.53E-04	NA	9.53E-04
			Chemical Total	5.86E-08	4.18E-08	1.00E-07		2.75E-02	8.53E-03	3.60E-02
		Exposure Point Total				1.00E-07				3.60E-02
	Exposure Medium Total					1.00E-07				3.60E-02
Sediment Total						1.00E-07				3.60E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	2.48E-10	Outside EPD	2.48E-10	Reproductive, Developmental	3.17E-05	Outside EPD	3.17E-05
			Metals							
			Arsenic	5.46E-09	8.64E-10	6.33E-09	Skin, Vascular	1.42E-04	2.24E-05	1.64E-04
			Cobalt	NA	NA	NA	Thyroid	1.78E-04	1.13E-05	1.89E-04
			Manganese	NA	NA	NA	Neurological	3.18E-04	1.26E-03	1.57E-03
			Pesticides							
			4,4'-DDT	2.06E-12	Outside EPD	2.06E-12	Liver	1.42E-07	Outside EPD	1.42E-07
			PCBs							
			Total PCBs	1.76E-11	Outside EPD	1.76E-11	Ocular/eye, Nails, Immune	2.56E-05	Outside EPD	2.56E-05
			Chemical Total	5.73E-09	8.64E-10	6.59E-09		6.95E-04	1.29E-03	1.99E-03
		Exposure Point Total				6.59E-09				1.99E-03
	Exposure Medium Total					6.59E-09				1.99E-03
Surface Water Total						6.59E-09				1.99E-03

Table H-2-6. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet)
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Anacostia								
			Metals							
			Mercury	NA	--	NA	Neurological (methyl mercury)	4.77E-02		4.77E-02
			Pesticides							
			4,4'-DDD	1.13E-09	--	1.13E-09	Liver	5.47E-03		5.47E-03
			4,4'-DDE	4.53E-09	--	4.53E-09	Liver, Developmental	1.56E-03		1.56E-03
			Aldrin	2.13E-09	--	2.13E-09	Liver	1.46E-04		1.46E-04
			alpha-Chlordane	2.87E-09	--	2.87E-09	Liver	5.75E-04		5.75E-04
			cis-Nonachlor	1.24E-09	--	1.24E-09	Liver	2.48E-04		2.48E-04
			Dieldrin	3.96E-08	--	3.96E-08	Liver	1.73E-03		1.73E-03
			gamma-Chlordane	1.04E-09	--	1.04E-09	Liver	2.08E-04		2.08E-04
			Heptachlor epoxide	1.02E-08	--	1.02E-08	Liver	3.03E-03		3.03E-03
			Mirex	2.72E-09		2.72E-09	Endocrine, Liver	2.64E-05		2.64E-05
			Oxychlordane	5.45E-10	--	5.45E-10	Liver	1.09E-04		1.09E-04
			trans-Nonachlor	3.20E-09	--	3.20E-09	Liver	6.39E-04		6.39E-04
			PCBs							
			Total PCBs	3.38E-07	--	3.38E-07	Ocular/eye, Nails, Immune	2.96E-01		2.96E-01
			PCB-TEQ	1.11E-07	--	1.11E-07	Reproductive, Developmental	4.26E-02		4.26E-02
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						4.08E-07				3.58E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						1.80E-07				1.04E-01
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment, surface water, and fish)						5.15E-07				3.96E-01
Total Receptor Risk/Hazard - Upper Anacostia (includes Total PCBs for sediment and surface water and PCB-TEQ for fish)						2.87E-07				1.42E-01

Notes

NA - Not applicable.

EPD - Effective Predictive Domain.

PCB - Polychlorinated Biphenyl.

PCB-TEQ - PCB Toxicity Equivalence.

RfD - Oral Reference Dose.

SVOC - Semivolatile Organic Compound.

TCDD-TEQ - 2,3,7,8-Tetrachloro-dibenzo-p-dioxin Toxicity Equivalence.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.

(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.

(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Sediment, Surface Water, and Upper Anacostia Fish

Organ	Chemical	Sediment	Surface Water	Fish Tissue	Total
Blood	Antimony, DRO	1.46E-03	--	--	1E-03
Decreased body and organ weights	Nickel	2.65E-04	--	--	3E-04
Developmental	TCDD-TEQ, PCB-TEQ, Benzo(a)pyrene, 4,4-DDE	1.52E-02	3.17E-05	4.41E-02	6E-02
Endocrine	Mirex	--	--	2.64E-05	3E-05
Eye	Total PCBs	6.11E-03	2.56E-05	2.96E-01	3E-01
Hair	Thallium, Vanadium	4.01E-03	--	--	4E-03
Immune	Total PCBs	6.11E-03	2.56E-05	2.96E-01	3E-01
Kidney	DRO	9.53E-04	--	--	1E-03
Liver	Pesticides, DRO	9.53E-04	1.42E-07	1.37E-02	1E-02
Mortality	Antimony	5.05E-04	--	--	5E-04
Nails	Total PCBs	6.11E-03	2.56E-05	2.96E-01	3E-01
Neurological	Aluminum, Manganese, Methyl Mercury	1.76E-03	1.57E-03	4.77E-02	5E-02
Reproductive	TCDD-TEQ, PCB-TEQ, Cyanide	1.47E-02	3.17E-05	4.26E-02	6E-02
Skin	Arsenic	1.83E-03	1.64E-04	--	2E-03
Thyroid	Cobalt	5.27E-03	1.89E-04	--	5E-03
Vascular	Arsenic	1.83E-03	1.64E-04	--	2E-03

Table H-2-7. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Potomac								
			Inorganics							
			Arsenic	1.60E-07	--	1.60E-07	Skin, Vascular	2.49E-03		2.49E-03
			Arsenic, organic	NA	--	NA	Bladder	3.36E-04		3.36E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.84E-02		3.84E-02
			Pesticides							
			4,4'-DDD	7.50E-09	--	7.50E-09	Liver	7.30E-03		7.30E-03
			4,4'-DDE	6.44E-08	--	6.44E-08	Liver, Developmental	4.42E-03		4.42E-03
			Aldrin	1.14E-08	--	1.14E-08	Liver	1.57E-04		1.57E-04
			alpha-Chlordane	1.31E-08	--	1.31E-08	Liver	5.23E-04		5.23E-04
			beta-BHC	3.78E-09	--	3.78E-09	NA	NA		NA
			cis-Nonachlor	4.11E-09	--	4.11E-09	Liver	1.64E-04		1.64E-04
			Dieldrin	3.54E-07	--	3.54E-07	Liver	3.09E-03		3.09E-03
			gamma-Chlordane	2.70E-09	--	2.70E-09	Liver	1.08E-04		1.08E-04
			Heptachlor epoxide	5.44E-08	--	5.44E-08	Liver	3.22E-03		3.22E-03
			Hexachlorobenzene	3.62E-09	--	3.62E-09	Liver	1.98E-05		1.98E-05
			Mirex	9.54E-09		9.54E-09	Endocrine, Liver	1.86E-05		1.86E-05
			Oxychlordane	1.99E-09	--	1.99E-09	Liver	7.95E-05		7.95E-05
			trans-Nonachlor	1.12E-08	--	1.12E-08	Liver	4.46E-04		4.46E-04
			PCBs							
			Total PCBs	2.87E-06	--	2.87E-06	Ocular/eye, Nails, Immune	5.02E-01		5.02E-01
			PCB-TEQ	4.46E-06	--	4.46E-06	Reproductive, Developmental	3.43E-01		3.43E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						3.57E-06				5.63E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						5.16E-06				4.04E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Potomac								
			Inorganics							
			Arsenic	3.37E-07	--	3.37E-07	Skin, Vascular	5.24E-03		5.24E-03
			Arsenic, organic	NA	--	NA	Bladder	7.08E-04		7.08E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.60E-02		2.60E-02
			Pesticides							
			4,4'-DDD	2.52E-09	--	2.52E-09	Liver	2.45E-03		2.45E-03
			4,4'-DDE	1.76E-08	--	1.76E-08	Liver, Developmental	1.21E-03		1.21E-03
			alpha-Chlordane	6.07E-09	--	6.07E-09	Liver	2.43E-04		2.43E-04
			Dieldrin	1.86E-07	--	1.86E-07	Liver	1.62E-03		1.62E-03
			gamma-Chlordane	2.96E-09	--	2.96E-09	Liver	1.19E-04		1.19E-04
			Heptachlor epoxide	3.78E-08	--	3.78E-08	Liver	2.24E-03		2.24E-03
			Oxychlordane	1.79E-09	--	1.79E-09	Liver	7.14E-05		7.14E-05
			trans-Nonachlor	8.30E-09	--	8.30E-09	Liver	3.32E-04		3.32E-04
			PCBs							
			Total PCBs	1.02E-06	--	1.02E-06	Ocular/eye, Nails, Immune	1.79E-01		1.79E-01
			PCB-TEQ	1.03E-06	--	1.03E-06	Reproductive, Developmental	7.91E-02		7.91E-02
Fish Tissue Total - Lower Potomac (Total PCBs)[3]						1.62E-06				2.19E-01
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]						1.63E-06				1.19E-01

Table H-2-7. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Non-Tidal Anacostia								
			Dioxin							
			2,3,7,8-TCDD-TEQ	2.94E-08	--	2.94E-08	Reproductive, Developmental	2.26E-03		2.26E-03
			Inorganics							
			Arsenic	4.31E-08	--	4.31E-08	Skin, Vascular	6.70E-04		6.70E-04
			Arsenic, organic	NA	--	NA	Bladder	9.05E-05		9.05E-05
			Cobalt	NA	--	NA	Thyroid	1.26E-03		1.26E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	8.03E-02		8.03E-02
			Thallium	NA	--	NA	Hair	1.07E-02		1.07E-02
			Pesticides							
			Chlordane	2.29E-08	--	2.29E-08	Liver	9.18E-04		9.18E-04
			Dieldrin	7.48E-08	--	7.48E-08	Liver	6.55E-04		6.55E-04
			Heptachlor epoxide	3.42E-08	--	3.42E-08	Liver	2.02E-03		2.02E-03
			PCBs		--					
			Total PCBs	1.78E-07		1.78E-07	Ocular/eye, Nails, Immune	3.11E-02		3.11E-02
			PCB-TEQ	2.01E-07	--	2.01E-07	Reproductive, Developmental	1.54E-02		1.54E-02
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]						3.82E-07				1.30E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]						4.05E-07				1.14E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Anacostia								
			Metals							
			Arsenic	1.64E-07	--	1.64E-07	Skin, Vascular	2.55E-03		2.55E-03
			Arsenic, organic	NA	--	NA	Bladder	3.45E-04		3.45E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.25E-02		2.25E-02
			Pesticides							
			4,4'-DDD	7.89E-09	--	7.89E-09	Liver	7.67E-03		7.67E-03
			4,4'-DDE	3.75E-08	--	3.75E-08	Liver, Developmental	2.57E-03		2.57E-03
			Aldrin	1.05E-08	--	1.05E-08	Liver	1.45E-04		1.45E-04
			alpha-Chlordane	2.01E-08	--	2.01E-08	Liver	8.04E-04		8.04E-04
			cis-Nonachlor	7.57E-09	--	7.57E-09	Liver	3.03E-04		3.03E-04
			Dieldrin	3.02E-07	--	3.02E-07	Liver	2.64E-03		2.64E-03
			gamma-Chlordane	9.64E-09	--	9.64E-09	Liver	3.86E-04		3.86E-04
			Heptachlor epoxide	6.49E-08	--	6.49E-08	Liver	3.84E-03		3.84E-03
			Mirex	1.16E-08		1.16E-08	Endocrine, Liver	2.25E-05		2.25E-05
			Oxychlordane	3.73E-09	--	3.73E-09	Liver	1.49E-04		1.49E-04
			trans-Nonachlor	2.09E-08	--	2.09E-08	Liver	8.37E-04		8.37E-04
			PCBs							
			Total PCBs	1.98E-06	--	1.98E-06	Ocular/eye, Nails, Immune	3.46E-01		3.46E-01
			PCB-TEQ	2.46E-06	--	2.46E-06	Reproductive, Developmental	1.89E-01		1.89E-01
Fish Tissue Total - Lower Anacostia (Total PCBs)[2]						2.64E-06				3.91E-01
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[3]						3.12E-06				2.34E-01
Receptor Total - Upper Potomac Fish (Total PCBs)[2]						3.57E-06				5.63E-01
Receptor Total - Upper Potomac Fish (PCB-TEQs)[3]						5.16E-06				4.04E-01
Receptor Total - Lower Potomac Fish (Total PCBs)[2]						1.62E-06				2.19E-01
Receptor Total -Lower Potomac Fish (PCB-TEQs)[3]						1.63E-06				1.19E-01
Receptor Total - Non-Tidal Anacostia Fish (Total PCBs)[2]						3.82E-07				1.30E-01
Receptor Total - Non-Tidal Anacostia Fish (PCB-TEQs)[3]						4.05E-07				1.14E-01
Receptor Total - Lower Anacostia Fish (Total PCBs)[2]						2.64E-06				3.91E-01
Receptor Total - Lower Anacostia Fish (PCB-TEQs)[3]						3.12E-06				2.34E-01

Table H-2-7. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Teen

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

Notes
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Upper Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	3.36E-04	3E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	3.47E-01	3E-01
Endocrine	Mirex	1.86E-05	2E-05
Eye	Total PCBs	5.02E-01	5E-01
Immune	Total PCBs	5.02E-01	5E-01
Liver	Pesticides	1.95E-02	2E-02
Nails	Total PCBs	5.02E-01	5E-01
Neurological	Methyl Mercury	3.84E-02	4E-02
Reproductive	PCB-TEQ, TCDD-TEQ	3.43E-01	3E-01
Skin	Arsenic	2.49E-03	2E-03
Vascular	Arsenic	2.49E-03	2E-03

Target Organ HI - Lower Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	7.08E-04	7E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	8.03E-02	8E-02
Eye	Total PCBs	1.79E-01	2E-01
Immune	Total PCBs	1.79E-01	2E-01
Liver	Pesticides	8.29E-03	8E-03
Nails	Total PCBs	1.79E-01	2E-01
Neurological	Methyl Mercury	2.60E-02	3E-02
Reproductive	PCB-TEQ, TCDD-TEQ	7.91E-02	8E-02
Skin	Arsenic	5.24E-03	5E-03
Vascular	Arsenic	5.24E-03	5E-03

Target Organ HI - Lower Anacostia

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	3.45E-04	3E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.92E-01	2E-01
Endocrine	Mirex	2.25E-05	2E-05
Eye	Total PCBs	3.46E-01	3E-01
Immune	Total PCBs	3.46E-01	3E-01
Liver	Pesticides	1.94E-02	2E-02
Nails	Total PCBs	3.46E-01	3E-01
Neurological	Methyl Mercury	2.25E-02	2E-02
Reproductive	PCB-TEQ, TCDD-TEQ	1.89E-01	2E-01
Skin	Arsenic	2.55E-03	3E-03
Vascular	Arsenic	2.55E-03	3E-03

Target Organ HI - Non-Tidal Anacostia Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	9.05E-05	9E-05
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.77E-02	2E-02
Eye	Total PCBs	3.11E-02	3E-02
Hair	Thallium	1.07E-02	1E-02
Immune	Total PCBs	3.11E-02	3E-02
Liver	Pesticides	3.59E-03	4E-03
Nails	Total PCBs	3.11E-02	3E-02
Neurological	Methyl Mercury	8.03E-02	8E-02
Reproductive	PCB-TEQ, TCDD-TEQ	1.77E-02	2E-02
Skin	Arsenic	6.70E-04	7E-04
Thyroid	Cobalt	1.26E-03	1E-03
Vascular	Arsenic	6.70E-04	7E-04

Table H-2-8. CTE
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Potomac								
			Metals							
			Arsenic	1.01E-07	--	1.01E-07	Skin, Vascular	2.63E-03		2.63E-03
			Arsenic, organic	NA	--	NA	Bladder	3.55E-04		3.55E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	4.06E-02		4.06E-02
			Pesticides							
			4,4'-DDD	4.76E-09	--	4.76E-09	Liver	7.71E-03		7.71E-03
			4,4'-DDE	4.08E-08	--	4.08E-08	Liver, Developmental	4.67E-03		4.67E-03
			Aldrin	7.24E-09	--	7.24E-09	Liver	1.66E-04		1.66E-04
			alpha-Chlordane	8.29E-09	--	8.29E-09	Liver	5.52E-04		5.52E-04
			beta-BHC	2.39E-09	--	2.39E-09	NA	NA		NA
			cis-Nonachlor	2.61E-09	--	2.61E-09	Liver	1.74E-04		1.74E-04
			Dieldrin	2.24E-07	--	2.24E-07	Liver	3.27E-03		3.27E-03
			gamma-Chlordane	1.71E-09	--	1.71E-09	Liver	1.14E-04		1.14E-04
			Heptachlor epoxide	3.45E-08	--	3.45E-08	Liver	3.40E-03		3.40E-03
			Hexachlorobenzene	2.30E-09	--	2.30E-09	Liver	2.09E-05		2.09E-05
			Mirex	6.05E-09		6.05E-09	Endocrine, Liver	1.96E-05		1.96E-05
			Oxychlordane	1.26E-09	--	1.26E-09	Liver	8.40E-05		8.40E-05
			trans-Nonachlor	7.07E-09	--	7.07E-09	Liver	4.72E-04		4.72E-04
			PCBs							
			Total PCBs	1.82E-06	--	1.82E-06	Ocular/eye, Nails, Immune	5.30E-01		5.30E-01
			PCB-TEQ	2.83E-06	--	2.83E-06	Reproductive, Developmental	3.62E-01		3.62E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						2.26E-06				5.94E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						3.27E-06				4.27E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Potomac								
			Metals							
			Arsenic	2.14E-07	--	2.14E-07	Skin, Vascular	5.54E-03		5.54E-03
			Arsenic, organic	NA	--	NA	Bladder	7.48E-04		7.48E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.74E-02		2.74E-02
			Pesticides							
			4,4'-DDD	1.60E-09	--	1.60E-09	Liver	2.59E-03		2.59E-03
			4,4'-DDE	1.12E-08	--	1.12E-08	Liver, Developmental	1.28E-03		1.28E-03
			alpha-Chlordane	3.85E-09	--	3.85E-09	Liver	2.56E-04		2.56E-04
			Dieldrin	1.18E-07	--	1.18E-07	Liver	1.72E-03		1.72E-03
			gamma-Chlordane	1.88E-09	--	1.88E-09	Liver	1.25E-04		1.25E-04
			Heptachlor epoxide	2.40E-08	--	2.40E-08	Liver	2.37E-03		2.37E-03
			Oxychlordane	1.13E-09	--	1.13E-09	Liver	7.54E-05		7.54E-05
			trans-Nonachlor	5.26E-09	--	5.26E-09	Liver	3.51E-04		3.51E-04
			PCBs							
			Total PCBs	6.49E-07	--	6.49E-07	Ocular/eye, Nails, Immune	1.89E-01		1.89E-01
			PCB-TEQ	6.52E-07	--	6.52E-07	Reproductive, Developmental	8.36E-02		8.36E-02
Fish Tissue Total - Lower Potomac (Total PCBs)[3]						1.03E-06				2.32E-01
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]						1.03E-06				1.26E-01

Table H-2-8. CTE
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upstream Non-Tidal Anacostia								
			Dioxin							
			2,3,7,8-TCDD-TEQ	1.86E-08	--	1.86E-08	Reproductive, Developmental	2.39E-03		2.39E-03
			Metals							
			Arsenic	2.73E-08	--	2.73E-08	Skin, Vascular	7.08E-04		7.08E-04
			Arsenic, organic	NA	--	NA	Bladder	9.56E-05		9.56E-05
			Cobalt	NA	--	NA	Thyroid	1.33E-03		1.33E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.83E-02		2.83E-02
			Thallium	NA	--	NA	Hair	1.13E-02		1.13E-02
			Pesticides							
			Chlordane	1.45E-08	--	1.45E-08	Liver	9.70E-04		9.70E-04
			Dieldrin	4.75E-08	--	4.75E-08	Liver	6.92E-04		6.92E-04
			Heptachlor epoxide	2.17E-08	--	2.17E-08	Liver	2.14E-03		2.14E-03
			PCBs	0.00E+00	--			0.00E+00		
			Total PCBs	1.13E-07		1.13E-07	Ocular/eye, Nails, Immune	3.28E-02		3.28E-02
			PCB-TEQ	1.27E-07	--	1.27E-07	Reproductive, Developmental	1.63E-02		1.63E-02
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]						2.42E-07				8.08E-02
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]						2.57E-07				6.42E-02
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Anacostia								
			Metals							
			Arsenic	1.04E-07	--	1.04E-07	Skin, Vascular	2.70E-03		2.70E-03
			Arsenic, organic	NA	--	NA	Bladder	3.64E-04		3.64E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	2.38E-02		2.38E-02
			Pesticides							
			4,4'-DDD	5.00E-09	--	5.00E-09	Liver	8.10E-03		8.10E-03
			4,4'-DDE	2.38E-08	--	2.38E-08	Liver, Developmental	2.72E-03		2.72E-03
			Aldrin	6.67E-09	--	6.67E-09	Liver	1.53E-04		1.53E-04
			alpha-Chlordane	1.27E-08	--	1.27E-08	Liver	8.49E-04		8.49E-04
			cis-Nonachlor	4.80E-09	--	4.80E-09	Liver	3.20E-04		3.20E-04
			Dieldrin	1.91E-07	--	1.91E-07	Liver	2.79E-03		2.79E-03
			gamma-Chlordane	6.11E-09	--	6.11E-09	Liver	4.07E-04		4.07E-04
			Heptachlor epoxide	4.12E-08	--	4.12E-08	Liver	4.06E-03		4.06E-03
			Mirex	7.34E-09		7.34E-09	Endocrine, Liver	2.38E-05		2.38E-05
			Oxychlordane	2.37E-09	--	2.37E-09	Liver	1.58E-04		1.58E-04
			trans-Nonachlor	1.33E-08	--	1.33E-08	Liver	8.84E-04		8.84E-04
			PCBs							
			Total PCBs	1.25E-06	--	1.25E-06	Ocular/eye, Nails, Immune	3.66E-01		3.66E-01
			PCB-TEQ	1.56E-06	--	1.56E-06	Reproductive, Developmental	2.00E-01		2.00E-01
Fish Tissue Total - Lower Anacostia (Total PCBs)[2]						1.67E-06				4.13E-01
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[3]						1.98E-06				2.47E-01
Receptor Total - Upper Potomac Fish (Total PCBs)[2]						2.26E-06				5.94E-01
Receptor Total - Upper Potomac Fish (PCB-TEQs)[3]						3.27E-06				4.27E-01
Receptor Total - Lower Potomac Fish (Total PCBs)[2]						1.03E-06				2.32E-01
Receptor Total -Lower Potomac Fish (PCB-TEQs)[3]						1.03E-06				1.26E-01
Receptor Total - Non-Tidal Anacostia Fish (Total PCBs)[2]						2.42E-07				8.08E-02
Receptor Total - Non-Tidal Anacostia Fish (PCB-TEQs)[3]						2.57E-07				6.42E-02
Receptor Total - Lower Anacostia Fish (Total PCBs)[2]						1.67E-06				4.13E-01
Receptor Total - Lower Anacostia Fish (PCB-TEQs)[3]						1.98E-06				2.47E-01

Table H-2-8. CTE
Summary of Receptor Risks and Hazards for COPCs - Older Child/Teen Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Older Child/Teen

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

Notes
NA - Not applicable.
ND - Not Detected.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Upper Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	3.55E-04	4E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	3.67E-01	4E-01
Endocrine	Mirex	1.96E-05	2E-05
Eye	Total PCBs	5.30E-01	5E-01
Immune	Total PCBs	5.30E-01	5E-01
Liver	Pesticides	2.07E-02	2E-02
Nails	Total PCBs	5.30E-01	5E-01
Neurological	Methyl Mercury	4.06E-02	4E-02
Reproductive	PCB-TEQ, TCDD-TEQ	3.62E-01	4E-01
Skin	Arsenic	2.63E-03	3E-03
Vascular	Arsenic	2.63E-03	3E-03

Target Organ HI - Lower Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	7.48E-04	7E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	8.49E-02	8E-02
Eye	Total PCBs	1.89E-01	2E-01
Immune	Total PCBs	1.89E-01	2E-01
Liver	Pesticides	8.76E-03	9E-03
Nails	Total PCBs	1.89E-01	2E-01
Neurological	Methyl Mercury	2.74E-02	3E-02
Reproductive	PCB-TEQ, TCDD-TEQ	8.36E-02	8E-02
Skin	Arsenic	5.54E-03	6E-03
Vascular	Arsenic	5.54E-03	6E-03

Target Organ HI - Lower Anacostia

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	3.64E-04	4E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	2.03E-01	2E-01
Endocrine	Mirex	2.38E-05	2E-05
Eye	Total PCBs	3.66E-01	4E-01
Immune	Total PCBs	3.66E-01	4E-01
Liver	Pesticides	2.05E-02	2E-02
Nails	Total PCBs	3.66E-01	4E-01
Neurological	Methyl Mercury	2.38E-02	2E-02
Reproductive	PCB-TEQ, TCDD-TEQ	2.00E-01	2E-01
Skin	Arsenic	2.70E-03	3E-03
Vascular	Arsenic	2.70E-03	3E-03

Target Organ HI - Non-Tidal Anacostia Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	9.56E-05	1E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.87E-02	2E-02
Eye	Total PCBs	3.28E-02	3E-02
Hair	Thallium	1.13E-02	1E-02
Immune	Total PCBs	3.28E-02	3E-02
Liver	Pesticides	3.80E-03	4E-03
Nails	Total PCBs	3.28E-02	3E-02
Neurological	Methyl Mercury	2.83E-02	3E-02
Reproductive	PCB-TEQ, TCDD-TEQ	1.87E-02	2E-02
Skin	Arsenic	7.08E-04	7E-04
Thyroid	Cobalt	1.33E-03	1E-03
Vascular	Arsenic	7.08E-04	7E-04

Table H-2-9. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upper Potomac								
			Metals							
			Arsenic	4.52E-08	--	4.52E-08	Skin, Vascular	3.51E-03		3.51E-03
			Arsenic, organic	NA	--	NA	Bladder	4.74E-04		4.74E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	5.43E-02		5.43E-02
			Pesticides							
			4,4'-DDD	2.12E-09	--	2.12E-09	Liver	1.03E-02		1.03E-02
			4,4'-DDE	1.82E-08	--	1.82E-08	Liver, Developmental	6.24E-03		6.24E-03
			Aldrin	3.22E-09	--	3.22E-09	Liver	2.21E-04		2.21E-04
			alpha-Chlordane	3.69E-09	--	3.69E-09	Liver	7.38E-04		7.38E-04
			beta-BHC	1.07E-09	--	1.07E-09	NA	NA		NA
			cis-Nonachlor	1.16E-09	--	1.16E-09	Liver	2.32E-04		2.32E-04
			Dieldrin	9.98E-08	--	9.98E-08	Liver	4.37E-03		4.37E-03
			gamma-Chlordane	7.62E-10	--	7.62E-10	Liver	1.52E-04		1.52E-04
			Heptachlor epoxide	1.54E-08	--	1.54E-08	Liver	4.55E-03		4.55E-03
			Hexachlorobenzene	1.02E-09	--	1.02E-09	Liver	2.80E-05		2.80E-05
			Mirex	2.69E-09		2.69E-09	Endocrine, Liver	2.62E-05		2.62E-05
			Oxychlordane	5.61E-10	--	5.61E-10	Liver	1.12E-04		1.12E-04
			trans-Nonachlor	3.15E-09	--	3.15E-09	Liver	6.30E-04		6.30E-04
			PCBs							
			Total PCBs	8.10E-07	--	8.10E-07	Ocular/eye, Nails, Immune	7.08E-01		7.08E-01
			PCB-TEQ	1.26E-06	--	1.26E-06	Reproductive, Developmental	4.84E-01		4.84E-01
Fish Tissue Total - Upper Anacostia (Total PCBs)[3]						1.01E-06				7.94E-01
Fish Tissue Total - Upper Anacostia (PCB-TEQ)[4]						1.46E-06				5.70E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Potomac								
			Metals							
			Arsenic	9.51E-08	--	9.51E-08	Skin, Vascular	7.40E-03		7.40E-03
			Arsenic, organic	NA	--	NA	Bladder	9.99E-04		9.99E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.67E-02		3.67E-02
			Pesticides							
			4,4'-DDD	7.12E-10	--	7.12E-10	Liver	3.46E-03		3.46E-03
			4,4'-DDE	4.98E-09	--	4.98E-09	Liver, Developmental	1.71E-03		1.71E-03
			alpha-Chlordane	1.71E-09	--	1.71E-09	Liver	3.43E-04		3.43E-04
			Dieldrin	5.24E-08	--	5.24E-08	Liver	2.29E-03		2.29E-03
			gamma-Chlordane	8.37E-10	--	8.37E-10	Liver	1.67E-04		1.67E-04
			Heptachlor epoxide	1.07E-08	--	1.07E-08	Liver	3.16E-03		3.16E-03
			Oxychlordane	5.04E-10	--	5.04E-10	Liver	1.01E-04		1.01E-04
			trans-Nonachlor	2.34E-09	--	2.34E-09	Liver	4.69E-04		4.69E-04
			PCBs							
			Total PCBs	2.89E-07	--	2.89E-07	Ocular/eye, Nails, Immune	2.53E-01		2.53E-01
			PCB-TEQ	2.90E-07	--	2.90E-07	Reproductive, Developmental	1.12E-01		1.12E-01
Fish Tissue Total - Lower Potomac (Total PCBs)[3]						4.58E-07				3.10E-01
Fish Tissue Total - Lower Potomac (PCB-TEQ)[4]						4.60E-07				1.68E-01

Table H-2-9. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Upstream Non-Tidal Anacostia								
			Dioxin							
			2,3,7,8-TCDD-TEQ	8.30E-09	--	8.30E-09	Reproductive, Developmental	3.19E-03		3.19E-03
			Metals							
			Arsenic	1.22E-08	--	1.22E-08	Skin, Vascular	9.46E-04		9.46E-04
			Arsenic, organic	NA	--	NA	Bladder	1.28E-04		1.28E-04
			Cobalt	NA	--	NA	Thyroid	1.78E-03		1.78E-03
			Mercury	NA	--	NA	Neurological (methyl mercury)	1.13E-01		1.13E-01
			Thallium	NA	--	NA	Hair	1.51E-02		1.51E-02
			Pesticides							
			Chlordane	6.48E-09	--	6.48E-09	Liver	1.30E-03		1.30E-03
			Dieldrin	2.11E-08	--	2.11E-08	Liver	9.25E-04		9.25E-04
			Heptachlor epoxide	9.65E-09	--	9.65E-09	Liver	2.85E-03		2.85E-03
			PCBs		--			0.00E+00		
			Total PCBs	5.01E-08		5.01E-08	Ocular/eye, Nails, Immune	4.39E-02		4.39E-02
			PCB-TEQ	5.66E-08	--	5.66E-08	Reproductive, Developmental	2.18E-02		2.18E-02
Fish Tissue Total - Non-Tidal Anacostia (Total PCBs)[3]						1.08E-07				1.83E-01
Fish Tissue Total - Non-Tidal Anacostia (PCB-TEQ)[4]						1.14E-07				1.61E-01
Fish Tissue	Fish Fillet Tissue - Mixed Diet (1)	Lower Anacostia								
			Metals							
			Arsenic	4.63E-08	--	4.63E-08	Skin, Vascular	3.60E-03		3.60E-03
			Arsenic, organic	NA	--	NA	Bladder	4.86E-04		4.86E-04
			Mercury	NA	--	NA	Neurological (methyl mercury)	3.18E-02		3.18E-02
			Pesticides							
			4,4'-DDD	2.23E-09	--	2.23E-09	Liver	1.08E-02		1.08E-02
			4,4'-DDE	1.06E-08	--	1.06E-08	Liver, Developmental	3.63E-03		3.63E-03
			Aldrin	2.97E-09	--	2.97E-09	Liver	2.04E-04		2.04E-04
			alpha-Chlordane	5.67E-09	--	5.67E-09	Liver	1.13E-03		1.13E-03
			cis-Nonachlor	2.14E-09	--	2.14E-09	Liver	4.28E-04		4.28E-04
			Dieldrin	8.52E-08	--	8.52E-08	Liver	3.73E-03		3.73E-03
			gamma-Chlordane	2.72E-09	--	2.72E-09	Liver	5.44E-04		5.44E-04
			Heptachlor epoxide	1.83E-08	--	1.83E-08	Liver	5.42E-03		5.42E-03
			Mirex	3.27E-09		3.27E-09	Endocrine, Liver	3.18E-05		3.18E-05
			Oxychlordane	1.05E-09	--	1.05E-09	Liver	2.11E-04		2.11E-04
			trans-Nonachlor	5.90E-09	--	5.90E-09	Liver	1.18E-03		1.18E-03
			PCBs							
			Total PCBs	5.59E-07	--	5.59E-07	Ocular/eye, Nails, Immune	4.89E-01		4.89E-01
			PCB-TEQ	6.94E-07	--	6.94E-07	Reproductive, Developmental	2.67E-01		2.67E-01
Fish Tissue Total - Lower Anacostia (Total PCBs)[2]						7.45E-07				5.52E-01
Fish Tissue Total - Lower Anacostia (PCB-TEQ)[3]						8.81E-07				3.30E-01
Receptor Total - Upper Potomac Fish (Total PCBs)[2]						1.01E-06				7.94E-01
Receptor Total - Upper Potomac Fish (PCB-TEQs)[3]						1.46E-06				5.70E-01
Receptor Total - Lower Potomac Fish (Total PCBs)[2]						4.58E-07				3.10E-01
Receptor Total -Lower Potomac Fish (PCB-TEQs)[3]						4.60E-07				1.68E-01
Receptor Total - Non-Tidal Anacostia Fish (Total PCBs)[2]						1.08E-07				1.83E-01
Receptor Total - Non-Tidal Anacostia Fish (PCB-TEQs)[3]						1.14E-07				1.61E-01
Receptor Total - Lower Anacostia Fish (Total PCBs)[2]						7.45E-07				5.52E-01
Receptor Total - Lower Anacostia Fish (PCB-TEQs)[3]						8.81E-07				3.30E-01

Table H-2-9. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Angler (Mixed Fish Diet) - Regional Areas
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child

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

Notes
NA - Not applicable.
PCB - Polychlorinated Biphenyl.
PCB-TEQ - PCB Toxicity Equivalence.
RfD - Oral Reference Dose.

(1) Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC.
(2) Total Receptor Risk/Hazard based on all COPCs except PCB-TEQ.
(3) Total Receptor Risk/Hazard based on all COPCs except Total PCBs.

Target Organ HI - Upper Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	4.74E-04	5E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	4.91E-01	5E-01
Endocrine	Mirex	2.62E-05	3E-05
Eye	Total PCBs	7.08E-01	7E-01
Immune	Total PCBs	7.08E-01	7E-01
Liver	Pesticides	2.76E-02	3E-02
Nails	Total PCBs	7.08E-01	7E-01
Neurological	Methyl Mercury	5.43E-02	5E-02
Reproductive	PCB-TEQ, TCDD-TEQ	4.84E-01	5E-01
Skin	Arsenic	3.51E-03	4E-03
Vascular	Arsenic	3.51E-03	4E-03

Target Organ HI - Lower Potomac Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	9.99E-04	1E-03
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	1.13E-01	1E-01
Eye	Total PCBs	2.53E-01	3E-01
Immune	Total PCBs	2.53E-01	3E-01
Liver	Pesticides	1.17E-02	1E-02
Nails	Total PCBs	2.53E-01	3E-01
Neurological	Methyl Mercury	3.67E-02	4E-02
Reproductive	PCB-TEQ, TCDD-TEQ	1.12E-01	1E-01
Skin	Arsenic	7.40E-03	7E-03
Vascular	Arsenic	7.40E-03	7E-03

Target Organ HI - Lower Anacostia

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	4.86E-04	5E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	2.71E-01	3E-01
Endocrine	Mirex	3.18E-05	3E-05
Eye	Total PCBs	4.89E-01	5E-01
Immune	Total PCBs	4.89E-01	5E-01
Liver	Pesticides	2.73E-02	3E-02
Nails	Total PCBs	4.89E-01	5E-01
Neurological	Methyl Mercury	3.18E-02	3E-02
Reproductive	PCB-TEQ, TCDD-TEQ	2.67E-01	3E-01
Skin	Arsenic	3.60E-03	4E-03
Vascular	Arsenic	3.60E-03	4E-03

Target Organ HI - Non-Tidal Anacostia Fish

Organ	Chemical	Fish Tissue	Total
Bladder	Arsenic, organic	1.28E-04	1E-04
Developmental	PCB-TEQ, TCDD-TEQ, 4,4-DDE	2.50E-02	2E-02
Eye	Total PCBs	4.39E-02	4E-02
Hair	Thallium	1.51E-02	2E-02
Immune	Total PCBs	4.39E-02	4E-02
Liver	Pesticides	5.07E-03	5E-03
Nails	Total PCBs	4.39E-02	4E-02
Neurological	Methyl Mercury	1.13E-01	1E-01
Reproductive	PCB-TEQ, TCDD-TEQ	2.50E-02	2E-02
Skin	Arsenic	9.46E-04	9E-04
Thyroid	Cobalt	1.78E-03	2E-03
Vascular	Arsenic	9.46E-04	9E-04

Table H-2-10. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	7.49E-09	1.02E-08	1.77E-08	Reproductive, Developmental	5.76E-04	7.88E-04	1.36E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	4.49E-05	NA	4.49E-05
			Antimony	NA	NA	NA	Mortality, Blood	2.68E-05	NA	2.68E-05
			Arsenic	3.98E-09	9.06E-09	1.30E-08	Skin, Vascular	6.18E-05	1.41E-04	2.03E-04
			Cobalt	NA	NA	NA	Thyroid	2.80E-04	NA	2.80E-04
			Cyanide	NA	NA	NA	Reproductive	7.73E-06	NA	7.73E-06
			Manganese	NA	NA	NA	Neurological	4.87E-05	NA	4.87E-05
			Nickel	NA	NA	NA	Decreased body and organ weights	1.41E-05	NA	1.41E-05
			Thallium	NA	NA	NA	Hair	1.17E-04	NA	1.17E-04
			Vanadium	NA	NA	NA	Hair	9.60E-05	NA	9.60E-05
			PCBs							
			Total PCBs	7.10E-10	4.53E-09	5.24E-09	Ocular/eye, Nails, Immune	1.24E-04	7.93E-04	9.18E-04
			SVOCs							
			Benzo(a)anthracene	4.69E-11	2.78E-10	3.25E-10	NA	NA	NA	NA
			Benzo(a)pyrene	5.16E-10	3.06E-09	3.58E-09	Developmental	1.20E-05	7.14E-05	8.35E-05
			Benzo(b)fluoranthene	7.71E-11	4.57E-10	5.34E-10	NA	NA	NA	NA
			Benzo(k)fluoranthene	2.82E-12	1.67E-11	1.95E-11	NA	NA	NA	NA
			Chrysene	6.96E-13	4.13E-12	4.82E-12	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	1.18E-10	6.97E-10	8.15E-10	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	4.53E-11	2.68E-10	3.14E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	5.06E-05	NA	5.06E-05
			Chemical Total	1.30E-08	2.86E-08	4.16E-08		1.46E-03	1.79E-03	3.25E-03
		Exposure Point Total				4.16E-08				3.25E-03
	Exposure Medium Total					4.16E-08				3.25E-03
Sediment Total						4.16E-08				3.25E-03
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	8.85E-12	Outside EPD	8.85E-12	Reproductive, Developmental	6.81E-07	Outside EPD	6.81E-07
			Metals							
			Arsenic	1.95E-10	1.94E-10	3.89E-10	Skin, Vascular	3.04E-06	3.02E-06	6.06E-06
			Cobalt	NA	NA	NA	Thyroid	3.81E-06	1.52E-06	5.33E-06
			Manganese	NA	NA	NA	Neurological	6.81E-06	1.69E-04	1.76E-04
			Pesticides							
			4,4'-DDT	7.37E-14	Outside EPD	7.37E-14	Liver	3.04E-09	Outside EPD	3.04E-09
			PCBs							
			Total PCBs	6.27E-13	Outside EPD	6.27E-13	Ocular/eye, Nails, Immune	5.49E-07	Outside EPD	5.49E-07
			Chemical Total	2.05E-10	1.94E-10	3.99E-10		1.49E-05	1.74E-04	1.89E-04
		Exposure Point Total				3.99E-10				1.89E-04
	Exposure Medium Total					3.99E-10				1.89E-04
Surface Water Total						3.99E-10				1.89E-04
Receptor Total						4.20E-08				3.44E-03

Table H-2-10. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index: Sediment	Surface Water	Total
Blood	Antimony, DRO	7.74E-05	--	7.74E-05
Decreased body and organ weights	Nickel	1.41E-05	--	1.41E-05
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	1.45E-03	6.81E-07	1.45E-03
Eye	Total PCBs	9.18E-04	5.49E-07	9.18E-04
Hair	Thallium, Vanadium	2.13E-04	--	2.13E-04
Immune	Total PCBs, Nickel	9.18E-04	5.49E-07	9.18E-04
Kidney	DRO	5.06E-05	--	5.06E-05
Liver	4,4'-DDT, DRO	5.06E-05	3.04E-09	5.06E-05
Mortality	Antimony	2.68E-05	--	2.68E-05
Nails	Total PCBs	9.18E-04	5.49E-07	9.18E-04
Neurological	Aluminum, manganese	9.35E-05	1.76E-04	2.70E-04
Reproductive	TCDD-TEQ, Cyanide	1.37E-03	6.81E-07	1.37E-03
Skin	Arsenic	2.03E-04	6.06E-06	2.09E-04
Thyroid	Cobalt	2.80E-04	5.33E-06	2.85E-04
Vascular	Arsenic	2.03E-04	6.06E-06	2.09E-04

Table H-2-11. CTE
Summary of Receptor Risks and Hazards for COPCs - Teen Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.36E-08	1.10E-08	2.46E-08	Reproductive, Developmental	1.74E-03	1.41E-03	3.15E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.35E-04	NA	1.35E-04
			Antimony	NA	NA	NA	Mortality, Blood	8.10E-05	NA	8.10E-05
			Arsenic	7.20E-09	9.76E-09	1.70E-08	Skin, Vascular	1.87E-04	2.53E-04	4.40E-04
			Cobalt	NA	NA	NA	Thyroid	8.45E-04	NA	8.45E-04
			Cyanide	NA	NA	NA	Reproductive	2.33E-05	NA	2.33E-05
			Manganese	NA	NA	NA	Neurological	1.47E-04	NA	1.47E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	4.26E-05	NA	4.26E-05
			Thallium	NA	NA	NA	Hair	3.53E-04	NA	3.53E-04
			Vanadium	NA	NA	NA	Hair	2.90E-04	NA	2.90E-04
			PCBs							
			Total PCBs	1.29E-09	4.88E-09	6.17E-09	Ocular/eye, Nails, Immune	3.75E-04	1.42E-03	1.80E-03
			SVOCs							
			Benzo(a)anthracene	2.12E-10	7.48E-10	9.60E-10	NA	NA	NA	NA
			Benzo(a)pyrene	2.34E-09	8.24E-09	1.06E-08	Developmental	3.64E-05	1.28E-04	1.65E-04
			Benzo(b)fluoranthene	3.49E-10	1.23E-09	1.58E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	1.28E-11	4.50E-11	5.78E-11	NA	NA	NA	NA
			Chrysene	3.15E-12	1.11E-11	1.43E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	5.32E-10	1.88E-09	2.41E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	2.05E-10	7.22E-10	9.27E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	1.53E-04	NA	1.53E-04
			Chemical Total	2.57E-08	3.85E-08	6.42E-08		4.41E-03	3.22E-03	7.62E-03
		Exposure Point Total				6.42E-08				7.62E-03
	Exposure Medium Total					6.42E-08				7.62E-03
Sediment Total						6.42E-08				7.62E-03
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.74E-11	Outside EPD	3.74E-11	Reproductive, Developmental	4.79E-06	Outside EPD	4.79E-06
			Metals							
			Arsenic	8.25E-10	2.50E-10	1.07E-09	Skin, Vascular	2.14E-05	6.47E-06	2.79E-05
			Cobalt	NA	NA	NA	Thyroid	2.69E-05	3.25E-06	3.01E-05
			Manganese	NA	NA	NA	Neurological	4.80E-05	3.63E-04	4.11E-04
			Pesticides							
			4,4'-DDT	3.12E-13	Outside EPD	3.12E-13	Liver	2.14E-08	Outside EPD	2.14E-08
			PCBs							
			Total PCBs	2.65E-12	Outside EPD	2.65E-12	Ocular/eye, Nails, Immune	3.87E-06	Outside EPD	3.87E-06
			Chemical Total	8.65E-10	2.50E-10	1.11E-09		1.05E-04	3.73E-04	4.78E-04
		Exposure Point Total				1.11E-09				4.78E-04
	Exposure Medium Total					1.11E-09				4.78E-04
Surface Water Total						1.11E-09				4.78E-04
Receptor Total						6.53E-08				8.10E-03

Table H-2-11. CTE
Summary of Receptor Risks and Hazards for COPCs - Teen Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Teen

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

Notes
NA - Not Applicable

Target Organ	**Chemical**	**Target Organ Hazard Index**		
		Sediment	**Surface Water**	**Total**
Blood	Antimony, DRO	2.34E-04	--	2.34E-04
Decreased body and organ weights	Nickel	4.26E-05	--	4.26E-05
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	3.32E-03	4.79E-06	3.32E-03
Eye	Total PCBs	1.80E-03	3.87E-06	1.80E-03
Hair	Thallium, Vanadium	6.42E-04	--	6.42E-04
Immune	Total PCBs, Nickel	1.80E-03	3.87E-06	1.80E-03
Kidney	DRO	1.53E-04	--	1.53E-04
Liver	4,4'-DDT, DRO	1.53E-04	2.14E-08	1.53E-04
Mortality	Antimony	8.10E-05	--	8.10E-05
Nails	Total PCBs	1.80E-03	3.87E-06	1.80E-03
Neurological	Aluminum, manganese	2.82E-04	4.11E-04	6.93E-04
Reproductive	TCDD-TEQ, Cyanide	3.18E-03	4.79E-06	3.18E-03
Skin	Arsenic	4.40E-04	2.79E-05	4.67E-04
Thyroid	Cobalt	8.45E-04	3.01E-05	8.75E-04
Vascular	Arsenic	4.40E-04	2.79E-05	4.67E-04

Table H-2-12. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.41E-08	4.87E-09	1.90E-08	Reproductive, Developmental	5.42E-03	1.87E-03	7.29E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	4.22E-04	NA	4.22E-04
			Antimony	NA	NA	NA	Mortality, Blood	2.53E-04	NA	2.53E-04
			Arsenic	7.48E-09	4.31E-09	1.18E-08	Skin, Vascular	5.82E-04	3.35E-04	9.17E-04
			Cobalt	NA	NA	NA	Thyroid	2.63E-03	NA	2.63E-03
			Cyanide	NA	NA	NA	Reproductive	7.28E-05	NA	7.28E-05
			Manganese	NA	NA	NA	Neurological	4.58E-04	NA	4.58E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	1.33E-04	NA	1.33E-04
			Thallium	NA	NA	NA	Hair	1.10E-03	NA	1.10E-03
			Vanadium	NA	NA	NA	Hair	9.03E-04	NA	9.03E-04
			PCBs							
			Total PCBs	1.34E-09	2.16E-09	3.49E-09	Ocular/eye, Nails, Immune	1.17E-03	1.89E-03	3.06E-03
			SVOCs							
			Benzo(a)anthracene	3.71E-10	5.55E-10	9.25E-10	NA	NA	NA	NA
			Benzo(a)pyrene	4.08E-09	6.11E-09	1.02E-08	Developmental	1.13E-04	1.70E-04	2.83E-04
			Benzo(b)fluoranthene	6.09E-10	9.12E-10	1.52E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	2.23E-11	3.34E-11	5.57E-11	NA	NA	NA	NA
			Chrysene	5.50E-12	8.24E-12	1.37E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	9.30E-10	1.39E-09	2.32E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.58E-10	5.36E-10	8.94E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	4.76E-04	NA	4.76E-04
			Chemical Total	2.93E-08	2.09E-08	5.02E-08		1.37E-02	4.26E-03	1.80E-02
		Exposure Point Total				5.02E-08				1.80E-02
	Exposure Medium Total					5.02E-08				1.80E-02
Sediment Total						5.02E-08				1.80E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.94E-11	Outside EPD	1.94E-11	Reproductive, Developmental	7.47E-06	Outside EPD	7.47E-06
			Metals							
			Arsenic	4.29E-10	6.56E-11	4.94E-10	Skin, Vascular	3.33E-05	5.10E-06	3.84E-05
			Cobalt	NA	NA	NA	Thyroid	4.19E-05	2.56E-06	4.45E-05
			Manganese	NA	NA	NA	Neurological	7.48E-05	2.86E-04	3.61E-04
			Pesticides							
			4,4'-DDT	1.62E-13	Outside EPD	1.62E-13	Liver	3.33E-08	Outside EPD	3.33E-08
			PCBs							
			Total PCBs	1.38E-12	Outside EPD	1.38E-12	Ocular/eye, Nails, Immune	6.03E-06	Outside EPD	6.03E-06
			Chemical Total	4.50E-10	6.56E-11	5.15E-10		1.64E-04	2.94E-04	4.57E-04
		Exposure Point Total				5.15E-10				4.57E-04
	Exposure Medium Total					5.15E-10				4.57E-04
Surface Water Total						5.15E-10				4.57E-04
Receptor Total						5.07E-08				1.85E-02

Table H-2-12. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Swimmer
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Swimmer
Receptor Age: Child

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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index: Sediment	Surface Water	Total
Blood	Antimony, DRO	7.29E-04	--	7.29E-04
Decreased body and organ weights	Nickel	1.33E-04	--	1.33E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	7.58E-03	7.47E-06	7.58E-03
Eye	Total PCBs	3.06E-03	6.03E-06	3.06E-03
Hair	Thallium, Vanadium	2.00E-03	--	2.00E-03
Immune	Total PCBs, Nickel	3.06E-03	6.03E-06	3.06E-03
Kidney	DRO	4.76E-04	--	4.76E-04
Liver	4,4'-DDT, DRO	4.76E-04	3.33E-08	4.76E-04
Mortality	Antimony	2.53E-04	--	2.53E-04
Nails	Total PCBs	3.06E-03	6.03E-06	3.06E-03
Neurological	Aluminum, manganese	8.80E-04	3.61E-04	1.24E-03
Reproductive	TCDD-TEQ, Cyanide	7.37E-03	7.47E-06	7.37E-03
Skin	Arsenic	9.17E-04	3.84E-05	9.56E-04
Thyroid	Cobalt	2.63E-03	4.45E-05	2.68E-03
Vascular	Arsenic	9.17E-04	3.84E-05	9.56E-04

Table H-2-13. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.99E-08	2.73E-08	4.72E-08	Reproductive, Developmental	1.53E-03	2.10E-03	3.63E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.19E-04	NA	1.19E-04
			Antimony	NA	NA	NA	Mortality, Blood	7.14E-05	NA	7.14E-05
			Arsenic	1.06E-08	2.41E-08	3.47E-08	Skin, Vascular	1.65E-04	3.75E-04	5.40E-04
			Cobalt	NA	NA	NA	Thyroid	7.45E-04	NA	7.45E-04
			Cyanide	NA	NA	NA	Reproductive	2.06E-05	NA	2.06E-05
			Manganese	NA	NA	NA	Neurological	1.30E-04	NA	1.30E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	3.75E-05	NA	3.75E-05
			Thallium	NA	NA	NA	Hair	3.11E-04	NA	3.11E-04
			Vanadium	NA	NA	NA	Hair	2.56E-04	NA	2.56E-04
			PCBs							
			Total PCBs	1.89E-09	1.21E-08	1.40E-08	Ocular/eye, Nails, Immune	3.31E-04	2.11E-03	2.44E-03
			SVOCs							
			Benzo(a)anthracene	1.25E-10	7.40E-10	8.64E-10	NA	NA	NA	NA
			Benzo(a)pyrene	1.37E-09	8.15E-09	9.52E-09	Developmental	3.21E-05	1.90E-04	2.22E-04
			Benzo(b)fluoranthene	2.05E-10	1.22E-09	1.42E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	7.51E-12	4.45E-11	5.20E-11	NA	NA	NA	NA
			Chrysene	1.85E-12	1.10E-11	1.28E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	3.13E-10	1.86E-09	2.17E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	1.21E-10	7.15E-10	8.35E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	1.35E-04	NA	1.35E-04
			Chemical Total	3.46E-08	7.62E-08	1.11E-07		3.89E-03	4.77E-03	8.66E-03
		Exposure Point Total				1.11E-07				8.66E-03
	Exposure Medium Total					1.11E-07				8.66E-03
Sediment Total						1.11E-07				8.66E-03
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.79E-11	Outside EPD	1.79E-11	Reproductive, Developmental	1.38E-06	Outside EPD	1.38E-06
			Metals							
			Arsenic	3.96E-10	1.88E-10	5.84E-10	Skin, Vascular	6.16E-06	2.93E-06	9.08E-06
			Cobalt	NA	NA	NA	Thyroid	7.74E-06	1.47E-06	9.21E-06
			Manganese	NA	NA	NA	Neurological	1.38E-05	1.64E-04	1.78E-04
			Pesticides							
			4,4'-DDT	1.50E-13	Outside EPD	1.50E-13	Liver	6.16E-09	Outside EPD	6.16E-09
			PCBs							
			Total PCBs	1.27E-12	Outside EPD	1.27E-12	Ocular/eye, Nails, Immune	1.11E-06	Outside EPD	1.11E-06
			Chemical Total	4.15E-10	1.88E-10	6.03E-10		3.02E-05	1.68E-04	1.99E-04
		Exposure Point Total				6.03E-10				1.99E-04
	Exposure Medium Total					6.03E-10				1.99E-04
Surface Water Total						6.03E-10				1.99E-04
Receptor Total						1.11E-07				8.86E-03

Table H-2-13. CTE
Summary of Receptor Risks and Hazards for COPCs - Adult Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
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

Notes
NA - Not Applicable

Target	Target Organ Hazard Index			
Organ	Chemical	Sediment	Surface Water	Total
Blood	Antimony, DRO	2.06E-04	--	2.06E-04
Decreased body and organ weights	Nickel	3.75E-05	--	3.75E-05
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	3.85E-03	1.38E-06	3.85E-03
Eye	Total PCBs	2.44E-03	1.11E-06	2.44E-03
Hair	Thallium, Vanadium	5.66E-04	--	5.66E-04
Immune	Total PCBs, Nickel	2.44E-03	1.11E-06	2.44E-03
Kidney	DRO	1.35E-04	--	1.35E-04
Liver	4,4'-DDT, DRO	1.35E-04	6.16E-09	1.35E-04
Mortality	Antimony	7.14E-05	--	7.14E-05
Nails	Total PCBs	2.44E-03	1.11E-06	2.44E-03
Neurological	Aluminum, manganese	2.49E-04	1.78E-04	4.27E-04
Reproductive	TCDD-TEQ, Cyanide	3.65E-03	1.38E-06	3.65E-03
Skin	Arsenic	5.40E-04	9.08E-06	5.49E-04
Thyroid	Cobalt	7.45E-04	9.21E-06	7.54E-04
Vascular	Arsenic	5.40E-04	9.08E-06	5.49E-04

Table H-2-14. CTE
Summary of Receptor Risks and Hazards for COPCs - Teen Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	2.30E-08	1.87E-08	4.16E-08	Reproductive, Developmental	2.94E-03	2.39E-03	5.34E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	2.29E-04	NA	2.29E-04
			Antimony	NA	NA	NA	Mortality, Blood	1.37E-04	NA	1.37E-04
			Arsenic	1.22E-08	1.65E-08	2.87E-08	Skin, Vascular	3.16E-04	4.28E-04	7.45E-04
			Cobalt	NA	NA	NA	Thyroid	1.43E-03	NA	1.43E-03
			Cyanide	NA	NA	NA	Reproductive	3.95E-05	NA	3.95E-05
			Manganese	NA	NA	NA	Neurological	2.49E-04	NA	2.49E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	7.21E-05	NA	7.21E-05
			Thallium	NA	NA	NA	Hair	5.97E-04	NA	5.97E-04
			Vanadium	NA	NA	NA	Hair	4.91E-04	NA	4.91E-04
			PCBs							
			Total PCBs	2.18E-09	8.27E-09	1.04E-08	Ocular/eye, Nails, Immune	6.35E-04	2.41E-03	3.05E-03
			SVOCs							
			Benzo(a)anthracene	3.59E-10	1.27E-09	1.63E-09	NA	NA	NA	NA
			Benzo(a)pyrene	3.96E-09	1.40E-08	1.79E-08	Developmental	6.16E-05	2.17E-04	2.79E-04
			Benzo(b)fluoranthene	5.91E-10	2.08E-09	2.67E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	2.16E-11	7.62E-11	9.78E-11	NA	NA	NA	NA
			Chrysene	5.34E-12	1.88E-11	2.41E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	9.02E-10	3.18E-09	4.08E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	3.47E-10	1.22E-09	1.57E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	2.59E-04	NA	2.59E-04
			Chemical Total	4.35E-08	6.53E-08	1.09E-07		7.46E-03	5.45E-03	1.29E-02
		Exposure Point Total				1.09E-07				1.29E-02
	Exposure Medium Total					1.09E-07				1.29E-02
Sediment Total						1.09E-07				1.29E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	2.07E-11	Outside EPD	2.07E-11	Reproductive, Developmental	2.65E-06	Outside EPD	2.65E-06
			Metals							
			Arsenic	4.56E-10	1.55E-10	6.11E-10	Skin, Vascular	1.18E-05	4.01E-06	1.58E-05
			Cobalt	NA	NA	NA	Thyroid	1.49E-05	2.01E-06	1.69E-05
			Manganese	NA	NA	NA	Neurological	2.65E-05	2.25E-04	2.51E-04
			Pesticides							
			4,4'-DDT	1.72E-13	Outside EPD	1.72E-13	Liver	1.18E-08	Outside EPD	1.18E-08
			PCBs							
			Total PCBs	1.47E-12	Outside EPD	1.47E-12	Ocular/eye, Nails, Immune	2.14E-06	Outside EPD	2.14E-06
			Chemical Total	4.79E-10	1.55E-10	6.33E-10		5.80E-05	2.31E-04	2.89E-04
		Exposure Point Total				6.33E-10				2.89E-04
	Exposure Medium Total					6.33E-10				2.89E-04
Surface Water Total						6.33E-10				2.89E-04
Receptor Total						1.09E-07				1.32E-02

Table H-2-14. CTE
Summary of Receptor Risks and Hazards for COPCs - Teen Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Teen

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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index		
		Sediment	**Surface Water**	**Total**
Blood	Antimony, DRO	3.96E-04	--	3.96E-04
Decreased body and organ weights	Nickel	7.21E-05	--	7.21E-05
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	5.62E-03	2.65E-06	5.62E-03
Eye	Total PCBs	3.05E-03	2.14E-06	3.05E-03
Hair	Thallium, Vanadium	1.09E-03	--	1.09E-03
Immune	Total PCBs, Nickel	3.05E-03	2.14E-06	3.05E-03
Kidney	DRO	2.59E-04	--	2.59E-04
Liver	4,4'-DDT, DRO	2.59E-04	1.18E-08	2.59E-04
Mortality	Antimony	1.37E-04	--	1.37E-04
Nails	Total PCBs	3.05E-03	2.14E-06	3.05E-03
Neurological	Aluminum, manganese	4.78E-04	2.51E-04	7.29E-04
Reproductive	TCDD-TEQ, Cyanide	5.38E-03	2.65E-06	5.38E-03
Skin	Arsenic	7.45E-04	1.58E-05	7.60E-04
Thyroid	Cobalt	1.43E-03	1.69E-05	1.45E-03
Vascular	Arsenic	7.45E-04	1.58E-05	7.60E-04

Table H-2-15. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.75E-08	1.30E-08	5.05E-08	Reproductive, Developmental	1.44E-02	4.99E-03	1.94E-02
			Metals							
			Aluminum	NA	NA	NA	Neurological	1.12E-03	NA	1.12E-03
			Antimony	NA	NA	NA	Mortality, Blood	6.72E-04	NA	6.72E-04
			Arsenic	1.99E-08	1.15E-08	3.14E-08	Skin, Vascular	1.55E-03	8.92E-04	2.44E-03
			Cobalt	NA	NA	NA	Thyroid	7.01E-03	NA	7.01E-03
			Cyanide	NA	NA	NA	Reproductive	1.94E-04	NA	1.94E-04
			Manganese	NA	NA	NA	Neurological	1.22E-03	NA	1.22E-03
			Nickel	NA	NA	NA	Decreased body and organ weights	3.53E-04	NA	3.53E-04
			Thallium	NA	NA	NA	Hair	2.93E-03	NA	2.93E-03
			Vanadium	NA	NA	NA	Hair	2.40E-03	NA	2.40E-03
			PCBs							
			Total PCBs	3.56E-09	5.74E-09	9.30E-09	Ocular/eye, Nails, Immune	3.11E-03	5.02E-03	8.14E-03
			SVOCs							
			Benzo(a)anthracene	9.86E-10	1.48E-09	2.46E-09	NA	NA	NA	NA
			Benzo(a)pyrene	1.09E-08	1.63E-08	2.71E-08	Developmental	3.02E-04	4.52E-04	7.54E-04
			Benzo(b)fluoranthene	1.62E-09	2.43E-09	4.05E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	5.94E-11	8.89E-11	1.48E-10	NA	NA	NA	NA
			Chrysene	1.46E-11	2.19E-11	3.66E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	2.47E-09	3.71E-09	6.18E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	9.53E-10	1.43E-09	2.38E-09	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	1.27E-03	NA	1.27E-03
			Chemical Total	7.80E-08	5.56E-08	1.34E-07		3.66E-02	1.14E-02	4.79E-02
		Exposure Point Total				1.34E-07				4.79E-02
	Exposure Medium Total					1.34E-07				4.79E-02
Sediment Total						1.34E-07				4.79E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.69E-11	Outside EPD	1.69E-11	Reproductive, Developmental	6.50E-06	Outside EPD	6.50E-06
			Metals							
			Arsenic	3.73E-10	9.58E-11	4.68E-10	Skin, Vascular	2.90E-05	7.45E-06	3.64E-05
			Cobalt	NA	NA	NA	Thyroid	3.64E-05	3.74E-06	4.02E-05
			Manganese	NA	NA	NA	Neurological	6.50E-05	4.18E-04	4.83E-04
			Pesticides							
			4,4'-DDT	1.41E-13	Outside EPD	1.41E-13	Liver	2.90E-08	Outside EPD	2.90E-08
			PCBs							
			Total PCBs	1.20E-12	Outside EPD	1.20E-12	Ocular/eye, Nails, Immune	5.24E-06	Outside EPD	5.24E-06
			Chemical Total	3.91E-10	9.58E-11	4.87E-10		1.42E-04	4.29E-04	5.71E-04
		Exposure Point Total				4.87E-10				5.71E-04
	Exposure Medium Total					4.87E-10				5.71E-04
Surface Water Total						4.87E-10				5.71E-04
Receptor Total						1.34E-07				4.85E-02

Table H-2-15. CTE
Summary of Receptor Risks and Hazards for COPCs - Child Wader
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Wader
Receptor Age: Child

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

Notes
NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index: Sediment	Surface Water	Total
Blood	Antimony, DRO	1.94E-03	--	1.94E-03
Decreased body and organ weights	Nickel	3.53E-04	--	3.53E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	2.02E-02	6.50E-06	2.02E-02
Eye	Total PCBs	8.14E-03	5.24E-06	8.14E-03
Hair	Thallium, Vanadium	5.33E-03	--	5.33E-03
Immune	Total PCBs, Nickel	8.14E-03	5.24E-06	8.14E-03
Kidney	DRO	1.27E-03	--	1.27E-03
Liver	4,4'-DDT, DRO	1.27E-03	2.90E-08	1.27E-03
Mortality	Antimony	6.72E-04	--	6.72E-04
Nails	Total PCBs	8.14E-03	5.24E-06	8.14E-03
Neurological	Aluminum, manganese	2.34E-03	4.83E-04	2.83E-03
Reproductive	TCDD-TEQ, Cyanide	1.96E-02	6.50E-06	1.96E-02
Skin	Arsenic	2.44E-03	3.64E-05	2.48E-03
Thyroid	Cobalt	7.01E-03	4.02E-05	7.05E-03
Vascular	Arsenic	2.44E-03	3.64E-05	2.48E-03

Table H-2-16. CTE
Summary of Receptor Risks and Hazards for COPCs - Shoreline Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Shoreline 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	Fringe Surface Sediment	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	3.80E-08	2.42E-08	6.22E-08	Reproductive, Developmental	4.43E-03	2.81E-03	7.25E-03
			Metals							
			Aluminum	NA	NA	NA	Neurological	3.45E-04	NA	3.45E-04
			Antimony	NA	NA	NA	Mortality, Blood	2.07E-04	NA	2.07E-04
			Arsenic	2.02E-08	2.14E-08	4.16E-08	Skin, Vascular	4.76E-04	5.04E-04	9.80E-04
			Cobalt	NA	NA	NA	Thyroid	2.15E-03	NA	2.15E-03
			Cyanide	NA	NA	NA	Reproductive	5.95E-05	NA	5.95E-05
			Manganese	NA	NA	NA	Neurological	3.75E-04	NA	3.75E-04
			Nickel	NA	NA	NA	Decreased body and organ weights	1.09E-04	NA	1.09E-04
			Thallium	NA	NA	NA	Hair	8.99E-04	NA	8.99E-04
			Vanadium	NA	NA	NA	Hair	7.39E-04	NA	7.39E-04
			PCBs							
			Total PCBs	3.61E-09	1.07E-08	1.43E-08	Ocular/eye, Nails, Immune	9.57E-04	2.83E-03	3.79E-03
			SVOCs							
			Benzo(a)anthracene	2.38E-10	6.55E-10	8.93E-10	NA	NA	NA	NA
			Benzo(a)pyrene	2.62E-09	7.22E-09	9.84E-09	Developmental	9.28E-05	2.55E-04	3.48E-04
			Benzo(b)fluoranthene	3.92E-10	1.08E-09	1.47E-09	NA	NA	NA	NA
			Benzo(k)fluoranthene	1.43E-11	3.94E-11	5.37E-11	NA	NA	NA	NA
			Chrysene	3.54E-12	9.73E-12	1.33E-11	NA	NA	NA	NA
			Dibenzo(a,h)anthracene	5.97E-10	1.64E-09	2.24E-09	NA	NA	NA	NA
			Indeno(1,2,3-cd)pyrene	2.30E-10	6.33E-10	8.63E-10	NA	NA	NA	NA
			TPH							
			Diesel Range Organics (C10-C20)	NA	NA	NA	Liver, Kidney, Blood	3.90E-04	NA	3.90E-04
			Chemical Total	6.59E-08	6.75E-08	1.33E-07		1.12E-02	6.41E-03	1.76E-02
		Exposure Point Total				1.33E-07				1.76E-02
	Exposure Medium Total					1.33E-07				1.76E-02
Sediment Total						1.33E-07				1.76E-02
Surface Water	Surface Water	Waterside Investigation Area	**Dioxin**							
			2,3,7,8-TCDD-TEQ	1.71E-11	Outside EPD	1.71E-11	Reproductive, Developmental	2.00E-06	Outside EPD	2.00E-06
			Metals							
			Arsenic	3.78E-10	3.33E-10	7.11E-10	Skin, Vascular	8.90E-06	7.85E-06	1.68E-05
			Cobalt	NA	NA	NA	Thyroid	1.12E-05	3.95E-06	1.51E-05
			Manganese	NA	NA	NA	Neurological	2.00E-05	4.40E-04	4.60E-04
			Pesticides							
			4,4'-DDT	1.43E-13	Outside EPD	1.43E-13	Liver	8.90E-09	Outside EPD	8.90E-09
			PCBs							
			Total PCBs	1.21E-12	Outside EPD	1.21E-12	Ocular/eye, Nails, Immune	1.61E-06	Outside EPD	1.61E-06
			Chemical Total	3.96E-10	3.33E-10	7E-10		4.37E-05	4.52E-04	4.96E-04
		Exposure Point Total				7.29E-10				4.96E-04
	Exposure Medium Total					7.29E-10				4.96E-04
Surface Water Total						7.29E-10				4.96E-04
Receptor Total						1.34E-07				1.81E-02

Table H-2-16. CTE
Summary of Receptor Risks and Hazards for COPCs - Shoreline Worker
Central Tendency Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Shoreline 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

Notes

NA - Not Applicable

Target Organ	Chemical	Target Organ Hazard Index		
		Sediment	**Surface Water**	**Total**
Blood	Antimony, DRO	5.96E-04	--	5.96E-04
Decreased body and organ weights	Nickel	1.09E-04	--	1.09E-04
Developmental	2,3,7,8-TCDD-TEQ, Benzo(a)pyrene	7.60E-03	2.00E-06	7.60E-03
Eye	Total PCBs	3.79E-03	1.61E-06	3.79E-03
Hair	Thallium, Vanadium	1.64E-03	--	1.64E-03
Immune	Total PCBs, Nickel	3.79E-03	1.61E-06	3.79E-03
Kidney	DRO	3.90E-04	--	3.90E-04
Liver	4,4'-DDT, DRO	3.90E-04	8.90E-09	3.90E-04
Mortality	Antimony	2.07E-04	--	2.07E-04
Nails	Total PCBs	3.79E-03	1.61E-06	3.79E-03
Neurological	Aluminum, manganese	7.20E-04	4.60E-04	1.18E-03
Reproductive	TCDD-TEQ, Cyanide	7.31E-03	2.00E-06	7.31E-03
Skin	Arsenic	9.80E-04	1.68E-05	9.96E-04
Thyroid	Cobalt	2.15E-03	1.51E-05	2.17E-03
Vascular	Arsenic	9.80E-04	1.68E-05	9.96E-04

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Alternate Diet Risk Calculation Table

Table H-3-1. RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - Angler
Reasonable Maximum Exposure
Benning Road Facility RI/FS Project
3400 Benning Rd, N.E., Washington DC 20019

Scenario Timeframe: Current/Future
Receptor Population: Angler
Receptor Age: Child and Adult

Receptor	Medium/ Exposure Medium/Exposure Route	Exposure Point	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Young Child	Fish Fillet Tissue	Upper Anacostia													
	Ingestion	*Mixed diet (1)*	*Total PCBs*	*3.6E-01*	*mg/kg*	*5.5E-06*	*mg/kg-day*	*2.0E+00*	*kg-day/mg*	*1.1E-05*	*6.4E-05*	*mg/kg-day*	*2.0E-05*	*mg/kg-day*	*3.2E+00*
		100% catfish (2)	Total PCBs	2.5E-01	mg/kg	3.9E-06	mg/kg-day	2.0E+00	kg-day/mg	7.8E-06	4.5E-05	mg/kg-day	2.0E-05	mg/kg-day	2.3E+00
		100% carp (2)	Total PCBs	6.8E-01	mg/kg	1.0E-05	mg/kg-day	2.0E+00	kg-day/mg	2.1E-05	1.2E-04	mg/kg-day	2.0E-05	mg/kg-day	6.1E+00
		100% largemouth bass (2)	Total PCBs	1.2E-01	mg/kg	1.8E-06	mg/kg-day	2.0E+00	kg-day/mg	3.7E-06	2.1E-05	mg/kg-day	2.0E-05	mg/kg-day	1.1E+00
		100% sunfish (2)	Total PCBs	4.2E-02	mg/kg	6.4E-07	mg/kg-day	2.0E+00	kg-day/mg	1.3E-06	7.5E-06	mg/kg-day	2.0E-05	mg/kg-day	3.8E-01
		100% northern snakehead (2)	Total PCBs	5.0E-02	mg/kg	7.7E-07	mg/kg-day	2.0E+00	kg-day/mg	1.5E-06	9.0E-06	mg/kg-day	2.0E-05	mg/kg-day	4.5E-01
		50% catfish & 50% largemouth bass (3)	Total PCBs	1.9E-01	mg/kg	2.9E-06	mg/kg-day	2.0E+00	kg-day/mg	5.7E-06	3.3E-05	mg/kg-day	2.0E-05	mg/kg-day	1.7E+00

Receptor	Medium/ Exposure Medium	Exposure Point	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF Value	CSF Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD Value	RfD Units	Hazard Quotient
Adult	Mixed	Upper Anacostia													
		Mixed diet (1)	*Total PCBs*	*3.6E-01*	*mg/kg*	*1.1E-05*	*mg/kg-day*	*2.0E+00*	*kg-day/mg*	*2.2E-05*	*3.9E-05*	*mg/kg-day*	*2.0E-05*	*mg/kg-day*	*2.0E+00*
		100% catfish (2)	Total PCBs	2.5E-01	mg/kg	7.9E-06	mg/kg-day	2.0E+00	kg-day/mg	1.6E-05	2.8E-05	mg/kg-day	2.0E-05	mg/kg-day	1.4E+00
		100% carp (2)	Total PCBs	6.8E-01	mg/kg	2.1E-05	mg/kg-day	2.0E+00	kg-day/mg	4.2E-05	7.4E-05	mg/kg-day	2.0E-05	mg/kg-day	3.7E+00
		100% largemouth bass (2)	Total PCBs	1.2E-01	mg/kg	3.7E-06	mg/kg-day	2.0E+00	kg-day/mg	7.5E-06	1.3E-05	mg/kg-day	2.0E-05	mg/kg-day	6.5E-01
		100% sunfish (2)	Total PCBs	4.2E-02	mg/kg	1.3E-06	mg/kg-day	2.0E+00	kg-day/mg	2.6E-06	4.6E-06	mg/kg-day	2.0E-05	mg/kg-day	2.3E-01
		100% northern snakehead (2)	Total PCBs	5.0E-02	mg/kg	1.6E-06	mg/kg-day	2.0E+00	kg-day/mg	3.1E-06	5.4E-06	mg/kg-day	2.0E-05	mg/kg-day	2.7E-01
		50% catfish & 50% largemouth bass (3)	Total PCBs	1.9E-01	mg/kg	5.8E-06	mg/kg-day	2.0E+00	kg-day/mg	1.2E-05	2.0E-05	mg/kg-day	2.0E-05	mg/kg-day	1.0E+00

Notes:
CSF - Cancer Slope Factor.
EPC - Exposure Point Concentration.
PCB - Polychlorinated Biphenyl.
RfD - Oral Reference Dose.

(1) Baseline diet. Assumes a mixed fish diet of the species with available fillet data based on a pooled EPC. See Table 3-8.
(2) Based on maximum concentration for this species.
(3) Based on the average of the maximum values for catfish and largemouth bass.