Appendix C.7

Human Health and Ecological Risk Assessment

Crawford Nickel Project Technical Data Report – Human Health and Ecological Risk Assessment

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Prepared for:

Canada Nickel Company

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Limitations and Sign-off

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Executive Summary

Canada Nickel Company Incorporated (Canada Nickel) proposes to develop, construct, operate, and progressively reclaim a new open pit nickel mine and processing facility, collectively known as the Crawford Nickel Project ('the Project'), approximately 42 kilometres (km) north of Timmins, Ontario along Highway 655 (the Project). Stantec Consulting Ltd. (Stantec) has been retained by Canada Nickel to conduct this Human Health and Ecological Risk Assessment (HHERA), which has been completed to inform the Impact Statement. The Impact Statement is intended to satisfy the federal impact assessment process under the *Impact Assessment Act*, 2019 (IAA) and project-specific requirements contained in the Tailored Impact Statement Guidelines (TIS Guidelines) for the Project, dated March 31, 2023 (refer to Appendix A.1 of the Impact Statement).

Human Health and Ecological Risk Assessment Methods

In the HHERA, health risk to human and ecological receptors from exposure to contaminants of potential concern (CoPC) in environmental media (e.g., air, soil, water, and biota) was assessed. The HHERA consists of two components: a human health risk assessment (HHRA) and an ecological risk assessment (ERA). The HHRA characterizes the short-term (acute) and long-term (chronic) health risk to people, while the ERA characterizes the potential chronic risk to a species population, a community of multiple species, or an individual within a species (applicable to rare and endangered species).

In the context of an Impact Assessment for major infrastructure projects, the HHERA evaluates the potential change in health risk to people and ecological receptors that may occur between baseline environmental conditions and estimated future conditions, during the various phases of the Project. Baseline environmental conditions may be based on historical monitoring data, measured data collected during baseline studies, or modelled data. Future conditions are based on modelled environmental conditions that reflect the influence of Project activities. As such, the HHERA considers three scenarios in evaluating the potential changes in human and ecological health risks.

- **Baseline Scenario**: evaluates the existing exposures and health risks based on the measured chemical concentrations in environmental media (air, soil, surface water, sediment, plants, small prey, and fish).
- **Project Alone Scenario**: evaluates health risks associated with exposure to estimated chemical concentrations in environmental media that are attributable only to project activities (i.e. these do not consider the contribution that Baseline Scenario concentrations make to overall exposure).
- **Baseline Plus Project Scenario**: evaluates the future health risks based on the estimated chemical concentrations in environmental media, as determined through detailed modelling from other VC chapters (e.g. air quality, water quality).

Baseline and Modelled Future Concentrations

To evaluate the potential health risks from chemicals potentially released by Project-related activities, the concentrations of the chemicals in environmental media (such as air, soil, surface water, sediment, and food items) were determined for each assessed scenario (i.e., Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario). These concentrations, called exposure point concentrations (EPCs), were used to calculate exposures for human and ecological receptors to CoPC identified in the HHRA and ERA, respectively.

For the Baseline Scenario, EPCs were estimated using measured baseline data for air, soil, surface water, terrestrial vegetation, sediment, fish tissue, and aquatic vegetation. Additional baseline EPCs for wild meat (moose, deer, rabbit, beaver, grouse, duck, and goose) were estimated using a dietary exposure modelling approach that incorporates the Baseline Scenario EPCs for soil, surface water, sediment, and applicable dietary items.

Human Health Risk Assessment (HHRA)

The Regional Study Area (RSA) consists of patented lands (privately owned), Crown land, provincial parks, conservation reserves and First Nation Reserves and encompasses the City of Timmins, Town of Cochrane, Town of Iroquois Falls, and Town of Smooth Rock Falls. The land within and immediately surrounding the Project Area is predominantly made up of wetlands, forested areas, and to a lesser extent, lakes, rivers and ponds. Activities conducted around the Project Area include hunting, trapping, fishing, and gathering, seasonal living and recreational water use (e.g., canoeing). Based on the above, two types of representative human receptors were identified to be present within the Local Study Area (LSA):

- **Indigenous Receptors** –Indigenous people who may live within the LSA seasonally or make use of the lands within the LSA/RSA for the harvesting of country foods, or who use the areas for recreational, ceremonial and/or spiritual purposes. This group was assumed to be an infant, toddler, child, teen, or adult.
- **Recreational Receptors** – Non-Indigenous people who may live within the LSA seasonally or make use of the lands within the LSA/RSA for harvesting country foods and/or recreational activities. This group was assumed to be an infant, toddler, child, teen, or adult.

Human receptors could come into contact with Project-related CoPCs through inhalation and multimedia exposure pathways.

In terms of inhalation, the risk assessment demonstrated that Project-related contaminants in air are not likely to be greater than the applicable health-based exposure limits and toxicity reference values at locations where people are expected to be present for extended periods of time (including overnight stays or beyond). However, given that some identified CoPCs are non-threshold contaminants for which any increase in exposure could result in increased health effects (e.g., $PM_{2.5}$), it is recommended that reasonable mitigations be undertaken to minimize releases of CoPCs to the environment during Project operations and that monitoring be undertaken to more accurately evaluate exposures. Specific additional mitigation measures that may be identified through the provincial permitting process for air emissions (i.e., Environmental Compliance Approval) and detailed design are discussed in Chapter 12 (Assessment of Potential Effects on the Atmospheric Environment) of the Impact Statement.

The assessment also considered multimedia exposures to Indigenous Receptors and Recreational Receptors while they engaged in activities within the LSA. This included exposures within the North Driftwood River, West Buskegau River, and Jocko Creek watersheds. It was assumed that these receptors would have direct contact with soil, drink surface water, and consume fish, wild meat, and vegetation from the LSA.

The quantitative risk characterization compared estimated exposures to the CoPC for each of the receptors with the toxicity reference values. This involved the calculation of either hazard quotients (HQ) or incremental lifetime cancer risks (ILCR).

Project-related risk estimates for arsenic were identified above targets for the North Driftwood River and West Buskegau River watersheds, while Project-related risk estimates were below targets for the Jocko Creek watershed. The risk estimates for arsenic are primarily affected by exposures resulting from modelled changes in surface water, specifically through fish and potable water consumption. However, given that studies indicate most of the arsenic in fish is in a relatively non-toxic form, that modelled concentrations in fish tissues were below Health Canada maximum levels, and that concentrations in water meet guidelines for Canadian drinking water quality, it is expected that Project-related activities would not result in unacceptable health risk for people in the LSA. Because risk estimates are based on modelled concentrations, monitoring of arsenic in surface water and fish in each watershed assessed would better represent changes in exposure.

Ecological Risk Assessment (ERA)

Ecological receptors selected for the ERA are mammals, birds, herptiles, as well as community-based receptors that can be expected in the LSA/RSA. Species at Risk (SAR) and Species of Conservation Concern (SOCC) were also considered. For the purpose of this ERA, the primary assessment endpoints were the protection of populations and communities for standard species (i.e., not species at risk) and the protection of individuals for species at risk. Potential risks to ecological receptors were assessed for the LSA according to three watersheds: North Driftwood River watershed, West Buskegau River watershed, and Jocko Creek watershed. In addition to multimedia exposures to metals, potential plant exposures to NO_2 and SO_2 were assessed.

The quantitative risk characterization compared estimated exposures to the CoPC for each of the receptors with the toxicity reference values. This involved the calculation of HQ that were then compared to a target HQ of 1.0. Calculated HQs were less than 1.0 for most CoPCs and most ecological receptors, including community receptors, assessed across the three watersheds assessed. In some cases, HQs were greater than the threshold of 1.0 in the Baseline scenario and the Baseline Plus Project scenario. However, the differences between HQs for the Baseline scenario and the Baseline Plus Project scenario (i.e., the Project Alone scenario) were less than 1.0 for most CoPCs and most ecological receptors assessed in the three watersheds assessed, suggesting that the Project-related risks for ecological receptors are expected to be negligible for most CoPCs.

For mammals and birds, HQs greater than 1.0 were calculated for the Project Alone scenario for nickel in all three watersheds for the masked shrew (standard and representative of SAR) and the barn swallow. However, given the conservative assumptions made during modelling and that the geology of the area exhibits elevated concentrations of nickel in soil, unacceptable risks to these receptors from exposure to nickel as well as other CoPCs are not expected. Further, their overall exposure to nickel (and several other metals) is mainly due to the terrestrial invertebrate ingestion pathway. As such, sampling and analysis of metals in terrestrial invertebrates could support refinements of assumptions associated with this pathway. Monitoring of nickel concentrations in terrestrial invertebrates (both earthworms and flying insects) would better represent changes in exposure for the masked shrew, the barn swallow, and those species they represent.

For herptiles and community receptors, Project-related risks for herptiles as well as terrestrial invertebrate, terrestrial plant, benthic, and freshwater aquatic communities are expected to be negligible for CoPCs assessed. However, it is noted that monitoring of metals, including tungsten and uranium, in surface water and sediment would better represent changes in exposures for benthic and freshwater aquatic communities.

North Driftwood Diversion Channel

The North Driftwood Diversion Channel is one of the non-contact water diversions that are part of the water management system for the Project. The realignment of the North Driftwood River channel may lead to the flooding of organic soils within the main channel excavation which could release mercury from wetlands and organic soil riparian areas. Mercury methylation due to wetland flooding was identified as a specific concern during consultation. As such, special consideration was given to evaluating changes in mercury and methyl mercury concentrations in surface water and how these changes are reflected in methyl mercury concentrations in fish tissue associated the North Driftwood River channel realignment.

The fish species evaluated for mercury changes related to the North Driftwood River channel realignment are the same as those considered for the North Driftwood River and included both angling fish for human exposures and forage fish for ecological exposures. Uptake of both mercury and methyl mercury was considered, assuming mercury fully converts to methyl mercury in fish tissue.

Changes in methyl mercury concentration in angling and forage fish consumed is calculated to be low (approximately 4%) and are not expected to markedly increase potential exposures to methyl mercury through fish consumption for both humans and ecological receptors. While Project-related activities are not expected to result in increased concentrations of mercury in the environment, the presence of mercury in fish is a regional concern. The Baseline Scenario mercury concentrations in angling fish tissue are greater than Health Canada standard of 0.5 mg/kg and there are fish consumption advisories in the area. People who consume fish from the LSA should follow the fish consumption advisory. The Baseline Scenario methyl mercury concentrations in forage fish tissue are also greater than the Canadian Tissue

Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota which are intended to protect wildlife species (ecological receptors) consuming aquatic biota.

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Acronyms and Abbreviations

AAQC	Ontario Ambient Air Quality Criteria
CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CO	Carbon Monoxide
CSA	Canadian Standards Association
CSQG	Canadian Soil Quality Guidelines
CoPC	Contaminants of Potential Concern
DPM	Diesel Particulate Matter
EPC	Exposure Point Concentrations
ERA	Ecological Risk Assessment
FCSAP	Federal Contaminated Sites Action Plan
FDP	Final Discharge Point
GCDWQ	Guidelines for Canadian Drinking Water Quality
HHERA	Human Health and Ecological Risk Assessment
HHRA	Human Health Risk Assessment
HQ	Hazard Quotients
ILCR	Incremental Lifetime Cancer Risks
IRIS	Integrated Risk Information System
IUR	Inhalation Unit Risk
LSA	Local Study Area
MECP	Ministry of the Environment, Conservation and Parks

NAPS	National Air Pollution Surveillance
NIOSH	National Institute for Occupational Safety and Health
NO_2	Nitrogen Dioxide
NOAEC	No Observed Adverse Effect Concentration
PAH	Polycyclic Aromatic Hydrocarbons
PHC	Petroleum Hydrocarbons
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PWQO	Provincial Water Quality Objective
RDL	Reportable Detection Limits
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
RSA	Regional Study Area
RSL	Regional Screening Levels
RfC	Reference Concentrations
SAR	Species at Risk
SF	Slope Factor
SO_2	Sulphur Dioxide
SOCC	Species of Conservation Concern
TEEL	Temporary Emergency Exposure Limits
TMF	Tailings Management Facility
TRV	Toxicity Reference Values
US EPA	United States Environmental Protection Agency
USDA	U.S. Department of Agriculture

VC	Valued Component
VOC	Volatile Organic Compounds
WHO	World Health Organization

1 Introduction

Canada Nickel Company (Canada Nickel) proposes to develop, operate, and progressively reclaim the Crawford Nickel Project ('the Project'), a new open pit nickel mine and processing facility approximately 42 kilometres (km) north of Timmins, Ontario along Highway 655. The Project is being assessed in accordance with the *Impact Assessment Act*, 2019.

Stantec Consulting Ltd. (Stantec) has been retained by Canada Nickel to complete an assessment of the potential change in risk for human and ecological receptors as a result of the Project. This Technical Data Report – Human Health and Ecological Risk Assessment (HHERA) has been prepared pursuant to the *Impact Assessment Act,* 2019 and in consideration of the Tailored Impact Statement Guidelines: Crawford Nickel Project (TIS Guidelines; Appendix A.1 of the Impact Statement). Figures referenced throughout this report are provided in Appendix A of this report.

The construction, operations, and decommissioning and closure of the Project have the potential to alter baseline conditions with respect to the concentrations of chemicals in the air, soil, water, and biota near the Project. These changes to the environment have the potential to adversely affect the health of human receptors and ecological receptors (terrestrial and aquatic wildlife, and communities of fish, vegetation, and invertebrates). The HHERA characterizes the change in exposure to Project-related chemicals that human and ecological receptors may experience between baseline (existing conditions) and modelled data for the future conditions, to quantify the potential change to human health and ecological risk that may be attributed to the Project.

The methods and guidance published by Health Canada were used to assess the human health risks, while those published by the Canadian Council of Ministers of the Environment (CCME) and the Federal Contaminated Sites Action Plan (FCSAP) were used to assess the ecological health risk. Details of the approach followed for the HHERA are explained in Section 7 and Section 8.

The conclusions of this HHERA regarding human health are included in Chapter 21 of the Impact Statement (Assessment of Potential Effects on Health), while the conclusions regarding ecological health are included in Chapter 17 (Assessment of Potential Effects on Fish and Fish Habitat) and Chapter 19 (Assessment of Potential Effects on Wildlife and Wildlife Habitat) of the Impact Statement.

1.1 Study Objectives

The objective of the HHERA is to address the potential change in risk for human and ecological receptors within the Local Study Area (LSA) and Regional Study Area (RSA) as a result of Project-related activities during construction, operations, and decommissioning and closure, as they relate to some of the biophysical determinants of health (i.e., environmental conditions that can influence health like air and water quality, and quality of country/traditional foods).

1.2 Project Overview

The Project includes the development of an Open Pit, Stockpiles, two ore Processing Plants, and other mine-related infrastructure, as well as a new rail spur line and the relocation of Highway 655 and an existing 500 kilovolt (kV) transmission line. Ore will be extracted from a single Open Pit that will be divided into an East Zone and Main Zone. The projected maximum depth of the Open Pit is 690 metres (m). The Project has a mineral reserve estimate of 1,715 million tonnes (Mt) and an expected project life of 41 years.

The Project is located approximately 42 km north of the City of Timmins, Ontario, in the geographic Townships of Crawford, Carnegie, Kidd, Lucas, Beck, Nesbitt, Wark and Prosser. A small portion of the Project extent within Kidd Township also lies within the municipal boundary of the City of Timmins.

Based on the current Project design, the maximum rate of ore extraction will be up to 240,000 tonnes per day (tpd) during Year 5 of operations and an average rate of 160,000 tpd over the life of mine. The two ore Processing Plants and associated service facilities will process run of mine ore delivered to primary crushers to produce nickel concentrate, iron concentrate, and tailings at a rate of approximately 60,000 tpd at the start of mine life, ramping up to a maximum of 120,000 tpd. In addition to nickel and iron, other metals such as cobalt, chromium, palladium and platinum are expected to be recovered from concentrate streams.

Based on the proposed processing rate and current information regarding the ore body, the current life of the proposed Project is expected to be approximately 41 years. Mining would be completed at a faster pace than milling, thus mining of ore would occur for about 30 years, then milling alone for the last 11 years.

Concentrate from the processing plants will be loaded onto rail cars and shipped via the rail spur line for refinement offsite.

1.3 Key Project Activities

The timing of activities and installation of Project components will occur in sequence to allow for the efficient extraction of materials. Various construction, operations, and decommissioning activities are proposed throughout the life of the mine. For the purposes of the assessment, these Project activities are anticipated to be advanced in three phases:

- Construction (Year -3 to Year -1)
- Operations
  - Operations phase 1 (Year 1 to Year 5): 60 kilotons per day (kt/d) milling capacity with ore extraction
  - Operations phase 2 (Year 5 to Year 30): 120 kt/d milling capacity with ore extraction
  - Operations phase 3 (Year 30 to Year 41): 120 kt/d milling capacity with no ore extraction
- Decommissioning and closure

- Active closure (Year 41 to Year 46)
- Passive closure (Year 46+)

1.3.1 Construction Phase

The construction phase will include the preparation of the site up to the point at which the first process plant has been commissioned and is ready to commence operations. This phase will include site preparation, physical construction, pre-production, and commissioning activities. Construction is anticipated to begin in the Main Zone and East Zone, and rock extracted at this time may be crushed into aggregate using a mobile aggregate crusher for use during the construction of roads and other infrastructure, as necessary.

Additional construction will occur through the operations phase of the Project, which begins with the start of ore processing.

1.3.2 Operations Phase

The operations phase is focused on the active processing of ore and generation of concentrate for delivery to market, specifically operation of the Process Plant(s). Due to the sequential nature of the mine operations, the operations phase of the Project has been divided into 3 sub-phases based on the open pit extraction schedule and sequential operation of the two Process Plants.

The three sub-phases of the operations phase include:

- <u>Operations phase 1</u> – This phase includes the operation of the first of two process plants that will be operating at an ore processing capacity of approximately 60 kt/day (or 21.9 Mt/a). In process tailings (IPT) carbonation within the process plant may also commence if a carbon dioxide (CO_2) source is available. Mining operations during this phase will produce more ore than the Process Plant can process, with surplus material to be stockpiled in the East Stockpile location for future processing. Construction will continue during this phase to expand and construct the second process plant and other supporting mine infrastructure, including the Highway 655 realignment. Material will begin to be stored within the West Stockpile at the end of this phase.
- <u>Operations phase 2</u> – This phase includes the operation of both process plants at an ore processing capacity of approximately 120 kt/d (or 43.8 Mt/a), including IPT carbonation. Mining operations during this phase will produce up to 240 kt/day of ore, which exceeds the processing capacity of the plants. Low grade ore will continue to be stockpiled in the East and/or the West Ore Stockpiles.
- <u>Operations phase 3</u> – This phase includes continuation of the operation of both process plants at an ore processing capacity of approximately 120 kt/d (or 43.8 Mt/a) following completion of mining operations (e.g., no further extraction of ore from the pits). The process plants, including IPT carbonation, will continue to operate by processing the ore stockpiled during operations phase 1 and 2. As mine operations cease, there will be an opportunity for progressive reclamation of the pits, haul routes, and other no longer used areas of the Project site.

1.3.3 Decommissioning and Closure Phase

Following the completion of ore processing, all Project operations will cease, and active closure will commence. Active closure includes the removal of buildings, structures, and other infrastructure, as well as reclamation and site stabilization activities. Once complete, the Project will then enter a passive closure phase as the pit lake fills. During this time, closure monitoring and adaptive mitigation will occur. Following pit lake filling, the Project site will be permanently closed.

Activities completed during the decommissioning and closure phase of the Project are focused on reclaiming the environments, establishing physical, chemical, and biological stability at the site, and to meet desired end land functions and uses. The Mine Development Closure Plan will be updated throughout the life of the Project as necessary to reflect the environmental requirements in place at the time of closure. The Mine Development Closure Plan will be prepared, refined, and implemented in accordance with the Ontario *Mining Act* and Ontario Regulation 35/24.

Progressive reclamation throughout the course of the mine life will occur, but the majority of the closure activities will commence at the cessation of mining activities and will be completed five years after ore processing ceases. Ongoing closure monitoring and maintenance activities will continue throughout both the active and passive closure phases until the closure objectives have been satisfied and the Project has been moved to a closed out and abandoned status.

1.3.4 North Driftwood Diversion Channel

The North Driftwood Diversion Channel is one of the non-contact water diversions that are part of the water management system for the Project. The objectives of the North Driftwood Diversion Channel are:

1) Re-direct flow in the North Driftwood River from Martin Lake westward then northward along the realigned Highway 655 corridor and to convey this flow back to the North Driftwood River downstream of the Project site.

2) Provide appropriate opportunities for fish habitat offsetting, in consideration of the environmental effects of the North Driftwood Diversion Channel.

As noted in the Surface Water Resources Assessment (Appendix C.5 of the Impact Statement), the realignment of the North Driftwood Diversion Channel may lead to the flooding of organic soils within the main channel excavation. This flooding could release mercury from wetlands and organic soil riparian areas, which can be uptaken by primary producer microorganisms. In anaerobic conditions, such as those found in wetlands, mercury can then be converted to methyl mercury. Both mercury and methyl mercury can then biomagnify through the food chain. Mercury can be further converted to methyl mercury within fish tissues, which are subsequently consumed by people and wildlife (Hall & St. Louis, 2004; Hall B. , et al., 2005; US EPA, 2005). The Surface Water Resources Assessment (Appendix C.5 of the Impact Statement) highlighted mercury methylation due to wetland flooding as a specific concern identified during consultation. As such, special consideration is given to evaluating changes in mercury and methyl mercury concentrations in surface water and how these changes are reflected in methyl mercury concentrations in fish tissue associated the North Driftwood Diversion Channel.

2 Study Area

The Project comprises approximately 11,785 hectares (ha) along Highway 655, approximately 42 km north of the City of Timmins, Ontario. The Project is located mostly within the Geographic Townships of Crawford and Lucas, with elements also in the Townships of Nesbitt, Beck, Carnegie, and Prosser. The proposed Highway 655 realignment and rail spur line extend into the geographic Townships of Kidd and Wark (which are considered to be part of the City of Timmins).

2.1 Project Area

The **Project Area (PA)** includes the Project footprint and is the anticipated area of physical disturbance associated with the construction, operations, and decommissioning/closure of the Project. The PA is shown on Figure A.1, Appendix A.

2.2 Local Study Area

The **Local Study Area (LSA)** includes the area in which Project-related effects (direct or indirect) as they relate to some of the biophysical determinants of health (i.e., air and water quality, and quality of country/traditional foods) that can be modelled or measured with a level of confidence appropriate for the assessment and in which there is a reasonable expectation that the potential effects in the LSA are of public interest. The LSA includes the PA and, to capture effects of the specific environmental components being assessed, includes the spatial boundaries outlined in the Acoustic Environment LSA, Surface Water LSA, Fish Habitat LSA, Atmospheric Environment LSA, and Indigenous Interest LSA as shown on Figure A.1, Appendix A.

2.3 Regional Study Area

The **Regional Study Area (RSA)** includes the area within which cumulative effects on health conditions as they relate to some of the biophysical determinants of health are likely to occur, depending on the location of other past, present, or reasonably foreseeable future projects or activities. The RSA includes the Surface water RSA, Fish Habitat RSA, Wildlife Habitat RSA, Atmospheric Environment RSA, and Indigenous Interest RSA (Figure A.1, Appendix A).

3 Regulatory Setting

As noted in the TIS Guidelines, a human health risk assessment (HHRA) is required to address potential changes to human health as a result of proposed Project activities. Health Canada provides general guidance for conducting HHRA and assessing human health affects in Impact Assessments, namely:

- Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment (Health Canada, 2023a).
- Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality (Health Canada, 2023b).
- Guidance for Evaluating Human Health Effects in Impact Assessment: Country Foods (Health Canada, 2023c).
- Guidance for Evaluating Human Health Effects in Impact Assessment: Drinking and Recreational Water Quality (Health Canada, 2023d).

The HHRA guidance applicable to federal contaminated sites in Canada was also considered as needed, including:

- Federal Contaminated Site Risk Assessment in Canada: Guidance on Human Health Preliminary Quantitative Risk Assessment, Version 3.0 (Health Canada, 2021a).
- Federal Contaminated Sites Risk Assessment in Canada, Part V: Guidance on Complex Human Health Detailed Quantitative Risk Assessment for Chemicals ($DQRA_{CHEM}$) (Health Canada, 2010a).
- Federal Contaminated Site Risk Assessment in Canada: Supplemental Guidance on Human Health Risk Assessment for Country Foods ($HHRA_{Foods}$) (Health Canada, 2010b).
- Federal Contaminated Site Risk Assessment in Canada: Toxicological Reference Values (TRVs), Version 3.0 (Health Canada, 2021b).

For assessing the ecological risk assessment (ERA), the following federal contaminated sites guidance was also considered as needed:

- Ecological Risk Assessment Guidance Document – Canadian Council of Ministers of the Environment (CCME, 2020).
- FCSAP Ecological Risk Assessment Guidance (FCSAP, 2012a) and associated modules.

4 Project Setting

4.1 Environmental Setting

The RSA consists of patented lands (privately owned), Crown land, provincial parks, conservation reserves and First Nation Reserves and encompasses the City of Timmins, Town of Cochrane, Town of Iroquois Falls, and Town of Smooth Rock Falls. The land within and immediately surrounding the PA is predominantly made up of wetlands, forested areas, and to a lesser extent, lakes, rivers and ponds. The PA consists primarily of patented mining claims with surface and/or mining rights, mineral leases with surface and mining rights, and unpatented mining claims with mining rights only. The closest Federal lands are the Taykwa Tagamou Nation Reserve lands located approximately 37 km away (straight line) from the PA (14 km southeast of Cochrane).

The Project is located within the Abitibi Ecoregion (Ecoregion 3E) in northeastern Ontario within the Ontario Shield Ecozone (Crins, Gray, Uhlig, & Wester, 2009). The Ecoregion is underlain by granitic or gneissic bedrock with intrusions of metavolcanic and metasedimentary rock. Surficial geology is diverse with highly variable terrain. The northern portion of the Ecoregion is part of the Clay Belt and is underlain by deep, fine-textured, glaciolacustrine sediments from post-glacial Lake Barlow-Ojibway resulting in an extensive area of relatively low relief with poor drainage and large areas of extensive wetlands overlain by deep organic deposits (Appendix B.7.4 of the Impact Statement [2023 Terrestrial Ecology Baseline Study]). The southern portion of the ecoregion has more varied terrain with poorly developed, thinner soils, and large areas of exposed bedrock.

The Ecoregion has a humid mid-boreal climate with precipitation ranging from approximately 650 mm to over 1000 mm near Lake Superior. Mean annual temperatures ranging from -0.5°C in the north to 2.5°C in the south with a growing season of 167 to 185 days (Banton, et al., 2009).

Land cover within the Ecoregion is typical of southern boreal forests with mixed forests and coniferous forests covering 29.5% and 28.1% of the landscape, respectively, with smaller amounts of deciduous forest (7.2% (Crins, Gray, Uhlig, & Wester, 2009)). Forests are composed primarily of boreal species with black spruce (*Picea mariana*) and trembling aspen (*Populus tremuloides*) the most common species with substantial areas of jack pine (*Pinus banksiana*) on drier and coarser soils. Balsam fir (*Abies balsamea*), white spruce (*P. glauca*) and paper birch (*Betula papyrifera*) are common in mixed upland stands with trembling aspen and black spruce, while tamarack (*Larix laricina*) is a large component of conifer swamps and low treed fens and bogs. Red pine (*Pinus resinosa*) and white pine (*Pinus strobus*) reach their northern limit in the southern portion of the Ecoregion where sporadic occurrences of yellow birch (*B. alleghaniensis*) and red maple (*Acer rubrum*) can also occur.

Wetlands around the PA are relatively diverse with all four wetland classes, bog, fen, marsh, and swamp, present and distributed throughout. Swamps are by far the most common wetland class around the PA. Fens and marshes are less common compared to swamps and bogs. The most common swamp community are intermediate conifer swamps. Treed bogs are the most common bog while sparse treed fens are by far the most common type of fen.

No designated natural areas are found around the PA, however, several occur within the RSA including the Kraft Creek/Murphy Creek Wetland and Little Goose Lake Provincially Significant Wetland in the south of the RSA (Ministry of Natural Resources and Forestry (MNRF) (2024a)); the Mahaffy Township Ground Moraine Conservation Reserve (MNRF, 2024b); and the Greenwater, Dana Jowsey Lakes, Frederick House Lake, and Kettle Lakes Provincial Parks.

Based on information from provincial and federal databases, satellite imagery, peer-reviewed literature, and information shared by Indigenous peoples through engagement, information gathering, and voluntary information sharing, the area around the PA is known to support a wide range of mammals. These mammals include, but are not limited to, moose (*Alces americanus),* American black bear *(Ursus americanus)*, American marten (*Martes americana),* American mink *(Neovison vison),* beaver *(Castor canadensis),* Canada lynx *(Lynx canadensis),* eastern cottontail *(Sylvilagus floridanus),* meadow vole *(Microtus pennsylvanicus),* muskrat *(Ondatra zibethicus),* North American river otter *(Lontra canadensis),* gray wolf *(Canis lupus occidentalis),* red fox *(Vulpes vulpes),* red squirrel *(Tamiasciurus hudsonicus),* snowshoe hare *(Lepus americanus),* woodchuck *(Marmota monax),* and woodland jumping mouse (*Napaeozapus insignis).*

The Project falls within Ontario's Bird Conservation Region 8 – the Boreal Softwood Shield. There are 71 bird species identified as priorities in this region, of which most are landbirds (65%), followed by waterfowl (17%), waterbirds (12%), and shorebirds (6%).

The Project is located within three subwatersheds: the North Driftwood River and the West Buskegau River, both of which drain north into the Abitibi River, and Jocko Creek, which drains into Kidd Creek and subsequently the Mattagami River. Several lakes located adjacent to the PA drain into the North Driftwood River. Larger, mainstem channels of the North Driftwood River, West Buskegau Creek, and Jocko Creek within the area are generally wide (6 m to 20 m) with broad floodplains and fine substrates. The smaller streams and drainage channels draining to these mainstem channels are generally low gradient, low energy depositional environments with fine-grained organic substrates. Beaver dams and ponds are frequent in these smaller, headwater subwatersheds. These ponds are typically shallow (<1 m) with fen mats, sedges, grasses, as well as sparse shrubs providing overhead cover nearshore.

The fish communities in the North Driftwood River, West Buskegau River, and Mattagami River watersheds are represented by a mix of cool and cold-water fish species typical of northeastern Ontario. They include a variety of small-bodied (e.g., minnows) and large-bodied (e.g., northern pike) species. A total of 29 fish species were identified during surveys conducted in 2021, 2022, and 2023. Some of the common small-bodied fish species in one or more of the watersheds included brook stickleback, fathead minnow, finescale dace, northern pearl dace, and northern redbelly dace. Some of the common large-bodied fish species in one or more of the watersheds included northern pike, lake sturgeon, white sucker and yellow perch.

4.2 Human Activities

The ways in which people interact with the land within the LSA and RSA is an important component of the HHRA and is used to identify potential ways a person may be exposed to Project-related chemicals. As outlined in Chapter 22 of the Impact Statement (Assessment of Potential Effects on Social Conditions), the RSA consists of lands made up of several municipalities (City of Timmins and the Towns of Smooth Rock Falls, Cochrane, and Iroquois Falls), privately owned lands, provincial parks, conservation reserves and First Nation Reserves. There are no provincial parks with the LSA. There are no provincial parks, conservation reserves, areas of natural or scientific interest or provincially significant wetlands with the PA. There are no permanent residences (i.e., homes that are lived in year round) near the PA. Information about hunting, trapping, fishing, and gathering within the RSA provided as part of the Project-specific Indigenous engagement program with the following six Indigenous nations is included in Section 4.2.1 to Section 4.2.6 (Chapters 25 to 28 of the Impact Statement [Assessment of Potential Effects on Indigenous Interests]).

- Apitipi Anicinapek Nation
- Flying Post First Nation
- Matachewan First Nation
- Mattagami First Nation
- Taykwa Tagamou Nation
- Métis Nation of Ontario - Region 3

Land use by non-Indigenous people also occurs within the LSA/RSA and is included in Section 4.2.7.

4.2.1 Apitipi Anicinapek Nation

4.2.1.1 Hunting and Trapping

Apitipi Anicinapek Nation stated that maintaining and protecting the current use of lands and resources for traditional purposes, which includes lands used for hunting and trapping, and its members abilities to exercise their rights to hunt and trap as one of the Nation's core values (Apitipi Anicinapek Nation, 2023), (Apitipi Anicinapek Nation, 2024).

Apitipi Anicinapek Nation previously identified that the Nation has the right to maintain and protect wildlife, including but not limited to moose, black bear, beaver, marten, rabbit, mink, muskrat, fox, and lynx (Wahgoshig First Nation, Odonaterra Inc. and Shared Value Solutions, 2021) (Apitipi Anicinapek Nation, 2024). In addition to these species, Apitipi Anicinapek Nation has also identified the following species of cultural importance: fisher, grey fox, muskrat, squirrel, otter, weasel, wolf, coyote, lynx, wolverine, cougar, boreal caribou, deer, white-tailed deer, geese, eagle (bald eagle), duck, grouse/partridge, crane, and osprey (Apitipi Anicinapek Nation, 2023) (Apitipi Anicinapek Nation, 2024) (Impact Assessment Agency of Canada, 2023).

Apitipi Anicinapek Nation identified key hunting and trapping/snaring areas along Highway 655, at Boundary Lake, Kirkland Lake, Ghost River, Smooth Rock, along backroads near Cochrane and Timmins, and small lakes, ponds and wetlands surrounding the PA (Apitipi Anicinapek Nation, 2024). The Kesagami Caribou Range intersects the PA, LSA, and RSA and was reported by Apitipi Anicinapek Nation to be an important hunting and trapping area (Impact Assessment Agency of Canada, 2023).

4.2.1.2 Fishing and Water

Apitipi Anicinapek Nation (Apitipi Anicinapek Nation, 2023) (Apitipi Anicinapek Nation, 2024) stated that one of their core values is maintaining and protecting the current use of lands and resources for traditional purposes. This includes waters within the LSA/RSA which are used for fishing, the ability to exercise rights to fish, and for travel and cultural continuity.

Apitipi Anicinapek Nation previously indicated that it has the right and interest to maintain and protect fish, which includes the following species of importance: perch, catfish, whitefish, splake, sturgeon, northern pike/jackfish, walleye, speckled trout, rainbow trout, lake trout, and smelts (Wahgoshig First Nation, Odonaterra Inc. and Shared Value Solutions, 2021) (Apitipi Anicinapek Nation, 2024). In addition to these species, Apitipi Anicinapek Nation has also identified the following species of cultural importance: bait fish, sauger, sea trout, bass (large and smallmouth), mooneye, sheepshead, goldeye, brook trout, burbot, lake sturgeon, pickerel and lake whitefish (Impact Assessment Agency of Canada, 2023) (Apitipi Anicinapek Nation, 2024).

4.2.1.3 Gathering

Apitipi Anicinapek Nation emphasized that one of their core values is maintaining and protecting the current use of lands and resources for traditional purposes. This includes lands used for plant and medicine harvesting and ability to exercise rights to harvest plants (Apitipi Anicinapek Nation, 2023).

Apitipi Anicinapek Nation previously identified that the Nation has the right to maintain and protect plants (for eating, medicines, ceremony, building materials, and firewood), which includes the following species of importance: blueberries, raspberries, strawberries, chokeberries, large and small cranberries, hazelnut, and tamarack (Wahgoshig First Nation, Odonaterra Inc. and Shared Value Solutions, 2021) (Apitipi Anicinapek Nation, 2024). In addition to these species, Apitipi Anicinapek Nation has also identified the following species of cultural importance: moss, fungi, reindeer lichen, gooseberries, Labrador tea, and mushrooms (Impact Assessment Agency of Canada, 2023) (Apitipi Anicinapek Nation, 2024).

4.2.2 Flying Post First Nation

4.2.2.1 Hunting and Trapping

Flying Post First Nation (Flying Post First Nation, 2023) stated that one of its core values is maintaining and protecting the current use of lands and resources for traditional purposes. This includes lands used for hunting and trapping, and the ability to practice its right to hunt and trap. Hunting and trapping were also identified as key components of the Nation’s traditional practices, integral for year-round sustenance, connection with the ancestors, cultural transmission, and for economic purposes (Flying Post First Nation, 2023).

The Nation identified that it has the right and interest to maintain and protect wildlife, which include the following species of importance; moose, ruffed grouse (partridge), and rabbits (Flying Post First Nation, 2023). Moose was identified as a dietary staple for Flying Post First Nation (Flying Post First Nation, 2023). Flying Post First Nation reported that ruffed grouse harvesting generally occurs in the fall to avoid interrupting their mating season, while rabbit are typically harvested in summer (Flying Post First Nation, 2023). Other species of importance include marten, beaver, fisher, mink, fox, grey fox, muskrat, squirrel, otter, weasel, rabbit, wolf, coyote, lynx, wolverine, black bear, cougar, boreal caribou, deer, white-tailed deer; geese, eagle (bald eagle), duck, crane, and osprey (Impact Assessment Agency of Canada, 2023).

4.2.2.2 Fishing and Water

Flying Post First Nation stated that one of its core values is maintaining and protecting the current use of lands and resources for traditional purposes, including waterways used for fishing and practicing the right to fish (Flying Post First Nation, 2023). Fishing was identified as a key component of the Nation's traditional practices, for sustenance, engaging with the land, and cultural transmission (Flying Post First Nation, 2023). It was identified as an important skill to teach to youth and cultural gatherings can also support language learning and learning about traditional medicines (Flying Post First Nation, 2023). The Nation reported that fishing occurs seasonally when other food sources are unavailable; ice fishing is less common that it was in the past but often families fish in the summer to store it for the winter (Flying Post First Nation, 2023). Two fishing areas (North Driftwood River and unspecified lakes off Highway 655) and two fish habitats (West Buskegau River and North Driftwood River) were reported to intersect the PA (Flying Post First Nation, 2023).

Flying Post First Nation identified that members have the right and interest to maintain and protect fish in their territory (Flying Post First Nation, 2023). Fished species of importance to Flying Post First Nation include walleye (pickerel), northern pike (jackfish), perch, sturgeon (a sacred species), bait fish, sauger, sea trout, bass (large and smallmouth), mooneye, sheepshead, goldeye, splake, sucker (white and redhorse), brook trout, burbot, catfish (channel and brown bullhead), lake trout, and lake whitefish (Flying Post First Nation, 2023) (Impact Assessment Agency of Canada, 2023).

The following water, fishing, fish and fish habitat areas were reported within the RSA (Flying Post First Nation 2023a; Appendix A.1 of the Impact Statement):

- Fish habitat located 36.5 km northeast of the PA along the Abitibi River
- Fishing area 37.6km west of the PA along the Nat River
- Fishing area 46.3 km southwest of the PA near Flying Post IR 73
- Water source 42.5 km northwest of the PA at Smooth Rock Falls
- Fishing area, sturgeon habitat, drinking water source and swimming area 50.3 km west of the PA at Groundhog River

Six additional fishing areas, as well as a sturgeon spawning area and a spill site were identified outside of the RSA (Flying Post First Nation 2023a; Appendix A.1 of the Impact Statement). The spill was reported to have occurred at Boulder Lake, approximately 83.6 km southwest of the PA (Flying Post First Nation 2023a). The fishing areas include Bromley Lake, Ivanhoe River, Ivanhoe Lake, Horwood Lake, Victoria Creek, and the Foleyet area (Flying Post First Nation 2023a).

4.2.2.3 Gathering

Flying Post First Nation noted that one of its core values is maintaining and protecting the current use of lands and resources for traditional purposes such as harvesting plants for food and medicine (Flying Post First Nation, 2023). Food plants and medicines were therefore identified as important to its members nutrition and health and the continuation of traditional healing and cultural practices (Flying Post First Nation, 2023). Plant use and knowledge of plants was reported to be an important aspect of knowledge transmission and connecting youth with the land (Flying Post First Nation, 2023). Plant harvesting was identified as a right-based value and an important part of Indigenous identity (Flying Post First Nation, 2023).

Food plants of importance to Flying Post First Nation include but are not limited to pin cherry, wild blueberry, wild cranberry, wild raspberry, wild strawberry, fireweed, wild rice, and wild strawberry (Flying Post First Nation, 2023) (Impact Assessment Agency of Canada, 2023). Berry-picking generally occurs mid- to late-summer and the Nation continues to perpetuate ceremonial practices associated with plant harvesting (Flying Post First Nation, 2023). Plant harvesting activities were reported to sometimes occur opportunistically when Nation members are performing other activities such as travelling or camping (Flying Post First Nation, 2023).

Flying Post First Nation noted that maintaining and protecting the current use of lands and resources for traditional purposes such as harvesting plants for medicine is one of its core values (Flying Post First Nation, 2023). Plants harvested for medicinal purposes were identified as important to its members nutrition and health and the continuation of traditional healing and cultural practices (Flying Post First Nation, 2023). Flying Post First Nation identified plant species of cultural importance which include but are not limited to bark, sage, sweetgrass, pearly everlasting, cedar and tobacco (Flying Post First Nation, 2023) (Impact Assessment Agency of Canada, 2023).

4.2.3 Matachewan First Nation

4.2.3.1 Hunting and Trapping

Matachewan First Nation stated that hunting and trapping continue to be critical cultural and subsistence practices for members today (Matachewan First Nation, 2023). These practices and associated values provide members with a range of tangible and intangible benefits including nutrition, food security, knowledge transmission, connection to land within its territory, and cultural persistence (Matachewan First Nation, 2023).

Matachewan First Nation continue to rely on an abundance and diversity of species to exercise hunting and trapping rights (Matachewan First Nation, 2023) (Impact Assessment Agency of Canada, 2023). Harvested species include moose, black bear, partridge, lynx, rabbits, duck, beaver (Matachewan First Nation, 2023) (Impact Assessment Agency of Canada, 2023). Traditional species of importance also include fisher, mink, fox, grey fox, muskrat, squirrel, otter, weasel, coyote, wolverine, cougar, moose, boreal caribou, deer, white-tailed deer, geese, eagle (bald eagle), duck, crane, and osprey (Matachewan First Nation, 2023).

4.2.3.2 Fishing and Water

Matachewan First Nation identified water and fishing practices such as harvesting, sharing of ecological knowledge, cooking, and processing fish as culturally important values (Matachewan First Nation, 2023). Waterbodies were reported to be directly connected to the Nations way of life, as waterbodies facilitate recreational activities such as camping and enjoying being on the land, as well as fishing (Matachewan First Nation, 2023). Members use waterbodies to travel across their territory to access different fishing locations during different seasons of the year (Matachewan First Nation, 2023).

Harvesting of water from the land was reported to have occurred for generations and water is perceived to be a conduit for land-based activities, a resource that is obtained and used by Matachewan, and a supportive factor for all lifeforms and species – both plants and animals (Matachewan First Nation, 2023).

Matachewan First Nation reported that numerous fish species are important sources of nutrition and facilitate the transmission of fishing knowledge and practices. These species include, pickerel (walleye), perch, northern pike/jackfish, trout, whitefish, lingcod, lake trout, speckled trout, sturgeon, minnow, and bass (Matachewan First Nation, 2023). Traditional species of importance also include bait fish, sauger, sea trout, mooneye, sheepshead, goldeye, splake, sucker (white and redhorse), brook trout, burbot, and catfish (channel and brown bullhead) (Matachewan First Nation, 2023) (Impact Assessment Agency of Canada, 2023).

Matachewan First Nation identified several water, fishing, environmental, and/or fish habitat features that intersect the PA (Matachewan First Nation, 2023). These include a fishing area along Highway 655 and North Driftwood River, a snowmobile trail from Timmins to Cochrane, multiple natural spring sources west of Kirkland, and fish habitat on the West Buskegau River (Matachewan First Nation, 2023).

4.2.3.3 Gathering

Harvesting practices for food plants and medicine, and the health of plant habitats, were reported to be important values for Matachewan First Nation (Matachewan First Nation, 2023). Matachewan First Nation highlighted the cultural importance of plants, berries and medicines for a variety of uses (Matachewan First Nation, 2023). These include but are not limited to foods harvested in specific areas or encountered during other activities and calling tools for moose (Matachewan First Nation, 2023).

Matachewan First Nation stated that obtaining food plants from the land is important both for sustenance and for maintaining traditional ecological knowledge (Matachewan First Nation, 2023). Matachewan First Nation reported that preferred locations for harvesting food plants and medicines include areas of intact forest free from chemical spraying (Matachewan First Nation, 2023). A variety of plant medicines are harvested including blueberry, raspberry, pin cherry, bamagillia buds (balsam poplar), and swampy tea (Matachewan First Nation, 2023) (Impact Assessment Agency of Canada, 2023). Matachewan First Nation indicated that the spirit berry is a culturally important species. Matachewan First Nation noted that the spirit berry grows in two localized patches and appear pure and sacred.

Harvesting practices for medicine, and the health of plant habitats, were reported to be important values for Matachewan First Nation (Matachewan First Nation, 2023). Matachewan First Nation highlighted the cultural importance of plants, berries and medicines for a variety of uses (Matachewan First Nation, 2023). These include ceremonial resources as part of the four sacred medicines, and topical and internal medicines for a variety of ailments including colds, rashes, and cancer (Matachewan First Nation, 2023).

Matachewan First Nation reported that preferred locations for harvesting medicines, include areas of intact forest free from chemical spraying (Matachewan First Nation, 2023). A variety of plant medicines are harvested including Labrador tea, cedar, mint, birch bark, mountain ash, mushroom chaga, sage, willow, and wild rose (Matachewan First Nation, 2023) (Impact Assessment Agency of Canada, 2023).

4.2.4 Mattagami First Nation

4.2.4.1 Hunting and Trapping

Wild game forms a central part of Mattagami First Nation's diet and therefore access to wild game and a year-round supply of meat are critically important. Members of Mattagami First Nation remarked that they have a strong preference for wild over store-bought meat, based on health benefits and flavour preferences (Mattagami First Nation, 2023a).

Participants interviewed as a part of Mattagami First Nations' Project-specific study, reported harvesting a variety of large and small game including moose, bear, beaver, spruce, and ruffed grouse (partridge), ducks, and rabbit. Hunting continues to sustain Mattagami First Nation's year-round diet, and participants recalled the prevalence of hunting and wild game (along a variety of fish) in their childhoods (Mattagami First Nation, 2023a). Mattagami First Nation noted that the eastern whip-poor-will is a species of concern and has the potential to be present in the PA (Mattagami First Nation, 2022). Traditional species of importance also include fisher, mink, fox, grey fox, muskrat, squirrel, otter, weasel, rabbit, coyote, lynx, wolverine, black bear, and cougar, moose, boreal caribou, deer, white-tailed deer, geese, eagle (bald eagle), duck, crane, and osprey (Impact Assessment Agency of Canada, 2023).

Several members of Mattagami First Nation have reported that they hunt from permanent or short-term camps, including trap lines, in addition to the more common day trips for hunting or harvesting animals while travelling for other purposes (Mattagami First Nation, 2023a). Mattagami First Nation reported that hunting for moose, grouse, bear, and deer starts in August and finishes in November, and ducks and geese are hunted from April to May and August to September. The importance of sharing with Elders and those who are no longer able to access the land was emphasized by members of Mattagami First Nation.

Members of Mattagami First Nation reported beginning hunting as youths, under the supervision of older family and community members; with one participant noting that family cabins and traplines are important areas where youth learn how to harvest and process animals as part of the transition towards supporting older generations. For some, annual intergenerational hunting trips are an explicit component of ensuring the continuation of Mattagami traditional knowledge (Mattagami First Nation, 2023a). Mattagami First Nation members articulate a hunting and trapping ethic that emphasizes the humane killing of animals and the conservation of meat. As with other elements of hunting and trapping described above, this ethic, too, is explicitly taught to younger generations of harvesters. As the subject of cultural teaching and learning, and as critical to food security, success in hunting is celebrated in Mattagami communities. Participants further describe the act of hunting as relaxing, and as essential to fostering bonding and learning experiences (Mattagami First Nation, 2023a).

4.2.4.2 Fishing and Water

Fish represent an important component of Mattagami First Nation members' wild food diets, along with many other species of animals and plants (Mattagami First Nation, 2023a). A wide diversity of fish species, such as pickerel, walleye, northern pike, whitefish, suckers, and perch, are harvested, processed, and preserved by Mattagami First Nation members using a range of techniques (Mattagami First Nation, 2023a). Mattagami First Nation fishers utilize different fishing techniques across species and fishing seasons including rod and reel, spring net fishing, and ice fishing (Mattagami First Nation, 2023a). Other traditional species of importance also include bait fish, sauger, sea trout, bass (large and smallmouth), mooneye, sheepshead, goldeye, splake, northern pike/jackfish, sucker (white and redhorse), brook trout, burbot, perch, catfish (channel and brown bullhead) and lake sturgeon (Impact Assessment Agency of Canada, 2023).

Mattagami First Nation Members shared their knowledge in their Knowledge and Use Study (Mattagami First Nation, 2023a). They note that fishing supports their cultural health in ways other than traditional food access and knowledge transmission, and provide a sense of place and connection to land that promotes mental health, sense of identity, and social fabric. Mattagami First Nation fishing knowledge is rich and place-based, typically passed down intergenerationally. This knowledge is learned through spending significant time on the water, providing Mattagami First Nation fishers with an understanding of fish habitat, spawning patterns, behaviour, and seasonality. Mattagami First Nation members move between different fishing areas to harvest a variety of species. North Driftwood River, for example, which intersects the PA, was identified as a place for smelt fishing. Preserving Mattagami First Nation members access to and confidence in lakes and rivers is vital to Mattagami First Nation fishing practices and food security. Traditional food sharing protocols, grounded in Elder care and mutual aid, make sure that the benefits of fishing practices are amplified throughout the community.

Collecting water from natural sources while out on the land (e.g., at cabins, traplines, fishing sites, harvesting areas) has always been an important activity for Mattagami First Nation members. Access to reliable and clean natural drinking water sources is therefore essential to Mattagami First Nation members' land-based way of life. For members of Mattagami First Nation, certain waterbodies can have multiple layers of significance. A single waterway could be a fishing area, a spawning habitat, a ceremonial site, a drinking water source, and a navigation route, among many others. Water is also critical for intangible elements of Mattagami First Nation culture practiced by Mattagami First Nation members including spirituality and ceremonial values (Mattagami First Nation, 2023a).

4.2.4.3 Gathering

Mattagami First Nation stated that harvesting occurs at a number of preferred harvesting locations and reported harvesting numerous species including but not limited to blueberries, raspberries, cranberries, chokecherries, strawberries, as well as a variety of mushrooms including chanterelle, puffball, and shaggy mane mushrooms (Impact Assessment Agency of Canada, 2023) (Mattagami First Nation, 2023b). For Mattagami First Nation, berries are especially important food species as they can be preserved for the winter, providing an important source of nutrients and vitamins throughout the year. While Mattagami First Nation members harvest berries primarily in the summer, they gather food plants throughout the seasons and often harvest a diversity of mushrooms species is in the fall (Mattagami First Nation, 2023a).

Mattagami First Nation stated that harvesting of medicinal plants occurs at a number of preferred harvesting locations, with species including but not limited to rosehips, sweetgrass, cedar, birch, maple, balsam, tamarack, red willow, swampy sage, and white grandmother sage (Impact Assessment Agency of Canada, 2023) (Mattagami First Nation, 2023b).

Medicinal plants are valued for their healing properties and used as teas, smudges, medicines, and ceremonies, which are critical for Mattagami's ability to seek culturally relevant healing and wellness (Mattagami First Nation, 2023a). Mattagami First Nation harvests a variety of medicinal plant species, including but not limited to cedar, birch, maple, balsam, tamarack, red willow, Labrador tea, sage (multiple varieties), sweetgrass, rose hips, tobacco, and chaga (Mattagami First Nation, 2023a). Similar to food plants, Mattagami relies on a diversity of species and locations for these medicines. Medicinal plants are stewarded to make sure an abundance of high-quality resources, and when necessary, they are traded or shared to make sure individuals have access to the medicines they require (Mattagami First Nation, 2023a). Members of Mattagami First Nation explained how attention to plant health is critical to assure the freshness and purity for medicinal and sacred uses. It is important to Mattagami members that medicinal species are found growing naturally (rather than replanted) to assure their potency and quality. This is especially the case for cedar, which is used in teas, for sacred fires, as a cleansing smudge, and during funerals. The knowledge of surrounding habitat conditions, quality, purity, and other ecological knowledge (e.g., soil conditions) is critical to assure that harvested medicine helps to heal community members effectively (and avoids potentially harming them) (Mattagami First Nation, 2023a).

4.2.5 Taykwa Tagamou Nation

4.2.5.1 Hunting and Trapping

Taykwa Tagamou Nation identified hunting as an important aspect of the Nation's livelihood (Taykwa Tagamou Nation, 2023a), indicating that members have the right and interest to maintain and protect wildlife including the following species of significance: moose, grouse/partridge, goose, duck, rabbit; and other important species to the Nation such as bald eagle, beaver, black bear, boreal caribou, cougar, coyote, crane, fisher, fox, grey fox, lynx, marten, mink, muskrat, osprey, otter, squirrel, weasel, white-tailed deer, wolf, and wolverines (Taykwa Tagamou Nation, 2023a) (Taykwa Tagamou Nation, 2023b).

Taykwa Tagamou Nation reported that waterfowl are hunted in both the spring and the fall, as the birds followed their annual north–south migration routes.

4.2.5.2 Fishing and Water

The Taykwa Tagamou Nation has emphasized the critical importance of water and fishing practices to their core values (Taykwa Tagamou Nation, 2023a). They have noted that the numerous rivers, streams, and lakes in what is now northeastern Ontario historically provided essential canoe routes for travel and trade, as well as access to abundant fish populations. The Nation asserts its right and interest in maintaining and protecting various fish species, including bait fish, large and smallmouth bass, brook trout, burbot, channel and brown bullhead catfish, goldeye, lake trout, lake whitefish, mooneye, perch, pickerel/walleye, sauger, sea trout, sheepshead, splake, and white and redhorse sucker (Taykwa Tagamou Nation, 2023a). Northern pike/jackfish and lake sturgeon are identified as particularly significant species to the Nation (Taykwa Tagamou Nation, 2023a). The large rivers in the area support a rich diversity of food fish species, such as pickerel (walleye), lake sturgeon, lake whitefish, brook trout, bait fish, and northern pike. The Taykwa Tagamou Nation has identified four fishing features that intersect the PA: Lower Sturgeon Dam Road, North Driftwood River, Highway 655 between Driftwood and Kidd Creek mine, and West Buskegau River.

4.2.5.3 Gathering

The Taykwa Tagamou Nation has highlighted the importance of plant harvesting practices to their core values (Taykwa Tagamou Nation, 2023a). They assert their right and interest in maintaining and protecting key medicinal plant resources such as rose hip berries, horsetail, mullein, raspberry leaves, goldenrod, cattail, yarrow, plantain, swamp aster, pearly everlasting, and plants used for ceremonial purposes like Labrador tea and cedar. Additionally, they emphasize the significance of food plants such as gooseberries, raspberries, sweetgrass, and tamarack (Taykwa Tagamou Nation, 2023a) (Taykwa Tagamou Nation, 2023b) (Taykwa Tagamou Nation, 2023c).

Blueberries are noted as an essential food source for the community. The Nation also reports harvesting spruce, gooseberries, tamarack, raspberries, sage, sweetgrass, rose hip berries, horsetail, mullein, goldenrod, cattail, yarrow, plantain, swamp aster, and pearly everlasting (Taykwa Tagamou Nation, 2023a). Cedar and Labrador tea are specifically harvested for ceremonial purposes (Taykwa Tagamou Nation, 2023a). Some of these species are used for treating burns, cuts, and stings, as well as for their anti-inflammatory and antioxidant properties (Taykwa Tagamou Nation, 2023a).

4.2.6 Métis Nation of Ontario – Region 3

4.2.6.1 Hunting, Trapping and Non-Consumptive Species

Traditional species of importance to Métis Nation of Ontario - Region 3 that were hunted and/or trapped by its members include marten, beaver, fisher, mink, fox, grey fox, muskrat, squirrel, otter, weasel, rabbit, wolf, coyote, lynx, wolverine, black bear, cougar, moose, boreal caribou, deer, white-tailed deer, geese, duck, grouse/partridge, and crane. Métis Nation of Ontario noted that specific bird species are of critical importance to the Métis, including Canada warbler, common nighthawk, eastern whip-poor-will; olive-sided flycatcher, bobolink, barn swallow, bank swallow, evening grosbeak, rusty blackbird, yellow rail (Impact Assessment Agency of Canada, 2023). Eagle (bald eagle) and osprey are species of cultural importance for Métis Nation of Ontario - Region 3.

4.2.6.2 Fishing and Water

Traditional species of importance to Métis Nation of Ontario - Region 3 include bait fish, sauger, sea trout, bass (large and smallmouth), mooneye, sheepshead, goldeye, splake, pike, northern pike/jackfish, sucker (white and redhorse), brook trout, burbot, perch, catfish (channel and brown bullhead), lake sturgeon, pickerel/walleye, lake trout, and lake whitefish (Canada Nickel Company, 2022) (Impact Assessment Agency of Canada, 2023). West Buskegau River and North Driftwood River were identified as fish habitat and as potential spawning grounds (Canada Nickel Company, 2022) (Impact Assessment Agency of Canada, 2023). West Buskegau River and the North Driftwood River intersect the PA.

4.2.6.3 Gathering

Traditional species of importance to Métis Nation of Ontario - Region 3 include moss, fungi, reindeer lichen, blueberries, raspberries, gooseberries, Labrador tea, tamarack, mushrooms (Impact Assessment Agency of Canada, 2023).

4.2.7 Non-Indigenous Land Use

Several municipalities and developed areas are located within the RSA. However, Project-related effects to environmental media (e.g., air, soil, water) from Project-related activities are expected to be limited to within the LSA, which is primarily undeveloped and consists of wetlands, forested areas, and to a lesser extent, lakes, rivers and ponds. As a result, non-Indigenous land use within the LSA is assumed to be recreational.

Outdoor recreational activities in Northeastern Ontario includes paddling, fishing, camping, hiking, biking trails, golfing, ATV trails, outfitters, outdoor experiences, tours, provincial parks, and other resource-based tourism activities. Winter activities include snowmobiling, Nordic skiing, and snowshoeing (The Seven Northeastern Ontario Canada, n.d.).

Given the presence of trails, camping areas, and watercourses within the LSA, recreational uses are expected to include paddling, hunting, berry picking, camping, hiking/biking, snowmobiling, skiing and snowshoeing.

Fishing is also a popular activity in the region, and fish can be an important part of a healthy diet (Health Canada, 2007). While fish are a great source of nutrients, they can also contain contaminants (e.g., mercury) from natural sources or human activities (MECP, 2023a). The MECP has issued fish consumption advisories for waterbodies in Ontario, including Bigwater Lake (MECP, 2021a) and Mattagami River downstream of Sturgeon Falls (MECP, 2021b), both of which are located within the LSA (Figure A.5, Appendix A).These advisories are due to the presence of mercury in fish tissue and concerns related to methyl mercury exposure. Bigwater Lake has consumption advisories for northern pike, walleye and white sucker while the Mattagami River downstream of Sturgeon Falls has consumption advisories for northern pike, walleye and redhorse sucker. The MECP fish consumption advisories for these two waterbodies were published in 2014 and most recently updated in 2021.

Consumption advisories specify the maximum number of meals per month people can safely eat, based on the size and species of fish. These advisories are set for the general population as well as sensitive populations (i.e., women of child-bearing age and children under 15). For example, members of the general population can safely consume 16 meals (one meal is equivalent to 227 g or 8 oz (MECP, 2023)) per month of northern pike that range in size from 30 to 35 cm caught in Bigwater Lake, while members of the sensitive population can safely consume 12 meals per month of northern pike of the same size. People who consume fish from the LSA should follow the advice provided by the MECP in consumption advisory documents.

5 Human Health and Ecological Risk Assessment Methods

The HHERA evaluates the health risk to human and ecological receptors from their exposure to chemicals in environmental media (e.g., air, soil, water, and biota). The HHERA consists of two components: an HHRA and an ERA. The HHRA characterizes the short-term (acute) and long-term (chronic) health risk to people, while the ERA characterizes the potential chronic risk to a species population (e.g., meadow voles), a community of multiple species (e.g., soil invertebrate community), or an individual within a species (applicable to rare and endangered species).

In the context of an impact assessment for major infrastructure projects, the HHERA evaluates the potential change in health risk to people and ecological receptors that may occur between baseline environmental conditions and estimated future conditions, during the various phases of the Project. Baseline environmental conditions may be based on historical monitoring data, measured data collected during baseline studies, or modelled data. Future conditions are based on modelled environmental conditions that reflect the influence of Project activities.

The HHERA considers three scenarios in evaluating the potential changes in human and ecological health risks.

- **Baseline Scenario**: evaluates the existing exposures and health risks based on the measured chemical concentrations in environmental media (air, soil, surface water, sediment, plants, small prey, and fish). Chemical concentrations for invertebrates and wild meat (e.g. moose) are estimated based upon measured concentrations of chemicals in other media.

- **Project Alone Scenario**: evaluates health risks associated with exposure to estimated chemical concentrations in environmental media that are attributable only to project activities (i.e. these do not consider the contribution that Baseline Scenario concentrations make to overall exposure).

- **Baseline Plus Project Scenario**: evaluates the future health risks based on the estimated chemical concentrations in environmental media, as determined through detailed modelling from other Valued Component chapters (e.g. air quality, water quality). These modelling results are used to estimate the future chemical concentrations in exposure media that human and ecological receptors are exposed to (i.e. air, soil, surface water, sediment, vegetation, small prey, fish, invertebrates, and wild meats).

The following sections describe the underlying concepts and approach to conducting an HHERA that is prescribed by Health Canada, the CCME, and the FCSAP.

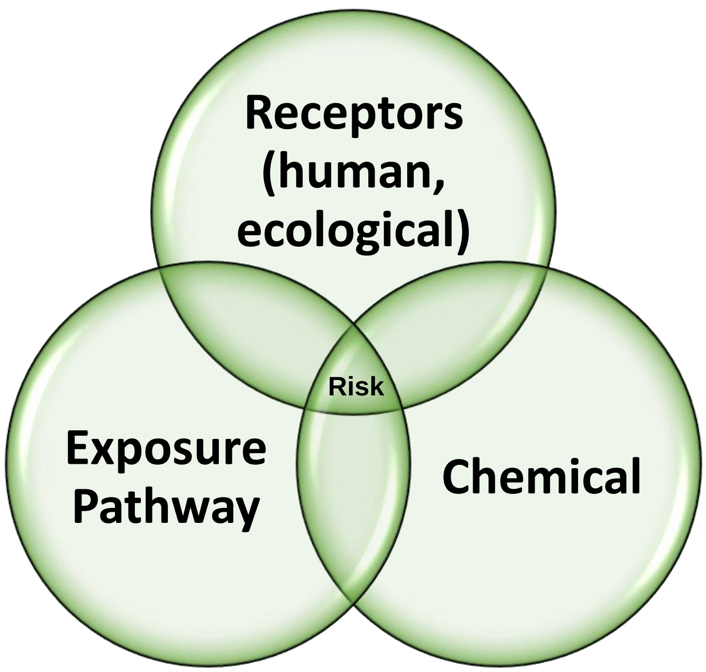
5.1 Components of Health Risk

Risk from exposure to a chemical depends on three factors:

1. The presence of a human or ecological receptor (i.e., receptor).
2. The presence of a chemical with inherent toxicity.
3. The exposure pathway and the degree of human or ecological receptor exposure to a chemical.

As illustrated in Figure 5.1, if all three factors of health risk interact (i.e., a receptor is exposed to a chemical hazard), a risk may exist. The degree of adverse health risk depends on other factors such as the exposure dose or concentration, exposure duration, and the inherent toxicity of the chemical to the human or ecological receptor. If one or more factors(s) is absent, there would be no potential health risk. Also, if a receptor is exposed to a chemical, but the chemical is inherently non-toxic, then there is no potential risk.

Figure 5.1 Considerations of a Quantitative HHERA (after Health Canada 2023a)



5.2 Risk Assessment Framework

The basic risk assessment framework consists of problem formulation, toxicological assessment, exposure assessment, risk characterization, and uncertainty and sensitivity assessment. Each component is discussed below.

- The problem formulation is an information gathering and interpretation stage that defines the nature and scope of the risk assessment, permits practical boundaries to be placed on the overall scope, and confirms that the HHERA is directed at the key areas and issues of concern related to the Project emissions. The data gathered provide information regarding the physical layout and characteristics of the assessment area (e.g., the LSA), the chemicals of potential concern (CoPCs), possible exposure pathways, potential human and ecological receptors, and other specific areas or issues of concern.
- The toxicity assessment involves the selection of TRVs and the identification of regulatory benchmarks for each CoPC as appropriate. Toxicity is the potential for a chemical to produce damage, permanent or temporary, to the structure or functioning of the receptor's body. Except for community receptors, the toxicity of a chemical depends on the amount of chemical taken into the body (referred to as the "dose") and the duration of exposure (i.e., the length of time the receptor is exposed to the chemical). For community receptors (e.g. plants, benthic invertebrates, fish), the toxicity depends on the concentration of CoPC in the media where the receptors live. For example, for benthic invertebrates, the toxicity depends on the concentration of the CoPC in sediment. For each CoPC, there is a specific dose and duration of exposure necessary to produce a toxic effect in a given receptor. TRVs are published by provincial, federal, or international (e.g., United States Environmental Protection Agency [US EPA]) agencies.
- The exposure assessment builds on the receptor and exposure pathway identification completed in the problem formulation stage. For each CoPC, exposures are estimated for each receptor for each of the exposure pathways that are relevant for that receptor. The rate of exposure to chemicals may be expressed as a dose, which is the amount of chemical taken in per body weight per unit time (e.g., microgram (µg) of chemical per kilogram (kg) body weight per day), or as a concentration in the exposure pathway (e.g., when considering health risks to people from the inhalation of CoPC, the rate of exposure would be the chemical concentration in air) or environmental media. Exposures are estimated for Baseline, Project Alone and Baseline Plus Project Scenarios.
- The risk characterization involves qualitatively and quantitatively assessing potential risk to receptors from exposure to CoPC. Within an environmental assessment framework, the health risks associated with the Baseline Plus Project Scenario are compared to the health risks associated with Baseline Scenario to provide the context for how the Project may affect health.

- The uncertainty and sensitivity assessment is an important part of the risk assessment process. Uncertainties can arise in various aspects of the assessment, such as sample collection and analysis, exposure estimates, the derivation of TRVs, and the assumptions made when applying professional judgment. This uncertainty does not invalidate the risk estimate. However, articulating the uncertainty aids in interpreting the risk estimates. Similarly, a sensitivity analysis helps identify the effect of assumptions on the results of the risk analysis. A qualitative uncertainty and sensitivity assessment has been incorporated into this HHERA.

Overall, in risk assessment the industry standard is to overstate, rather than understate, potential health risks. Regulatory guidance supports use of a protective approach (one that overestimates exposures and toxicological responses) when assessing potential health risks for both human and ecological receptors. This protective approach (also known as a conservative approach) has been maintained in the assessment of potential human health and ecological risks for the Project.

6 Baseline and Modelled Future Concentrations

To evaluate the potential health risks from chemicals potentially released by Project-related activities, the concentrations of the chemicals in environmental media (such as air, soil, surface water, sediment, and food items) were determined for each assessed scenario (i.e., Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario). These concentrations, called exposure point concentrations (EPCs), are used to calculate exposures for human and ecological receptors.

Approaches used to define EPCs for each of the assessed scenarios are discussed below. Evaluations of baseline and future air quality and surface water quality are provided in Chapter 12 (Assessment of Potential Effects on the Atmospheric Environment) and Chapter 15 (Assessment of Potential Effects on Surface Water) of the Impact Statement.

For the Baseline Scenario, EPCs were estimated using measured baseline data if available. In the absence of measured baseline data, Baseline Scenario EPCs were estimated using an uptake factor approach or dietary exposure modelling. Approaches used to define Baseline Scenario EPCs are summarized below and further discussed in Sections 6.1 to 6.11 according to each medium.

1. **Measured Baseline Data.** Measured baseline data for soil, terrestrial vegetation (berries and other), wild birds, sediment, fish tissue, and aquatic vegetation were collected in field programs carried out between 2021 and 2023. The sampling locations where baseline data were collected for these media are shown in Figures A.2 to A.4, Appendix A and the analytical data from these sampling programs are summarized in Appendix B.

   For soil, terrestrial vegetation (berries and other), wild birds, sediment, fish tissue, and aquatic vegetation, Baseline Scenario EPCs were derived using the following approach:

   - Where sufficient sample size permits (i.e., $n \geq 10$) with at least four samples that are greater than the reported detection limit, the 95% upper confidence limit of the mean (UCLM), calculated using US EPA's ProUCL Version 5.2 statistical software (US EPA, 2022), was used to represent a reasonable upper limit of the Baseline Scenario EPC. Duplicate sample were removed from the data prior to ProUCL analysis. If more than one 95% UCLM value was recommended by ProUCL, the highest recommended value was selected. ProUCL output files are provided in Appendix B.
   - Where sample size is limited (i.e., $n < 10$ and/or number of detected samples < 4), the maximum reported concentration or detection limit (whichever is greater) was selected as the Baseline Scenario EPC.

   The resulting Baseline Scenario EPCs from this analysis are summarized in Appendix B.

2. **Uptake Factors.** The uptake factor approach was used to estimate concentrations of metals in some tissue without measured baseline data. Concentrations of metals in a biological tissue (e.g., terrestrial and benthic invertebrates) were estimated from concentrations in a corresponding media (e.g., soil or sediment) using a media-specific and parameter-specific uptake factor, as follows:

$$EPC_j = EPC_i \times UP_{ij} \qquad \textbf{Equation 6-1}$$

Where:

EPC_j = Exposure point concentration in target biotic tissue *j* (e.g., plants or fish, mg/kg wet weight)

EPC_i = Exposure point concentration in measured media *i* (e.g., soil and/or surface water, in mg/kg dry weight or in mg/L)

UP_{ij} = Uptake Factor from environmental medium *i* to target biota tissue *j* (parameter, environmental medium, and biotic tissue dependent). Depending on the chemical and the media, uptake factors were either based on linear relationships, resulting in a single value, or non-linear relationships, where the value of the uptake factor depends on the exposure point concentration. The uptake factors applied to generate Baseline Scenario EPCs in this HHERA are summarized in Appendix C.

3. **Dietary Exposure Modelling:** Baseline Scenario EPCs for wild meat (moose, deer, rabbit, beaver, grouse, duck, and goose) were estimated using a dietary exposure modelling approach that incorporates the Baseline Scenario EPCs for soil, surface water, sediment, and applicable dietary items. This approach is discussed further in Section 6.8.

Approaches used to define Project Alone Scenario and Baseline Plus Project Scenario EPCs are summarized below and further discussed in Sections 6.1 to 6.11 according to each medium. For the Project Alone Scenario and Baseline Plus Project Scenario, Project Alone Scenario EPCs were calculated as the difference between Baseline Plus Project Scenario EPCs and Baseline Scenario EPCs. Baseline Plus Project Scenario EPCs were estimated from modelled Project-related changes in air concentrations, deposition to soil, and changes in surface water concentrations as described in Chapter 12 (Assessment of Potential Effects on the Atmospheric Environment) and Chapter 15 (Assessment of Potential Effects on Surface Water) of the Impact Statement.

The EPCs for air for each of the assessed scenarios were presented in Chapter 12 the Impact Statement and are reproduced in Section 6.1. Deposition to soil modelled in Chapter 12 of the Impact Statement were used to estimate Baseline Plus Project Scenario EPCs in soil and the approach is further discussed in Section 6.2 alongside Baseline Scenario and Project Alone Scenario EPCs. The EPCs for surface water for each of the assessed scenarios were presented in Chapter 15 of the Impact Statement and are also presented in Section 6.3. Changes in surface water modelled in Chapter 15 of the Impact Statement were used to estimate Baseline Plus Project Scenario EPCs in sediment and the approach is further discussed in Section 6.4 alongside Baseline Scenario and Project Alone Scenario EPCs.

The modelled changes in chemical concentrations in soil (see Section 6.2), surface water (see Section 6.3), and sediment (see Section 6.4) were used to estimate changes in tissue concentrations, excluding uncovered plants and wild meats (both discussed below in their respective section). This estimation followed a specific process. First, modelled Baseline Scenario concentrations were calculated using Baseline Scenario concentrations in soil, surface water, and/or sediment and literature-based uptake factors. Next, modelled Baseline Plus Project Scenario concentrations were calculated using the same uptake factors applied to the modelled Baseline Plus Project Scenario concentrations in soil, water, and/or sediment. The ratio of the modelled Baseline Plus Project Scenario to the modelled Baseline Scenario concentrations was then multiplied by the measured Baseline Scenario concentrations to estimate the Baseline Plus Project Scenario concentrations in vegetation, invertebrates, small prey, and fish tissue. This uptake factor and proportioning approach for estimating Baseline Plus Project Scenario EPCs of metals was used for the following media:

- Terrestrial plants (encompassing berries and other traditional plants) – estimated based on modelled change in soil concentrations and/or direct deposition onto uncovered plant surfaces, as applicable.
- Terrestrial invertebrates – estimated based on modelled change in soil concentrations.
- Terrestrial small prey – estimated based on modelled change in soil concentrations.
- Wild meat – estimated using a dietary exposure modelling approach that incorporates modelled changed in soil, surface water, sediment, and applicable dietary items (i.e., vegetation).
- Fish – estimated based on modelled change in surface water concentrations.
- Aquatic vegetation – estimated based on modelled change in sediment concentrations.
- Benthic invertebrates – estimated based on modelled change in sediment concentrations.

Baseline Plus Project Scenario estimated concentrations in wild meat (including birds and mammals) were modelled using the same approach as that use to establish Baseline Scenario EPCs (as mentioned above and discussed in Section 6.8).

Concentrations in tissues for each of the assessed scenarios are presented in Sections 6.5 to 6.11 according to each medium.

Baseline data were available in one or more media for the following metals; however, they were not considered further in the multimedia HHERA due to low toxicity and/or ubiquity in the natural environment as discussed in Appendix D:

- Aluminum
- Bismuth
- Boron
- Calcium
- Iron
- Lithium
- Magnesium
- Phosphorus
- Potassium
- Sodium
- Strontium
- Tin
- Titanium

For tungsten, baseline sampling of tissue provided limited data, and the modelled percent changes from Baseline Scenario concentrations in soil were low, as presented in Section 6.2. In addition, there is a lack of toxicity data available for tungsten in the literature. Therefore, tungsten is not assessed quantitatively. Instead, it was evaluated qualitatively in the HHRA and ERA. Consequently, tungsten concentrations in sediment and tissues have not been modelled and are marked as "not calculated" in tables in Sections 6.5 to 6.11.

As noted in Section 1.3.4, special consideration is given to evaluating changes in mercury and methyl mercury concentrations in surface water and how these changes are reflected in methyl mercury concentrations in fish tissue associated the North Driftwood Diversion Channel.

6.1 Air

An evaluation of baseline and future air quality was conducted as part of the air quality assessment in support of the Impact Statement. A summary of the ambient monitoring data used to evaluate Baseline Scenario and the modelling methods applied to estimate future air quality conditions (i.e., Project Alone Scenario and Baseline Plus Project Scenario) is provided below. Additional details (e.g., model software, model inputs and assumptions) are provided in Chapter 12 of the Impact Statement and the Air Quality Assessment Technical Data Report (Appendix C.1 of the Impact Statement).

A comprehensive list of Project-related chemicals that may be released to the receiving environment and have the potential to elicit adverse human or ecological effects was developed based on a review of several information sources, including:

- the Project design.
- mineralogical and trace constituent analysis of the ore, waste rock and overburden.
- Safety Data Sheets for additives and other chemicals used in the ore milling and concentrating processes.
- air contaminants with provincial air quality criteria (O. Reg. 419) that may be emitted during construction, operations, and decommissioning and closure phases.

- air contaminants emitted from vehicle tailpipe exhaust.

Based on this review, the following key groups of chemicals were identified for evaluation in the air quality assessment:

- Suspended particulate matter (PM), particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).
- Other Criteria Air Contaminants (CAC) - substances with regulatory limits including sulphur dioxide (SO_2), nitrogen oxides (NO_X), and carbon monoxide (CO).
- Hazardous Air Pollutants - Substances that are capable of causing environmental or health effects including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and metals. PAHs and VOCs (including benzo(a)pyrene and benzene) from vehicle tailpipe emissions were included in the assessment.
- Asbestiform minerals - The ore and waste rock types identified by Canada Nickel (dunite, peridotite, pyroxenite, metavolcanic and gabbro) are all mafic or ultramafic rock. These rock types can contain serpentine mineral groups including chrysotile (an asbestiform mineral) as well as lizardite and antigorite (which are non-asbestiform minerals). Canada Nickel has identified chrysotile in dunite and peridotite and has not identified amphibole family asbestiform minerals (which are typically found in felsic rocks). Therefore, chrysotile was included as a chemical for evaluation in the air quality assessment.
- Diesel particulate matter (DPM)

For the parameters listed above, baseline conditions were evaluated based on a review of ambient monitoring data from two sources. These included data available from the Canadian National Air Pollution Surveillance (NAPS) Network and on-site ambient monitoring.

Future conditions (i.e., Project Alone and Baseline Plus Project) were assessed using air dispersion modelling. This modelling accounted for air emissions during Project construction and/or operation from activities such as material handling, equipment travel, grading, drilling, blasting, tailpipe emissions from mobile equipment and locomotives, wind erosion, primary crushing, secondary crushing and screening, general construction activities, unpaved road dust, and unloading of solid reagents to storage tanks or mix tanks. The air dispersion modelling for construction and operation was conducted assuming the worst-case year for each Project phase based on a review of Project emission sources over time. This means that air dispersion modelling was performed using emissions data from Year -1 of construction and Year 7 of operation. Air quality emissions during Project decommissioning and closure were not explicitly modelled because active closure emissions are expected to be less than construction emissions. Therefore, the assessment of the construction-related scenario was considered to implicitly address emissions during the active closure phase as well.

The locations evaluated in the air quality dispersion modelling that are pertinent to the HHRA include the modelled mine boundary and specific sensitive and representative receptor locations selected to represent places where people are likely to be present and could be exposed to emissions from the Project.

1. **Modelled Mine Boundary**: In addition to the PA as described in Section 2.1, a separate property boundary has been defined in the air quality assessment provided in Chapter 12 of the Impact Statement that is applicable to the evaluation of Project effects on human health. The intention of the modelled mine boundary is to provide a buffer around the PA similar to those at other mines and industrial sites. Within the modelled mine boundary, seasonal or permanent housing will be avoided. People (on snowmobile trails, rivers, etc.), could still pass through the area within the modelled mine boundary (but outside the PA), but time within this area would be limited and no overnight stays would be possible. These land use restrictions within the modelled mine boundary will be imposed by Canada Nickel via the following measures.

   - Agreements with property owners within the restricted area to remove buildings (through acquisition of the property or other arrangements)
   - Agreements with other individual landowners to prevent construction of any seasonal or permanent housing through acquisition or specific agreements to defer any construction until after mine operations are completed
   - Crown Leases to be obtained on Crown lands, to restrict access

   In addition to the receptor-specific mitigations listed above, the following general mitigations are proposed within the modelled mine boundary:

   - Install signage and/or gates on trails to restrict access into the modelled mine boundary (agreement with landowners if needed to place the signs)
   - Prohibit overnight stays in warming huts along the snowmobile trail except in emergencies (signage for warming huts to be installed)

   A map of the proposed modelled mine boundary is presented in Figure A.5, Appendix A Public roads are not included within the modelled mine boundary.

2. **Sensitive and Representative Receptor Locations:** Air quality dispersion modelling was also completed for specific receptor locations selected to represent places where people are more likely to be present and exposed to emissions from the Project. The selection of these receptor locations for human health considerations was based on current and historical land use, input from local communities, a review of the aerial photography, and a field verification program conducted with the Project team in 2024. Traditional knowledge and land and resource use information were gathered through engagement with Indigenous nations. This information helped identify 13 potential human receptor locations across the LSA (Table 6.1, Figure A.5, Appendix A). Among these:

   - Seven are existing dwellings, camps or cottages where non-Indigenous overnight use has been confirmed or assumed. These are labelled as "Sensitive Receptor, Non-Indigenous" in Table 6.1 and Figure A.5, Appendix A),
   - Five are generalized locations identified by Indigenous nations as having potential for overnight stays lasting up to a week at a time in temporary structures such as campers, vehicles, tents, or ice fishing huts. These are labelled as "Sensitive Receptor, Indigenous' in in Table 6.1 and Figure A.5, Appendix A), and

- One is a generalized location along the Mattagami River selected to be representative of Indigenous uses of this natural feature (identified as “Representative Receptor – Indigenous in Table 6.1 and Figure A.5, Appendix A).

As shown in Figure A.5, Appendix A, receptors R2, R3, and R4 are located inside the modelled mine boundary, where future time spent will be limited and overnight stays will not be possible. Furthermore, Canada Nickel will impose the land use restrictions applicable to within the modelled mine boundary as described above to receptors R1 and R5. Therefore, the eight receptor locations located outside the modelled mine boundary (R6, R7, R8, R9, R10, R11, R12, and R13) are considered representative of areas where people are most likely to be present for chronic exposure periods and overnight stays.

Table 6.1 Sensitive and Representative Receptor Locations

Receptor	Category	Description
R1[a]	Sensitive Receptor - Non-Indigenous	House South of Site, At Lake 300m East of Highway 655
R2[a]	Sensitive Receptor - Non-Indigenous	Camp/Cottage on Davis Lake
R3[a]	Sensitive Receptor - Non-Indigenous	Camp on the West Buskegau River
R4[a]	Sensitive Receptor - Non-Indigenous	Camp/Cottage East of Site
R5[a]	Sensitive Receptor - Non-Indigenous	Camp/Cottage Near Highway 655 South of Site
R6	Sensitive Receptor - Indigenous	Campground at Bigwater Lake Campgrounds
R7	Representative Receptor - Indigenous	Mattagami River - Indigenous Site
R8	Sensitive Receptor - Indigenous	Overnight Indigenous Habitation Location
R9	Sensitive Receptor - Indigenous	Overnight Indigenous Habitation Location
R10	Sensitive Receptor - Indigenous	Overnight Indigenous Habitation Location
R11	Sensitive Receptor - Indigenous	Overnight Indigenous Habitation Location
R12	Sensitive Receptor - Non-Indigenous	Camp/Cottage North of Existing Rail Corridor
R13	Sensitive Receptor - Non-Indigenous	Camp/Cottage North of Existing Rail Corridor

Notes:

a. Receptors R2, R3, and R4 are located inside the modelled mine boundary and Canada Nickel will impose the land use restrictions applicable to within the modelled mine boundary at receptors R1 and R5. Therefore, the eight receptor locations located outside the modelled mine boundary (R6, R7, R8, R9, R10, R11, R12, and R13) are considered representative of areas where people are most likely to be present for chronic exposure periods and overnight stays

The maximum modelled concentrations along the modelled mine boundary for Baseline, Project Alone, and Baseline Plus Project Scenarios during construction and operations as provided in Chapter 12 of the Impact Statement are summarized in Table 6.2 to Table 6.3. In these tables, modelled cumulative concentrations (i.e., Baseline Plus Project) are compared to the Ontario Ambient Air Quality Criteria (AAQC) and the federal Canadian Ambient Air Quality Standards (CAAQS), as identified in Chapter 12 of the Impact Statement. For parameters modelled as particulate, modelled concentrations are provided both with and without assuming plume depletion as the particulates travel from the source to receptor. Comparisons to air quality criteria in these tables are made using predictions without plume depletion. However, the concentrations with plume depletion more accurately reflect how particulate and chemical concentrations decrease as particulate settle on nearby surfaces such as vegetation and buildings.

For some parameters, additional modelling beyond what was reported in Chapter 12 of the Impact Statement was needed. This additional modelling provided air concentrations for specific averaging periods or statistical representations of the data that align with health-based exposure limits and toxicity reference values identified in the human health risk assessment (see Section 1.1). In such cases, modelling was carried out using the same methods and assumptions described in Chapter 12 of the Impact Statement, adjusted for the applicable averaging periods or statistical representations of the data. The results of this supplemental modelling are summarized in Table 6.2 to Table 6.3, below.

Table 6.2 Maximum Modelled Concentrations for the Construction Scenario Compared to Ontario Ambient Air Quality Criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS) - Modelled Mine Boundary

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Total Suspended Particulate Matter (PM) [a]	24	120	26	93	120	208	235	196%
	8760	60	12	9.3	21	23	34	57%
Total Suspended Particulate Matter (PM) (MECP Method - excluding haul roads and wind erosion)[b]	24	120	26	NC	NC	22	49	41%
	8760	60	12	NC	NC	2.7	14	24%
Inhalable Particulate Matter (PM_{10})[a]	24	50	13	28	42	65	78	156%
Inhalable Particulate Matter (PM_{10}) (MECP Method - excluding haul roads and wind erosion)[b]	24	50	13	NC	NC	7.3	20	41%
Fine Particulate Matter ($PM_{2.5}$) [a]	24	27	12	3.2	16	7.4	20	73%
	8760	8.8	6.2	0.3	6.5	0.8	7.0	80%
Fine Particulate Matter ($PM_{2.5}$) (MECP Method - excluding haul roads and wind erosion) [b]	24	27	12.4	NC	NC	2.1	15	54%
	8760	8.8	6.2	NC	NC	0.3	6.5	73%
Diesel Particulate Matter ($PM_{2.5}$ from Diesel Combustion)	2	NA - no criteria	0.2	1.0	1.2	2.1	2.3	NA
	8760	NA - no criteria	1.8E-02	1.4E-02	3.2E-02	2.6E-02	4.4E-02	NA
Elemental Carbon (from diesel exhaust)	24	15	9.4E-02	0.1	0.2	0.3	0.4	2%

Parameter	Averaging Period (hours)	Criteria (µg/m^3)	Baseline Concentration (µg/m^3)	Maximum Predicted Concentration (µg/m^3)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Carbon Monoxide (CO)	0.5	6,000	1,170	NC	NC	1,370	2,540	42%
	1	36,200	965	NC	NC	1,128	2,093	6%
	8	15,700	965	NC	NC	1,426	2,391	15%
Sulphur Dioxide (SO_2)	0.17	178	8.6	NC	NC	36	45	25%
	1	100	5.2	NC	NC	22	27	27%
	8760	10	0.4	NC	NC	5.5E-03	0.4	4%
Nitrogen Dioxide (NO_2) [c]	1	400	5.4	NC	NC	135	140	35%
	24	200	2.2	NC	NC	15	18	9%
Fluoride	720	62,000	ND	7.1E-06	7.1E-06	1.8E-05	1.8E-05	<1%
	1440	47,000	ND	5.8E-06	5.8E-06	1.5E-05	1.5E-05	<1%
Chromium VI	24	7.00E-04	ND	6.6E-08	6.6E-08	1.5E-07	1.5E-07	<1%
	8760	1.40E-04	ND	6.4E-09	6.4E-09	1.5E-08	1.5E-08	<1%
Chromium VI (in PM_{10})	24	3.50E-04	ND	2.4E-08	2.4E-08	5.3E-08	5.3E-08	<1%
	8760	7.00E-05	ND	2.2E-09	2.2E-09	5.0E-09	5.0E-09	<1%
Mercury	24	2	6.4E-05	7.9E-10	6.4E-05	1.6E-09	6.4E-05	<1%
Aluminum	24	12	0.4	6.7	7.1	15	15	129%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Silver	24	1	2.6E-04	2.3E-05	2.8E-04	5.4E-05	3.1E-04	<1%
Arsenic	24	0.3	1.3E-03	2.4E-04	1.5E-03	5.3E-04	1.8E-03	<1%
Barium	24	10	8.6E-03	1.1E-02	1.9E-02	2.5E-02	3.3E-02	<1%
Beryllium	24	1.0E-02	7.6E-04	1.4E-05	7.7E-04	3.2E-05	7.9E-04	8%
Boron	24	120	2.6E-02	8.7E-04	2.7E-02	1.9E-03	2.8E-02	<1%
Bismuth	24	2.5	1.3E-03	5.5E-06	1.3E-03	1.3E-05	1.3E-03	<1%
Calcium	24	NA - no criteria	0.7	8.1	8.8	19	19	NA
Cadmium	24	2.5E-02	2.6E-04	5.3E-06	2.7E-04	1.2E-05	2.7E-04	1%
	8760	5.0E-02	2.6E-04	5.3E-07	2.6E-04	1.2E-06	2.6E-04	5%
Cobalt	24	0.1	7.6E-04	4.2E-03	5.0E-03	9.4E-03	1.0E-02	10%
Chromium	24	0.5	6.0E-03	4.9E-02	5.5E-02	0.1	0.1	23%
Copper	24	50	5.8E-03	9.3E-03	1.5E-02	2.1E-02	2.7E-02	<1%
Iron	24	NA	0.2	4.1	4.4	9.3	9.5	NA
Potassium	24	10	0.1	0.3	0.5	0.8	0.9	9%
Lithium	24	20	ND	1.2E-03	1.2E-03	2.7E-03	2.7E-03	<1%
Magnesium	24	72	0.2	6.5	6.6	15	15	21%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Manganese	24	0.4	8.6E-03	0.1	9.6E-02	0.2	0.2	52%
Manganese (in PM_{10})	24	0.2	8.6E-03	2.7E-02	3.5E-02	5.9E-02	6.8E-02	34%
Manganese (in $PM_{2.5}$)	24	0.1	8.6E-03	2.8E-03	1.1E-02	6.4E-03	1.5E-02	15%
Molybdenum	24	120	7.6E-04	5.1E-05	8.1E-04	1.2E-04	8.8E-04	<1%
Silicon	24	27	ND	0.5	0.5	1.1	1.1	4%
Sodium	24	NA - no criteria	0.5	0.8	1.4	1.8	2.3	NA
Nickel (in PM)	24	0.2	2.6E-03	2.1E-02	2.4E-02	4.7E-02	5.0E-02	25%
	8760	4.0E-02	1.7E-03	2.1E-03	3.8E-03	4.6E-03	6.2E-03	16%
Nickel (in PM_{10})	24	0.1	2.6E-03	6.8E-03	9.4E-03	1.4E-02	1.7E-02	17%
	8760	2.0E-02	1.7E-03	6.6E-04	2.3E-03	1.4E-03	3.0E-03	15%
Lead	24	0.5	3.4E-03	1.2E-04	3.5E-03	2.8E-04	3.7E-03	<1%
	720	0.2	1.3E-03	4.4E-05	1.4E-03	3.6E-04	1.7E-03	<1%
Antimony	24	25	1.3E-03	3.9E-05	1.3E-03	9.0E-05	1.4E-03	<1%
Selenium	24	10	2.6E-03	2.7E-05	2.6E-03	6.4E-05	2.7E-03	<1%
Tin	24	10	2.4E-03	3.0E-04	2.7E-03	7.0E-04	3.1E-03	<1%
Strontium	24	120	1.5E-03	1.2E-02	1.4E-02	2.8E-02	3.0E-02	<1%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Titanium	24	120	8.8E-03	0.1	0.1	0.3	0.3	<1%
Thallium	24	0.5	2.6E-04	3.9E-06	2.6E-04	9.4E-06	2.7E-04	<1%
Uranium	24	0.3	2.6E-04	1.3E-05	2.7E-04	3.3E-05	2.9E-04	<1%
	8760	0.06	2.6E-04	1.4E-06	2.6E-04	3.4E-06	2.6E-04	<1%
Uranium (in PM_{10})	24	0.15	2.6E-04	4.5E-06	2.6E-04	1.1E-05	2.7E-04	<1%
	8760	0.03	2.6E-04	4.8E-07	2.6E-04	1.1E-06	2.6E-04	<1%
Vanadium	24	2	7.6E-04	1.0E-02	1.1E-02	2.4E-02	2.4E-02	1%
Tungsten	24	5	ND	1.5E-05	1.5E-05	3.2E-05	3.2E-05	<1%
Yttrium	24	5	ND	4.8E-04	4.8E-04	1.1E-03	1.1E-03	<1%
Zinc	24	120	1.5E-02	3.5E-03	1.8E-02	7.8E-03	2.3E-02	<1%
Thorium	24	NA - no criteria	ND	7.3E-05	7.3E-05	1.6E-04	1.6E-04	NA
Quartz (in PM_{10})	24	5	1.0	1.0	2.0	2.1	3.0	61%
Pyrite	24	NA - no criteria	ND	1.7E-05	1.7E-05	3.4E-05	3.4E-05	NA
Biotite	24	NA - no criteria	ND	0.5	0.5	1.1	1.1	NA
Magnetite	24	25	ND	0.5	0.5	1.1	1.1	4%
Hematite	24	25	ND	1.9E-02	1.9E-02	3.7E-02	3.7E-02	<1%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Chlorite	24	120	ND	10	10	24	24	20%
Muscovite	24	1.5	ND	2.0	2.0	4.4	4.4	295%
Talc (fibrous)	24	2	ND	8.4E-02	8.4E-02	0.2	0.2	8%
Chrysotile Asbestos (units are fibres/cm³)[d]	24	4.0E-02 fibres/cm³	2.9E-03 fibres/cm³	1.1E-03 fibres/cm³	4.0E-03 fibres/cm³	2.2E-03 fibres/cm³	5.1E-03 fibres/cm³	13%
1,3-butadiene	24	10	0.6	NC	NC	2.0E-03	0.6	6%
	8760	2	0.6	NC	NC	1.5E-04	0.6	28%
Acenaphthene	24	NA - no criteria	4.4E-03	NC	NC	1.5E-04	4.6E-03	NA
	8760	NA - no criteria	8.5E-04	NC	NC	1.9E-05	8.7E-04	NA
Acenaphthylene	24	NA - no criteria	8.2E-03	NC	NC	2.5E-04	8.4E-03	NA
	8760	NA - no criteria	1.6E-03	NC	NC	3.9E-05	1.6E-03	NA
Acetaldehyde	0.5	500	ND	NC	NC	2.0	2.0	<1%
	24	500	ND	NC	NC	0.2	0.2	<1%
Acrolein	1	4.5	ND	NC	NC	0.2	0.2	5%
	24	0.4	ND	NC	NC	2.5E-02	2.5E-02	6%
Anthracene	24	NA - no criteria	1.6E-04	NC	NC	8.4E-05	2.5E-04	NA
	8760	NA - no criteria	3.1E-05	NC	NC	6.6E-06	3.7E-05	NA

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Benzene	24	2.3	0.5	NC	NC	3.3E-02	0.5	23%
	8760	0.45	0.4	NC	NC	2.5E-03	0.4	83%
Benzo(a)anthracene	24	NA - no criteria	ND	NC	NC	1.8E-06	1.8E-06	NA
	8760	NA - no criteria	ND	NC	NC	3.0E-07	3.0E-07	NA
Benzo(a)pyrene	24	5.00E-05	5.3E-05	NC	NC	1.1E-06	5.4E-05	108%
	8760	1.00E-05	1.0E-05	NC	NC	9.1E-08	1.0E-05	102%
Benzo(b+k)fluoranthene	24	NA - no criteria	2.8E-04	NC	NC	9.6E-07	2.8E-04	NA
	8760	NA - no criteria	5.3E-05	NC	NC	1.3E-07	5.4E-05	NA
Benzo(g,h,i)perylene	24	NA - no criteria	ND	NC	NC	9.6E-07	9.6E-07	NA
	8760	NA - no criteria	ND	NC	NC	2.3E-07	2.3E-07	NA
Chrysene	24	NA - no criteria	3.4E-04	NC	NC	2.5E-06	3.4E-04	NA
	8760	NA - no criteria	6.5E-05	NC	NC	3.4E-07	6.5E-05	NA
Dibenzo(a,h) anthracene	24	NA - no criteria	ND	NC	NC	2.8E-07	2.8E-07	NA
	8760	NA - no criteria	ND	NC	NC	2.6E-08	2.6E-08	NA
Fluoranthene	24	NA - no criteria	8.2E-04	NC	NC	1.3E-04	9.5E-04	NA
	8760	NA - no criteria	1.6E-04	NC	NC	1.0E-05	1.7E-04	NA

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Fluorene	24	NA - no criteria	1.5E-03	NC	NC	5.1E-04	2.0E-03	NA
	8760	NA - no criteria	2.8E-04	NC	NC	3.9E-05	3.2E-04	NA
Indeno(1,2,3,c,d)pyrene	24	NA - no criteria	ND	NC	NC	4.8E-07	4.8E-07	NA
	8760	NA - no criteria	ND	NC	NC	4.7E-08	4.7E-08	NA
Naphthalene	0.17	50	ND	NC	NC	0.5	0.5	1%
	24	22.5	ND	NC	NC	3.9E-02	3.9E-02	<1%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Phenanthrene	24	NA - no criteria	2.2E-03	NC	NC	2.2E-03	4.4E-03	NA
	8760	NA - no criteria	4.2E-04	NC	NC	1.7E-04	6.0E-04	NA
Pyrene	24	NA - no criteria	7.1E-04	NC	NC	1.1E-04	8.3E-04	NA
	8760	NA - no criteria	1.4E-04	NC	NC	8.6E-06	1.5E-04	NA
Formaldehyde	24	65	ND	NC	NC	0.5	0.5	<1%
Hydrocarbons	24	NA - no criteria	ND	NC	NC	1.9	1.9	NA

Notes:

a. Model predictions for particulates including all emissions sources.

b. Model predictions for particulates excluding roads and stockpile wind erosion as allowed by MECP Guideline A-10, Section 7.4.1 for facilities with a fugitive dust BMP. These model predictions were used for comparison to the applicable criteria.

c. Maximum predicted 1-hr NO_2 concentrations using the ARM2 method.

d. Maximum predicted 24-hour Chrysotile Asbestos concentration was converted to fibres/cm³ using a conversion factor of 1µg/m³ = 0.03 fibres/cm³. The conversion factor was taken from Table 4-2 of the National Research Council (US) Asbestiform Fibers: Nonoccupational Health Risks document. https://www.ncbi.nlm.nih.gov/books/NBK216742/table/ttt00007/?report=objectonly

e. Maximum predicted concentration without plume depletion is compared to the criteria.

NA: not applicable, NC: not calculated, ND: no data

Table 6.3 Maximum Modelled Concentrations for the Operation Scenario Compared to Ontario Ambient Air Quality Criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS)- Modelled Mine Boundary

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Total Suspended Particulate Matter (PM) [a]	24	120	26	196	223	507	533	445%
	8760	60	12	18.5	30	49.9	62	103%
Total Suspended Particulate Matter (PM) (MECP method - excluding haul roads and wind erosion) [b]	24	120	26	NC	NC	33.9	60	50%
	8760	60	12	NC	NC	5.2	17	28%
Inhalable Particulate Matter (PM_{10}) [a)]	24	50	13	57	70	148	161	322%
Inhalable Particulate Matter (PM_{10}) (MECP method - excluding haul roads and wind erosion) [b]	24	50	13	NC	NC	10	23	46%
Fine Particulate Matter ($PM_{2.5}$) [a]	24	27	12	6.20	19	16.04	28	105%
	8760	8.8	6.2	0.7	6.9	1.7	8	90%
Fine Particulate Matter ($PM_{2.5}$) (MECP method - excluding haul roads and wind erosion) [b]	24	27	12	NC	NC	3.2	16	58%
	8760	8.8	6.2	NC	NC	0.5	7	76%
Diesel Particulate Matter ($PM_{2.5}$ from Diesel Combustion)	2	NA - no criteria	0.19	1.99	2.18	3.72	3.91	NA
	8760	NA - no criteria	1.8E-02	3.0E-02	4.8E-02	6.5E-02	8.3E-02	NA
Elemental Carbon (from diesel exhaust)	24	15	9.4E-02	0.37	0.47	0.66	0.76	5%
Carbon Monoxide (CO)	0.5	6,000	1,170	NC	NC	3,932	5,102	85%
	1	36,200	965	NC	NC	3,238	4,203	12%
	8	15,700	965	NC	NC	1,809	2,348	15%
Sulphur Dioxide (SO_2)	0.17	178	8.6	NC	NC	121	129	73%
	1	100	5.2	NC	NC	73	78	78%
	8760	10	0.4	NC	NC	1.2E-02	3.65E-01	4%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Nitrogen Dioxide (NO_2) [c]	1	400	5.4	NC	NC	227	232	58%
	24	200	2.2	NC	NC	42	44	22%
Fluoride	720	62,124	ND	1.3E-05	1.3E-05	2.6E-05	2.6E-05	<1%
	1440	46,593	ND	1.1E-05	1.1E-05	2.1E-05	2.1E-05	<1%
Chromium VI	24	7.0E-04	ND	1.9E-07	1.9E-07	4.0E-07	4.0E-07	<1%
	8760	1.4E-04	ND	1.5E-08	1.5E-08	3.0E-08	3.0E-08	<1%
Chromium VI (in PM_{10})	24	3.5E-04	ND	5.4E-08	5.4E-08	1.1E-07	1.1E-07	<1%
	8760	7.0E-05	ND	4.9E-09	4.9E-09	9.6E-09	9.6E-09	<1%
Mercury	24	2.0	6.4E-05	6.2E-07	6.5E-05	1.1E-06	6.5E-05	<1%
Aluminum	24	12	0.4	14.4	14.8	37	37.38	312%
Silver	24	1	2.6E-04	4.9E-05	3.1E-04	1.3E-04	3.9E-04	<1%
Arsenic	24	0.3	1.3E-03	5.6E-04	1.8E-03	1.5E-03	2.8E-03	<1%
Barium	24	10	8.6E-03	2.2E-02	3.0E-02	5.7E-02	6.5E-02	<1%
Beryllium	24	1.0E-02	7.6E-04	3.2E-05	7.9E-04	7.6E-05	8.4E-04	8%
Boron	24	120	2.6E-02	2.2E-03	2.8E-02	5.8E-03	3.2E-02	<1%
Bismuth	24	2.5	1.3E-03	1.3E-05	1.3E-03	3.3E-05	1.3E-03	<1%
Calcium	24	NA - no criteria	0.7	17	18	45	46	NA
Cadmium	24	0.025	2.6E-04	1.2E-05	2.7E-04	3.1E-05	2.9E-04	1%
	8760	0.005	2.6E-04	1.1E-06	2.6E-04	2.7E-06	2.6E-04	5%
Cobalt	24	0.1	7.6E-04	9.0E-03	9.7E-03	2.5E-02	2.6E-02	26%
Chromium	24	0.5	6.0E-03	0.1	0.1	0.3	0.3	59%
Copper	24	50	5.8E-03	2.0E-02	2.6E-02	5.2E-02	5.8E-02	<1%
Iron	24	NA	0.2	8.9	9.2	24	24	-
Potassium	24	10	0.1	0.7	0.8	1.7	1.9	19%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Lithium	24	20	ND	2.4E-03	2.4E-03	6.3E-03	6.3E-03	<1%
Magnesium	24	72	0.2	14	14	38	38	53%
Manganese	24	0.4	8.6E-03	0.2	0.2	0.5	0.5	123%
Manganese (in PM_{10})	24	0.2	8.6E-03	5.4E-02	6.3E-02	0.1	0.2	76%
Manganese (in $PM_{2.5}$)	24	0.1	8.6E-03	5.6E-03	1.4E-02	1.5E-02	2.4E-02	24%
Molybdenum	24	120	7.6E-04	1.1E-04	8.7E-04	2.9E-04	1.1E-03	<1%
Silicon	24	27	ND	1.2	1.2	3.1	3.1	11%
Sodium	24	NA - no criteria	5.2E-01	2.0	2.5	5.1	5.2	NA
Nickel (in PM)	24	0.2	2.6E-03	5.9E-02	6.2E-02	0.2	0.2	78%
	8760	4.0E-02	1.7E-03	4.6E-03	6.2E-03	1.1E-02	1.3E-02	31%
Nickel (in PM_{10})	24	0.1	2.6E-03	1.5E-02	1.8E-02	3.9E-02	4.2E-02	42%
	8760	2.0E-02	1.7E-03	1.3E-03	2.9E-03	3.0E-03	4.7E-03	23%
Lead	24	0.5	3.4E-03	2.0E-04	3.6E-03	4.8E-04	3.9E-03	<1%
	720	0.2	1.3E-03	7.7E-05	1.4E-03	1.8E-04	1.5E-03	<1%
Antimony	24	25	1.3E-03	8.2E-05	1.3E-03	2.2E-04	1.5E-03	<1%
Selenium	24	10	2.6E-03	5.7E-05	2.7E-03	1.5E-04	2.8E-03	<1%
Tin	24	10	2.4E-03	6.2E-04	3.0E-03	1.7E-03	4.1E-03	<1%
Strontium	24	120	1.5E-03	2.5E-02	2.7E-02	6.5E-02	6.7E-02	<1%
Titanium	24	120	8.8E-03	0.3	0.3	0.7	0.7	<1%
Thallium	24	0.5	2.6E-04	6.4E-06	2.7E-04	1.6E-05	2.8E-04	<1%
Uranium	24	0.3	2.6E-04	2.4E-05	2.8E-04	5.1E-05	3.1E-04	<1%
	8760	6.0E-02	2.6E-04	3.2E-06	2.6E-04	6.5E-06	2.7E-04	<1%
Uranium (in PM_{10})	24	0.15	2.6E-04	7.6E-06	2.7E-04	1.6E-05	2.8E-04	<1%
	8760	3.0E-02	2.6E-04	1.0E-06	2.6E-04	2.1E-06	2.6E-04	<1%

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Vanadium	24	2	7.6E-04	2.2E-02	2.3E-02	5.8E-02	5.9E-02	3%
Tungsten	24	5	ND	4.2E-05	4.2E-05	1.1E-04	1.1E-04	<1%
Yttrium	24	5	ND	1.1E-03	1.1E-03	2.9E-03	2.9E-03	<1%
Zinc	24	120	1.5E-02	7.9E-03	2.3E-02	2.1E-02	3.6E-02	<1%
Thorium	24	NA - no criteria	0	1.8E-04	1.8E-04	4.6E-04	4.6E-04	NA
Quartz (in PM10)	24	5	0.99	2.7	3.7	4.9	5.9	117%
Pyrite	24	NA - no criteria	ND	2.0E-04	2.0E-04	3.4E-04	3.4E-04	NA
Biotite	24	NA - no criteria	ND	1.0	1.0	2.7	2.7	NA
Magnetite	24	25	ND	1.9	1.9	4.6	4.6	18%
Hematite	24	25	ND	6.6E-02	6.6E-02	0.14	0.14	<1%
Chlorite	24	120	ND	22	22	56	56	NA
Muscovite	24	1.5	ND	5.4	5.4	12	12	806%
Talc (fibrous)	24	2	ND	0.3	0.3	0.6	0.6	32%
Phosphorus	24	0.5	ND	1.1E-07	1.1E-07	2.2E-07	2.2E-07	<1%
Platinum	24	0.2	ND	3.4E-11	3.4E-11	6.4E-11	6.4E-11	<1%
Palladium 2	24	10	ND	1.2E-10	1.2E-10	2.2E-10	2.2E-10	<1%
Chrysotile Asbestos (units are fibres/cm³) [d]	24	0.04 fibres/cm³	2.9E-03 fibres/cm³	9.6E-03 fibres/cm³	1.3E-02 fibres/cm³	1.7E-02 fibres/cm³	2.0E-02 fibres/cm³	50%
1,3-butadiene	24	10	0.6	NC	NC	3.4E-03	0.6	6%
	8760	2	0.6	NC	NC	3.3E-04	0.6	28%
Acenaphthene	24	NA - no criteria	4.4E-03	NC	NC	2.4E-04	4.6E-03	NA
	8760	NA - no criteria	8.5E-04	NC	NC	2.2E-05	8.7E-04	NA

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Acenaphthylene	24	NA - no criteria	8.2E-03	NC	NC	3.9E-04	8.5E-03	NA
	8760	NA - no criteria	1.6E-03	NC	NC	4.2E-05	1.6E-03	NA
Acetaldehyde	0.5	500	ND	NC	NC	2.8	2.8	<1%
	24	500	ND	NC	NC	0.3	0.3	<1%
Acrolein	1	4.5	ND	NC	NC	0.3	0.3	7%
	24	0.4	ND	NC	NC	4.2E-02	4.2E-02	11%
Anthracene	24	NA - no criteria	1.6E-04	NC	NC	1.5E-04	3.1E-04	NA
	8760	NA - no criteria	3.1E-05	NC	NC	1.4E-05	4.5E-05	NA
Benzene	24	2.3	0.5	NC	NC	5.5E-02	0.5	24%
	8760	0.45	0.4	NC	NC	5.4E-03	0.4	83%
Benzo(a)anthracene	24	NA - no criteria	ND	NC	NC	2.3E-06	2.3E-06	NA
	8760	NA - no criteria	ND	NC	NC	3.1E-07	3.1E-07	NA
Benzo(a)pyrene	24	5.0E-05	5.3E-05	NC	NC	2.2E-06	5.5E-05	110%
	8760	1.0E-05	1.0E-05	NC	NC	2.2E-07	1.0E-05	103%
Benzo(b+k)fluoranthene	24	NA - no criteria	2.8E-04	NC	NC	1.9E-06	2.8E-04	NA
	8760	NA - no criteria	5.4E-05	NC	NC	1.9E-07	5.4E-05	NA
Benzo(g,h,i)perylene	24	NA - no criteria	ND	NC	NC	1.4E-06	1.4E-06	NA
	8760	NA - no criteria	ND	NC	NC	2.3E-07	2.3E-07	NA
Chrysene	24	NA - no criteria	3.4E-04	NC	NC	4.1E-06	3.4E-04	NA
	8760	NA - no criteria	6.5E-05	NC	NC	3.8E-07	6.5E-05	NA
Dibenzo(a,h) anthracene	24	NA - no criteria	ND	NC	NC	8.8E-07	8.8E-07	NA
	8760	NA - no criteria	ND	NC	NC	8.8E-08	8.8E-08	NA
Fluoranthene	24	NA - no criteria	8.2E-04	NC	NC	2.3E-04	1.0E-03	NA
	8760	NA - no criteria	1.6E-04	NC	NC	2.2E-05	1.8E-04	NA

Parameter	Averaging Period (hours)	Criteria (µg/m³)	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)				% of Criteria [e]
				Refined Method - With Plume Depletion		Base Method – Without Plume Depletion		
				Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	
Fluorene	24	NA - no criteria	1.5E-03	NC	NC	8.6E-04	2.3E-03	NA
	8760	NA - no criteria	2.8E-04	NC	NC	8.5E-05	3.7E-04	NA
Indeno(1,2,3,c,d)pyrene	24	NA - no criteria	ND	NC	NC	6.0E-07	6.0E-07	NA
	8760	NA - no criteria	ND	NC	NC	5.0E-08	5.0E-08	NA
Naphthalene	0.17	50	ND	NC	NC	0.9	0.9	2%
	24	22.5	ND	NC	NC	9.2E-02	9.2E-02	<1%
Phenanthrene	24	NA - no criteria	2.2E-03	NC	NC	5.2E-03	7.4E-03	NA
	8760	NA - no criteria	4.2E-04	NC	NC	5.2E-04	9.4E-04	NA
Pyrene	24	NA - no criteria	7.1E-04	NC	NC	2.6E-04	9.7E-04	NA
	8760	NA - no criteria	1.4E-04	NC	NC	2.6E-05	1.6E-04	NA
Formaldehyde	24	65	ND	NC	NC	0.9	0.9	1%
Potassium amyl xanthate	24	NA - no criteria	ND	5.4E-02	5.4E-02	9.2E-02	9.2E-02	NA
Sodium hexametaphosphate	24	15	ND	8.7E-02	8.7E-02	0.1	0.1	<1%
Hydrocarbons	24	NA - no criteria	ND	NC	NC	3.3	3.3	NA

Notes:

a. Model predictions for particulates including all emissions sources.

b. Model predictions for particulates excluding roads and stockpile wind erosion as allowed by MECP Guideline A-10, Section 7.4.1 for facilities with a fugitive dust BMP. These model predictions were used for comparison to the applicable criteria.

c. Maximum predicted 1-hr NO2 concentrations using the ARM2 method.

d. Maximum predicted 24-hour Chrysotile Asbestos concentration was converted to fibres/cm³ using a conversion factor of 1µg/m³ = 0.03 fibres/cm³. The conversion factor was taken from Table 4-2 of the National Research Council (US) Asbestiform Fibers: Nonoccupational Health Risks document. https://www.ncbi.nlm.nih.gov/books/NBK216742/table/ttt00007/?report=objectonly

e. Maximum predicted concentration without plume depletion is compared to the criteria.

NA: not applicable, NC: not calculated, ND: no data

Table 6.4 Summary of Supplemental Air Quality Model Results to Support Human Health Risk Assessment - Construction Scenario, Modelled Mine Boundary

Parameter	Averaging Period	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)			
			Refined Method - With Plume Depletion		Base Method – Without Plume Depletion	
			Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
1,3-Butadiene	1-hour	1.4	NC	NC	0.018	1.4
Acetaldehyde	1-hour	ND	NC	NC	1.7	1.7
Acetaldehyde	Annual	ND	NC	NC	0.013	0.013
Arsenic	Annual	0.0013	2E-05	0.0013	5E-05	0.0013
Beryllium	Annual	0.00078	1E-06	0.0008	3E-06	0.0008
Benzene	1-hour	1.2	NC	-	0.28	1.5
Chrysotile Asbestos (units are fibres/cm³)[a]	Annual	0.001 fibres/cm³	9E-05 fibres/cm³	0.0011 fibres/cm³	0.0002 fibres/cm³	0.0012 fibres/cm³
Formaldehyde	1-hour	ND	NC	NC	5.1	5.1
Formaldehyde	Annual	ND	NC	NC	0.042	0.042
Naphthalene	Annual	ND	NC	NC	0.0031	0.0031
NO_2 (ARM2 method)[b]	24-hour, 99th percentile[c]	2.2	NC	NC	13	15
NO_2 (ARM2 method)[b]	1-hour	0.33	NC	NC	3.2	3.5
PM_{10}	24-hour, 99th percentile[c]	13	NC	NC	43	56
PM_{10}	Annual	8.3	2.8	11	6.2	15
$PM_{2.5}$	24-hour, 99th percentile[c]	12	NC	NC	5.1	18

Parameter	Averaging Period	Baseline Concentration (µg/m^3)	Maximum Predicted Concentration (µg/m^3)			
			Refined Method - With Plume Depletion		Base Method – Without Plume Depletion	
			Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Quartz (IN PM_{10})	Annual	0.41	0.057	0.47	0.13	0.54
SO_2	24-hour, 99th percentile[c]	2.1	NC	NC	0.049	2.2

Notes:

a. Chrysotile Asbestos concentration was converted to fibres/cm^3 using a conversion factor of 1µg/m^3 = 0.03 fibres/cm^3. The conversion factor was taken from Table 4-2 of the National Research Council (US) Asbestiform Fibers: Nonoccupational Health Risks document. https://www.ncbi.nlm.nih.gov/books/NBK216742/table/ttt00007/?report=objectonly .

b. NO_2 concentrations modelled using the Ambient Ratio Method (ARM2) method

c. 99th percentile of the annual distribution of 24-hour average concentrations

NC: not calculated, ND: no data

Table 6.5 Summary of Supplemental Air Quality Model Results to Support Human Health Risk Assessment - Operation Scenario, Modelled Mine Boundary

Parameter	Averaging Period	Baseline Concentration (µg/m³)	Maximum Predicted Concentration (µg/m³)			
			Refined Method - With Plume Depletion		Base Method – Without Plume Depletion	
			Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
1,3-Butadiene	1-hour	1.4	NC	NC	0.025	1.4
Acetaldehyde	1-hour	ND	NC	NC	2.3	2.3
Acetaldehyde	Annual	ND	NC	NC	0.029	0.029
Arsenic	Annual	0.0013	0.00005	0.0013	0.00012	0.0014
Beryllium	Annual	0.00078	0.0000032	0.00078	0.0000069	0.00079
Benzene	1-hour	1.2	NC	NC	0.41	1.6
Chrysotile Asbestos (units are fibres/cm³)[a]	Annual	0.001 fibres/cm³	0.00034 fibres/cm³	0.0013 fibres/cm³	0.00064 fibres/cm³	0.0016 fibres/cm³
Formaldehyde	1-hour	ND	NC	NC	7	7
Formaldehyde	Annual	ND	NC	NC	0.091	0.091
Naphthalene	Annual	ND	NC	NC	0.0092	0.0092
NO_2 (ARM2 method)[b]	24-hour, 99th percentile[c]	2.2	NC	NC	41	43
NO_2 (ARM2 method)[b]	Annual	0.33	NC	NC	7.1	7.4
PM_{10}	24-hour, 99th percentile[c]	13	NC	NC	110	120
PM_{10}	Annual	8.3	5.5	14	13	22
$PM_{2.5}$	24-hour, 99th percentile[c]	12	NC	NC	12	24

Parameter	Averaging Period	Baseline Concentration ($\mu g/m^3$)	Maximum Predicted Concentration ($\mu g/m^3$)			
			Refined Method - With Plume Depletion		Base Method – Without Plume Depletion	
			Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Quartz (IN PM_{10})	Annual	0.41	0.19	0.61	0.37	0.78
SO_2	24-hour, 99th percentile[c]	2.1	NC	NC	0.11	2.3

Notes:

a. Chrysotile Asbestos concentration was converted to fibres/cm^3 using a conversion factor of 1µg/m^3 = 0.03 fibres/cm^3. The conversion factor was taken from Table 4-2 of the National Research Council (US) Asbestiform Fibers: Nonoccupational Health Risks document. https://www.ncbi.nlm.nih.gov/books/NBK216742/table/ttt00007/?report=objectonly .

b. NO_2 concentrations modelled using the Ambient Ratio Method (ARM2) method

c. 99th percentile of the annual distribution of 24-hour average concentrations

NC: not calculated, ND: no data

6.2 Soil

Baseline soil data are summarized in Appendix B. These data were used to calculate EPCs for the Baseline Scenario as described in Section 6.

Future soil concentrations (Baseline Plus Project Scenario) were estimated using modelled air deposition data for construction and operations phases. The modelled dust deposition rates at each of the selected deposition receptor locations were used to estimate the concentrations of metals in soil, with the following assumptions:

- Metal accumulation in the soil from deposition would occur over the life of the Project (construction and operations) and there would be no loss of metal from the soil (e.g., from runoff).
- The Project construction phase is three years long and the Project operations phase is 40 years long.
- Deposition rates were modelled for 79 receptor locations, as described in Chapter 12 of the Impact Statement.
- The deposition rate during the construction phase is the modelled deposition rate during “Year -1” (with Year 0 representing the beginning of operations).
- The deposition rate during the operations phase is based on the modelled deposition rate during “Year 7”. These are protective assumptions representing years expected to have highest rates of deposition. As such, these values were considered for the purposes of this assessment and the 95th percentile of the total deposition rates among the receptor locations during the Project (operations phase) is used.
- The surface soil bulk density of 1,200 kg/m^3, which represents soil suitable for good plant growth and root development, is based on the mean bulk density of Ontario sites assessed within the On-Farm Applied Research and Monitoring Soil Health Technical Report (Soil Resource Group, 2023, p. Table 4).
- The mass of the deposited dust has a negligible effect on the estimated soil concentrations. The mass of the deposited dust is minor compared to the mass of the surface soil prior to deposition, and conservatively was not included within the calculation of Baseline Plus Project Scenario soil concentrations.
- The surface soil mixing zone is 14 cm (0.14 m) thick. This depth is based on soil mixing depth as a function of time from the literature (Drivas, Bowers, & Yamartino, 2011). The mixing zone of 14 cm reflects a mine life of 43 years (i.e., the Project’s assumed construction and operations phases), rounded down to the nearest centimetre.

A sample calculation of the modelled future soil concentrations (Baseline Plus Project Scenario) is included in Appendix C.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario soil concentrations are presented in Table 6.6, along with the modelled future percentage change from baseline. As noted previously, Project Alone Scenario EPCs were calculated as the difference between Baseline Plus Project Scenario EPCs and Baseline Scenario EPCs.

Table 6.6 Representative Concentrations of Metals in Soil

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future (Construction and Operations Phases)		
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario	
			Concentration (mg/kg)	% Change from Baseline
Antimony	0.23	0.0060	0.24	3%
Arsenic	2.7	0.084	2.8	3%
Barium	50	3.1	53.1	6%
Beryllium	0.35	0.0079	0.36	2%
Cadmium	0.52	0.0015	0.52	0.3%
Chromium (Total)	26	18.4	44.4	71%
Chromium VI	0.13	1.8E-05	0.13	<0.1%
Cobalt	6	1.7	7.7	28%
Copper	22	1.4	23.4	7%
Lead	15	0.046	15.0	0.3%
Manganese	380	14.3	394.3	4%
Mercury	0.096	4.9E-07	0.096	<0.1%
Molybdenum	0.59	0.013	0.60	2%
Nickel	16	28.3	44.3	177%
Selenium	0.57	0.0042	0.57	0.7%
Silver	0.5	0.0035	0.50	0.7%
Thallium	0.11	0.0010	0.11	0.9%
Tungsten	1.51	0.0077	1.52	0.5%
Uranium	1.1	0.0053	1.11	0.5%
Vanadium	23	1.6	24.6	7%
Zinc	67	1.0	68.0	2%
Notes: NC = Not calculated NM = Not measured				

6.3 Surface Water

Baseline EPCs used for surface water the same as those provided in the Surface Water Resources Assessment (Appendix C.5 of the Impact Statement). Average values from the samples within each of the three watersheds are used for baseline conditions. Additional details regarding baseline surface water sampling are also provided in the Technical Data Report - Surface Water.

The Project Alone and Baseline Plus Project Scenarios are based on modelled surface water concentrations as provided in the Surface Water Resources Assessment (Appendix C.5 of the Impact Statement), which included modelled surface water concentrations at selected locations downstream of each final discharge point (FDP) in the North Driftwood River and West Buskegau River and at selected locations in Jocko Creek (no FDP to Jocko Creek, only seepage). For the purposes of the HHERA, locations under normal operation conditions scenario were selected to provide representative and protective surface water concentrations. As such, surface water concentrations used in the HHERA for the Project Alone Scenario and Baseline Plus Project Scenario were from the following five selected modelled locations under normal operation conditions:

- Within the North Driftwood River watershed:
  - at the point of full mixing with discharge from the Tailings Management Facility (TMF) seepage and runoff collection ponds (FDP-TMF-SP)
  - at the point of full mixing with discharge from Collection Pond 2 (FDP-SP-02)
- Within the West Buskegau River watershed:
  - at the point of full mixing with discharge from Collection Pond 1 (FDP-SP-01)
  - at the point of full mixing with discharge from Collection Pond 3 (FDP-SP-03)
- Within the Jocko Creek watershed:
  - at the location where those Baseline Plus Project Scenario surface water concentrations modelled to increase from Baseline Scenario were the highest (JC1 Pourpoint)

Locations of the ponds (FDP-TMF-SP, FDP-SP-01, FDP-SP-02, and FDP-SP-03) and of the modelled surface water concentrations (points of full mixing and JC1 Pourpoint) are presented Chapter 15 of the Impact Statement.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario surface water concentrations are presented in Table 6.7, Table 6.8 and Table 6.9 for the North Driftwood, West Buskegau, and Jocko Creek watersheds, respectively, along with the modelled future percentage change from baseline.

Chromium VI concentrations in surface water are not available for the Baseline Scenario, and the Baseline Plus Project concentrations were estimated to be below typical reportable detection limits (RDL). Changes in chromium VI concentrations in soil between the Baseline Scenario and the Baseline Plus Project Scenario are also considered negligible (<0.1%). Therefore, chromium VI was not evaluated further in the HHERA.

The Project is not expected to be a significant source of mercury to the aquatic environment. Mercury inputs associated with the Project were below typical RDL; as such, and as discussed in the Surface Water Resources Assessment (Appendix C.5 of the Impact Statement), a value corresponding to half the RDL was carried forward in the surface water modelling. As such, changes in mercury concentrations in surface water are expected to be negligible for the Baseline Plus Project scenario in the three watersheds assessed. Therefore, with the exception of changes in mercury concentrations associated with the North Driftwood River channel realignment (see Section 6.12), further assessment of mercury in the aquatic environment (e.g., sediment, fish, benthic invertebrates) were not evaluated further in the HHERA.

Table 6.7 Representative Concentrations of Metals in Surface Water – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds			Modelled Future – Point of Full Mixing – Collection Pond 2		
		Project Alone Scenario	Baseline Plus Project Scenario		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline	Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline
Antimony	0.00010	0.00029	0.00039	285%	0.00025	0.00035	247%
Arsenic	0.00060	0.0040	0.0046	667%	0.0039	0.0045	652%
Barium	0.0083	0.00034	0.0086	4%	0.0050	0.013	60%
Beryllium	2.0E-05	0.00033	0.00035	1674%	0.00022	0.00024	1115%
Cadmium	2.0E-05	2.7E-07	2.0E-05	1%	1.2E-06	2.1E-05	6%
Chromium (Total)	0.0013	0.0044	0.0057	337%	0.0043	0.0056	330%
Cobalt	0.00030	0.00051	0.00081	169%	0.00049	0.00079	164%
Copper	0.0012	0.0024	0.0036	199%	0.0023	0.0035	195%
Lead	0.00028	0.00016	0.00044	59%	0.00019	0.00047	67%
Manganese	0.067	Negligible	0.067	<0.1%	Negligible	0.067	<0.1%
Mercury [1]	*2.5E-06*	*1.8E-06*	*4.3E-06*	*73%*	*1.7E-06*	*4.2E-06*	*71%*
Molybdenum	5.0E-05	0.0036	0.0037	7292%	0.0033	0.0033	6532%
Nickel	0.00080	0.010	0.011	1275%	0.0092	0.010	1150%
Selenium	0.00013	0.00066	0.00079	508%	0.00062	0.00075	479%
Silver	1.0E-05	Negligible	1.0E-05	<0.1%	Negligible	1.0E-05	<0.1%
Thallium	1.0E-05	Negligible	1.0E-05	<0.1%	Negligible	1.0E-05	<0.1%
Tungsten	0.00010	0.00074	0.00084	738%	0.00070	0.00080	701%
Uranium	3.0E-05	0.0039	0.0040	13133%	0.0039	0.0039	12833%

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds			Modelled Future – Point of Full Mixing – Collection Pond 2		
		Project Alone Scenario	Baseline Plus Project Scenario		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline	Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline
Vanadium	0.00070	0.0053	0.0060	757%	0.0052	0.0059	741%
Zinc	0.0060	0.0080	0.014	133%	0.0080	0.014	133%

Notes:

1. Inputs associated with the Project for mercury were below typical RDL; as such, a value corresponding to half the RDL was carried forward in calculation of inputs to receiving environment for this parameter.

Negligible = Project-related contributions are considered negligible

NC = Not calculated

NM = Not measured

Table 6.8 Representative Concentrations of Metals in Surface Water – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future - Point of Full Mixing – Collection Pond 1			Modelled Future – Point of Full Mixing – Collection Pond 3		
		Project Alone Scenario	Baseline Plus Project Scenario		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline	Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline
Antimony	0.00010	6.5E-05	0.00016	65%	3.02E-05	0.00013	30%
Arsenic	0.00090	0.00093	0.0018	103%	0.00012	0.0010	13%
Barium	0.0075	0.0039	0.011	53%	0.00052	0.0080	7%
Beryllium	2.0E-05	Negligible	2.0E-05	<0.1%	Negligible	2.0E-05	<0.1%
Cadmium	3.9E-05	Negligible	3.9E-05	<0.1%	Negligible	3.9E-05	<0.1%
Chromium (Total)	0.0013	0.0011	0.0024	82%	0.00013	0.0014	10%
Cobalt	0.00030	0.00012	0.00042	41%	1.9E-05	0.00032	6%
Copper	0.0017	0.00051	0.0022	30%	6.0E-05	0.0018	4%
Lead	0.00047	5.4E-05	0.00052	12%	1.4E-07	0.00047	<0.1%
Manganese	0.068	Negligible	0.068	<0.1%	Negligible	0.068	<0.1%
Mercury [1]	*4.8E-06*	*1.1E-07*	*4.9E-06*	*2%*	*Negligible*	*4.8E-06*	*<0.1%*
Molybdenum	5.0E-05	0.0011	0.0011	2127%	0.00024	0.00029	482%
Nickel	0.0010	0.0024	0.0034	240%	0.00040	0.0014	40%
Selenium	0.00012	0.00016	0.00028	134%	3.7E-05	0.00016	31%
Silver	1.0E-05	Negligible	1.0E-05	<0.1%	Negligible	1.0E-05	<0.1%
Thallium	1.0E-05	Negligible	1.0E-05	<0.1%	1.9E-07	1.0E-05	<0.1%
Tungsten	0.00010	0.00026	0.00036	256%	6.6E-05	0.00017	66%
Uranium	4.0E-05	0.0010	0.0010	2400%	0.00012	0.00016	298%
Vanadium	0.0011	0.0012	0.0023	114%	0.00015	0.0012	14%

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future - Point of Full Mixing – Collection Pond 1			Modelled Future – Point of Full Mixing – Collection Pond 3		
		Project Alone Scenario	Baseline Plus Project Scenario		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline	Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline
Zinc	0.0070	0.0018	0.0088	26%	0.00020	0.0072	3%

Notes:

1. Inputs associated with the Project for mercury were below typical RDL; as such, a value corresponding to half the RDL was carried forward in calculation of inputs to receiving environment for this parameter.

Negligible = Project-related contributions are considered negligible

NC = Not calculated

NM = Not measured

Table 6.9 Representative Concentrations of Metals in Surface Water – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future JC1 Pourpoint		
		Project Alone Scenario Concentration (mg/L)	Baseline Plus Project Scenario	
			Concentration (mg/L)	% Change from Baseline
Antimony	0.00010	7.9E-05	0.00018	79%
Arsenic	0.00070	8.7E-06	0.00071	1%
Barium	0.0073	2.9E-05	0.0073	0.4%
Beryllium	2.0E-05	Negligible	2.0E-05	<0.1%
Cadmium	4.2E-05	Negligible	4.2E-05	<0.1%
Chromium (Total)	0.0013	Negligible	0.0013	<0.1%
Cobalt	0.00020	1.5E-05	0.00021	7%
Copper	0.0023	Negligible	0.0023	<0.1%
Lead	0.00041	Negligible	0.00041	<0.1%
Manganese	0.040	0.00062	0.040	2%
Mercury	3.9E-06	2.4E-08	3.9E-06	0.6%
Molybdenum	5.0E-05	0.00059	0.00064	1176%
Nickel	0.00090	0.00034	0.0012	38%
Selenium	0.00019	5.7E-05	0.00025	30%
Silver	1.0E-05	Negligible	1.0E-05	<0.1%
Thallium	1.0E-05	9.8E-07	1.1E-05	10%
Tungsten	0.00010	0.00015	0.00025	154%
Uranium	4.0E-05	Negligible	4.0E-05	<0.1%
Vanadium	0.00080	Negligible	0.00080	<0.1%

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future JC1 Pourpoint		
		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline
Zinc	0.0080	Negligible	0.0080	<0.1%

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

6.4 Sediment

Baseline sediment data are summarized in Appendix B. Baseline Scenario sediment EPCs were calculated as described in Section 6. Measured Baseline Scenario sediment data are not available for the Jocko Creek watershed (Appendix B.2 of the Impact Statement [2021-2023 Fish and Fish Habitat Baseline]). Its Baseline Scenario sediment data was assumed to be represented by the North Driftwood River watershed sediment based on proximity, as further discussed in Section 8.5. As noted in Section 6.3, there is no FDP in Jocko Creek.

Baseline Plus Project Scenario EPCs of metals in sediment were estimated using the modelled Baseline Plus Project Scenario EPCs in surface water, as provided in Section 6.3. Where available, uptake factors for water-to-sediment were based on concentration ratios (CR) from Sheppard, Long and Sanipelli (2010), which were adjusted to reflect site-specific sediment characteristics (e.g., organic carbon and grain-size). For barium, beryllium, mercury, and silver, CRs were not available from Sheppard et al. (2010). For these metals, sediment-to-water partition coefficients were obtained from CSA (CSA, 2011).

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario sediment concentrations are presented in Table 6.10, Table 6.11 and Table 6.12

for the North Driftwood, West Buskegau, and Jocko Creek watersheds, respectively, along with the modelled future percentage change from baseline. As noted previously, Project Alone Scenario EPCs were calculated as the difference between Baseline Plus Project Scenario EPCs and Baseline Scenario EPCs.

Table 6.10 Representative Concentrations of Metals in Sediment – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)	Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)
Antimony	0.20	0.29	0.49	0.25	0.45
Arsenic	4.0	3.6	7.6	3.5	7.5
Barium	88	0.34	88	4.9	93
Beryllium	0.42	0.80	1.2	0.54	1.0
Cadmium	0.85	0.00029	0.85	0.0013	0.85
Chromium (Total)	32	3.1	35	3.0	35
Cobalt	8.3	4.9	13	4.7	13
Copper	20	8.0	28	7.8	28
Lead	22	1.2	23	1.3	23
Manganese	700	Negligible	700	Negligible	700
Molybdenum	0.79	1.4	2.2	1.3	2.1
Nickel	20	85	105	77	97
Selenium	0.70	0.013	0.71	0.012	0.71
Silver	0.12	Negligible	0.12	Negligible	0.12
Thallium	0.15	Negligible	0.15	Negligible	0.15
Tungsten	0.56	NC	NC	NC	NC
Uranium	1.3	12	13	12	13
Vanadium	28	19	47	18	46

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)	Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)
Zinc	110	1.2	111	1.2	111

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

Table 6.11 Representative Concentrations of Metals in Sediment – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future - Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)	Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)
Antimony	0.12	0.052	0.17	0.024	0.14
Arsenic	2.9	0.65	3.6	0.084	3.0
Barium	70	3.9	74	0.52	71
Beryllium	0.40	Negligible	0.40	Negligible	0.40
Cadmium	0.76	Negligible	0.76	Negligible	0.76
Chromium (Total)	31	0.59	32	0.071	31
Cobalt	8.8	0.93	9.7	0.14	8.9
Copper	12	1.3	13	0.16	12
Lead	15	0.30	15	0.00077	15
Manganese	920	Negligible	920	Negligible	920
Molybdenum	0.50	0.32	0.82	0.073	0.57
Nickel	17	16	33	2.6	20
Selenium	0.78	0.0024	0.78	0.00055	0.78
Silver	0.10	Negligible	0.10	Negligible	0.10
Thallium	0.13	Negligible	0.13	0.0010	0.13
Tungsten	0.50	NC	NC	NC	NC
Uranium	1.1	2.3	3.4	0.29	1.4
Vanadium	27	3.4	30	0.41	27

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future - Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)	Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)
Zinc	80	0.21	80	0.024	80

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

Table 6.12 Representative Concentrations of Metals in Sediment – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)
Antimony	0.20	0.081	0.28
Arsenic	4.0	0.0078	4.0
Barium	88	0.029	88
Beryllium	0.42	Negligible	0.42
Cadmium	0.85	Negligible	0.85
Chromium (Total)	32	Negligible	32
Cobalt	8.3	0.14	8.4
Copper	20	Negligible	20
Lead	22	Negligible	22
Manganese	700	2.1	702
Molybdenum	0.79	0.23	1.0

Parameter	Baseline Scenario Concentration (mg/kg)	Modelled Future – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg)	Baseline Plus Project Scenario Concentration (mg/kg)
Nickel	20	2.8	23
Selenium	0.70	0.0011	0.70
Silver	0.12	Negligible	0.12
Thallium	0.15	0.0063	0.16
Tungsten	0.56	NC	NC
Uranium	1.3	Negligible	1.3
Vanadium	28	Negligible	28
Zinc	110	Negligible	110

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

6.5 Terrestrial Vegetation

Terrestrial vegetation includes covered and uncovered plants (also referred to as leafy vegetables) and berries that may be consumed by human and ecological receptors. Baseline terrestrial vegetation data are summarized in Appendix B.

Sampled species include the following non-berry plants, as well as the berries species discussed in Section 6.5.1:

- Blueberry leaves
- Goldenrod
- Grass
- Horsetail
- Labrador tea
- Mullein
- Pearly everlasting
- Plantain
- Raspberry leaf
- Rosehip leaf
- Swamp aster
- Tea leaf
- Yarrow

Baseline Scenario terrestrial plant EPCs were calculated as described in Section 6. Baseline Scenario terrestrial vegetation data does not include silver as it was not analysed; instead, Stantec estimated silver in Baseline Scenario vegetation by calculating uptake from soil using the same methodology as for future modelled concentrations, discussed in the sections below.

Modelled future concentrations of metals in terrestrial plants, including berries, were estimated via calculation of uptake from future modelled soil using published uptake factors for soil to vegetation, in addition to contribution from direct deposition from air (US EPA, 2005). Uptake factors were generally sourced from Bechtel Jacobs (1998), Sheppard and Evenden (1990), and US EPA (2007), where available; uptake factors for molybdenum, silver, and thallium are calculated as the mean of available values from published sources including Baes III, et al. (1984), the International Atomic Energy Agency (IAEA, 1994), Davis et al. (1993), and Zach et al. (1988).

Contribution from direct deposition was calculated as follows consistent with US EPA (2005):

$$C_{plants\ deposition} = \frac{1{,}000 \times Dytotal \times Rp_i \times \left[1.0 - e^{(-kp \times Tp_i)}\right]}{Yp_i \times kp} \quad \textbf{Equation 6-2}$$

where:

$C_{plants\ deposition}$ = Concentration of chemical in plants due to direct deposition (mg/kg dry weight)

1,000 = units conversion factor

Dytotal = Yearly total deposition (g / m^2 · y)

Rp_i = Interception fraction of the edible portion of plant tissue (unitless) (US EPA, 2005)

kp = Plant surface loss coefficient (1/y) (US EPA, 2005)

Tp_i = Length of plant's exposure to deposition per harvest of the edible portion (y) (US EPA, 2005)

Yp_i = Yield or standing crop biomass of edible portion (kg dry weight/m^2) (US EPA, 2005)

The moisture content of terrestrial vegetation was used when estimating concentrations of terrestrial vegetation by calculating uptake from soil. Moisture contents were assumed to be the average of the values from samples collected during baseline sampling, as follows: 78.8% for berries (n=11) and 74.7% for non-berries (n=53).

Modelled future concentrations in berries were used to calculate risks to humans from consumption of traditional foods. Concentrations in berries and uncovered vegetation were also used to estimate concentrations in tissues of target hunting species as well as health risks for ecological receptors.

6.5.1 Berries

Baseline Scenario metal concentrations in berries include concentrations from the berries sampled during terrestrial vegetation sampling as discussed above. Sampled species were blueberry, choke cherry, cranberry, pin cherry, raspberry, rosehip berry, and squash berry. Baseline Scenario berry EPCs were calculated as described in Section 6. Modelled future concentrations were calculated as described in Section 6.5.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario berry concentrations are presented in Table 6.13.

Table 6.13 Representative Concentrations of Metals in Berries

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.00011	0.0021
Arsenic	0.0086	0.0011	0.010
Barium	2.2	0.17	2.4
Beryllium	0.0020	0.00012	0.0021
Cadmium	0.023	8.0E-05	0.023
Chromium (Total)	0.060	0.22	0.28
Cobalt	0.019	0.021	0.039
Copper	1.1	0.086	1.2
Lead	0.011	0.00048	0.012
Manganese	33	1.4	34
Mercury	0.0010	6.8E-09	0.0010
Molybdenum	0.69	0.015	0.70
Nickel	0.17	0.56	0.73
Selenium	0.010	0.00011	0.010
Silver	0.0024	4.97E-05	0.0025
Thallium	0.00040	1.36E-05	0.00041
Tungsten	NM	NC	NC
Uranium	0.0011	5.70E-05	0.0012
Vanadium	0.052	0.019	0.071
Zinc	2.5	0.048	2.5

Notes:
NC = Not calculated
NM = Not measured

6.5.2 Other Terrestrial Plants

Baseline Scenario metal concentrations in other terrestrial plants were based on concentrations from vegetation sampling as discussed above.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario uncovered terrestrial plant concentrations other than berries are presented in Table 6.14.

Table 6.14 Representative Concentrations of Metals in Uncovered Terrestrial Plants (Non-Berries)

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0028	0.00021	0.0030
Arsenic	0.029	0.0029	0.032
Barium	9.3	0.65	9.9
Beryllium	0.0176	0.00059	0.018
Cadmium	0.043	0.00016	0.043
Chromium (Total)	0.26	0.61	0.87
Cobalt	0.079	0.060	0.14
Copper	1.7	0.14	1.8
Lead	0.11	0.0014	0.11
Manganese	39	1.8	40.8
Mercury	0.0020	1.4E-08	0.0020
Molybdenum	0.66	0.015	0.67
Nickel	0.24	1.1	1.3
Selenium	0.027	0.00030	0.027
Silver	0.0034	0.00010	0.0035
Thallium	0.0024	4.7E-05	0.0024
Tungsten	NM	NC	NC
Uranium	0.0054	0.00015	0.0056
Vanadium	0.25	0.054	0.30
Zinc	9.8	0.17	10.0

Notes:
NC = Not calculated
NM = Not measured

6.6 Terrestrial Invertebrates

While a targeted baseline sampling plan was developed to collect terrestrial invertebrates, too few samples (i.e., one worm and one slug) were collected to support an assessment of baseline chemical concentrations. As such baseline Scenario concentrations and modelled future concentrations (Project Alone and Baseline Plus Project Scenarios) of metals in terrestrial invertebrates were estimated via calculation of uptake from baseline soil and future modelled soil, respectively, as discussed in Section 6, using published uptake factors for soil to terrestrial invertebrates. Uptake factors were generally sourced from Sample, Beauchamp, et al. (1998a), cited within US EPA (2007) where available. The available sources reviewed by US EPA (2007) did not contain bioaccumulation factors for antimony; because no earthworm bioaccumulation data were located for antimony, a default BAF of 1 was assumed (US EPA, 2007). The uptake factor for thallium was calculated from data collected in the vicinity of Saint John, New Brunswick (Jacques Whitford, 2008). The model focuses on earthworms as the "model" soil invertebrate, due to the relative abundance of data and models to estimate contaminant uptake, and the perceived importance of earthworms in food webs. Assumptions involved in uptake calculations include the use of the following values:

- Soil to invertebrate bioavailability factor of 1.0 (conservative default value)
- Soil invertebrate metabolic factor of 1.0 (conservative default value)
- Dry weight to wet weight conversion factor of 0.16, based on earthworms (US EPA, 1993)

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario terrestrial invertebrate concentrations are presented in Table 6.15.

Table 6.15 Representative Concentrations of Metals in Terrestrial Invertebrates

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.037	0.00096	0.038
Arsenic	0.078	0.0017	0.080
Barium	0.728	0.045	0.77
Beryllium	0.0025	5.7E-05	0.0026
Cadmium	0.79	0.0018	0.79
Chromium (Total)	1.3	0.90	2.2
Cobalt	0.12	0.032	0.15
Copper	1.9	0.033	2.0
Lead	1.1	0.0029	1.1
Manganese	4.1	0.10	4.2
Mercury	0.026	1.3E-07	0.026

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Molybdenum	0.090	0.0019	0.092
Nickel	2.7	4.8	7.5
Selenium	0.090	0.00067	0.090
Silver	0.16	0.0011	0.16
Thallium	0.00083	7.7E-06	0.00083
Tungsten	NC	NC	NC
Uranium	0.0058	2.8E-05	0.0058
Vanadium	0.15	0.011	0.17
Zinc	54	0.27	55
Notes: NC = Not calculated			

6.7 Terrestrial Small Prey

Terrestrial small prey represent an important food source for ecological receptors. Baseline Scenario concentrations and modelled future concentrations (Project Alone and Baseline Plus Project Scenarios) of metals in terrestrial small prey were estimated via calculation of uptake from baseline soil and future modelled soil, respectively, as discussed in Section 6, using published uptake factors for soil to terrestrial mammals. Uptake factors were generally sourced from Sample, Beauchamp, et al. (1998b) and US EPA (2007) where available. The available sources reviewed by US EPA (2007) did not contain bioaccumulation factors for antimony; because no earthworm bioaccumulation data were located for antimony, a default BAF of 1 was assumed (US EPA, 2007). The uptake factors for molybdenum, thallium, uranium, and vanadium were calculated from data collected in the vicinity of Saint John, New Brunswick (Jacques Whitford, 2008). The model focuses on small mammals as prey, due to the relative abundance of data and models to estimate contaminant uptake. Assumptions involved in uptake calculations include the use of the following values:

- Plant foods to animal bioavailability factor of 1.0 (conservative default value)
- Small herbivore metabolic factor of 1.0 (conservative default value – not metabolized)
- Dry weight to wet weight conversion factor of 0.32, a typical value for small mammals (US EPA, 1993)

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario terrestrial invertebrate concentrations are presented in Table 6.16.

Table 6.16 Representative Concentrations of Metals in Terrestrial Small Prey

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.00015	3.8E-06	0.00015
Arsenic	0.0057	0.00014	0.0058
Barium	1.1	0.069	1.2
Beryllium	0.0043	7.2E-05	0.0044
Cadmium	0.15	0.00021	0.15
Chromium (Total)	0.81	0.39	1.2
Cobalt	0.042	0.012	0.054
Copper	3.9	0.035	3.9
Lead	1.1	0.0016	1.1
Manganese	2.5	0.094	2.6
Mercury	0.0038	2.0E-08	0.0038
Molybdenum	0.042	0.00089	0.042
Nickel	0.91	0.55	1.5
Selenium	0.17	0.00048	0.17
Silver	0.00064	4.5E-06	0.00064
Thallium	0.0040	3.7E-05	0.0040
Tungsten	NC	NC	NC
Uranium	0.00081	3.9E-06	0.00081
Vanadium	0.091	0.0063	0.097
Zinc	38	0.043	38
Note: NC = Not calculated			

6.8 Wild Meat

The wild meat species selected were based on the top species by consumption rate from Chan et al. (2014). Additional discussion of species selection is provided in Section 7.3.1. Baseline Scenario and Baseline Plus Project Scenario metal concentrations in wild meat (moose, deer, rabbit, beaver, grouse, duck, and goose) were modelled using generalized equations from the US EPA (2005). The generalized equation used to calculate metals concentrations in wild meat that will be consumed by humans is:

$$C_{meat} = \Big(\big(F_{FOODi} \times Q_{FOODi(meat)} \times C_{FOODi}\big) + \big(F_S \times Q_{S(meat)} \times C_s\big) + \big(F_{Sed} \times Q_{Sed(meat)} \times C_{Sed}\big) + \big(F_W \times Q_{W(meat)} \times C_W\big)\Big) \times B_{a(meat)} \times MF$$

Equation 6-3

where:

C_{meat} = Concentration of chemical in meat tissue (mg/kg wet weight)

F_{FOODi} = Fraction of food i from site (conservatively set at 100%; unitless), can consist of terrestrial vegetation (coniferous or deciduous), berries or aquatic vegetation

$Q_{FOODi(meat)}$ = Quantity of food i (including terrestrial and/or aquatic vegetation, invertebrates, etc.) ingested by animal (kg dry weight/day)

C_{FOODi} = Concentration of chemical in food i (mg/kg dry weight)

F_S = Fraction of soil from site (conservatively set at 100%; unitless)

$Q_{S(meat)}$ = Quantity of soil ingested by animal (kg dry weight/day)

C_S = Concentration of chemical in soil (mg/kg dry weight)

F_{Sed} = Fraction of sediment from site (conservatively set at 100%; unitless)

$Q_{Sed(meat)}$ = Quantity of sediment ingested by animal (kg dry weight/day)

C_{Sed} = Concentration of chemical in sediment (mg/kg dry weight)

F_W = Fraction of water from site (conservatively set at 100%; unitless)

$Q_{W(meat)}$ = Quantity of water ingested by animal (L/day)

C_W = Concentration of chemical in surface water (mg/L)

$B_{a(meat)}$ = chemical-specific bio-transfer factor for animal (day/kg wet weight)

MF = Metabolic factor (set at 1.0; unitless)

The target hunting species were conservatively assumed to spend an entire lifetime within the RSA and not range into other areas that would be subject to different (lesser) rates of deposition. As such, the fractions of soil, terrestrial vegetation, terrestrial invertebrates, surface water, aquatic plants, benthic invertebrates, and sediment that the target species would consume within the RSA regions have conservatively been set at 100%. It was also conservatively assumed that all metals are 100% bioavailable and are not metabolized (i.e., metabolic factor of 1). The intake rates of soil, terrestrial vegetation, terrestrial invertebrates, surface water, aquatic plants, benthic invertebrates and sediment for the moose, snowshoe hare, beaver, spruce grouse and mallard were estimated using the animals' body weights and the equations provided in US EPA (2005). The body weights of each species and the intake rates for each media are provided in the receptor profiles in Section 8.1.3.

Uptake factors from the primary literature and intake rates for estimating animal tissue concentrations are available for beef cattle. In accordance with US EPA (2005) guidance, to estimate the uptake of chemicals into the target hunting species, the beef uptake factor is adjusted based on the relative lipid content of these animals. The fat contents of the target hunting species were assumed as follows, based on information from the U.S. Department of Agriculture's FoodData Central website (USDA, 2024): 1% for moose, 3% for deer and rabbit, 5% for beaver, 1% for grouse, 15% for duck, and 4% for goose, in contrast to 19% for the beef cattle.

Concentrations of metals in wild meat under baseline conditions were estimated using the equations and uptake factors described above, as well as the baseline concentrations for soil, terrestrial vegetation, terrestrial invertebrates, surface water, aquatic plants, benthic invertebrates and sediment. The concentrations under future conditions were estimated using the same equations and uptake factors and the estimated future concentrations in these media.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario terrestrial invertebrate concentrations are presented in Table 6.17 to Table 6.23.

Table 6.17 Representative Concentrations of Metals in Wild Meat – Large Terrestrial Mammal (Moose)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Antimony	6.7E-06	4.0E-06	1.1E-05	3.5E-06	1.0E-05	6.6E-06	1.2E-06	7.9E-06	6.8E-07	7.3E-06	6.7E-06	1.2E-06	8.0E-06
Arsenic	0.00027	0.00020	0.00047	0.00020	0.00047	0.00027	5.3E-05	0.00032	1.0E-05	0.00028	0.00027	4.4E-06	0.00028
Barium	0.00075	3.8E-05	0.00079	5.2E-05	0.00080	0.00074	5.1E-05	0.00080	3.9E-05	0.00078	0.00075	3.7E-05	0.00078
Beryllium	1.1E-05	1.2E-05	2.3E-05	8.1E-06	1.9E-05	1.1E-05	2.2E-07	1.1E-05	2.2E-07	1.1E-05	1.1E-05	2.2E-07	1.1E-05
Cadmium	5.2E-06	1.5E-08	5.2E-06	1.6E-08	5.2E-06	5.2E-06	1.4E-08	5.2E-06	1.4E-08	5.2E-06	5.2E-06	1.4E-08	5.2E-06
Chromium (Total)	0.0025	0.0024	0.0049	0.0024	0.0049	0.0025	0.0023	0.0048	0.0023	0.0048	0.0025	0.0023	0.0048
Cobalt	0.0027	0.0016	0.0043	0.0016	0.0043	0.0027	0.00093	0.0037	0.00080	0.0035	0.0027	0.00080	0.0035
Copper	0.022	0.0035	0.025	0.0035	0.025	0.022	0.0019	0.024	0.0013	0.023	0.022	0.0012	0.023
Lead	6.6E-05	2.0E-06	6.8E-05	2.2E-06	6.8E-05	6.3E-05	8.8E-07	6.4E-05	2.9E-07	6.3E-05	6.6E-05	2.9E-07	6.6E-05
Manganese	0.032	0.00078	0.033	0.00078	0.033	0.032	0.00078	0.033	0.00078	0.033	0.032	0.00082	0.033
Mercury	2.4E-05	5.1E-08	2.4E-05	4.9E-08	2.4E-05	2.4E-05	3.4E-09	2.4E-05	6.5E-11	2.4E-05	2.4E-05	7.3E-10	2.4E-05
Molybdenum	0.0070	0.0026	0.0096	0.0024	0.0093	0.0070	0.0010	0.0080	0.00033	0.0073	0.0070	0.00053	0.0075
Nickel	0.0040	0.014	0.018	0.014	0.018	0.0040	0.0075	0.012	0.0060	0.010	0.0040	0.0059	0.010
Selenium	6.8E-05	2.6E-06	7.1E-05	2.5E-06	7.0E-05	6.8E-05	9.2E-07	6.9E-05	5.3E-07	6.9E-05	6.8E-05	6.0E-07	6.9E-05
Silver	3.0E-05	2.7E-07	3.0E-05	2.7E-07	3.0E-05	2.8E-05	2.7E-07	2.8E-05	2.7E-07	2.8E-05	3.0E-05	2.7E-07	3.0E-05
Thallium	0.00072	1.0E-06	0.00072	1.0E-06	0.00072	0.00072	1.0E-06	0.00072	5.9E-06	0.00072	0.00072	2.9E-05	0.00075
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	1.0E-05	8.0E-05	9.1E-05	7.9E-05	8.9E-05	1.0E-05	1.8E-05	2.8E-05	2.2E-06	1.2E-05	1.0E-05	2.2E-08	1.0E-05

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	0.0017	0.00087	0.0026	0.00085	0.0026	0.0017	0.00024	0.0019	1.1E-04	0.0018	0.0017	8.9E-05	0.0018
Zinc	0.00064	1.1E-05	0.00065	1.1E-05	0.00065	0.00064	7.4E-06	0.00064	6.5E-06	0.00064	0.00064	6.4E-06	0.00065

Notes:
NC = Not calculated

Table 6.18 Representative Concentrations of Metals in Wild Meat – Large Terrestrial Mammal (Deer)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Antimony	4.1E-06	4.0E-07	4.5E-06	3.7E-07	4.5E-06	4.1E-06	2.3E-07	4.4E-06	2.0E-07	4.3E-06	4.1E-06	2.4E-07	4.4E-06
Arsenic	5.8E-05	1.0E-05	6.8E-05	9.8E-06	6.8E-05	5.8E-05	5.3E-06	6.3E-05	4.0E-06	6.2E-05	5.8E-05	3.9E-06	6.2E-05
Barium	0.00048	3.5E-05	0.00051	3.6E-05	0.00051	0.00048	3.6E-05	0.00051	3.5E-05	0.00051	0.00048	3.5E-05	0.00051
Beryllium	4.8E-06	4.6E-07	5.3E-06	3.8E-07	5.2E-06	4.8E-06	2.1E-07	5.1E-06	2.1E-07	5.1E-06	4.8E-06	2.1E-07	5.1E-06
Cadmium	3.9E-06	1.4E-08	3.9E-06	1.4E-08	3.9E-06	3.9E-06	1.4E-08	3.9E-06	1.4E-08	3.9E-06	3.9E-06	1.4E-08	3.9E-06
Chromium (Total)	0.0013	0.0022	0.0036	0.0022	0.0036	0.0013	0.0022	0.0035	0.0022	0.0035	0.0013	0.0022	0.0035
Cobalt	0.0013	0.00076	0.0020	0.00076	0.0020	0.0013	0.00075	0.0020	0.00075	0.0020	0.0013	0.00075	0.0020
Copper	0.016	0.0012	0.017	0.0012	0.017	0.016	0.0012	0.017	0.0012	0.017	0.016	0.0012	0.017
Lead	3.3E-05	3.1E-07	3.3E-05	3.2E-07	3.3E-05	3.3E-05	2.9E-07	3.4E-05	2.8E-07	3.3E-05	3.3E-05	2.8E-07	3.3E-05
Manganese	0.018	0.00075	0.019	0.00075	0.019	0.018	0.00075	0.019	0.00075	0.019	0.018	0.00075	0.019
Mercury	1.0E-05	7.3E-09	1.0E-05	7.0E-09	1.0E-05	1.0E-05	5.0E-10	1.0E-05	6.3E-11	1.0E-05	1.0E-05	1.6E-10	1.0E-05
Molybdenum	0.0054	0.00013	0.0055	0.00013	0.0055	0.0054	0.00012	0.0055	0.00012	0.0055	0.0054	0.00012	0.0055
Nickel	0.0019	0.0055	0.0074	0.0055	0.0074	0.0019	0.0055	0.0074	0.0055	0.0074	0.0019	0.0055	0.0074
Selenium	3.8E-05	1.5E-06	3.9E-05	1.5E-06	3.9E-05	3.8E-05	6.7E-07	3.9E-05	4.6E-07	3.8E-05	3.8E-05	4.9E-07	3.8E-05
Silver	1.9E-05	2.6E-07	1.9E-05	2.6E-07	1.9E-05	1.9E-05	2.6E-07	1.9E-05	2.6E-07	1.9E-05	1.9E-05	2.6E-07	1.9E-05
Thallium	4.9E-05	9.7E-07	5.0E-05	9.7E-07	5.0E-05	4.9E-05	9.7E-07	5.0E-05	9.7E-07	5.0E-05	4.9E-05	1.0E-06	5.0E-05
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	1.7E-06	6.2E-07	2.3E-06	6.1E-07	2.3E-06	1.7E-06	1.7E-07	1.9E-06	4.0E-08	1.7E-06	1.7E-06	2.2E-08	1.7E-06

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	0.00054	9.6E-05	0.00063	9.5E-05	0.00063	0.00054	8.8E-05	0.00063	8.6E-05	0.00062	0.00054	8.6E-05	0.00062
Zinc	0.00033	6.7E-06	0.00034	6.7E-06	0.00034	0.00033	6.3E-06	0.00034	6.2E-06	0.00034	0.00033	6.2E-06	0.00034
Notes: NC = Not calculated													

Table 6.19 Representative Concentrations of Metals in Wild Meat – Small Terrestrial Mammal (Rabbit)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Antimony	2.8E-07	1.6E-08	3.0E-07	1.5E-08	3.0E-07	2.8E-07	1.1E-08	2.9E-07	1.1E-08	2.9E-07	2.8E-07	1.2E-08	2.9E-07
Arsenic	5.1E-06	4.0E-07	5.5E-06	3.9E-07	5.5E-06	5.1E-06	2.8E-07	5.4E-06	2.4E-07	5.3E-06	5.1E-06	2.4E-07	5.3E-06
Barium	2.2E-05	1.6E-06	2.4E-05	1.6E-06	2.4E-05	2.2E-05	1.6E-06	2.4E-05	1.6E-06	2.4E-05	2.2E-05	1.6E-06	2.4E-05
Beryllium	3.7E-07	1.9E-08	3.9E-07	1.7E-08	3.9E-07	3.7E-07	1.2E-08	3.8E-07	1.2E-08	3.8E-07	3.7E-07	1.2E-08	3.8E-07
Cadmium	1.8E-07	6.2E-10	1.9E-07	6.2E-10	1.9E-07	1.8E-07	6.2E-10	1.9E-07	6.2E-10	1.9E-07	1.8E-07	6.2E-10	1.9E-07
Chromium (Total)	0.00013	0.00014	0.00027	0.00014	0.00027	0.00013	0.00014	0.00027	0.00014	0.00027	0.00013	0.00014	0.00027
Cobalt	0.00011	4.7E-05	0.00016	4.7E-05	0.00016	0.00011	4.7E-05	0.00016	4.7E-05	0.00016	0.00011	4.7E-05	0.00016
Copper	0.00072	5.5E-05	0.0008	5.5E-05	0.00078	0.00072	5.4E-05	0.00078	5.4E-05	0.00078	0.00072	5.4E-05	0.00078
Lead	3.7E-06	1.9E-08	3.7E-06	1.9E-08	3.7E-06	3.7E-06	1.8E-08	3.7E-06	1.8E-08	3.7E-06	3.7E-06	1.8E-08	3.7E-06
Manganese	0.00078	3.2E-05	0.00081	3.2E-05	0.00081	0.00078	3.2E-05	0.00081	3.2E-05	0.00081	0.00078	3.2E-05	0.00081
Mercury	6.5E-07	1.9E-10	6.5E-07	1.8E-10	6.5E-07	6.5E-07	1.5E-11	6.5E-07	3.8E-12	6.5E-07	6.5E-07	6.2E-12	6.5E-07
Molybdenum	0.00021	5.0E-06	0.00022	5.0E-06	0.00022	0.00021	4.7E-06	0.00022	4.6E-06	0.00021	0.00021	4.6E-06	0.00021
Nickel	0.00012	0.00030	0.00043	0.00030	0.00043	0.00012	0.00030	0.00043	0.00030	0.00043	0.00012	0.00030	0.00043
Selenium	2.1E-06	5.0E-08	2.2E-06	4.8E-08	2.2E-06	2.1E-06	2.8E-08	2.2E-06	2.2E-08	2.2E-06	2.1E-06	2.3E-08	2.2E-06
Silver	1.5E-06	1.6E-08	1.5E-06	1.6E-08	1.5E-06	1.5E-06	1.6E-08	1.5E-06	1.6E-08	1.5E-06	1.5E-06	1.6E-08	1.5E-06
Thallium	4.2E-06	5.9E-08	4.28E-06	5.9E-08	4.3E-06	4.2E-06	5.9E-08	4.3E-06	5.9E-08	4.3E-06	4.2E-06	6.0E-08	4.3E-06
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	1.8E-07	1.7E-08	2.0E-07	1.7E-08	2.0E-07	1.8E-07	5.2E-09	1.9E-07	1.9E-09	1.8E-07	1.8E-07	1.4E-09	1.8E-07

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	5.1E-05	5.7E-06	5.7E-05	5.7E-06	5.7E-05	5.1E-05	5.5E-06	5.7E-05	5.4E-06	5.7E-05	5.1E-05	5.4E-06	5.7E-05
Zinc	1.6E-05	3.0E-07	1.63E-05	3.0E-07	1.6E-05	1.6E-05	2.9E-07	1.6E-05	2.9E-07	1.6E-05	1.6E-05	2.9E-07	1.6E-05

Notes:
NC = Not calculated

Table 6.20 Representative Concentrations of Metals in Wild Meat – Aquatic Mammal (Beaver)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
	Baseline Scenario	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2		Baseline Scenario	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3		Baseline Scenario	Modelled Future – JC1 Pourpoint	
		Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario		Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario		Project Alone Scenario	Baseline Plus Project Scenario
Antimony	1.2E-06	1.2E-06	2.4E-06	1.0E-06	2.2E-06	1.0E-06	3.0E-07	1.3E-06	1.5E-07	1.2E-06	1.2E-06	3.4E-07	1.5E-06
Arsenic	5.8E-05	4.9E-05	0.00011	4.8E-05	0.00011	5.5E-05	1.2E-05	6.6E-05	1.8E-06	5.6E-05	5.8E-05	4.4E-07	5.8E-05
Barium	0.00010	2.7E-06	0.00010	6.4E-06	0.00011	9.4E-05	6.1E-06	0.00010	2.9E-06	0.00010	0.00010	2.4E-06	0.00010
Beryllium	2.2E-06	3.4E-06	5.6E-06	2.3E-06	4.5E-06	2.2E-06	1.7E-08	2.2E-06	1.7E-08	2.2E-06	2.2E-06	1.7E-08	2.2E-06
Cadmium	6.2E-07	1.1E-09	6.3E-07	1.5E-09	6.3E-07	6.1E-07	9.2E-10	6.1E-07	9.2E-10	6.1E-07	6.3E-07	9.2E-10	6.3E-07
Chromium (Total)	0.00062	0.00025	0.00087	0.00025	0.00087	0.00061	0.00020	0.00082	0.00020	0.00081	0.00062	0.00019	0.00082
Cobalt	0.00065	0.00036	0.0010	0.00035	0.0010	0.00066	0.00012	0.00078	7.4E-05	0.00074	0.00065	7.4E-05	0.00072
Copper	0.0024	0.00062	0.0030	0.00061	0.0030	0.0023	0.00021	0.0025	0.00010	0.0024	0.0024	8.0E-05	0.0025
Lead	2.0E-05	8.4E-07	2.1E-05	9.5E-07	2.1E-05	1.6E-05	2.6E-07	1.7E-05	2.6E-08	1.7E-05	2.0E-05	2.5E-08	2.0E-05
Manganese	0.0041	4.8E-05	0.0041	4.8E-05	0.0041	0.0042	4.8E-05	0.0043	4.8E-05	0.0043	0.0041	5.7E-05	0.0041
Mercury	4.1E-06	1.4E-08	4.1E-06	1.3E-08	4.1E-06	4.0E-06	8.9E-10	4.0E-06	5.3E-12	4.0E-06	4.1E-06	1.9E-10	4.1E-06
Molybdenum	0.00058	0.00049	0.0011	0.00044	0.0010	0.00058	0.00018	0.00076	0.000046	0.00063	0.00058	8.5E-05	0.00067
Nickel	0.00072	0.0028	0.0035	0.0025	0.0033	0.00069	0.00091	0.0016	0.00051	0.0012	0.00072	0.00051	0.0012
Selenium	1.1E-05	8.5E-07	1.2E-05	8.0E-07	1.2E-05	1.1E-05	2.2E-07	1.1E-05	7.3E-08	1.1E-05	1.1E-05	1.0E-07	1.1E-05
Silver	4.4E-06	2.2E-08	4.5E-06	2.2E-08	4.5E-06	4.0E-06	2.2E-08	4.1E-06	2.2E-08	4.1E-06	4.4E-06	2.2E-08	4.5E-06
Thallium	0.00014	8.3E-08	0.00014	8.3E-08	0.00014	0.00014	8.3E-08	0.00014	1.1E-06	0.00014	0.00014	5.7E-06	0.00014
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	2.2E-06	1.9E-05	2.1E-05	1.8E-05	2.0E-05	2.1E-06	4.0E-06	6.2E-06	5.0E-07	2.6E-06	2.2E-06	2.0E-09	2.2E-06

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	0.00038	0.00022	0.00060	0.00022	0.00060	0.00038	4.8E-05	0.00042	1.2E-05	0.00039	0.00038	7.6E-06	0.00039
Zinc	9.3E-05	1.5E-06	9.4E-05	1.5E-06	9.4E-05	8.8E-05	6.7E-07	8.9E-05	4.5E-07	8.9E-05	9.3E-05	4.2E-07	9.3E-05

Notes:
NC = Not calculated

Table 6.21 Representative Concentrations of Metals in Wild Meat – Terrestrial Bird (Grouse)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Antimony	4.4E-08	2.3E-09	4.7E-08	2.2E-09	4.7E-08	4.4E-08	1.8E-09	4.6E-08	1.7E-09	4.6E-08	4.4E-08	1.8E-09	4.6E-08
Arsenic	4.6E-07	4.5E-08	5.0E-07	4.5E-08	5.0E-07	4.6E-07	3.2E-08	4.9E-07	2.8E-08	4.9E-07	4.6E-07	2.8E-08	4.9E-07
Barium	3.2E-06	2.4E-07	3.5E-06	2.4E-07	3.5E-06	3.2E-06	2.4E-07	3.5E-06	2.4E-07	3.5E-06	3.2E-06	2.4E-07	3.5E-06
Beryllium	3.4E-08	2.2E-09	3.6E-08	1.9E-09	3.6E-08	3.4E-08	1.4E-09	3.5E-08	1.4E-09	3.5E-08	3.4E-08	1.4E-09	3.5E-08
Cadmium	6.9E-08	1.9E-10	6.9E-08	1.9E-10	6.9E-08	6.9E-08	1.9E-10	6.9E-08	1.9E-10	6.9E-08	6.9E-08	1.9E-10	6.9E-08
Chromium (Total)	1.2E-05	1.7E-05	2.9E-05	1.7E-05	2.9E-05	1.2E-05	1.7E-05	2.9E-05	1.7E-05	2.9E-05	1.2E-05	1.7E-05	2.9E-05
Cobalt	9.6E-06	5.4E-06	1.5E-05	5.4E-06	1.5E-05	9.6E-06	5.3E-06	1.5E-05	5.3E-06	1.5E-05	9.6E-06	5.3E-06	1.5E-05
Copper	0.00011	8.2E-06	0.00012	8.2E-06	0.00012	0.00011	8.2E-06	0.00012	8.2E-06	0.00012	0.00011	8.2E-06	0.00012
Lead	3.8E-07	2.4E-09	3.9E-07	2.4E-09	3.9E-07	3.8E-07	2.3E-09	3.9E-07	2.3E-09	3.9E-07	3.8E-07	2.3E-09	3.9E-07
Manganese	0.00012	5.0E-06	0.00013	5.0E-06	0.00013	0.00012	5.0E-06	0.00013	5.0E-06	0.00013	0.00012	5.0E-06	0.00013
Mercury	1.3E-07	2.2E-11	1.3E-07	2.1E-11	1.3E-07	1.3E-07	2.0E-12	1.3E-07	7.4E-13	1.3E-07	1.3E-07	1.0E-12	1.3E-07
Molybdenum	3.6E-05	8.3E-07	3.7E-05	8.3E-07	3.7E-05	3.6E-05	8.0E-07	3.7E-05	7.9E-07	3.7E-05	3.6E-05	7.9E-07	3.7E-05
Nickel	2.0E-05	5.0E-05	7.0E-05	5.0E-05	7.0E-05	2.0E-05	5.0E-05	7.0E-05	5.0E-05	7.0E-05	2.0E-05	5.0E-05	7.0E-05
Selenium	3.5E-07	6.6E-09	3.5E-07	6.5E-09	3.5E-07	3.5E-07	4.1E-09	3.5E-07	3.5E-09	3.5E-07	3.5E-07	3.6E-09	3.5E-07
Silver	3.5E-07	3.3E-09	3.6E-07	3.3E-09	3.6E-07	3.5E-07	3.3E-09	3.6E-07	3.3E-09	3.6E-07	3.5E-07	3.3E-09	3.6E-07
Thallium	3.5E-07	6.6E-09	3.5E-07	6.6E-09	3.5E-07	3.5E-07	6.6E-09	3.5E-07	6.6E-09	3.5E-07	3.5E-07	6.7E-09	3.5E-07
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	1.2E-08	1.9E-09	1.4E-08	1.8E-09	1.4E-08	1.2E-08	5.7E-10	1.3E-08	2.0E-10	1.2E-08	1.2E-08	1.5E-10	1.2E-08

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	3.8E-06	6.2E-07	4.4E-06	6.2E-07	4.4E-06	3.8E-06	5.9E-07	4.4E-06	5.9E-07	4.4E-06	3.8E-06	5.9E-07	4.4E-06
Zinc	4.4E-06	5.4E-08	4.5E-06	5.4E-08	4.5E-06	4.4E-06	5.3E-08	4.5E-06	5.2E-08	4.5E-06	4.4E-06	5.2E-08	4.5E-06

Notes:
NC = Not calculated

Table 6.22 Representative Concentrations of Metals in Wild Meat – Waterfowl (Duck)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Antimony	1.8E-06	1.9E-06	3.7E-06	1.6E-06	3.4E-06	1.6E-06	4.8E-07	2.1E-06	2.3E-07	1.8E-06	1.8E-06	5.3E-07	2.3E-06
Arsenic	0.00038	0.00026	0.00064	0.00025	0.00064	0.00032	5.7E-05	0.00037	7.5E-06	0.00032	0.00038	7.0E-07	0.00038
Barium	0.00030	1.6E-06	0.00030	1.7E-05	0.00031	0.00026	1.4E-05	0.00027	2.3E-06	0.00026	0.00030	5.7E-07	0.00030
Beryllium	8.4E-06	1.6E-05	2.4E-05	1.1E-05	1.9E-05	8.1E-06	3.6E-09	8.1E-06	3.6E-09	8.1E-06	8.4E-06	3.6E-09	8.4E-06
Cadmium	1.4E-05	5.9E-09	1.4E-05	1.6E-08	1.4E-05	1.3E-05	2.9E-09	1.3E-05	2.9E-09	1.3E-05	1.4E-05	2.9E-09	1.4E-05
Chromium (Total)	0.0039	0.00026	0.0042	0.00026	0.0041	0.00384	0.00013	0.0040	9.8E-05	0.0039	0.0039	9.4E-05	0.0040
Cobalt	0.00080	0.00046	0.0013	0.00045	0.0012	0.00082	0.00010	0.00092	3.1E-05	0.00085	0.00080	3.2E-05	0.00083
Copper	0.035	0.0050	0.040	0.0049	0.040	0.029	0.0013	0.031	0.00017	0.029	0.035	1.7E-05	0.035
Lead	8.4E-05	3.5E-06	8.8E-05	4.0E-06	8.8E-05	6.5E-05	1.0E-06	6.6E-05	1.8E-08	6.5E-05	8.4E-05	1.5E-08	8.4E-05
Manganese	0.0098	8.4E-06	0.0098	8.4E-06	0.0098	0.011	8.4E-06	0.011	8.4E-06	0.011	0.0098	3.7E-05	0.0099
Mercury	1.3E-05	3.6E-08	1.3E-05	3.5E-08	1.3E-05	1.3E-05	2.3E-09	1.3E-05	9.6E-12	1.3E-05	1.3E-05	4.8E-10	1.3E-05
Molybdenum	0.00083	0.0014	0.0022	0.0012	0.0021	0.00073	0.00044	0.0012	0.00010	0.00083	0.00083	2.2E-04	0.0011
Nickel	0.0028	0.0083	0.011	0.0075	0.010	0.0025	0.0022	0.0048	0.00079	0.0033	0.0028	0.00077	0.0036
Selenium	0.00012	2.1E-06	0.00012	2.0E-06	0.00012	0.00013	4.3E-07	0.00013	1.2E-07	0.00013	0.00012	2.1E-07	0.00012
Silver	1.3E-05	4.7E-08	1.3E-05	4.7E-08	1.3E-05	1.2E-05	4.7E-08	1.2E-05	4.7E-08	1.2E-05	1.3E-05	4.7E-08	1.3E-05
Thallium	0.00038	0.00000	0.00038	0.00000	0.00038	0.00036	1.8E-08	0.00036	2.7E-06	0.00036	0.00038	1.6E-05	0.00039
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	4.0E-06	3.6E-05	4.0E-05	3.6E-05	4.0E-05	3.8E-06	7.9E-06	1.2E-05	9.8E-07	4.8E-06	4.0E-06	3.9E-10	4.0E-06

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	0.00065	0.00042	0.0011	0.00041	0.0011	0.00064	8.0E-05	0.00072	1.1E-05	0.00065	0.00065	1.6E-06	0.00065
Zinc	0.0017	5.3E-06	0.0017	5.3E-06	0.0017	0.0016	1.5E-06	0.0016	5.0E-07	0.0016	0.0017	3.7E-07	0.0017

Notes:
NC = Not calculated

Table 6.23 Representative Concentrations of Metals in Wild Meat – Waterfowl (Goose)

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Antimony	1.7E-06	6.1E-08	1.7E-06	6.0E-08	1.7E-06	1.7E-06	5.5E-08	1.7E-06	5.4E-08	1.7E-06	1.7E-06	5.5E-08	1.7E-06
Arsenic	3.3E-05	1.5E-06	3.4E-05	1.5E-06	3.4E-05	3.3E-05	1.3E-06	3.4E-05	1.3E-06	3.4E-05	3.3E-05	1.3E-06	3.4E-05
Barium	0.00010	6.7E-06	0.00010	6.7E-06	0.00010	0.00010	6.7E-06	0.00010	6.7E-06	0.00010	0.00010	6.7E-06	0.00010
Beryllium	2.3E-06	7.3E-08	2.3E-06	7.0E-08	2.3E-06	2.3E-06	6.4E-08	2.3E-06	6.4E-08	2.3E-06	2.3E-06	6.4E-08	2.3E-06
Cadmium	9.5E-07	3.0E-09	9.6E-07	3.0E-09	9.6E-07	9.5E-07	3.0E-09	9.6E-07	3.0E-09	9.6E-07	9.5E-07	3.0E-09	9.6E-07
Chromium (Total)	0.0008	0.00076	0.0016	0.00076	0.0016	0.0008	0.00076	0.0016	0.00076	0.0016	0.0008	0.00076	0.0016
Cobalt	0.00072	0.00025	0.0010	0.00025	0.0010	0.00072	0.00025	0.0010	0.00025	0.0010	0.00072	0.00025	0.0010
Copper	0.0031	0.00022	0.0033	0.00022	0.0033	0.0031	0.00022	0.0033	0.00022	0.0033	0.0031	2.22E-04	0.0033
Lead	2.6E-05	1.0E-07	2.6E-05	1.0E-07	2.6E-05	2.6E-05	1.0E-07	2.6E-05	1.0E-07	2.6E-05	2.6E-05	1.0E-07	2.6E-05
Manganese	0.0030	0.00012	0.0032	0.00012	0.0032	0.0030	0.00012	0.0032	0.00012	0.0032	0.0030	0.00012	0.0032
Mercury	3.8E-06	3.0E-10	3.8E-06	2.9E-10	3.8E-06	3.8E-06	3.8E-11	3.8E-06	2.1E-11	3.8E-06	3.8E-06	2.5E-11	3.8E-06
Molybdenum	0.00071	1.6E-05	0.00073	1.6E-05	0.00073	0.00071	1.6E-05	0.00073	1.5E-05	0.00073	0.00071	1.55E-05	0.00073
Nickel	0.00072	0.0015	0.0023	0.0015	0.0023	0.00072	0.0015	0.0023	0.0015	0.0023	0.00072	0.0015	0.0023
Selenium	1.1E-05	1.4E-07	1.1E-05	1.4E-07	1.1E-05	1.1E-05	1.1E-07	1.1E-05	1.0E-07	1.1E-05	1.1E-05	1.0E-07	1.1E-05
Silver	1.0E-05	8.8E-08	1.0E-05	8.8E-08	1.0E-05	1.0E-05	8.8E-08	1.0E-05	8.8E-08	1.0E-05	1.0E-05	8.8E-08	1.0E-05
Thallium	2.7E-05	3.1E-07	2.7E-05	3.1E-07	2.7E-05	2.7E-05	3.1E-07	2.7E-05	3.2E-07	2.7E-05	2.7E-05	3.2E-07	2.7E-05
Tungsten	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uranium	1.2E-06	3.1E-08	1.3E-06	3.0E-08	1.3E-06	1.2E-06	1.3E-08	1.3E-06	8.4E-09	1.2E-06	1.2E-06	7.7E-09	1.2E-06

Parameter	North Driftwood River Watershed Concentration (mg/kg wet weight)					West Buskegau River Watershed Concentration (mg/kg wet weight)					Jocko Creek Watershed Concentration (mg/kg wet weight)		
		Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2			Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3			Modelled Future – JC1 Pourpoint	
	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Project Alone Scenario	Baseline Plus Project Scenario	Baseline Scenario	Project Alone Scenario	Baseline Plus Project Scenario
Vanadium	0.00034	3.0E-05	0.00037	3.0E-05	0.00037	0.00034	3.0E-05	0.00037	2.95E-05	0.00037	0.00034	2.95E-05	0.00037
Zinc	7.9E-05	1.3E-06	8.0E-05	1.3E-06	8.0E-05	7.9E-05	1.3E-06	8.0E-05	1.3E-06	8.0E-05	7.9E-05	1.3E-06	8.0E-05

Notes:
NC = Not calculated

6.9 Fish

Fish consists of fish for human consumption (larger "angling fish") and smaller fish representing fish as general ecological receptors ("forage fish"). Baseline data are summarized in Appendix B. These data were used to calculate EPCs for the Baseline Scenario as described in Section 6. Angling fish were not collected in the Jocko Creek watershed during baseline sampling, and so Baseline Scenario angling fish in the Jocko Creek watershed are assumed to be represented by those for the North Driftwood watershed, as was done for sediment (discussed in Section 6.4). Baseline Scenario fish data does not include silver as it was not analysed; instead, Stantec estimated silver in Baseline Scenario fish by calculating uptake from soil using the same methodology as for future modelled concentrations, discussed below. Uptake is assumed to be the same between angling fish and forage fish.

Modelled future concentrations (Project Alone and Baseline Plus Project) of metals in fish were estimated via calculation of uptake from baseline surface water and future modelled surface water, respectively, as discussed in Section 6, using published uptake factors for surface water to fish. Uptake factors were sourced from Davis et al. (1993), Holdway, Sprague and Dick (1982), McGeer et al. (2003), Nussey, van Vuren and du Preez (2000), the IAEA (1994), or the Canadian Standards Association (CSA, 2011), where available. The uptake factor used for arsenic (100 mg/kg wet weight per mg/L water) encompasses the upper end of values from US EPA (2003) and Lijzen et al. (2001). Where uptake factors were not available (i.e., for thallium), Stantec calculated site-specific uptake factors based on measured baseline data in surface water and fish tissue.

Assumptions involved in uptake calculations include a fish metabolic factor of 1.0 (conservative default value). The moisture content of fish was used when estimating concentrations by calculating uptake from surface water. Moisture contents were assumed to be the average of the values from forage fish samples collected during baseline sampling: 78.3% (n=53).[1]

Modelled future fish concentrations are estimated as described in the sections below. Modelled future concentrations of angling fish are used to calculate risks to humans from consumption, while modelled future concentrations of forage fish were used to estimate concentrations in tissues of target species as well as health risks for ecological receptors.

6.9.1 Angling Fish

Angling fish are assumed to be those consumed by human receptors and include the following species sampled during baseline studies: northern pike, walleye, and perch.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario angling fish concentrations are presented in Table 6.24, Table 6.25 and Table 6.26.

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[1] Angling fish were not included in the average tissue moisture content calculations as the majority of angling fish consisted of Northern Pike, which were analyzed as muscle rather than as whole fish, as discussed in Section 8.5.

As discussed in Section 4.2, the MECP has fish consumption advisories for waterbodies within the LSA (including fish consumption advisories for Bigwater Lake and Mattagami River downstream of Sturgeon Falls due to mercury). The MECP fish consumption advisories are generally based on guidelines from Health Canada (MECP, 2023a). Health Canada has also set a maximum limit for 0.5 parts per million (ppm; or 0.5 mg/kg) total mercury in retail fish, with few exceptions.

The Baseline Scenario mercury concentrations in fish tissue are greater than Health Canada standard for retail fish. This is not unexpected given the fish consumption advisories within the LSA (Bigwater Lake and Mattagami River downstream of Sturgeon Falls) (MECP, 2021a; MECP, 2021b).

Table 6.24 Representative Concentrations of Metals in Angling Fish – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0022	0.0063	0.0085	0.0054	0.0076
Arsenic	0.072	0.48	0.55	0.47	0.54
Barium	0.047	0.0019	0.049	0.0281	0.075
Beryllium	0.0020	0.033	0.035	0.022	0.024
Cadmium	0.0011	1.5E-05	0.0011	6.5E-05	0.0012
Chromium (Total)	0.036	0.12	0.16	0.12	0.15
Cobalt	0.0040	0.0068	0.011	0.0066	0.011
Copper	0.16	0.32	0.48	0.31	0.47
Lead	0.0091	0.0054	0.014	0.0061	0.015
Manganese	0.60	Negligible	0.60	Negligible	0.60
Molybdenum	0.0040	0.29	0.30	0.26	0.27
Nickel	0.040	0.51	0.55	0.46	0.50
Selenium	0.12	0.61	0.73	0.58	0.70
Silver	0.083	Negligible	0.083	Negligible	0.083
Thallium	0.0039	Negligible	0.0039	Negligible	0.0039
Tungsten	NM	NC	NC	NC	NC
Uranium	0.00040	0.053	0.053	0.051	0.052
Vanadium	0.020	0.15	0.17	0.15	0.17

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	4.9	6.5	11	6.5	11

Notes:

Negligible = Project-related contributions are considered negligible

NC = Not calculated

NM = Not measured

Table 6.25 Representative Concentrations of Metals in Angling Fish – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.0013	0.0033	0.00060	0.0026
Arsenic	0.034	0.035	0.069	0.0045	0.038
Barium	0.021	0.011	0.032	0.0015	0.022
Beryllium	0.0020	Negligible	0.0020	Negligible	0.0020
Cadmium	0.0029	Negligible	0.0029	Negligible	0.0029
Chromium (Total)	0.023	0.019	0.042	0.0023	0.025
Cobalt	0.0040	0.0017	0.0057	0.00025	0.0043
Copper	0.165	0.050	0.21	0.0058	0.17
Lead	0.0040	0.00046	0.0045	1.2E-06	0.0040
Manganese	0.14	Negligible	0.14	Negligible	0.14
Molybdenum	0.0040	0.085	0.089	0.019	0.023
Nickel	0.040	0.10	0.14	0.016	0.056
Selenium	0.27	0.37	0.64	0.084	0.36
Silver	0.083	Negligible	0.083	Negligible	0.083
Thallium	0.0021	Negligible	0.0021	4.0E-05	0.0021
Tungsten	NM	NC	NC	NC	NC
Uranium	0.00040	0.010	0.010	0.0012	0.0016
Vanadium	0.020	0.023	0.043	0.0028	0.023

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	8.9	2.3	11	0.25	9.2

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

Table 6.26 Representative Concentrations of Metals in Angling Fish – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0022	0.0017	0.0039
Arsenic	0.072	0.00090	0.073
Barium	0.047	0.00019	0.047
Beryllium	0.0020	Negligible	0.0020
Cadmium	0.0011	Negligible	0.0011
Chromium (Total)	0.036	Negligible	0.036
Cobalt	0.0040	0.00030	0.0043
Copper	0.16	Negligible	0.16
Lead	0.0091	Negligible	0.0091
Manganese	0.60	0.0094	0.61
Molybdenum	0.0040	0.047	0.051
Nickel	0.040	0.015	0.055
Selenium	0.12	0.036	0.16
Silver	0.083	Negligible	0.083
Thallium	0.0039	0.00038	0.0043
Tungsten	NM	NC	NC
Uranium	0.00040	Negligible	0.00040
Vanadium	0.020	Negligible	0.020
Zinc	4.9	Negligible	4.9

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

6.9.2 Forage Fish

Forage fish species analysed as part of the sampling program were Brook Stickleback, Fathead Minnow, Finescale Dace, Lake Chub, Northern Pearl Dace, and Northern Redbelly Dace. Baseline Scenario EPCs were calculated as described in Section 6. Modelled future concentrations were calculated as described in Section 6.9.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario berry concentrations are presented in Table 6.27, Table 6.28, and Table 6.29 for the North Driftwood River, West Buskegau River, and Jocko Creek watersheds, respectively.

Table 6.27 Representative Concentrations of Metals in Forage Fish – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.0057	0.0077	0.0049	0.0069
Arsenic	0.024	0.16	0.18	0.16	0.18
Barium	3.8	0.16	4.0	2.3	6.1
Beryllium	0.0020	0.033	0.035	0.022	0.024
Cadmium	0.018	0.00024	0.018	0.0011	0.019
Chromium (Total)	0.038	0.13	0.17	0.13	0.16
Cobalt	0.018	0.030	0.048	0.030	0.048
Copper	1.9	3.8	5.7	3.7	5.6
Lead	0.031	0.018	0.049	0.021	0.052
Manganese	8.1	Negligible	8.1	Negligible	8.1
Molybdenum	0.033	2.4	2.4	2.2	2.2
Nickel	0.040	0.51	0.55	0.46	0.50
Selenium	0.26	1.3	1.6	1.2	1.5
Silver	0.083	Negligible	0.083	Negligible	0.083
Thallium	0.0046	Negligible	0.0046	Negligible	0.0046
Tungsten	5.1E-05	NC	NC	NC	NC
Uranium	0.0022	0.29	0.29	0.28	0.28
Vanadium	0.067	0.51	0.57	0.50	0.56

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	47	63	110	63	110

Notes:

Negligible = Project-related contributions are considered negligible

NC = Not calculated

Table 6.28 Representative Concentrations of Metals in Forage Fish – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0027	0.0017	0.0044	0.00081	0.0035
Arsenic	0.038	0.039	0.077	0.0051	0.043
Barium	4.9	2.6	7.5	0.34	5.2
Beryllium	0.0020	Negligible	0.0020	Negligible	0.0020
Cadmium	0.017	Negligible	0.017	Negligible	0.017
Chromium (Total)	0.038	0.031	0.069	0.0038	0.042
Cobalt	0.029	0.012	0.041	0.0018	0.031
Copper	1.1	0.33	1.4	0.039	1.1
Lead	0.068	0.0079	0.076	2.0E-05	0.068
Manganese	17	Negligible	17	Negligible	17
Molybdenum	0.041	0.87	0.91	0.20	0.24
Nickel	0.075	0.18	0.26	0.030	0.11
Selenium	0.18	0.24	0.42	0.056	0.24
Silver	0.083	Negligible	0.083	Negligible	0.083
Thallium	0.0056	Negligible	0.0056	0.00011	0.0057
Tungsten	5.1E-05	NC	NC	NC	NC
Uranium	0.0023	0.054	0.057	0.0068	0.0090
Vanadium	0.078	0.089	0.17	0.011	0.089

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	52	13	65	1.5	53

Notes:

Negligible = Project-related contributions are considered negligible

NC = Not calculated

Table 6.29 Representative Concentrations of Metals in Forage Fish – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.0016	0.0036
Arsenic	0.022	0.00028	0.022
Barium	2.2	0.0088	2.2
Beryllium	0.0020	Negligible	0.0020
Cadmium	0.053	Negligible	0.053
Chromium (Total)	0.010	Negligible	0.010
Cobalt	0.014	0.0010	0.015
Copper	1.6	Negligible	1.6
Lead	0.16	Negligible	0.16
Manganese	12	0.18	12
Molybdenum	0.026	0.30	0.33
Nickel	0.040	0.015	0.055
Selenium	0.25	0.076	0.33
Silver	0.083	Negligible	0.083
Thallium	0.011	0.0010	0.012
Tungsten	5.1E-05	7.9E-05	0.00013
Uranium	0.00066	Negligible	0.00066
Vanadium	0.020	Negligible	0.020
Zinc	45	Negligible	45

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated

6.10 Aquatic Vegetation

Aquatic vegetation consists of general aquatic plants as well as cattails. Metals concentrations in cattails were assessed separately to represent aquatic plants for human consumption, as cattails may be consumed by humans as discussed in Section 4.2. Baseline aquatic vegetation samples were collected from 2021 to 2023. Based on the limited number of samples collected (18 samples), baseline aquatic vegetation data were not separated by watershed (i.e., Baseline Scenario EPCs are not watershed specific). Because silver was not measured in aquatic vegetation, the Baseline Scenario EPC for silver was estimated using uptake factors and baseline sediment data.

Modelled future concentrations of metals in aquatic plants (Project Alone and Baseline Plus Project Scenarios) were estimated via calculation of uptake from future modelled sediment, as discussed in Section 6, plus deposition from air using the same method and equation presented for terrestrial plants in Section 6.5. Uptake factors from freshwater sediment to aquatic plants are the same as the uptake factors from soil to terrestrial plants (Section 6.5) multiplied by the aquatic plant dry weight to wet weight conversion factor.

The moisture content of aquatic vegetation was used when estimating concentrations of aquatic vegetation by calculating uptake from sediment. Moisture contents were assumed to be the average of the values from samples collected during baseline sampling, as follows: 82.1% for all aquatic vegetation (n=13) and 78.0% for cattails (n=5).

Future aquatic vegetation concentrations are estimated as described in the sections below. Estimated future concentrations of cattails are used to calculate risks to humans from consumption as traditional foods, while modelled concentrations of future general aquatic plants were used to estimate concentrations in tissues of target hunting species as well as health risks for ecological receptors.

6.10.1 Aquatic Plants

Baseline Scenario metal concentrations in aquatic plants include concentrations from samples of cattails, as well as wild calla and other unspecified aquatic plants. Baseline Scenario aquatic plant EPCs were calculated as described in Section 6.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario aquatic plant concentrations are presented in Table 6.30, Table 6.31, and Table 6.32 for the North Driftwood River, West Buskegau River, and Jocko Creek watersheds, respectively (note that Baseline Scenario concentrations are the same for each watershed, as discussed in Section 6.3).

Table 6.30 Representative Concentrations of Metals in Aquatic Plants – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0064	0.0094	0.016	0.0081	0.014
Arsenic	0.30	0.27	0.57	0.26	0.56
Barium	4.7	0.018	4.7	0.26	5.0
Beryllium	0.016	0.031	0.047	0.021	0.037
Cadmium	0.025	8.6E-06	0.025	3.8E-05	0.025
Chromium (Total)	0.48	0.046	0.53	0.045	0.53
Cobalt	0.18	0.11	0.29	0.10	0.28
Copper	1.6	0.64	2.2	0.62	2.2
Lead	0.23	0.012	0.24	0.014	0.24
Manganese	98	Negligible	98	Negligible	98
Molybdenum	0.68	1.2	1.9	1.1	1.8
Nickel	0.94	4.0	4.9	3.6	4.5
Selenium	0.035	0.00064	0.036	0.00060	0.036
Silver	0.0094	Negligible	0.0094	Negligible	0.0094
Thallium	0.049	Negligible	0.049	Negligible	0.049
Tungsten	NM	NC	NC	NC	NC
Uranium	0.12	1.1	1.3	1.1	1.2
Vanadium	1.3	0.84	2.1	0.82	2.1

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	9.4	0.11	9.5	0.11	9.5

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

Table 6.31 Representative Concentrations of Metals in Aquatic Plants – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0064	0.0028	0.0092	0.0013	0.0077
Arsenic	0.30	0.067	0.37	0.0087	0.31
Barium	4.7	0.26	5.0	0.035	4.7
Beryllium	0.016	Negligible	0.016	Negligible	0.016
Cadmium	0.025	Negligible	0.025	Negligible	0.025
Chromium (Total)	0.48	0.0091	0.49	0.0011	0.48
Cobalt	0.18	0.019	0.20	0.0029	0.18
Copper	1.6	0.18	1.8	0.021	1.6
Lead	0.23	0.0046	0.23	1.2E-05	0.23
Manganese	98	Negligible	98	Negligible	98
Molybdenum	0.68	0.44	1.1	0.10	0.78
Nickel	0.94	0.86	1.8	0.14	1.1
Selenium	0.035	0.00011	0.035	2.5E-05	0.035
Silver	0.0078	Negligible	0.0078	Negligible	0.0078
Thallium	0.049	Negligible	0.049	0.00036	0.049
Tungsten	NM	NC	NC	NC	NC
Uranium	0.12	0.26	0.38	0.032	0.15
Vanadium	1.3	0.16	1.4	0.019	1.3

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	9.4	0.025	9.4	0.0028	9.4

Notes:

Negligible = Project-related contributions are considered negligible

NC = Not calculated

NM = Not measured

Table 6.32 Representative Concentrations of Metals in Aquatic Plants – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0064	0.0026	0.0090
Arsenic	0.30	0.00059	0.30
Barium	4.7	0.0016	4.7
Beryllium	0.016	Negligible	0.016
Cadmium	0.025	Negligible	0.025
Chromium (Total)	0.48	Negligible	0.48
Cobalt	0.18	0.0031	0.18
Copper	1.6	Negligible	1.6
Lead	0.23	Negligible	0.23
Manganese	98	0.30	98
Molybdenum	0.68	0.20	0.88
Nickel	0.94	0.13	1.1
Selenium	0.035	5.5E-05	0.035
Silver	0.0094	Negligible	0.0094
Thallium	0.049	0.0021	0.051
Tungsten	NM	NC	NC
Uranium	0.12	Negligible	0.12
Vanadium	1.3	Negligible	1.3
Zinc	9.4	Negligible	9.4

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated
NM = Not measured

6.10.2 Cattails

Cattails were sampled as discussed in Section 6.10. Baseline Scenario EPCs for cattails were calculated as described in Section 6.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario cattail concentrations are presented in Table 6.33, Table 6.34, and Table 6.35 for the North Driftwood River, West Buskegau River, and Jocko Creek watersheds, respectively (note that Baseline Scenario concentrations are the same for each watershed, as discussed in Section 6.3).

Table 6.33 Representative Concentrations of Metals in Cattails – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.0026	0.0046	0.0030	0.0050
Arsenic	0.025	0.023	0.048	0.023	0.049
Barium	1.3	0.095	1.3	0.030	1.3
Beryllium	0.0020	0.0026	0.0046	0.0039	0.0059
Cadmium	0.014	3.3E-05	0.014	1.7E-05	0.014
Chromium (Total)	0.15	0.16	0.31	0.16	0.31
Cobalt	0.033	0.032	0.065	0.033	0.065
Copper	0.47	0.19	0.66	0.20	0.67
Lead	0.050	0.0034	0.054	0.0030	0.053
Manganese	234	0.12	234	0.12	234
Molybdenum	1.3	2.2	3.5	2.4	3.8
Nickel	0.088	0.56	0.65	0.60	0.69
Selenium	0.010	0.00021	0.010	0.00022	0.010
Silver	0.012	2.8E-05	0.012	2.8E-05	0.012
Thallium	0.0073	8.4E-06	0.0073	8.4E-06	0.0073
Tungsten	NM	NC	NC	NC	NC
Uranium	0.00069	0.0063	0.0070	0.0065	0.0072
Vanadium	0.026	0.030	0.056	0.030	0.056
Zinc	7.8	0.096	7.9	0.096	7.9

Notes:
NC = Not calculated
NM = Not measured

Table 6.34 Representative Concentrations of Metals in Cattails – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.00091	0.0029	0.00045	0.0025
Arsenic	0.025	0.0064	0.032	0.0014	0.027
Barium	1.3	0.095	1.3	0.035	1.3
Beryllium	0.0020	6.5E-05	0.0021	6.5E-05	0.0021
Cadmium	0.014	1.2E-05	0.014	1.2E-05	0.014
Chromium (Total)	0.15	0.15	0.30	0.15	0.30
Cobalt	0.033	0.017	0.049	0.014	0.047
Copper	0.47	0.063	0.53	0.018	0.49
Lead	0.050	0.0014	0.052	0.00038	0.051
Manganese	234	0.12	234	0.12	234
Molybdenum	1.3	0.87	2.2	0.20	1.5
Nickel	0.088	0.31	0.40	0.24	0.33
Selenium	0.010	6.5E-05	0.010	4.1E-05	0.010
Silver	0.010	2.8E-05	0.010	2.8E-05	0.010
Thallium	0.0073	8.4E-06	0.0073	6.2E-05	0.0074
Tungsten	NM	NC	NC	NC	NC
Uranium	0.00069	0.0015	0.0022	0.00022	0.00091
Vanadium	0.026	0.016	0.042	0.013	0.039
Zinc	7.8	0.029	7.9	0.011	7.8

Notes:
NC = Not calculated
NM = Not measured

Table 6.35 Representative Concentrations of Metals in Cattails – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0020	0.00086	0.0029
Arsenic	0.025	0.00074	0.026
Barium	1.3	0.026	1.3
Beryllium	0.0020	6.5E-05	0.0021
Cadmium	0.014	1.2E-05	0.014
Chromium (Total)	0.15	0.15	0.30
Cobalt	0.033	0.014	0.047
Copper	0.47	0.012	0.48
Lead	0.050	0.00038	0.051
Manganese	234	0.82	235
Molybdenum	1.3	0.39	1.7
Nickel	0.088	0.24	0.33
Selenium	0.010	5.0E-05	0.010
Silver	0.012	2.8E-05	0.012
Thallium	0.0073	0.00031	0.0076
Tungsten	NM	NC	NC
Uranium	0.00069	4.4E-05	0.00073
Vanadium	0.026	0.013	0.039
Zinc	7.8	0.008	7.8

Notes:
NC = Not calculated
NM = Not measured

6.11 Benthic Invertebrates

Benthic invertebrates were not collected during baseline sampling. Baseline Scenario concentrations and modelled future concentrations (Project Alone and Baseline Plus Project Scenarios) of metals in benthic invertebrates were estimated via calculation of uptake from baseline sediment and future modelled sediment, respectively, as discussed in Section 6, using published uptake factors for sediment to benthic invertebrates. Uptake factors for sediment to benthic invertebrates were obtained from Garn et al. (2001), Hamilton et al. (2002), Haus et al. (2007), ORNL (1998), and Welsh and Maughan (1994). Assumptions involved in uptake calculations include the use of the following values:

- Soil invertebrate metabolic factor of 1.0 (conservative default value)
- Dry weight to wet weight conversion factor of 0.24, based on a percent moisture content of invertebrates of 76% (69% to 84%) (Gewurtz, Lazar, & Haffner, 2000)

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario benthic invertebrate concentrations are presented in Table 6.36, Table 6.37, and Table 6.38 for the North Driftwood River, West Buskegau River, and Jocko Creek watersheds, respectively.

Table 6.36 Representative Concentrations of Metals in Benthic Invertebrates – North Driftwood River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0014	0.0021	0.0035	0.0018	0.0033
Arsenic	1.5	0.90	2.35	0.88	2.3
Barium	12	0.047	12	0.67	13
Beryllium	0.056	0.11	0.16	0.071	0.13
Cadmium	0.98	0.00023	0.98	0.0010	0.98
Chromium (Total)	5.7	0.20	5.9	0.19	5.9
Cobalt	0.020	0.012	0.032	0.011	0.031
Copper	32	4.1	36	4.0	36
Lead	2.0	0.084	2.1	0.095	2.1
Manganese	106	Negligible	106	Negligible	106
Molybdenum	0.41	0.74	1.2	0.67	1.1
Nickel	2.8	6.7	9.6	6.0	8.8
Selenium	0.44	0.0080	0.45	0.0075	0.45
Silver	0.0094	Negligible	0.0094	Negligible	0.0094
Thallium	0.030	Negligible	0.030	Negligible	0.030
Tungsten	NC	NC	NC	NC	NC
Uranium	0.022	0.20	0.23	0.20	0.22
Vanadium	0.51	0.34	0.84	0.33	0.84

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – TMF Seepage and Runoff Collection Ponds		Modelled Future – Point of Full Mixing – Collection Pond 2	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Zinc	168	0.39	168	0.39	168

Notes:

Negligible = Project-related contributions are considered negligible

NC = Not calculated

Table 6.37 Representative Concentrations of Metals in Benthic Invertebrates – West Buskegau River Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – Point of Full Mixing – Collection Pond 1		Modelled Future – Point of Full Mixing – Collection Pond 3	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)	Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.00086	0.00037	0.0012	0.00017	0.0010
Arsenic	1.1	0.19	1.3	0.025	1.2
Barium	9.6	0.53	10	0.071	9.6
Beryllium	0.053	Negligible	0.053	Negligible	0.053
Cadmium	0.91	Negligible	0.91	Negligible	0.906
Chromium (Total)	5.7	0.039	5.7	0.0048	5.674
Cobalt	0.021	0.0022	0.023	0.00034	0.021
Copper	27	1.0	28	0.12	27
Lead	1.5	0.023	1.5	6.0E-05	1.5
Manganese	140	Negligible	140	Negligible	140
Molybdenum	0.26	0.17	0.43	0.038	0.30
Nickel	2.4	1.7	4.1	0.37	2.8
Selenium	0.49	0.0015	0.49	0.00035	0.49
Silver	0.0078	Negligible	0.0078	Negligible	0.0078
Thallium	0.026	Negligible	0.026	0.00019	0.0259
Tungsten	NC	NC	NC	NC	NC
Uranium	0.018	0.039	0.057	0.0048	0.0233
Vanadium	0.49	0.062	0.55	0.0075	0.50
Zinc	157	0.088	157	0.010	157

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated

Table 6.38 Representative Concentrations of Metals in Benthic Invertebrates – Jocko Creek Watershed

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – JC1 Pourpoint	
		Project Alone Scenario Concentration (mg/kg wet weight)	Baseline Plus Project Scenario Concentration (mg/kg wet weight)
Antimony	0.0014	0.00059	0.0020
Arsenic	1.5	0.0021	1.5
Barium	12	0.0040	12
Beryllium	0.056	Negligible	0.056
Cadmium	0.98	Negligible	0.98
Chromium (Total)	5.7	Negligible	5.7
Cobalt	0.020	0.00034	0.020
Copper	32	Negligible	32
Lead	2.0	Negligible	2.0
Manganese	106	0.32	106
Molybdenum	0.41	0.12	0.53
Nickel	2.8	0.36	3.2
Selenium	0.44	0.00068	0.44
Silver	0.0094	Negligible	0.0094
Thallium	0.030	0.0012	0.031
Tungsten	NC	NC	NC
Uranium	0.022	Negligible	0.022
Vanadium	0.51	Negligible	0.51
Zinc	168	Negligible	168

Notes:
Negligible = Project-related contributions are considered negligible
NC = Not calculated

6.12 North Driftwood River Channel Realignment

As noted in Section 1.4.4, special emphasis is placed on changes in mercury and methyl mercury concentrations in surface water and how these changes may affect methyl mercury concentrations in fish tissue due to the North Driftwood River channel realignment.

Baseline Scenario mercury (i.e., total mercury) concentrations in fish tissue are calculated as the maximum between the mercury and methyl mercury concentrations as a conservative assumption to account for uncertainty in laboratory analysis.

The fish species evaluated for mercury changes related to the North Driftwood River channel realignment are the same as those considered for the North Driftwood River (Section 6.9). Future concentrations in fish tissue (Project Alone and Baseline Plus Project) were modelled by estimating uptake from baseline and modelled future surface water, respectively**.** Uptake of both mercury and methyl mercury was considered, assuming mercury fully converts to methyl mercury in fish tissue.

Baseline Scenario, Project Alone Scenario, and Baseline Plus Project Scenario associated with the North Driftwood River channel realignment water, angling fish, and forage fish are presented in Table 6.39, Table 6.40, and Table 6.41. Concentrations of methyl mercury in angling fish are used to calculate human health risks from consumption, while concentrations in forage fish were used to calculate ecological health risks.

Table 6.39 Concentrations of Mercury and Methyl Mercury in Surface Water – North Driftwood River Channel Realignment

Parameter	Baseline Scenario Concentration (mg/L)	Modelled Future – North Driftwood River Channel Realignment		
		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/L)	Concentration (mg/L)	% Change from Baseline
Mercury	2.5E-06	Negligible	2.5E-06	<0.1%
Methyl mercury	1.0E-07	9.0E-09	1.1E-07	9%
Notes: Negligible = Contributions associated with the North Driftwood River channel realignment are considered negligible				

Table 6.40 Concentrations of Mercury and Methyl Mercury in Angling Fish – North Driftwood River Channel Realignment

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – North Driftwood River Channel Realignment		
		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/kg wet weight)	Concentration (mg/kg wet weight)	% Change from Baseline
Mercury	2.4	Assumed completely transformed to methyl mercury		
Methyl mercury	2.4	0.10	2.5	4%

Table 6.41 Concentrations of Mercury and Methyl Mercury in Forage Fish – North Driftwood River Channel Realignment

Parameter	Baseline Scenario Concentration (mg/kg wet weight)	Modelled Future – North Driftwood River Channel Realignment		
		Project Alone Scenario	Baseline Plus Project Scenario	
		Concentration (mg/kg wet weight)	Concentration (mg/kg wet weight)	% Change from Baseline
Mercury	0.048	Assumed completely transformed to methyl mercury		
Methyl mercury	0.046	0.0020	0.048	4%

7 Human Health Risk Assessment

7.1 Problem Formulation

The key tasks of the problem formulation for the HHRA were:

- Identification of CoPC: Identification of those Project-related chemicals that may be released to the receiving environment and that have the potential to elicit adverse human health effects.
- Receptor Identification: Identification of the individuals that may be affected by the Project, which includes the people with the greatest probability of exposure to the CoPC and/or those that have the greatest potential sensitivity to the CoPC.
- Exposure Pathway Identification: Identification of the potential ways in which CoPC move through the environment from a source to a point of contact with people
- Conceptual Site Model (CSM) Development: Development of a visual CSM showing the release mechanisms, source media, transport mechanisms, exposure pathways and CoPC for the identified receptors.

The spatial and temporal boundaries are also an important part of the problem formulation. These boundaries were discussed in Section 2.

7.1.1 Identification of Human Health Contaminants of Potential Concern

The following subsections outline how CoPCs were identified by exposure routes and media. Specifically, inhalation of air and ingestion of/dermal contact with multiple media (including soil, sediment, surface water and country foods), also referred to as the multimedia assessment. The HHRA considers potential emissions from the Project, as well as dispersion/remobilization of chemicals in the environment that are elevated in baseline conditions.

7.1.1.1 Inhalation

As described in Section 6.1, air emission inventories were prepared for the construction and operation phases of the Project using operational and design information, and emission factors published by regulatory agencies such as the US EPA or Environmental and Climate Change Canada.

As noted by Health Canada (Health Canada, 2023b), to determine the human health impacts of changes to air quality, the concentrations of modelled air contaminants should be compared to “the most stringent federal, provincial or territorial air quality standards” applicable to the PA. For this Project, the applicable air quality standards (identified in Chapter 12 of the Impact Statement) comprised the Ontario Ambient Air Quality Criteria (AAQC) and the federal Canadian Ambient Air Quality Standards (CAAQS). Comparisons of modelled air quality contaminant concentrations during construction and operations to the AAQC, CAAQS, and other applicable Ontario Air Contaminant Benchmarks (including guidelines and screening levels) are provided in Chapter 12 of the Impact Statement and are summarized in Section 6.1.

Health Canada (2023b) notes that further health assessment of air quality contaminants may not be necessary if modelled concentrations or levels of these contaminants remain well below the applicable CAAQS or other criteria. However, a health-based risk assessment is recommended for non-threshold contaminants (i.e., those contaminants that may cause health effects at any exposure level) and for contaminants that are modelled to approach or exceed applicable air quality guidelines or standards. Additionally, Health Canada (2023a) notes that chemicals should be screened into a quantitative HHRA if no guidelines exist and modelled concentrations increase above background levels. Therefore, chemicals identified as being potentially released into air by the Project were identified for consideration as CoPCs in air for the HHRA if:

- The contaminant is a known non-threshold contaminant (includes carcinogens and non-threshold non-carcinogens, see further discussion in Section 1.1),
- Modelled contaminant concentrations approach or exceed applicable criteria at the maximum location along the modelled mine boundary (i.e., the modelled contaminant concentration (without plume depletion) for Baseline Plus Project scenario at the maximum location along the modelled mine boundary was greater than 85% of the applicable air quality criteria as summarized in Section 6.1), or
- The modelled contaminant concentration is greater than background levels due to the Project and no applicable air quality criterion was identified, as summarized in Section 6.1.

In addition, some chemicals were excluded as CoPCs based on a case-by-case review of additional quantitative and qualitative lines of evidence (see below). A summary of the chemicals identified as CoPC is provided in Table 7.1.

Table 7.1 Human Health Contaminants of Potential Concern (CoPCs) in Air

	Non-Threshold (Carcinogens and Non-carcinogens)	Approaches or Exceeds Criteria (per Section 6.1)	No Criteria (per Section 6.1)	Identified as CoPC?
Criteria Air Contaminants				
Total suspended particulate matter (PM)	✓	✓	-	No, see text
Coarse particulate matter (PM_{10})	✓	✓	-	Yes
Fine particulate matter ($PM_{2.5}$)	✓	✓	-	Yes
Nitrogen dioxide (NO_2)	✓	✓	-	Yes
Sulphur dioxide (SO_2)	✓	-	-	Yes
Volatile Organic Compounds				
1,3-Butadiene	✓	-	-	Yes
Acetaldehyde	✓	-	-	Yes
Benzene	✓	✓	-	Yes
Formaldehyde	✓	-	-	Yes
Hydrocarbons	-	-	✓	No, see text
Diesel Particulate Matter				
Diesel particulate matter	✓	-	✓	Yes
PAHs				
Acenaphthene	-	-	✓	Yes
Acenaphthylene	-	-	✓	Yes
Anthracene	-	-	✓	Yes
Benz(a)anthracene	✓	-	✓	Yes
Benzo(a)pyrene	✓	✓	-	Yes
Benzo(b)fluoranthene	✓	-	✓	Yes
Benzo(g,h,i)perylene	✓	-	✓	Yes
Chrysene	✓	-	✓	Yes
Dibenzo(a,h)anthracene	✓	-	✓	Yes
Fluoranthene	-	-	✓	Yes
Fluorene	-	-	✓	Yes
Indeno(1,2,3-c,d)pyrene	✓	-	✓	Yes
Phenanthrene	-	-	✓	Yes
Pyrene	-	-	✓	Yes
Process Chemicals				
Potassium Amyl Xanthate	-	-	✓	No, see text

	Non-Threshold (Carcinogens and Non-carcinogens)	Approaches or Exceeds Criteria (per Section 6.1)	No Criteria (per Section 6.1)	Identified as CoPC?
Metals and Minerals				
Aluminum	-	✓	-	No, see text
Arsenic	✓	-	-	Yes
Beryllium	✓	-	-	Yes
Cadmium	✓	-	-	Yes
Calcium	-	-	✓	No, see text
Chromium VI	✓	-	-	Yes
Iron	-	-	✓	No, see text
Manganese	-	✓	-	Yes
Nickel	✓	-	-	Yes
Sodium	-	-	✓	No, see text
Thorium	-	-	✓	No, see text
Biotite	-	-	✓	No, see text
Chrysotile Asbestos	✓	-	-	Yes
Magnetite	-	✓	-	No, see text
Muscovite	-	✓	-	No, see text
Pyrite	-	-	✓	No, see text
Quartz (in PM_{10})	✓	✓	-	Yes

Notes: Checkmark (✓) indicates criterion is applicable to this parameter and dash (-) indicates that criterion is not applicable to this parameter.

The additional lines of evidence relied to exclude parameters as CoPCs on a case-by-case basis are summarized below.

- **Total Suspended Particulate Matter.** Although modelled concentrations of total suspended particulate matter (PM) (i.e., total particulate matter with an aerodynamic diameter less than 44 µm) were greater than applicable air criteria (per Section 6.1), it was not identified as CoPC because existing evidence indicates that health effects related to inhaltion of particulate matter are most strongly correlated with smaller particulate size (Health Canada, 2016a). For example, the World Health Organization notes that, "the effects of long-term particulate matter exposure on mortality seem to be attributable to $PM_{2.5}$ rather than coarse particles" (WHO, 2006). Therefore, PM_{10} and $PM_{2.5}$ were retained as CoPCs to assess the potential for particulate matter to affect human health in this HHRA.
- **Hydrocarbons.** The term "hydrocarbons" encompasses a broad group of chemicals that contain carbon and hydrogen atoms. Petroleum products such as gasoline and diesel typically contain hundreds to thousands of hydrocarbon compounds in varying proportions. Total hydrocarbons were modelled as a byproduct of fuel combustion even though certain individual hydrocarbons (e.g., benzene) have also been modelled and evaluated individually. The CCME (2008) has

identified reference concentrations (RfCs) for various aliphatic and aromatic subfractions of total petroleum hydrocarbons (PHC). These RfCs represent concentrations that can be inhaled continuously over a lifetime without resulting in appreciable risk of deleterious effects for non-carcinogenic effects (i.e., RfCs are equivalent to TCs for threshold effects as described in Section 7.2.1). The lowest (most sensitive) RfC from CCME (2008) for a PHC subfraction is 0.2 mg/m^3 (200 µg/m^3); which is applicable to C_9- C_{16} range aromatic hydrocarbons. Given that the the maximum modelled 24-hour concentration of total hydrocarbons at the modelled mine boundary due to the Project for either the construction or operation phases as shown in Section 6.1 is 3.3 µg/m^3 (i.e., two orders of magnitude lower than the most sensitive RfC for a subfraction of PHC from CCME (2008)), it can be concluded that non-cancer effects from exposure to total hydrocarbons in air will be negligible from the Project and therefore total hydrocarbons were not identified as CoPCs in air for human health.

- **Potassium Amyl Xanthate.** Potassium amyl xanthate (PAX) is a process chemical that is widely used in mining as a flotation reagent. This chemical will be supplied in bulk bags as a dry reagent and subsequently diluted to a solution, transferred to the day tank, and distributed to the flotation circuit. It is not volatile and was modelled to be released as a particulate in air as a result of product loading/ transferring, which is assumed to occur inside of the processing plant building. As such, off-site emissions of this chemical are modelled to be extremely low (i.e., the maximum concentrations in air modelled to occur at the modelled mine boundary was 0.09 µg/m^3 (24-hour). By comparison, a no observed adverse effect concentration (NOAEC) of 23 mg/m^3 (23,000 µg/m^3) was established for this chemical in a 30-day inhalation (aerosol) study based on no observed effects in rats (DOW, 1976; Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) , 2020). Given that the the maximum 24-hour concentration of potassium amyl xanthate modelled at the modelled mine boundary due to the Project (0.09 µg/m^3) is six orders of magnitude lower than this 30-day NOAEC, it can be concluded that effects from exposure to potassium amyl xanthate in air will be negligible from the Project and therefore potassium amyl xanthate was not identified as a CoPC in air for human health.
- **Manganese.** Manganese in air was modelled and compared to Ontario ambient air quality criteria in Section 6.1 at the modelled mine boundary as manganese in total suspended PM, manganese in PM_{10}, and manganese in $PM_{2.5}$. Modelled manganese concentrations met the applicable criteria for all three size fractions at the modelled mine boundary for the Project construction phase. However, for the Project operation phase, modelled manganese concentrations were greater than the applicable criteria at the modelled mine boundary for manganese in total suspended PM but not for manganese in PM_{10} or manganese in $PM_{2.5}$. In the Ontario ambient air quality criteria rationale document (MECP, 2020) it is specified that the metal concentration in the lowest particulate size fraction is the most relevant from a toxicological perspective. The criteria provided for the larger particulate fractions are described as being available to address implementation issues associated with monitoring and/or modelling of contaminants and are therefore not strictly health-based. Since concentrations of the smaller, toxicologically relevant fractions were below the criteria at the modelled mine boundary, manganese was not identified as a CoPC in air for human health.
- **Thorium.** As noted by ATSDR (2019a), the toxicity of thorium to humans and animals via inhalation, oral, or dermal exposure pathways is poorly understood. Studies of occupational

exposure to thorium have provided some evidence of respiratory disease, liver disease, and increased incidence of pancreatic, lung, and hematopoietic cancers in exposed workers (ATSDR, 2019a). However, these workers were also exposed to numerous other toxic agents and therefore a direct attribution to thorium exposure alone cannot be made (ATSDR, 2019a). Animal studies of chronic inhalation exposure to low concentrations of thorium dioxide did not result in adverse effects in rats, rabbits, or dogs (ATSDR, 2019b). As such, ATSDR (2019a) provides no minimal risk level (MRL) concentrations for thorium via inhalation or oral exposure in the absence of "suitable human or animal data regarding health effects following inhalation or oral exposure to thorium and its progeny". However, the US Department of Energy (US DOE) has established temporary emergency exposure limits (TEELs) for thorium. The 'TEEL-1' value derived by DOE is intended to represent "*the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, when exposed for more than one hour, could experience notable discomfort, irritation, or certain asymptomatic, non-sensory effects. However, these effects are not disabling and are transient and reversible upon cessation of exposure*" (US DOE, 2016). For thorium, the TEEL-1 value derived by DOE is 30 mg/m^3 (i.e., 30,000 µg/m^3) (US DOE, 2016). In contrast, the maximum 24-hour concentration of thorium in air modelled at the modelled mine boundary during construction or operation for the Project Alone scenario was 4.6×10^{-4} µg/m^3. Given that the modelled concentrations are eight orders of magnitude lower than the 1-hour TEEL-1 value from DOE (2018), it can be concluded that effects from exposure to thorium in air will be negligible from the Project and therefore thorium was not identified as a CoPC in air for human health.

- **Non-carcinogenic inorganic components of particulate matter (aluminum, calcium, iron, sodium, biotite, magnetite, muscovite, and pyrite).** Inorganics and minerals are being released to air from this project as particulate matter released from geological sources in the area due to various activities such as material handling, equipment travel, grading, drilling, blasting, wind erosion, and unpaved road dust. Aluminum, calcium, iron, and sodium are ubiquitous, naturally occurring elements (Appendix D) while biotite, magnetite, muscovite and pyrite are naturally occuring minerals. As noted previously, PM_{10} and $PM_{2.5}$ have been retained as CoPCs. The link between specific inorganic components of particulate matter and observed human health outcomes remains poorly understood (Schlesinger, 2007). For example, a review by Schlesinger (2007) of epidemiological studies focused on crustal components of $PM_{2.5}$ such as aluminum, calcium, and iron concluded that these parameters do not appear to pose signficant individual health risks. Similarly, occupational exposure guidelines for biotite, magnetite, and muscovite, indicate that these minerals have limited inherent toxicity via inhalation. For example biotite and muscovite are phyllosilicate minerals within the mica group for which the National Institute for Occupational Safety and Health (NIOSH) provides a recommended exposure limit (REL) time-weighted average concentration protective of daily occupational exposure of 3000 µg/m^3 (NIOSH, 2019b) and magnetite is an iron oxide for which NIOSH provides a REL of 5000 µg/m^3 (NIOSH, 2019a). In contrast, the maximum modelled 24-hour concentrations of these parameters along the modelled mine boundary during Project construction or operations range from 2.7 µg/m^3 to 12 µg/m^3 as shown in Table 6.3. Therefore, these inorganic parameters will be evaluated as components of $PM_{2.5}$ rather than as individual CoPC.

7.1.1.2 Multimedia

As described in Section 6.1, a comprehensive list of chemicals related to air emissions during Project construction and/or operations was developed. The Project-related chemicals released to the receiving environment (air and water) may alter baseline conditions with respect to the concentrations of chemicals in the air, soil, water, and biota near the Project.

While chemicals that might increase in environmental media due to Project activities (evaluated in Section 6) could initially be considered as CoPCs, Health Canada (2023a) notes that if the modelled concentrations from the Baseline Plus Project Scenario are below screening criteria for the impacted media, the problem formulation phase of the risk assessment may conclude that the chemicals do not need to be carried forward as CoPCs in a quantitative risk assessment. In cases where there are no screening criteria available for an environmental medium (e.g., country foods), the CoPCs may be carried forward into a quantitative risk assessment to determine whether there may be health risks (Health Canada, 2023a). Federal human health-based guidelines were applied where available to identify CoPCs. When these were not available, human health-based guidelines were obtained from the province of Ontario.

Baseline Plus Project Scenario soil EPCs were compared to federal human health-based guidelines from the CCME (i.e., Canadian Soil Quality Guidelines, CSQGs) (CCME, 1999)) or provincial human health-based guidelines (i.e., direct contact component, or S1) from the (MECP, 2011a), where appropriate (Table E-1, Appendix E). Federal and provincial human health-based guidelines for agricultural land use were applied because it is the most sensitive land use. Baseline Plus Project Scenario soil EPCs were less than the federal and provincial human health-based guidelines. As indicated in Table 6.6, except for chromium (71%), cobalt (28%) and nickel (177%), the percent change between Baseline Scenario and Baseline Plus Project Scenario soil EPCs is less than 10%. Further, the percent change for cadmium, chromium VI, lead, mercury, selenium, silver, thallium, tungsten and uranium are below 1%.

Baseline Plus Project Scenario surface water EPCs were compared to federal human health-based guidelines from Health Canada (2024) (i.e., Guidelines for Canadian Drinking Water Quality (GCDWQ)) or provincial human health-based guidelines (i.e., drinking water component, or GW1) from the MECP (2011a)), where appropriate (Table E-2, Appendix E). Baseline Plus Project Scenario surface water EPCs were less than the federal and provincial human health-based guidelines. In the absence of a Health Canada GCDWQ or MECP drinking water component (GW1), the tungsten EPCs in surface water were compared to Provincial Water Quality Objective (PWQOs; (MECP, 1994)), which is stated to be protective of recreational uses. The tungsten EPCs in surface water were less than the PWQO (0.03 mg/L). As indicated in Table 6.7, except for cadmium (< 6%), manganese (< 2%) silver (< 0.1%) and thallium (< 10%), the percent change in surface water EPCs between Baseline Scenario and Baseline Plus Project Scenario are greater than 10%.

In the absence of human health-based sediment guidelines, Health Canada (2017b) states sediment concentrations may be screened against available human health-based residential/parkland soil quality guidelines. Therefore, Baseline Plus Project Scenario sediment EPCs were compared to federal CSQG (CCME, 1999) or provincial human health-based guidelines (i.e., direct contact component, or S1) from the MECP (2011a), where appropriate (Table E-3, Appendix E). Baseline Plus Project Scenario sediment EPCs were less than the federal and provincial human health-based guidelines, with the exception of vanadium. The vanadium EPCs in sediment at TMF Seepage and Runoff Collection Ponds (47 mg/kg) and Collection Pond 2 (46 mg/kg) are greater than the provincial direct contact component value.

As outlined by Health Canada (2023a), when human health pathway-specific guidelines are not available for an environmental medium and concentrations are greater than background concentrations, parameters should be evaluated quantitatively. Since the Baseline Plus Project Scenario metal EPCs in country food are greater than Baseline Scenario metals concentrations (e.g., see Section 6), the following metals were identified as CoPCs for quantitative evaluation:

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium (Total)
- Cobalt
- Copper
- Lead
- Manganese
- Molybdenum
- Nickel
- Selenium
- Silver
- Thallium
- Uranium
- Vanadium
- Zinc

Project-related discharges are not expected to result in increased concentrations of mercury in the aquatic environment. As a result, mercury was not carried forward for quantitative assessment. However, the North Driftwood River Channel realignment may result in methylation of mercury in inundated soil (Section 6.12). As a result, additional consideration of methyl mercury in fish is provided in Section 7.4.2.2.

Insufficient data are available to support quantitative assessment of tungsten due to limited toxicological and bioaccumulation information. Tungsten is discussed qualitatively in Section 7.4.2.2 and considered in the uncertainty analysis.

Flying Post First Nation and Matachewan First Nation expressed concern about the use of pesticides and herbicide in areas where meat is harvested, citing links to cancer and bioaccumulation within the food chain. If pesticides are used, they must be applied by qualified applicators who adhere to the label instructions approved by Pesticide Management Regulatory Agency. As a result, pesticides are not included as CoPC during the construction, operations and closure stages.

7.1.2 Identification of Human Receptors

As described in Section 4, the RSA consists of patented lands (privately owned), Crown land, provincial parks, conservation reserves and First Nation Reserves and encompasses the City of Timmins, Town of Cochrane, Town of Iroquois Falls, and Town of Smooth Rock Falls. The land within and immediately surrounding the PA is predominantly made up of wetlands, forested areas, and to a lesser extent, lakes, rivers and ponds. Activities conducted around the PA include hunting, trapping, fishing, and gathering, seasonal living and recreational water use (e.g., canoeing). Based on the above, two types of representative human receptors were identified to be present within the LSA/RSA.

- **Indigenous Receptors** – Includes Indigenous people who may live within the LSA seasonally or make use of the lands within the LSA/RSA for the harvesting of country foods, or who use the areas for recreational, ceremonial and/or spiritual purposes. This receptor was assumed to be an infant, toddler, child, teen, or adult.
- **Recreational Receptors** – Includes non-Indigenous people who may live within the LSA seasonally, or make use of the lands within the LSA/RSA for harvesting country foods and/or recreational activities. This receptor was assumed to be an infant, toddler, child, teen, or adult.

Some populations may be more sensitive to exposures compared to most people. These populations include, but are not limited to, pregnant people, toddlers (due to their higher intake rates relative to their body weight), elderly, Indigenous people (harvest and consume higher levels of traditional foods than non-Indigenous members of the population) and people with respiratory diseases.

Occupational exposures of workers for the project are not assessed within the HHRA. Instead, worker health and safety is addressed through compliance with applicable provincial and federal legislation. Non-work-related exposures of these persons, which would occur outside the modelled area during non-work hours, would be the same as the other human receptors already identified.

7.1.3 Identification of Exposure Pathways

Exposure pathways are used to describe how a substance can move from media (e.g., soil) to a point where it can enter the body. Only those pathways for which there is a reasonable potential for exposure were considered quantitatively in the HHRA (i.e., a complete exposure pathway). A discussion of the complete and incomplete exposure pathways, by media, relevant for the Project is provided below and summarized in Table 7.2.

7.1.3.1 Air

CoPCs will be released to the air from Project-related activities and the receptors could inhale these CoPCs, either as vapours or as suspended particulates. Therefore, the inhalation of CoPCs from air emissions is a complete exposure pathway and was evaluated further in the HHRA. When evaluating this exposure pathway, both short-term and long-term exposures were considered.

7.1.3.2 Soil

Dust dispersion and deposition from Project-related activities could affect soil quality. Indigenous and Recreational Receptors could come in direct contact with CoPCs in soil through incidental ingestion, dermal contact and inhalation of suspended particulates outside of the PA. Therefore, these pathways are complete and were evaluated further in the HHRA.

Given that the Project-related CoPCs for multimedia are metals, and metals are not volatile, inhalation of vapours migrating from soil into air (outdoor or indoor) outside of the PA is an incomplete exposure pathway and was not evaluated further in the HHRA.

7.1.3.3 Groundwater

As outlined in the Chapter 14 of the Impact Statement (Assessment of Potential Effects on Groundwater), seepage from Project infrastructure has the potential to affect groundwater quality. However, there are no known groundwater users within the seepage pathways of the Impoundment Facility or East and West Stockpiles. Although there is a drilled well for water supply located within the seepage pathway of the TMF, it is not expected to be affected. This is based on estimated travel time from the TMF to the drilled well, the rehabilitation of the TMF with a vegetative cover by Year 30, and the anticipated drainage of tailings within the TMF, resulting in less seepage from the facility. Therefore, potable groundwater-related pathways (i.e., drinking, cooking, bathing/showering) were not evaluated further in the HHRA.

Given that the Project-related CoPCs for multimedia are metals, and metals are not volatile, inhalation of vapours migrating from groundwater into air (outdoor or indoor) outside of the PA is an incomplete exposure pathway and was not evaluated further in the HHRA.

7.1.3.4 Surface Water

As outlined in the Chapter 15 of the Impact Statement (Assessment of Potential Effects on Surface Water), the Mattagami First Nation indicated surface water could be used as a drinking water source and the six Indigenous nations listed in Section 4.2 have expressed concern regarding changes in drinking water quality. In addition, Indigenous and Recreational Receptors may consume water while in the LSA engaging in activities, but these consumptions rates would be much less than a potable water supply. Further, Indigenous and Recreational Receptors could occasionally come into contact with surface water through incidental ingestion/dermal contact during recreational activities such as boating and fishing. As discussed in Section 7.1.1.2, modelled concentrations (i.e., Baseline Plus Project Scenario) were below the GCDWQ, which suggests ingestion of surface water is not of concern; however, ingestion is being considered as part of the multimedia assessment. Dermal exposures are considered negligible relative to ingestion, especially given that modelled concentrations are below the GCDWQ; therefore, only ingestion related pathways were evaluated further in the multimedia assessment.

7.1.3.5 Sediment

According to Health Canada (2017b), direct contact with sediment can occur via incidental ingestion of sediments that are submerged under water or are periodically exposed (e.g., wetlands) (also referred to as bedded sediments), dermal absorption when sediments adhere to skin, incidental ingestion of suspended sediment in surface water and inhalation of airborne particulates when sediment dry out periodically. People are not expected to come in direct contact with sediment via incidental ingestion of bedded sediments or dermal absorption given that these types of exposures are for on-land activities which are not anticipated as outlined in Section 4. In addition, inhalation of airborne sediments is not expected to occur since sediments in the watersheds are not expected to dry out. Lastly, incidental ingestion of suspended sediment in surface water is accounted for when evaluating surface water as a potable water source (Health Canada, 2017b). Based on the above, sediment exposure pathways were not evaluated further in the HHRA.

7.1.3.6 Country Foods

People are known to hunt, trap, fish and gather within the LSA/RSA. Project-related activities could lead to higher concentrations of CoPCs in plants, wild meat and fish as outlined below.

- Deposition of dust and metals onto soils and vegetation, and subsequent accumulation in vegetation could occur as a result of Project-related activities. In addition, an increase in surface water concentrations and subsequent uptake by aquatic vegetation could occur. Since Indigenous and Recreational Receptors could consume wild vegetation (terrestrial and aquatic), the consumption of traditional food is a complete pathway and was evaluated in the HHRA. As discussed in Section 4 and Section 6.1, buildings within the LSA/RSA are seasonal camps/cottages. Given that these locations are used recreationally and are not permanent residences (i.e., homes that are lived in year round), garden produce isn't expected to be grown at these locations. Therefore, consumption of garden produce is an incomplete pathway and was not evaluated further in the HHRA.
- Similarly, changes in surface water quality due to Project-related activities could result in higher concentrations of CoPCs in fish tissues. Indigenous and Recreational Receptors could consume local fish. Therefore, the consumption of fish is a complete exposure pathway and was evaluated further in the HHRA.
- Concentrations of CoPCs in the tissues of wild animals could be higher because of changes in soil, surface water, fish and vegetation concentrations due to Project-related activities. Since Indigenous and Recreational Receptors could consume wild meat, consumption of wild meat is a complete exposure pathway and was evaluated in the HHRA.

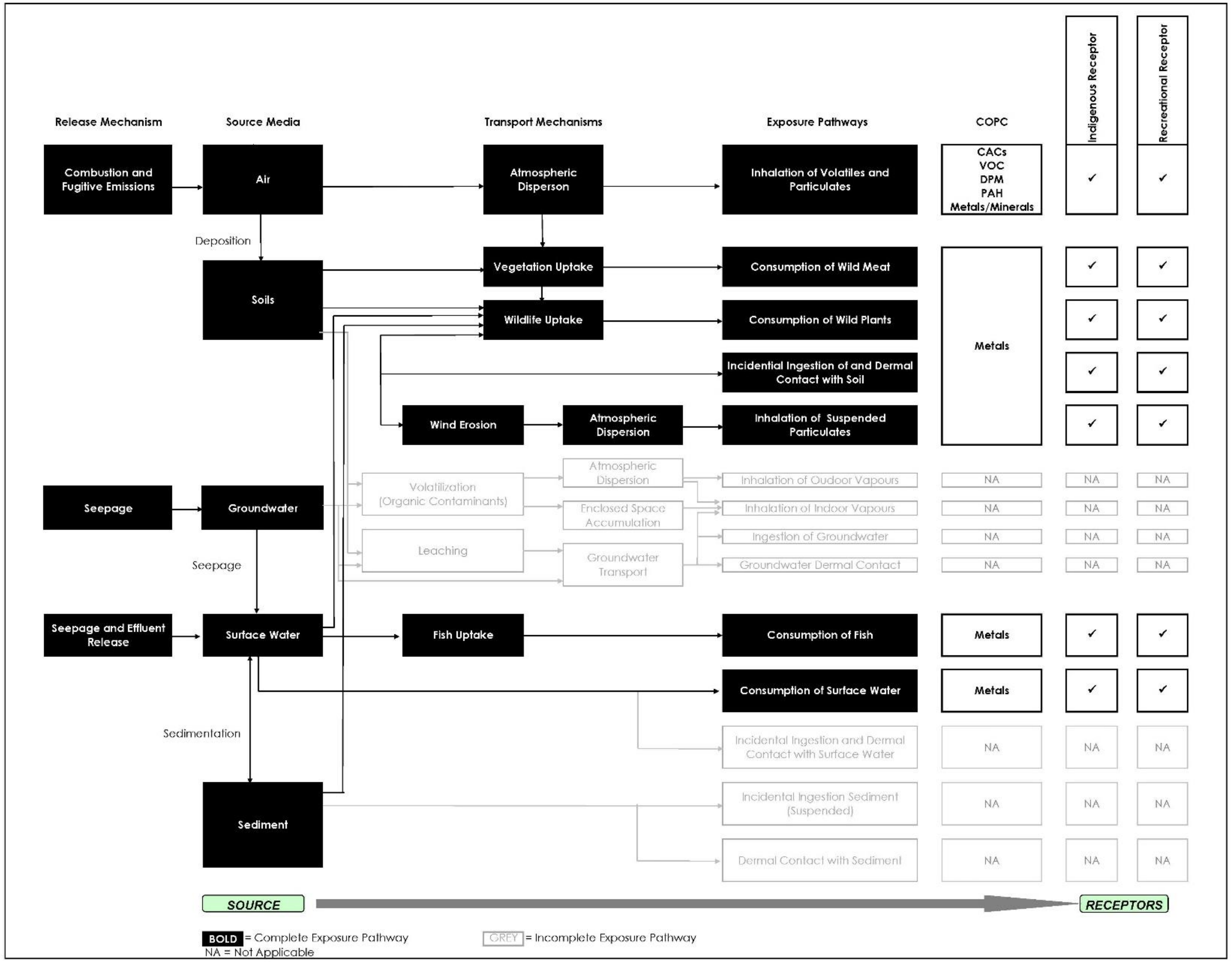
Table 7.2 Summary of Exposure Pathways in the HHRA

Exposure Pathway	Receptor	Assessed Further in the HHRA
Inhalation of CoPCs from air emissions (short-term and long-term)	Indigenous Receptor	Yes
	Recreational Receptor	
Incidental ingestion of and dermal contact with soil and inhalation of suspended particulates	Indigenous Receptor	Yes
	Recreational Receptor	
Surface water ingestion	Indigenous Receptor	Yes
	Recreational Receptor	
Recreational water use (incidental ingestion and dermal contact)	Indigenous Receptor	No
	Recreational Receptor	
Ingestion of and dermal contact with groundwater	Indigenous Receptor	No
	Recreational Receptor	
Incidental ingestion of sediment (suspended)	Indigenous Receptor	No
	Recreational Receptor	
Dermal contact with sediment	Indigenous Receptor	No
	Recreational Receptor	
Inhalation of vapours migrating from soil or groundwater into air	Indigenous Receptor	No
	Recreational Receptor	
Consumption of wild vegetation	Indigenous Receptor	Yes
	Recreational Receptor	
Consumption of garden produce	Indigenous Receptor	No
	Recreational Receptor	
Consumption of fish	Indigenous Receptor	Yes
	Recreational Receptor	
Consumption of wild meat	Indigenous Receptor	Yes
	Recreational Receptor	

7.1.4 Conceptual Site Model

An important step in the problem formulation is the development of the CSM. The CSM is a visual representation of CoPCs, the associated source and release mechanisms, and potential exposure pathways to the identified human receptors. The human health CSM is presented in Figure 7.1.

Figure 7.1 Conceptual Site Model for Human Health Risk Assessment



7.2 Toxicity Assessment

The toxic potency of a chemical is dependent on the inherent properties of the chemical itself (its ability to cause a biochemical or physiological response at the site of action within the receptor's body) as well as the ability of the chemical to reach the site of action. The toxicity assessment (also known as a hazard assessment) involves the selection of toxicological reference values (TRVs), also referred to as exposure limits, for each CoPC. The TRVs are estimates of the maximum exposure dose (from oral exposure) or exposure concentration (from inhalation exposure) to which people (including members of sensitive subgroups such as pregnant women, infants, children, the elderly) could be exposed without an appreciable risk of adverse effects.

When establishing TRVs for a CoPC, the type of dose-response relationship leading to a possible effect needs to be considered as well as the duration of exposure. Effects are typically classified as threshold or non-threshold based on a chemical's mode of action (Health Canada, 2021a).

7.2.1 Threshold Effects

A threshold effect is one where a certain dose must be exceeded for toxicity to occur. A no observable adverse effect level (NOAEL) can be identified for threshold contaminants, which is the dose or amount of the contaminant that results in no obvious response. When developing a TRV for a CoPC with threshold effects, uncertainty factors are applied to the NOAEL to provide an added level of protection. This results in the derivation of a TRV that is lower than the NOAEL, and thus reasonably expected to be protective of the general public (including health-sensitive members of the population such as children, seniors, and people with existing health conditions) following exposure for a prescribed period of time. The TRVs for threshold contaminants in air are typically provided in terms of an acceptable concentration such as a tolerable concentration (TC), which refers to the acceptable concentration of an airborne chemical for which the primary route of exposure is inhalation, and tolerable daily intake (TDI), which refers to the acceptable dose of a chemical and is most commonly expressed in terms of the total intake of the chemical per unit of body weight per day (mg/kg bw-day).

7.2.2 Non-Threshold Effects

A non-threshold effect occurs when there is no specific dose below which a toxic effect does not occur. This implies that any level of exposure to a non-threshold CoPC carries some degree of risk of effect. Consequently, there is no NOAEL for chemicals with non-threshold effects. The dose-response relationship for non-threshold CoPCs is typically conceptualized as linear. At low doses, the adverse health effect may need to be mathematically extrapolated from higher dose data or larger population studies. Non-threshold effects are further categorized into carcinogenic and non-carcinogenic effects.

7.2.2.1 Carcinogens

Regulatory agencies such as Health Canada and the US EPA assume that any level of long-term exposure to carcinogens is associated with some "hypothetical cancer risk". Generic nomenclature for TRV for carcinogens includes inhalation unit risk (IUR), defined as the upper-bound excess lifetime cancer risk estimated to result from continuous inhalation exposure to an agent at a unit concentration of 1 $\mu g/m^3$ (US EPA 1989a), and slope factor (SF), which is generally defined as the upper-bound increased cancer risk from a lifetime exposure to a dose of 1 mg/kg bw-day.

7.2.2.2 Non-carcinogens

In theory, any level of exposure to a non-threshold non-carcinogen carries some degree of risk for an effect. At very low doses, the toxic effect may be at the cellular level without an observable adverse health effect. As the dose increases, the severity of the adverse health effects can also increase, and additional health effects can appear. For these CoPC, TRVs may not be available. In such cases, exposures may be benchmarked against exposure limits or air quality guidelines that are designed to protect public health.

7.2.3 Acute and Chronic Toxicity Reference Levels

The toxicity of a chemical varies with the duration of exposure. Thus, it is important to differentiate TRVs based on where the exposure duration is acute (short-term) or chronic (long-term), as described below:

- Acute: The amount or dose of a chemical that can be tolerated without evidence of adverse health outcomes on a short-term basis. As described in Health Canada (2010a), an acute exposure periods is anything less than 14 days and often involves a single high-intensity exposure.

- Chronic: The amount of a chemical that is expected to be without health outcomes, even when exposure occurs continuously or regularly over extended periods (greater than 90 days per Health Canada (2010a).

7.2.4 Identification of Applicable Exposure Limits and Toxicological Reference Values

A number of sources were consulted in the selection of exposure limits and TRVs for assessing inhalation and oral exposures to CoPC. The primary sources that were consulted, based on recommendations in Health Canada (2023a), are listed below.

- Health Canada
- US EPA Integrated Risk Information System (IRIS)
- World Health Organization (WHO)
- National Institute for Public Health and the Environment (Netherlands)
- Agency for Toxic Substances and Disease Registry (ATSDR)

- California Environmental Protection Agency (CalEPA), which includes the California Office of Environmental Health Hazard Assessment (OEHHA)

If no TRVs were available from the above sources, additional sources were considered (e.g., Ontario Ministry of Conservation and Parks (MECP) and peer-reviewed literature).

Per Health Canada (2023a) guidance, priority was given to Health Canada TRVs, and these were employed where available. Where TRVs were selected from a source other than Health Canada, additional information is provided below to support that selection.

The exposure limits and TRVs presented in this section are grouped based on effect type (i.e., threshold and non-threshold). Some chemicals can exhibit both threshold and non-threshold effects (Health Canada, 2021a), and may therefore have multiple TRVs listed here. In instances where both threshold and non-threshold TRVs are applicable, health risks from exposure will be evaluated for both modes of action.

7.2.4.1 Inhalation Exposure Limits and TRVs

According to Health Canada (2023b), modelled concentrations of CoPCs in air should be evaluated against relevant air quality standards. This was done in the Air Quality Assessment (Appendix C.1 of the Impact Statement) and reported in Chapter 12 of the Impact Statement. However, the standards used (e.g., Ontario Ambient Air Quality Criteria (AAQC), and the federal Canadian Ambient Air Quality Standards) are often based on statistical representations of existing airshed data and not necessarily health based. This section describes the exposure limits and TRVs (TCs and IURs) that were relied on to evaluate risk associated with modelled concentrations of CoPCs in air. In addition, for carcinogenic parameters with identified IURs, risk specific concentrations (RSCs) that would correspond to an incremental lifetime cancer risk (ILCR) of one in one hundred thousand (1 x 10^{-5}) assuming exposure to this concentration over an entire lifetime (80 years) were calculated according to Equation 7-1, below.

$$\boldsymbol{RSC}(\mu \boldsymbol{g}/\boldsymbol{m^3}) = \frac{\mathbf{1} \times \mathbf{10^{-5}}}{\boldsymbol{IUR}\ (\mu \boldsymbol{g}/\boldsymbol{m^3})^{-\mathbf{1}}}$$

Equation 7-1

As discussed further in Section 7.4, Health Canada (2021a) considers an ILCR of less than 1 x 10^{-5} to be essentially negligible. As such, the RSCs represent concentrations that would result in negligible increases to a person's lifetime cancer risk even when exposed to that concentration constantly over an 80-year lifetime. Where concentrations higher than the RSC are observed during a Project phase, additional risk characterization may be considered to account for less than lifetime exposure during that Project phase, as discussed further in Section 7.4.

7.2.4.1.1 Criteria Air Contaminants

The criteria air contaminants PM_{10}, $PM_{2.5}$, NO_2, and SO_2 are non-threshold contaminants, for which it is acknowledged that any increase in exposure to these contaminants may result in adverse health effects. However, the severity of effects increases incrementally with exposure concentration and exposure duration. The absence of clearly defined TRVs for these parameters presents a technical challenge for health regulatory agencies and health risk practitioners on how to assess the incremental increase in health risk resulting from modelled or measured exposure concentrations.

In the absence of standard TRVs such as a TC or IUR for these parameters, inhalation exposure limits (ELs) have been identified based on reviews of the data characterizing the potential health effects from exposure to varying levels of these parameters in ambient air as summarized by Health Canada and WHO.

In most cases, WHO ambient air quality guidelines (WHO, 2021) have been adopted as exposure limits for these parameters. These limits are defined by the WHO as, "The lowest exposure level of an air pollutant above which the guideline development group is confident that there is an increase in adverse health effects," and that, "It is assumed that adverse health effects do not occur or are minimal below this concentration level." The WHO air quality guideline is essentially the lowest level of exposure for which there is evidence of adverse health effects (WHO, 2021). In addition to the WHO ambient air quality guidelines, an acute (10 minute) exposure limit for SO_2 is provided based on a review of toxicological data provided by Health Canada (2016c). This 10-minute exposure limit is based on controlled human exposure studies, which showed a lowest observed adverse effect concentration of 1,050 µg/m^3, with an uncertainty factor of 6 (i.e., 1,050 µg/m^3 divided by 6 equals 175 µg/m^3). This 10-minute SO_2 reference concentration is expected to be protective of respiratory effects in humans, including sensitive populations like people with asthma. For SO_2, Health Canada (2016c) concluded that there is inadequate evidence to infer a causal relationship between long-term SO_2 exposure and cardiovascular effects, reproductive and development effects, total mortality, or cancer. As such, evaluation of the effects of chronic exposure to SO_2 has not been conducted in this HHRA.

7.2.4.1.2 Volatile Organic Compounds

VOCs are organic compounds with a high vapour pressure at ambient temperatures that allow these substances to volatilize or evaporate into the air relatively quickly. Fuel-based VOCs associated with Project-related activities include 1,3-butadiene, acetaldehyde, benzene, formaldehyde, toluene and total hydrocarbons.

1,3-Butadiene

1,3-Butadiene is a flammable, colourless gas with a mild aromatic odour. It is ubiquitous in the environment and is produced from the combustion of organic matter. Emission sources include chemical products industries such as plastics, refined petroleum and coal, automobile exhaust (gasoline- and diesel- motor vehicles) and cigarette smoke. In air, 1,3-butadiene is rapidly degraded by photochemical reactions to form acrolein and formaldehyde (US EPA, 2002b).

There is a paucity of data on acute human exposure to butadiene. The OEHHA (2013) developed an acute (1-hour) exposure limit of 660 µg/m^3 for 1,3-butadiene based on an inhalation study using pregnant mice and offspring, as it addressed the most sensitive non-cancer endpoint associated with butadiene – developmental effects (lowered male fetal weight). As no acute toxicity-based criterion for 1,3-butadiene has been established by regulatory agencies in Canada, nor by the US EPA, the OEHHA value was selected for this HHRA.

The US EPA (2002b) established a chronic inhalation TRV of 2.0 µg/m^3 for 1,3-butadiene, derived on a human equivalent benchmark response of 1,980 µg/m^3 from a two-year mouse inhalation study (National Toxicology Program (NTP), 1993) and an uncertainty factor of 1,000 (3 for interspecies variation, 10 for intraspecies variability, 10 for extrapolation to a level below the 10% effect level, and an additional 3-fold for an incomplete database). The critical effect was ovarian atrophy. This value was selected as the chronic (annual) ambient air exposure limit by both the Ontario MOECC (2016) and the OEHHA (2013) and was considered appropriate to evaluate long-term non-carcinogenic exposure risks to 1,3-butadiene within the current assessment.

Health Canada (2024) derived an inhalation unit risk of 5.9 x 10^{-6} (µg/m^3)$^{-1}$, which equates to a risk-specific concentration of 1.7 µg/m^3 at the 1 in 100,000 risk level. This value was derived from a retrospective cohort study (Delzell, Sathiakumar, & Macaluso, 1995) of more than 15,000 male styrene-butadiene rubber production workers to provide high-quality epidemiologic data on leukemia risk from 1,3-butadiene exposure. The IUR from Health Canada (2024) and resulting RSC calculated to be equivalent to an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (1 x 10^{-5}) were considered appropriate to evaluate long-term carcinogenic exposure risks to 1,3-butadiene within the current assessment.

Acetaldehyde

Health Canada (2017a) has developed residential indoor air quality guidelines for acetaldehyde. The short-term exposure limit is derived from the results of a controlled human exposure study by Prieto et al. (2000) that investigated bronchoconstriction response in asthmatic human volunteers. Health Canada (2017a) identified 142 mg/m^3 as the point of departure in this study as it represented the lower 95% confidence level of the concentration required to produce a 20% fall in forced expiratory volume in one-second geometric mean for asthmatic subjects following a 2-minute exposure to acetaldehyde. An uncertainty factor of 100 was then applied to account for use of a LOAEL and to account for sensitive receptors (e.g., more severe asthmatics and children). This resulted in a final short-term residential indoor air quality guideline for acetaldehyde of 1,420 µg/m^3, which is recommended to be compared to a one-hour air sample. As such, this value was considered appropriate to evaluate acute non-carcinogenic exposure risks to acetaldehyde within the current assessment.

With respect to long-term exposure, Health Canada (2017a) reviewed the available toxicological data for acetaldehyde and concluded that acetaldehyde is carcinogenic, but that it exerts its carcinogenic effect through a non-linear mode of action and that non-cancer effects are precursors to a carcinogenic effect. Therefore, Health Canada (2017a) developed a long-term exposure limit based on a non-cancer endpoint that is considered protective of carcinogenic effects. Specifically, the long-term exposure limit developed by Health Canada (2017a) is based on a study by Dorman et al. (2008), who observed a NOAEL of

89 mg/m^3 based on degeneration of the olfactory epithelium in rats. This was converted to a human equivalent concentration of 120 mg/m^3 using a physiologically-based pharmacokinetic model, which was then adjusted for continuous exposure, resulting in an adjusted human equivalent concentration of 21 mg/m3. Health Canada (2017a) then applied an uncertainty factor of 75 to account for the use of animal rather than human toxicity data, additional sensitivity in the human population, and uncertainty in the shape of the lower region of the concentration-response curve, resulting in a final long-term residential indoor air quality guideline for acetaldehyde of 280 µg/m^3, which is recommended to be compared to a sample collected over at least 24-hours. As such, this value was considered appropriate to evaluate chronic non-carcinogenic and carcinogenic exposure risks to acetaldehyde within the current assessment.

Benzene

Benzene is a colourless liquid with a high vapour pressure and a sweet odour at room temperature, which is produced by natural (e.g., volcanoes and forest fires) and anthropogenic activities (ATSDR, 2007). Incomplete combustion of gasoline, coal, oil and other petroleum- based fuels are the most significant sources of benzene released into the environment (ATSDR, 2007). Inhalation is the general public's primary route of exposure to benzene (ATSDR, 2007). Acute exposure to benzene may cause dizziness, headaches, and drowsiness while chronic inhalation exposure to benzene affects the bone marrow, and the immune and central nervous systems (ATSDR, 2007).

In both human and animal non-carcinogenic studies, data suggest the most sensitive endpoint for short-term inhalation exposure to benzene is hematotoxicity (ATSDR, 2007; TCEQ, 2015). A lowest-observed-adverse-effect-level of approximately 10 ppm for hematotoxic effects of benzene in mice was indicated in a key study by Rozen et al. (1985), which was selected as the key study by both the TCEQ (2015) in their derivation of an acute exposure limit (1 hour) of 580 µg/m^3, and by ATSDR (2007) in their derivation of an acute (1 to 14 day) exposure limit of 30 µg/m^3 (0.009 ppmv), both of which were used in this HHRA.

Health Canada (2021b) provides an IUR for benzene of 1.6 x 10^{-5} (µg/m^3)$^{-1}$, which corresponds to a risk-specific concentration of 0.6 µg/m^3 at a 1 in 100,000 (1 x 10^{-5}) risk level. This value was derived based on the incidence of leukemia observed in human occupational studies (Rinsky, et al., 1987; Paxton, Chinchilli, Brett,, & Rodricks, 1994; Hayes, et al., 1997). The IUR from Health Canada (2021b) and resulting RSC were considered appropriate to evaluate long-term carcinogenic exposure risks to benzene within the current assessment.

Formaldehyde

Health Canada (2006a) established a 1-hour exposure limit for formaldehyde of 123 µg/m^3 and an 8-hour exposure limit of 50 µg/m^3. The 1-hour exposure limit recommended by Health Canada represents one fifth of the NOAEL for eye irritation in a human clinical study by Kulle (1993). The 8-hour exposure limit is the lower end of the exposure category associated with no significant increase of asthma hospitalization (Rumchev, Spickett, Bulsara, Phillips, & Stick, 2002).

More recently, the TCEQ (2008) developed an acute (1-hour) exposure limit of 50 $\mu g/m^3$ for formaldehyde based on key inhalation studies on human volunteers by Pazdrak et al. (1993) and Krakowiak et al. (1998). The critical health effect in these studies was eye and nose irritation. The TCEQ (2008) 1-hour exposure limit was selected as the acute exposure limit in this HHRA and is considered protective of the eye irritation and asthma effects identified by Health Canada (2006a).

To derive a chronic exposure limit protective of non-carcinogenic health effects, the TCEQ (2008) relied on a key study by Wilhelmsson and Holmstrom (1992), who identified the specific critical effects of formaldehyde exposure in the key study as increased rates of symptoms such as eye, nasal, and lower airway discomfort (e.g., cough, wheezing) in a study of exposed workers. The TCEQ derived a chronic exposure limit of 11 $\mu g/m^3$, which is considered appropriate to assess the potential threshold effects of chronic exposure to formaldehyde.

With respect to carcinogenic effects, Health Canada (2006a) noted that carcinogenicity studies have reported an increased incidence of nasal cavity carcinomas at exposure levels greater than or equal to 6.7 mg/m^3 (6700 $\mu g/m^3$) but that no such tumours were observed at lower concentrations of up to 2.4 mg/m^3 (2400 $\mu g/m^3$) and therefore concluded that exposure limits protective of irritation and inflammatory responses will also be protective of potential carcinogenic effects. Therefore, the TCEQ (2008) chronic exposure limit of 11 $\mu g/m^3$ described above is considered protective of both non-carcinogenic and carcinogenic effects.

7.2.4.1.3 Diesel Particulate Matter

Diesel exhaust is a complex mixture of hundreds of chemicals including airborne particles and gases from the combustion products of diesel fuel (Health Canada, 2016b). The exact composition of the mixture is variable, and depends on the nature of the engine, operating conditions, fuel composition, emission control system, and additives (NTP, 2021).

Many of the individual components of diesel exhaust have been modelled individually and will be evaluated based on comparison to individual TRVs (e.g., NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, VOCs, and PAHs). The risk characterization presented in Section 7.4 of this HHRA for each of these individual components of diesel exhaust provides a partial evaluation of potential risks associated with exposure to diesel exhaust (i.e., assessing toxicity of diesel exhaust via the toxicity of some of its components). However, a human health risk assessment for diesel exhaust that was completed by Health Canada in 2016 (Health Canada, 2016b) concluded that “the component or components of diesel exhaust that are the most relevant toxicologically…have not yet been identified” and that “[t]he most appropriate metric for diesel exhaust exposure remains unknown.” Thus, an evaluation of the toxicity of diesel exhaust as a mixture, and DPM as a surrogate, is provided below.

Health Canada reviewed a number of studies on the health effects of exposure to diesel exhaust and diesel exhaust particles (synonymous with DPM for the purpose of this HHRA) ranging from rural farm, urban city, and occupational exposures (Health Canada, 2016b). Inhalation of diesel exhaust may result in a variety of health effects, in part due to the mixture of chemical hazards, where each chemical hazard may have different types of health effects and at different concentrations. Sensitive groups of people generally include children, asthmatics, and people with chronic obstructive pulmonary disease.

Acute inhalation of diesel exhaust shows a causal relationship with respiratory effects, and a likely relationship with cardiovascular and immunological effects. There is some evidence to suggest a relationship between exposure to diesel exhaust and reproductive, developmental, and central nervous system effects. However, long-term relationships are more difficult to distinguish due to the co-exposure to other airborne hazards in the air.

For non-cancer health effects, Health Canada (2016b) chose DPM as the basis for development of acute and chronic exposure guidance values as:

- toxicological studies have demonstrated DPM to be the main causative agent of many of the health effects associated with diesel exhaust exposure
- removal of the particulate component of diesel exhaust resulted in fewer or less severe health effects
- the DPM component of exhaust contains compounds known to be hazardous to human health, and DPM contributes to ambient PM, which is also known to be harmful to human health
- DPM is typically the parameter used to set experimental exposure levels

Health Canada (2016b) reviewed controlled human exposure studies to determine the critical effect associated with short-term exposure to diesel exhaust, and concluded that respiratory endpoints are the most sensitive, with effects demonstrated at lower concentrations than for other types of endpoints (such as cardiovascular health). Based on multiple studies conducted with healthy and/or mildly asthmatic participants, increased measures of airway resistance and/or respiratory inflammation were observed at 100 µg/m^3 diesel exhaust particulate for a 2-hour exposure period (Behndig, et al., 2006; Riedl, et al., 2012; Mudway, et al., 2004; Behndig, et al., 2011; Stenfors, et al., 2004). Based on this lowest-observed adverse effect level of 100 µg/m^3, Health Canada (2016b) derived a short-term exposure (2-hour) guidance value for diesel exhaust particulate of 10 µg/m^3. This Health Canada value was used as the TRV for non-carcinogenic effects due to short-term exposures in this HHRA.

For chronic exposure to diesel exhaust, a consistent exposure–response relationship for respiratory effects were observed in studies with animal test species, and epidemiological studies also indicate that respiratory health effects are associated with human exposures (Health Canada, 2016b). Health Canada (2016b) derived a chronic exposure limit using the NOAEL of 0.46 mg/m^3 diesel exhaust particulate from the inhalation study on rats by Ishinishi et al. (1986) by performing dosimetric modelling to derive a human equivalent concentration of 0.12 mg/m^3 diesel exhaust particulate. Based on the human equivalent concentration of 0.12 mg/m^3 diesel exhaust particulate and applying a composite uncertainty factor of 25, Health Canada derived a chronic exposure guidance value of 5 µg/m^3 diesel exhaust particulate. This value is consistent with values previously developed by the World Health Organization, the US EPA and the California EPA, and was used as the TRV for non-carcinogenic effects due to chronic exposure to DPM in this HHRA.

In addition to the non-cancer health effects described above, the International Agency for Research on Cancer (IARC) has classified diesel exhaust as a Group 1 human carcinogen. The Group 1 classification indicates that there is sufficient evidence to conclude carcinogenicity in humans. Specifically, diesel exhaust has exhibited a causal relationship with lung cancer, and a suggested relationship with bladder cancer (Health Canada, 2016b; IARC, 2014). However, within their 2016 human health risk assessment for diesel exhaust, Health Canada (2016b) did not evaluate studies for use in a quantitative exposure–response analysis of lung cancer risk with diesel exhaust particulate.

Rather, Health Canada (2022a) provided a quantitative estimate of the risk of lung cancer associated with exposure to $PM_{2.5}$ in Canada that may be used to provide an estimate of the additional lung cancer mortality (ALCM) from DPM according to the following equation:

$$ALCM = \left[(e^{\beta \cdot Exposure)} - 1) \Big/ e^{\beta \cdot Expsoure} \right] \cdot Baseline\ rate\ \cdot years$$

Equation 7-2

where,

β	=	0.01196 (the slope coefficient for the relationship between the pooled hazard ratio for lung cancer mortality in the Canadian population (1.127 (95% CI: 1.085, 1.170)) per 10 µg/m^3 increase in long-term exposure to ambient $PM_{2.5}$ (Health Canada, 2022a)
Exposure	=	the predicted Project-related annual DPM concentration for each year of Project Construction and Operation
Baseline rate	=	45.5 per 100,000 (the 2021 Canadian age standardized mortality rate for lung cancer) (Health Canada, 2022a)
Years	=	Number of years evaluated

7.2.4.1.4 Polycyclic Aromatic Hydrocarbons

Polycyclic aromatic hydrocarbons (PAHs) are a class of organic compounds containing only carbon and hydrogen, where the carbon atoms form multiple aromatic rings. These compounds are ubiquitous in the environment and are formed by incomplete combustion of organic matter. Natural processes that produce PAHs include volcanic activity, forest fires, and lightning strikes. Additionally, PAHs are found naturally in fossil fuels such as oil and coal. Human activities including the combustion of fossil fuels, barbequing, flame cooking or smoking food, and tobacco smoking can also produce PAHs and release it into the air through the formation of smoke and soot. Among the PAHs, naphthalene is the predominant PAH found in gasoline and diesel exhaust (Marr, et al., 1999).Some PAHs are associated with non-carcinogenic effects (e.g., anthracene) and some are associated with carcinogenic effects (e.g., benzo(a)pyrene).

Threshold (Non-carcinogenic) Effects of PAHs

Non-carcinogenic PAHs potentially emitted by Project-related activities and modelled as individual compounds include: acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene and pyrene. Health Canada (2021b) has identified threshold (non-carcinogenic) effects associated with benzo(a)pyrene, which is also associated with carcinogenic effects. Toxicologically relevant exposure limits associated with inhalation exposure to individual PAHs are limited to naphthalene and benzo(a)pyrene.

Health Canada (2013) reviewed the literature related to the health effects associated with inhalation of naphthalene and concluded that naphthalene has been shown to cause tissue damage and cancer in the nasal passages and lungs of rats and mice exposed to high levels in laboratory studies. It is considered a possible carcinogen for humans, although there is not yet sufficient evidence to prove it causes cancer in humans (Health Canada, 2013). Importantly, Health Canada concluded that a short-term indoor air exposure limit is not necessary as prevention of initial cytotoxicity is considered likely to prevent tumour development and lesions on chronic exposure. Health Canada derived a chronic TRV of 10 µg/m^3 based on an adjusted lowest observed adverse effect level of 9.3 mg/m^3 from chronic inhalation study on rats by NTP (2000) and an uncertainty factor of 1000 (Health Canada, 2013; Health Canada, 2021b). The critical effect was respiratory tract toxicity. This chronic exposure limit was used in this HHRA.

The US EPA (2017) developed a chronic exposure limit for benzo(a)pyrene of 0.002 µg/m^3 for developmental toxicity. The key study was an inhalation study in rats exposed for four hours per day for 10 days during gestation that identified decreases in embryo/fetal survival as the critical effect (Archibong, et al., 2002). Health Canada (2021b) cited this TRV and it was used in this HHRA.

Although inhalation exposure limits and TRVs were not available for the other specific non-carcinogenic PAHs, a TRV representative of aromatic hydrocarbons ranging from C_9 to C_{16} (which would include PAHs such as acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene) was identified by the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG) (1997). The TPHCWG (1997) acknowledges that data for this group of compounds is limited; however, of the available information the TPHCWG (1997) selected an inhalation study using rats (Clark, Butterworth, Martin, Roderick, & Bird, 1989) as the key study to set a chronic RfC of 200 µg/m^3. This chronic RfC is based on a NOAEL of 900,000 µg/m^3 for increased liver and kidney weights in male rats.

This NOAEL was adjusted to account for continuous exposure (rats were only exposed for 6 hrs/d, 5d/week for 1 year) and applied a 1,000 fold uncertainty factor (including an uncertainty factor of 10 to account for sensitive subpopulations, a factor of 10 to account for animal to human extrapolation, and a factor of 10 to account for converting a subchronic exposure to a chronic exposure). The chronic reference concentration of 200 µg/m^3 developed by the TPHCWG (1997) was used as the chronic TRV in this HHRA.

Non-Threshold (Carcinogenic) PAHs

Although there is strong evidence of carcinogenicity for several PAH compounds, benzo(a)pyrene is the compound that has been most reliably studied for carcinogenicity. The IARC classifies benzo(a)pyrene as a Group 1 human carcinogen. The Group 1 classification indicates that there is sufficient evidence to conclude carcinogenicity in humans. Studies on the carcinogenic potential of other PAHs in humans is less certain, and many other PAHs that are suspected carcinogens, such as benz(a)anthracene, are classified as Group 2B human carcinogens. Group 2B carcinogens are those that are considered possible human carcinogens based on limited evidence in human studies, or inadequate evidence in human studies but strong evidence in animal studies.

The mechanism of carcinogenicity among PAHs is believed to be similar. However, the carcinogenic potential differs between PAHs. Health Canada (2021b) recommends assessing exposures to mixtures of carcinogenic PAHs according to the relative potency factors approach, also known as potency equivalency factor approach, in which carcinogenic PAHs are adjusted for their carcinogenic potency relative to benzo(a)pyrene (B(a)P). Concentrations of each compound are multiplied by their relative potency factors and summed to give a B(a)P total potency equivalents (TPE), which represents the carcinogenic potency of the entire mixture. The following relative potency factors were used in this HHRA:

- Benz(a)anthracene = 0.1
- Benzo(a)pyrene = 1.0
- Benzo(b)fluoranthene = 0.1
- Benzo(g,h,i)perylene = 0.01
- Benzo(k)fluoranthene = 0.1
- Chrysene = 0.01
- Dibenz(a,h)anthracene = 1.0
- Fluoranthene = 0.001
- Indeno (1,2,3-c,d)pyrene = 0.1
- Phenanthrene = 0.001

The final B(a)P TPE is then compared to the chronic carcinogenic exposure limit for B(a)P.

The US EPA (2017) developed a IUR for benzo(a)pyrene of 0.0006 (µg/m^3)$^{-1}$ based on a study by Thyssen et al. (1981). Thyssen et al. (1981) exposed groups of Syrian golden hamsters to benzo(a)pyrene in air. Exposure-related neoplasms were found in the nasal cavity, larynx, pharynx, esophagus, and forestomach. Health Canada (2021b) cited this IUR of 0.0006 (µg/m^3)$^{-1}$, which equates to a RSC of 0.017 µg/m^3 at a 1 in 100,000 (1 x 10^{-5}) risk level. Therefore, this IUR and resulting RSC were selected as the TRVs for B(a)P TPE.

7.2.4.1.5 Metals and Minerals

Arsenic, Beryllium, Cadmium, Chromium VI, Nickel

Arsenic, beryllium, cadmium, chromium VI, and nickel have been detected in geological samples from the PA. Consequently, these metals are anticipated to be present in dust (as particulate) generated by various Project activities. Health Canada (2021) has provided inhalation unit risks for arsenic, beryllium, cadmium, and chromium VI based on lung cancer and for nickel based on lung, nasal, kidney, prostate, and buccal cavity cancers. Health Canada (2021) also provided chronic non-cancer tolerable concentrations for beryllium (based on immunotoxicity and respiratory toxicity) and chromium VI (based on respiratory tract toxicity). These Health Canada (2021b) values were adopted as the TRVs for inhalation for these metals in this HHRA.

Chrysotile Asbestos

The term asbestos encompasses several types of naturally-occurring fibrous minerals, the most common of which is chrysotile asbestos. Asbestos may be found in rocks (e.g., ultramafic rock) and may be released when those rocks are broken or crushed. Asbestos may also be released to the environment due to natural weathering and erosion. Once it is released, asbestos may become suspended in air for long periods where it may subsequently be inhaled. Historically, methods for quantifying asbestos in air have included both mass-based methods that results in mass-based units (e.g., µg/m^3) and counting methods that result in fibre-based units (e.g., fibres/cm^3). The counting methods are considered more responsive, because samples with masses that are too low to be accurately weighed can still be amenable to counting (National Research Council (US), 1984). However, the methods used to count fibres may result in considerable variability. For example, counts made by phase contrast microscopy are limited to asbestos fibers longer than 5 µm and >0.4 µm in diameter and will produce lower values than counts made using electron microscope, which can detect much smaller fractions (US EPA, 2020). Therefore, when evaluating toxicity of asbestos based on fibre-based units, it is important to specify the applicable analytical technique. The TRVs for asbestos relied on in this HHRA are based on fiber counts made by phase contrast microscopy, in accordance with US EPA (2020).

In 2020, the US EPA released a risk evaluation for chrysotile asbestos, assessing its carcinogenicity based on five epidemiological study cohorts that analyzed lung cancer and mesothelioma (US EPA, 2020). The evaluation highlighted a long latency period for the onset of asbestos-related respiratory diseases. Consequently, the US EPA concluded that individuals exposed to asbestos earlier in life might be at a higher risk of developing respiratory problems than those exposed later. To address this, the EPA developed a worst-case inhalation unit risk (IUR) of 0.16 (fibres/cm^3)$^{-1}$ for a lifetime of exposure starting at birth. They also created a table of 'less than lifetime' IURs, showing decreased cancer risk with increased age at first exposure and/or reduced duration of exposure. For example, the IUR for someone exposed to chrysotile asbestos for 40 years starting at age two is 1.30 x 10^{-1} (fibres/ cm^3)$^{-1}$ while the IUR for someone exposed to chrysotile asbestos for 40 years starting at age 20 is reduced by more than half to 4.86 x 10^{-2} (fibres/ cm^3)$^{-1}$ (US EPA, 2020). For this HHRA, the worst-case IUR based on an assumed lifetime of exposure starting at age zero from US EPA (2020) of 0.16 (fibres/ cm^3)$^{-1}$ was adopted for initial risk characterization. This is equal to a risk specific concentration of 6.25×10^{-5} fibres/cm^3 at the 1 in 100,000 risk level for a lifetime of exposure.

Crystalline Silica (Quartz in PM_{10})

Crystalline silica is mineral commonly found in the earth's crust. Acute and chronic exposures of humans to crystalline silica via inhalation have been associated with various respiratory effects ranging from respiratory irritation, cough, and shortness of breath to chronic bronchitis, emphysema, silicosis and lung cancer (OEHHA, 2005). An acute (24-hour) reference exposure level for crystalline silica (including quartz, cristobalite, tripoli, and tridymite) was published by TCEQ in 2020 based on pulmonary inflammation and cytotoxicity (TCEQ, 2020). This value was considered appropriate for assessing risk to human health based on acute exposure to crystalline silica (quartz in PM_{10}) via inhalation in this HHRA. In 2005, OEHHA released a chronic toxicity summary for respirable crystalline silica that is applicable to silicon dioxide, quartz, tridymite, and cristobalite. In this summary, OEHHA (2005) derived a chronic inhalation reference exposure level of 3 µg/m^3 of respirable crystalline silica based on silicosis as the critical effect. Although crystalline silica has been classified as a Class 1 known human carcinogen, no IUR has been identified for this parameter (OEHHA, 2005). The correlation between exposure to crystalline silica and silicosis is better understood than the correlation between exposure to crystalline silica and lung cancer, and there is evidence that silicosis can be a precursor to lung cancer following crystalline silica exposure (Sato, Shimosato, & Klinman, 2018). Therefore, in the absence of an applicable IUR, the OEHHA reference exposure level was considered appropriate for assessing risk to human health based on chronic exposure to crystalline silica (quartz in PM_{10}) via inhalation in this HHRA.

7.2.4.1.6 Summary

The health-based inhalation exposure limits and TRVs applied in this HHRA are summarized in Table 7.3 and Table 7.4, respectively.

Table 7.3 Inhalation Exposure Limits for Criteria Air Contaminants

Chemical of Potential Concern	Exposure Period	Exposure Limit (µg/m³)	Critical Effect	Reference
Nitrogen Dioxide (NO_2)	Acute (1-hour)	200	Respiratory effects	(WHO, 2021)
	Acute (24-hour)	25[a]	Mortality and respiratory effects	(WHO, 2021)
	Chronic (Annual)	10	Mortality	(WHO, 2021)
Sulphur Dioxide (SO_2)	Acute (10-minute)	175	Respiratory effects	(Health Canada, 2016c)
	Acute (24-hour)	40[a]	Respiratory effects	(WHO, 2021)
Particulate Matter (Fine) ($PM_{2.5}$)	Acute (24-hour)	15[a]	Mortality	(WHO, 2021)
	Chronic (Annual)	5	Mortality	(WHO, 2021)
Particulate Matter (Coarse) (PM_{10})	Acute (24-hour)	45[a]	Mortality	(WHO, 2021)
	Chronic (Annual)	15	Mortality	(WHO, 2021)

Note:

a. 99th percentile of the annual distribution of 24-hour average concentrations (equivalent to 3-4 exceedance days per year)

Table 7.4 Inhalation Toxicological Reference Values

Chemical of Potential Concern	Exposure Period	Toxicological Reference Value: Non-Carcinogenic: Tolerable Concentration (TC) (µg/m³)	Toxicological Reference Value: Carcinogenic: Risk Specific Concentration (RSC) (µg/m³)	Toxicological Reference Value: Carcinogenic: Inhalation Unit Risk (IUR) (µg/m³)⁻¹	Critical Effect	Reference
Volatile Organic Compounds						
1,3-Butadiene	Acute (1-hour)	660 µg/m³	-	-	Developmental effects	OEHHA (2013)
	Chronic (Annual)	2 µg/m³	-	-	Ovarian atrophy	US EPA (2002b)
	Chronic (Annual)	-	1.7 µg/m³	5.9 x 10^{-6} (µg/m³)$^{-1}$	Leukemia	Health Canada (2024)
Acetaldehyde[a]	Acute (1-hour)	1420 µg/m³	-	-	Respiratory effects	Health Canada (2017a)
	Chronic (Annual)	280 µg/m³	-	-	Olfactory epithelial degeneration in the nasal cavity of rats	Health Canada (2017a)
Benzene	Acute (1-hour)	580 µg/m³	-	-	Blood toxicity (bone marrow depression)	TCEQ (2015)
	Acute (24-hour)	30 µg/m³	-	-	Blood toxicity (bone marrow depression)	ATSDR (2007)
	Chronic (Annual)	-	0.6 µg/m³	1.6 x 10^{-5} (µg/m³)$^{-1}$	Leukemia	Health Canada (2021b)
Formaldehyde[a]	Acute (1-hour)	50 µg/m³	-	-	Eye and nose irritation	TCEQ (2008)
	Chronic (Annual)	11 µg/m³			Eye, nasal, and lower airway discomfort	TCEQ (2008)
Diesel Particulate Matter						
Diesel particulate matter	Acute (2-hour)	10 µg/m³			Respiratory effects	Health Canada (2016b)
	Chronic (Annual)	5 µg/m³			Respiratory effects	Health Canada (2016b)
	Chronic (Annual)		See **Equation 7-2**		Lung cancer mortality	Health Canada (2022a)

Chemical of Potential Concern	Exposure Period	Toxicological Reference Value			Critical Effect	Reference
		Non-Carcinogenic	Carcinogenic			
		Tolerable Concentration (TC) (µg/m³)	Risk Specific Concentration (RSC) (µg/m³)	Inhalation Unit Risk (IUR) (µg/m³)⁻¹		
PAHs						
Naphthalene	Chronic (Annual)	10 µg/m³			Nasal effects (hyperplasia and metaplasia in respiratory and olfactory epithelium, respectively)	Health Canada (2021b)
Benzo(a)pyrene	Chronic (Annual)	0.002 µg/m³			Developmental effects	Health Canada (2021b)
Aromatic C_9-C_{16}[b]	Chronic (Annual)	200 µg/m³			Liver and kidney effects	TPHCWG (1997)
Benzo(a)pyrene TPE[c]	Chronic (Annual)		0.017 µg/m³	0.0006 (µg/m³)⁻¹	Cancer (tumours of the upper gastrointestinal tract and upper respiratory tract)	Health Canada (2021b)
Metals and Minerals						
Arsenic	Chronic (Annual)		0.0016 µg/m³	0.0064 (µg/m³)⁻¹	Cancer (lung)	Health Canada (2021b)
Beryllium	Chronic (Annual)	0.02			Immunotoxicity and respiratory toxicity	Health Canada (2021b)
	Chronic (Annual)		0.0042 µg/m³	0.0024 (µg/m³)⁻¹	Cancer (lung)	Health Canada (2021b)
Cadmium	Chronic (Annual)		0.0024 µg/m³	0.0042 (µg/m³)⁻¹	Cancer (lung)	Health Canada (2021b)
Chromium VI	Chronic (Annual)	0.1			Respiratory tract toxicity	Health Canada (2021b)
	Chronic (Annual)		0.00013 µg/m³	0.076 (µg/m³)⁻¹	Cancer (lung)	Health Canada (2021b)
Nickel	Chronic (Annual)		0.0077 µg/m³	0.0013 (µg/m³)⁻¹	Cancer (lung, nasal, kidney, prostate, buccal cavity)	Health Canada (2021b)

Chemical of Potential Concern	Exposure Period	Toxicological Reference Value			Critical Effect	Reference
		Non-Carcinogenic	Carcinogenic			
		Tolerable Concentration (TC) (µg/m³)	Risk Specific Concentration (RSC) (µg/m³)	Inhalation Unit Risk (IUR) (µg/m³)⁻¹		
Chrysotile asbestos	Chronic (Annual)		6.25 x 10^{-5} fibres/cm³	0.16 (fibres/ cm³)⁻¹	Cancer (lung and mesothelioma)	US EPA (2020)
Crystalline silica (Quartz) (in PM_{10})[a,d]	Acute (24-hour)	24 µg/m³			Respiratory inflammation	TCEQ (2020)
	Chronic (Annual)	3 µg/m³			Silicosis	OEHHA (2005)

Notes:

a Non-carcinogenic tolerable concentration is also considered protective of carcinogenic effects for acetaldehyde, formaldehyde, and crystalline silica

b Sum of acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene

c B(a)P total potency equivalents (TPE) calculated by summing concentrations of carcinogenic PAHs, adjusted by applying total potency equivalents (TPE)

d TRVs reported here for crystalline silica are applicable to the occupationally defined respirable fraction, which has a 50% cut-point at 4 µm particle aerodynamic diameter and represents a subfraction of total PM_{10}. Therefore, comparison of modelled crystalline silica (quartz in PM_{10}) concentrations to these TRVs is a protective approach that will marginally overestimate potential risks.

TC – Tolerable Concentration the acceptable concentration of an airborne chemical for which the primary route of exposure is inhalation

RSC - Risk-specific concentration calculated to be equivalent to an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (1 x 10^{-5}) based on lifetime exposure where RSC (µg/m³) = (1 x 10^{-5})/[IUR (µg/m³)$^{-1}$]

7.2.4.2 Oral Toxicological Reference Values

Oral TRVs established by Health Canada (2021b) and US EPA IRIS (2024) were primarily relied on in the multimedia evaluation. When oral TRVs were not available from Health Canada or the US EPA, oral TRVs from ATSDR, Netherlands and CalEPA were relied on. The values derived by ATSDR are chronic minimal risk levels and are lower than the levels of a chemical that may cause adverse health effects to sensitive populations. The oral TRVs for non-carcinogenic and carcinogenic metals are provided in Table 7.5.

Table 7.5 Oral Toxicological Reference Values

Chemical Of Potential Concern	Toxicological Reference Values			Critical Effect	Reference
	Threshold	Non-Threshold			
	Tolerable Daily Intake (TDI) (mg/kg-day)	Carcinogenic: Slope Factor SF $(mg/kg\text{-}day)^{-1}$	Non-Carcinogenic: Risk Specific Dose (mg/kg-day)		
Antimony	0.0004	Not applicable	Not applicable	Decreased lifespan and blood glucose levels, and altered cholesterol levels	US EPA IRIS (2024a)
Arsenic (inorganic*)	0.0003	1.8	Not applicable	Threshold: Dermal toxicity (lesions, disease) Non-Threshold: Cancer (bladder, lung, liver)	US EPA IRIS (2024a) Health Canada (2021b)
Barium	0.2	Not applicable	Not applicable	Kidney toxicity (lesions)	Health Canada (2021b)
Beryllium	0.002	Not applicable	Not applicable	Gastrointestinal toxicity (lesions)	(Health Canada, 2021b)
Cadmium	0.0008	Not applicable	Not applicable	Kidney toxicity (kidney function)	Health Canada (2021b)
Chromium (Total)	1.5	Not applicable	Not applicable	No effects observed at any dose level	Health Canada (2021b) TRV for trivalent chromium selected.
Cobalt	0.003	Not applicable	Not applicable	Increased blood cell count. No chronic value provided. Modified from subchronic oral minimum risk level (MRL).	ATSDR (2023)
Copper	0.426	Not applicable	Not applicable	Gastrointestinal toxicity and liver toxicity (liver function)	Health Canada (2021b)
Lead	Not applicable	Not applicable	0.0005**	Neurodevelopmental toxicity (cognitive function)	Health Canada (2021b)
Manganese	0.025	Not applicable	Not applicable	Neurodevelopmental toxicity	Health Canada (2021b)

Chemical Of Potential Concern	Toxicological Reference Values			Critical Effect	Reference
	Threshold	Non-Threshold			
	Tolerable Daily Intake (TDI) (mg/kg-day)	Carcinogenic: Slope Factor SF $(mg/kg\text{-}day)^{-1}$	Non-Carcinogenic: Risk Specific Dose (mg/kg-day)		
Molybdenum	0.005	Not applicable	Not applicable	Increased uric acid levels	US EPA IRIS (2024a)
Nickel	0.05	Not applicable	Not applicable	Endocrine effects in the pancreas and thyroid	(RIVM, 2001)
Selenium	Infant: 0.0055 Toddler: 0.006 Child: 0.0063 Teen: 0.0062 Adult: 0.0057	Not applicable	Not applicable	Hair and nail brittleness and loss	Health Canada (2021b)
Silver	0.005	Not applicable	Not applicable	Dermal toxicity (discoloration of the skin)	US EPA IRIS (2024a)
Thallium	1.4E-05	Not applicable	Not applicable	Not available	CalEPA DW (CalEPA, 1999) in MECP (2011b)
Uranium	0.0006	Not applicable	Not applicable	Kidney toxicity (lesions)	Health Canada (2021b)
Vanadium	0.001	Not applicable	Not applicable	No significant human health effects. No chronic value provided. Modified from subchronic oral MRL.	ATSDR (2012)
Zinc	Infant: 0.49 Toddler: 0.48 Child: 0.51 Teen: 0.54 Adult: 0.57	Not applicable	Not applicable	Cellular damage	Health Canada (2021b)

Notes:

* Organic arsenic compounds (e.g., arsenocholine and arsenobetaine) found in most fish have been determined to be relatively non-toxic (Health Canada, 2006b)

Chemical Of Potential Concern	Toxicological Reference Values			Critical Effect	Reference
	Threshold	Non-Threshold			
	Tolerable Daily Intake (TDI) (mg/kg-day)	Carcinogenic: Slope Factor SF (mg/kg-day)$^{-1}$	Non-Carcinogenic: Risk Specific Dose (mg/kg-day)		
** Based on the available scientific literature, no threshold could be established for the identified critical effect for lead (neurodevelopmental toxicity). As such, (Health Canada, 2021b) guidance identifies a provisional TRV of 0.0005 mg/kg-day, which is the benchmark dose level where the change in response is likely to be smaller than 1% ($BMDL_{01}$) from EFSA (EFSA, 2013).					

7.3 Exposure Assessment

The main objective of the exposure assessment is to develop a quantitative estimate of exposure for human receptors to each CoPC, based on CoPC concentrations in environmental media and receptor characteristics.

7.3.1 Receptor Characterization

Generic physical characteristics (i.e., body weight, soil ingestion rate, inhalation rate, skin surface area, and soil loading to skin) were selected from Health Canada (2017b) and Health Canada (2021a), and are provided in Table E-4, Appendix E. Because there are no permanent residences within the LSA, it is unlikely that receptors would spend 100% of their time within the LSA. However, because it is possible that people could spend more than 90 days per year at the seasonal camps and cottages, exposures at these locations are considered chronic exposures. Consistent with Health Canada (2021a), initial risk calculations assume an exposure term of 1, which implies that receptors are exposed continuously to media - 24 hours per day, 7 days per week, 52 weeks per year for an assumed lifetime of 80 years.

No distinction was made between time spent indoors and time spent outdoors. This means that the CoPC concentrations in air estimated for each receptor location were assumed to be the same indoors and outdoors. This approach assumes that inhalation exposures to CoPC happens on a 24-hour per day basis and is not limited to the time a person spends outdoors. Receptors were assumed to be exposed to the exposure point concentrations (EPCs) for the appropriate exposure averaging periods (e.g., 1-hour, 24-hour, annual average) for each CoPC.

Receptors were conservatively assumed to obtain all of their wild meat, fish, berries, and aquatic plants from watersheds within the LSA. This conservative assumption is consistent with Health Canada (2023a) guidance and likely overestimates actual consumption since community and Indigenous engagement indicates that people source their country foods from locations beyond the LSA.

Generic consumption rates for traditional food (i.e., amount of food eaten in a day) are not provided by Health Canada (2021a). Indigenous nations confirmed the traditional foods that they consumed within the LSA, as discussed in Section 4. The consumption patterns identified by the Indigenous nations are consistent with regional studies, discussed in more detail below.

The First Nations Food, Nutrition & Environment Study (FNFNES) was co-led by principal investigators from the Assembly of First Nations and researchers from the University of Ottawa and l'Universite de Montreal. This study (Chan, et al., 2014) is a highly regarded source for traditional food consumption information and provides estimates of traditional food intake for average and heavy consumers from 18 Indigenous communities in Ontario. As part of the FNFNES, communities were categorized by ecozone and culture area. Within Ontario, there are three terrestrial ecozones: Boreal Shield, Hudson Plains and Mixedwood Plains. As outlined in Chan et al. (2014), cultural areas "is an older concept developed by anthropologists in the nineteenth century to identify geographic areas within which Indigenous communities shared a greater number of traits/cultural affinities than from those outside the area. In Ontario, there are two identified culture areas (Northeast and Subarctic)". Using the identified ecozones and culture areas, Indigenous communities in Ontario were categorized as part of the FNFNES into one of four categories: Boreal Shield/Subarctic (Ecozone 1), Boreal Shield/Northeast (Ecozone 2), Hudson Plains/Subarctic (Ecozone 3) and Mixedwood Plains/Northeast (Ecozone 4).

Information on traditional foods consumption from the Boreal Shield/Subarctic (Ecozone 1) was used in the HHRA. The Boreal Shield was chosen because the spatial boundaries for the HHERA are located within this ecozone. The Subarctic cultural area was selected based on the locations and boundaries of the Indigenous nations involved in the Project-specific Indigenous Engagement program, the boundaries of Treaty 9, and a comparison of traditional foods identified in the engagement program to those in the FNFNES (Chan, et al., 2014).

The species and tissues chosen for inclusion in the assessment are representative of the most consumed by receptor group. While not all species listed by First Nations could be included, the selected species are among the most consumed and recognized as traditional foods, thus providing a reasonable upper bound estimate of potential exposure for the receptor groups considered. For example, food consumption rates of harvested species that were not included in Table 7.6 (e.g., black bear) are discussed in Section 7.5.8.2.

Because information on traditional food intake provided by Chan et al. (2014) was limited to Indigenous adults, protective assumptions were made to estimate intake rates for other age groups and to apply the study results to Indigenous and Recreational Receptors in the HHRA.

To estimate the daily intake rates of traditional foods consumed by younger age groups (i.e., for a toddler, child, and teen), a life stage conversion factor was calculated using information provided by Richardson (1997) for different food groupings. For example, the life stage conversion factor for wild meat for a teen was calculated by dividing the average amount for the meat and eggs group for a teen by the average amount from the meat and eggs group for an adult. This life stage conversion factor was then multiplied by the traditional foods consumption rate for adults to calculate the different consumption rate for the various age groups. Although some people may introduce foods, such as berries, to infants between five and six months of age, this is not considered a substantive source of exposure and it was assumed that an infant would not consume traditional foods.

Since Indigenous Receptors are assumed to harvest and consume higher levels of traditional foods than non-Indigenous members of the population, the values for the heavy consumer (i.e., the 95th percentile grams of traditional food per day) from Chan et al. (2014) provided the basis for Indigenous Receptors, with the exception of fish. The average consumer fish consumption rate provided by Chan et al. (2014) for an adult was used for the Indigenous Receptor as it is considered unlikely that a heavy consumer of fish would obtain all of their fish from the three watersheds. The fish consumption rate is discussed further in the uncertainty section.

Recreational Receptors are assumed to harvest and consume smaller amounts of traditional foods. Health Canada (2007) provides fish consumption rates for the general population for adults, toddlers and children which were used in the HHRA. In the absence of federal consumption rates for the general population for foods other than fish, the values for the average consumer from Chan et al. (2014) were used. Food consumption rates for different traditional foods and age groups are provided in Table 7.6.

Table 7.6 Food Consumption Rates

Parameter	Units	Infant	Toddler	Child	Teen	Adult	Reference/Explanation[1,2]
Indigenous Receptors							
Local Wild Meat - Moose[3]	g/day	N/A	5.2E+01	7.4E+01	1.0E+02	1.0E+02	Life stage conversion factor calculated based on the average amount of meat and eggs for the age group (toddler – 86 g/day, child – 123 g/day and teen – 170 g/day) (Richardson, 1997) and the average amount for the adult (166 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of their wild meat from within the LSA.
Local Wild Meat - Deer	g/day	N/A	5.9E+00	8.4E+00	1.2E+01	1.1E+01	
Local Wild Meat - Rabbit	g/day	N/A	6.9E+00	9.9E+00	1.4E+01	1.3E+01	
Local Wild Meat - Beaver	g/day	N/A	5.7E-01	8.2E-01	1.1E+00	1.1E+00	
Local Wild Meat - Duck	g/day	N/A	6.2E+00	8.9E+00	1.2E+01	1.2E+01	
Local Wild Meat - Goose	g/day	N/A	1.7E+01	2.4E+01	3.3E+01	3.2E+01	
Local Wild Meat - Grouse	g/day	N/A	6.2E+00	8.9E+00	1.2E+01	1.2E+01	
Local Fish	g/day	N/A	1.8E+01	2.8E+01	3.3E+01	3.5E+01	Life stage conversion factor calculated based on the average amount of fish and shellfish for the age group (toddler – 56 g/day, child – 90 g/day and teen – 104 g/day) (Richardson, 1997) and the average amount for the adult (111 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of their fish from within the LSA.
Wild Vegetation Intake - Berries	g/day	N/A	2.6E+01	3.0E+01	2.9E+01	2.8E+01	Life stage conversion factor calculated based on the average amount of fruits and juices for the age group (toddler – 234 g/day, child – 268 g/day and teen – 258 g/day) (Richardson, 1997) and the average amount for the adult (245 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of berries from the LSA.
Wild Vegetation Intake – Aquatic Vegetation	g/day	N/A	3.1E+00	4.5E+00	5.5E+00	6.3E+00	Life stage conversion factor calculated based on the average amount of Other vegetables for the age group (toddler – 67 g/day, child – 98 g/day and teen – 120 g/day) (Richardson, 1997)

Parameter	Units	Infant	Toddler	Child	Teen	Adult	Reference/Explanation[1,2]
(e.g., cattails, wild rice)[4]							and the average amount for the adult (137 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of aquatic plants from the LSA.
Recreational Receptor							
Local Wild Meat - Moose[3]	g/day	N/A	1.3E+01	1.9E+01	2.7E+01	2.6E+01	Life stage conversion factor calculated based on the average amount of meat and eggs for the age group (toddler – 86 g/day, child – 123 g/day and teen – 170 g/day) (Richardson, 1997) and the average amount for the adult (166 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of their wild meat from within the LSA.
Local Wild Meat - Deer	g/day	N/A	1.9E+00	2.7E+00	3.7E+00	3.6E+00	
Local Wild Meat - Rabbit	g/day	N/A	1.8E+00	2.6E+00	3.6E+00	3.5E+00	
Local Wild Meat - Beaver	g/day	N/A	1.5E-01	2.1E-01	3.0E-01	2.9E-01	
Local Wild Meat - Duck	g/day	N/A	2.5E+00	3.5E+00	4.9E+00	4.8E+00	
Local Wild Meat - Goose	g/day	N/A	5.1E+00	7.3E+00	1.0E+01	9.9E+00	
Local Wild Meat - Grouse	g/day	N/A	1.3E+00	1.8E+00	2.6E+00	2.5E+00	
Local Fish	g/day	N/A	1.0E+01	1.4E+01	2.2E+01	2.2E+01	The ingestion rates provided by Health Canada 2007 were selected for the toddler, child and adult. In the absence of an ingestion rates for the teen, the adult ingestion rate was used. Receptors were assumed to obtain 100% of their fish from within the LSA.
Wild Vegetation - Berries	g/day	N/A	5.7E+00	6.5E+00	6.3E+00	6.0E+00	Life stage conversion factor calculated based on the average amount of fruits and juices for the age group (toddler – 234 g/day, child – 268 g/day and teen – 258 g/day) (Richardson, 1997) and the average amount for the adult (245 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of berries from the LSA.
Wild Vegetation – Aquatic (e.g.,	g/day	N/A	1.0E+00	1.5E+00	1.8E+00	2.1E+00	Life stage conversion factor calculated based on the average amount of Other vegetables for the age group (toddler – 67 g/day, child – 98 g/day and teen

Parameter	Units	Infant	Toddler	Child	Teen	Adult	Reference/Explanation[1,2]
cattails, wild rice)[4]							– 120 g/day) (Richardson, 1997) and the average amount for the adult (137 g/day) (Richardson, 1997). Receptors were assumed to obtain 100% of aquatic plants from the LSA.

Note:

[1] In Table 10b of Chan et al. (2014), traditional food intake rates are provided by category (e.g., game meat, plants) but also for the top three species per category (e.g., moose, deer and rabbit). When the sum of the traditional food intake rates for the individual species per category was greater than the total per category (e.g., sum of moose, deer and rabbit was greater than total game meat), the individual food intake rates were used. When the total per category was greater than the sum of the individual species (e.g., total fish was greater than sum of walleye and northern pike), the total per category was used.

[2] The intake rates for beaver meat were selected from Appendix F of Chan et al. (2014).

[3] The intake rate for the moose is the sum of moose meat and moose organ intakes.

[4] Aquatic plants, such as cattails and wild rice, may be consumed by the identified receptors. Based on information provided by Chan et al. (2014), wild rice was identified as the third most consumed plant within Ecozone 1. Therefore, the consumptions rate for wild rice was used as a surrogate for aquatic plants. In addition, in the absence of measured data for wild rice, measured data for cattails were used.

N/A – Not applicable

7.3.2 Inhalation Exposures

The inhalation exposure limits and TRVs presented in Section 7.2.4.1 are expressed based on chemical concentrations in air (e.g. µg/m^3) rather than as doses on a per body weight basis (mg/kg-day). As a result, potential human health risks associated with inhalation exposures to CoPC are characterized by comparing the predicted CoPC concentration in air with the corresponding TRVs (Section 7.2.4.1). Inhalation TRVs are provided for specified exposure durations (e.g. 1-hour, 2-hour, 24-hour, annual average).

As noted in Section 6.1, the locations evaluated in the air quality dispersion modelling that are pertinent to the HHRA include the modelled mine boundary and sensitive and representative receptor locations selected to represent places where people are likely to be present and could be exposed to emissions from the Project. Given the land use restrictions to be imposed by Canada Nickel within the modelled mine boundary (including receptor locations R2, R3, and R4) and at receptor locations R1 and R5 (see Section 6.1), the eight sensitive and representative receptor locations located outside the modelled mine boundary (R6, R7, R8, R9, R10, R11, R12, and R13) are considered representative of areas where people are most likely to be present for chronic exposure periods and overnight stays. Outside of these areas, exposure is anticipated to be short-term and transient. Therefore, evaluation of chronic exposure (and risk) will be applicable only for the eight sensitive and representative receptor locations located outside the modelled mine boundary (R6, R7, R8, R9, R10, R11, R12, and R13) and acute exposure (and risk) may occur elsewhere outside the modelled mine boundary. Given that the TRVs are provided for specified exposure durations, it is not necessary to adjust the predicted CoPC concentrations in air prior to comparison with the respective TRVs. Rather, The CoPC concentrations for the various exposure averaging periods (1-hour, 2-hour, 24-hour, annual average) can be compared directly to the respective TRVs to estimate the potential inhalation health risk for these receptor groups.

As such, the exposure values used in the risk characterization are based on the maximum modelled air concentrations at the modelled mine boundary and at the Sensitive and Representative Receptor Locations described in Section 6.1.

7.3.3 Multimedia Exposures

Exposure equations provided by Health Canada (2023a) were used to calculate exposure estimates for each multimedia CoPC quantitatively evaluated in the HHRA. The equations used to calculate exposure estimates are shown in Appendix C. As discussed in Section 7.3.1, as per Health Canada (2021a), initial risk calculations assume an exposure term of 1, which implies that receptors are exposed continuously to media - 24 hours per day, 7 days per week, 52 weeks per year for an assumed lifetime of 80 years.

Exposure estimates were calculated for the different receptors (Indigenous and Recreational Receptors), the five modelled locations (i.e., TMF Seepage and Runoff Collection Ponds, Collection Pond 1, Collection Pond 2 Collection Pond 3 and JC1 Pourpoint) within the three watersheds, and three different scenarios (Baseline, Project Alone and Baseline Plus Project). For the Baseline Scenario, exposure estimates were calculated using measured baseline data (where available) or calculated using the uptake factor approach or dietary exposure modelling. Baseline Plus Project Scenario were calculated using terrestrial exposure estimates that incorporate the combined metal accumulation in the soil from deposition over the life of the Project (which occurs after Year 40, following construction and operations), and surface water exposure estimates based on points of full mixing and the JC1 Pourpoint (modelled to occur at various times over the life of the Project, depending on FDP and parameter).

When estimating exposure to arsenic in fish tissue, it was assumed that arsenic existed only in its inorganic form, which is more toxic to humans. This assumption was made even though fish tissues typically contain organic arsenic compounds (e.g., arsenocholine and arsenobetaine), which have been determined to be relatively non-toxic (Health Canada, 2006b). In a study conducted by CFIA in 2018/2019 (CFIA, 2019), total and inorganic arsenic concentrations were measured in 92 domestic fish samples from local and regional retail locations from six cities across Canada. The fish samples were found to have low average levels of inorganic arsenic. Total arsenic was detected in each of the 92 samples with an average concentration of 1027 µg/kg, while inorganic arsenic was only detected in 56 samples with an average concentration of 1.31 µg/kg. Based on these results, inorganic arsenic made up a small portion (approximately 0.1%) of the arsenic analyzed in fish (the remaining being organic arsenic). A worked example, including equations, for an Indigenous toddler exposed to arsenic within the North Driftwood River watershed (TMF Ponds) for the Baseline Scenario is provided in Appendix C. Exposure estimate summary tables are provided in Appendix E.

Receptor characteristics, such as ingestion rates and body weights, are presented in Section 7.3.1 and Appendix E. The EPCs for soil, surface water, wild terrestrial vegetation (i.e., berries), wild aquatic vegetation (i.e., cattails), wild meat, and fish tissue for the Baseline, Project Alone and Baseline Plus Project Scenarios are presented in Section 6. Although EPCs for other terrestrial plants (e.g., Labrador tea) are available, Chan et al. (2014) indicate less than 10% of the population consumes this type of vegetation. As a result, consumption of other terrestrial plants is discussed in Section 7.5.8.3.

The RAF is used to account for bioavailability, which represents the amount of the chemical that is absorbed in the body and becomes available to target organs and tissues. This is most commonly used in the assessment of dermal dose, since dermal TRVs are rare and oral toxicity benchmarks are most often used to assess dermal risks. In these cases, dermal RAFs are applied to reflect dermal bioavailability relative to the oral route. For exposure calculations involving oral ingestion and inhalation of particulates, the RAFs were set to a default of 100% or 1.0. This is based on the conservative assumption that the bioavailability of the chemical in the assessment is equivalent to the bioavailability of the chemical in the toxicity study used to derive the TRV. Selected dermal absorption factors from Health Canada (2021b) and MECP (2011b) are shown in Table E-5, Appendix E.

7.4 Risk Characterization

The quantitative risk characterization compares the estimated exposures to the CoPC for each of the receptors with the toxicity reference values. This typically involves the calculation of either hazard quotients (HQ) or incremental lifetime cancer risks (ILCR), which can be calculated using the following general equations from Health Canada (2023a).

Hazard Quotient (HQ)	**Direct Contact**	$HQ = \frac{Estimated\ Exposure\ (\mu g/kg\ bw/day)}{TDI\ (\mu g/kg\ bw/day)}$	**Equation 7-3**
	Inhalation	$HQ = \frac{Air\ Concentration\ (\mu g/m^3) \times Fraction\ of\ Time\ Exposed}{TC\ (\mu g/m^3)}$	**Equation 7-4**
Incremental Lifetime Cancer Risk (ILCR)	**Direct Contact**	$\boldsymbol{I}LCR = Lifetime\ Average\ Daily\ Dose\ (\mu g/kg\ bw/day) \times SF\ (\mu g/kg\ bw/day)^{-1}$	**Equation 7-5**
	Inhalation	$ILCR = Air\ Concentration\ (\mu g/m^3) \times Fraction\ of\ Time\ Exposed \times IUR\ (\mu g/m^3)^{-1}$	**Equation 7-6**

For chemicals with a threshold mode of action, Health Canada (2023a) considers a target HQ of 1.0 to be applicable if all potential exposure media and pathways are considered, including background dietary intake. Where an HHRA evaluates only project-related exposures (excluding background estimated daily intake for sources not related to the project, including consumer products, food, air, and water), a target HQ of less than or equal to 0.2 is deemed negligible to compensate for the exposures not taken into consideration (Health Canada, 2023a). Health Canada (2023a) indicates that if the calculated HQ is greater than the applicable target (0.2 or 1.0, as described above), further consideration is warranted to either reduce uncertainty in the risk assessment or identify mitigation measures to reduce exposure to contaminants for which the applicable target HQ was exceeded.

For chemicals with a carcinogenic mode of action, Health Canada (2023a) indicates that only Project-related exposures are to be considered in the ILCR calculation. Health Canada (2021a) considers an ILCR of less than one in one hundred thousand (1×10^{-5}) to be essentially negligible. Health Canada (2023a) indicates that further examination of the potential risk is recommended if the calculated ILCR is greater than 1×10^{-5}.

For lead, an IQ decrement less than 1 is considered acceptable (Health Canada, 2021b). Conversely, if the IQ decrement is greater than 1 there may be a potentially unacceptable risk to human health.

Specific approaches applied to assess risk due to exposure via inhalation, ingestion, and dermal contact pathways are described in further detail below.

7.4.1 Human Health Risk Via Inhalation

7.4.1.1 Methods

Inhalation exposure limits and TRVs applicable to the evaluation of Project-related effects on air quality were identified in Section 7.2.4.1, above and are summarized in Table 7.3 and Table 7.4.

These values include inhalation exposure limits (ELs) for criteria air contaminants with non-carcinogenic non-threshold effects as well as standard TRVs including TCs applicable to threshold effects and IURs applicable to carcinogenic effects. For chemicals with a carcinogenic mode of action, Table 7.4 also includes RSCs calculated to be equivalent to an ILCR of 1 in 100,000 (1×10^{-5}) assuming a lifetime (80 years) of continuous exposure based on the IUR where RSC ($\mu g/m^3$) = (1×10^{-5})/[IUR ($\mu g/m^3$)$^{-1}$]. As such, for CoPCs with an EL, TC, or RSC identified in Table 7.3 or Table 7.4 it is possible to calculate exposure ratios (ERs) using modelled air concentrations where:

$$\begin{array}{c}\text{Exposure Ratio (ER)}\\ \text{(unitless)}\end{array} = \frac{\text{Modelled Air Concentration } (\mu g/m^3)}{\text{EL, TC, or RSC } (\mu g/m^3)} \qquad \textbf{Equation 7-7}$$

For criteria air contaminants with non-threshold modes of action, it is acknowledged that the ELs are not equivalent to TRVs and therefore adverse effects to health may occur even when the ER is less than one. However, for CoPCs for which TCs applicable to threshold effects or inhalation unit risks (IURs) applicable to carcinogenic effects have been identified, the ERs calculated according to Equation 7-7 can be interpreted according to Health Canada (2023a) guidance for CoPCs with threshold and non-threshold (carcinogenic) modes of action as described below.

- **Threshold Effects:** For CoPCs with a threshold mode of action, the ER is equivalent to the HQ described in Equation 7-4 and can be compared to a benchmark of 1.0 where background air concentrations are available and to a benchmark of 0.2 if background air concentrations are not available per Health Canada (2023a).

- **Non-threshold (Carcinogenic) Effects:** For CoPCs with a non-threshold carcinogenic mode of action, the ER provides an indication of whether the ILCR described in Equation 7-6 would meet the target ILCR of one in one hundred thousand (1 x 10^{-5}) assuming a lifetime of exposure to that concentration (i.e., fraction of time exposed is assumed to be equal to 1.0). As such, if the ER for a particular non-threshold carcinogen for a Project Alone scenario is less than 1.0, this indicates that the ILCR is essentially negligible and generally no further assessment is considered necessary. However, if the ER for the Project Alone scenario is greater than 1.0, additional risk characterization may be required to more accurately account for the less than lifetime duration of the applicable Project phase by adjusting the 'fraction of time exposed' in the ILCR calculation described in Equation 7-6. For the assessment of carcinogenic effects, the risk-specific concentrations (and the ER) are only applicable to the Project Alone scenario as they were developed to address cancer risks that are above existing conditions (i.e., the ILCR). There are no regulatory benchmarks of acceptable or tolerable cancer risk for existing incidences of cancers. Therefore, exposure ratios for carcinogens for Baseline and Baseline Plus Project Scenarios are provided for context, but are not compared to the target of 1.0.

Therefore, the first step applied to characterize health risk associated with the inhalation pathway for CoPCs with an EL, TC, or RSC identified in Table 7.3 or Table 7.4 was to calculate ERs to evaluate the maximum modelled air concentrations at the modelled mine boundary described in Section 6.1. Although the modelling results described in Section 6.1 include predictions made with and without plume depletion, ERs are calculated using values modelled without plume depletion, unless otherwise noted. This assumption will protectively overestimate exposures given that concentrations of particulate and CoPCs in particulate are expected to be depleted from plumes as they travel from source to receptor due to deposition on surfaces such as vegetation and structures. Predictions considering plume depletion may be discussed as an additional refinement in the risk characterization, if required.

For CoPCs with threshold and non-threshold (carcinogenic) modes of action, if the ERs are less than the applicable target (1.0 or 0.2, as defined above) at the modelled mine boundary described in Section 6.1, this indicates that the ER is also less than the applicable target (1.0 or 0.2, as defined above) for that CoPC in the LSA area outside the modelled mine boundary. In such cases, human health risk related to inhalation of that CoPC was considered acceptable and further assessment of risk related to inhalation of that CoPC was not required.

The second step applied to characterize health risk associated with the inhalation pathway therefore focused on further assessment of risk for:

- Criteria Air Contaminants with non-threshold modes of action, and
- CoPCs with threshold and non-threshold (carcinogenic) modes of action for which an ER greater than the applicable target (1.0 or 0.2, as defined above) was identified using the maximum modelled concentrations from the modelled mine boundary

For these parameters, further assessment or risk will focus on predicted health risks at the eight receptor locations located outside the modelled mine boundary considered representative of areas where people are most likely to be present (i.e., R6, R7, R8, R9, R10, R11, R12, and R13, as described in Section 6.1)

In addition, in the absence of a defined IUR that could be used to define an RSC for DPM, the second step of risk characterization for the inhalation pathway includes an evaluation of the potential for cancer risks due to exposure to DPM using the formula described in Equation 7-2, above.

7.4.1.2 Construction Phase

7.4.1.2.1 Exposure Ratios at the Modelled Mine Boundary and Human Receptor Locations

Exposure ratios (ERs) based on the maximum modelled air concentrations at the modelled mine boundary assuming no plume depletion for each human health CoPC in air during Project construction are presented in Table 7.7. In Table 7.7, specific CoPCs and exposure durations are identified as requiring a more detailed evaluation of the significance of the estimated risk if one of the following conditions was met:

- For ERs based on a threshold effect endpoint (EL or TC), the ER for Baseline, Project Alone, or Baseline Plus Project is greater than 1.0 (if a baseline concentration is available) or greater than 0.2 (in the absence of applicable baseline data).
- For ERs based on a non-threshold effect endpoint (RSC), the Project Alone values are greater than 1.0. Baseline and Baseline Plus Project Scenarios are not compared to a threshold of 1.0 in this case as the RSC is based on a target ILCR relative to baseline conditions.

In addition, further evaluation was identified as applicable for diesel particulate matter to evaluate cancer risks based on an additional lung cancer mortality (ALCM) calculation.

Therefore, the analysis presented in Table 7.7 indicated that a more detailed evaluation of the significance of potential risk outside the modelled mine boundary was required for:

- $PM_{2.5}$ (24-hour and annual),
- PM_{10} (24-hour and annual),
- Chrysotile asbestos (annual), and
- DPM (annual)

As such, exposure estimates and ERs for this subset of CoPCs and averaging periods are provided in Table 7.8 for the eight receptor locations outside the modelled mine boundary where people are most likely to be present (i.e., R6, R7, R8, R9, R10, R11, R12, and R13 as discussed in Section 6.1). The exposure estimates and ERs in Table 7.8 are provided for model results with and without plume depletion. As described in Section 6.1, model results generated without plume depletion will protectively overestimate exposures given that concentrations of particulate and CoPCs in particulate are expected to be depleted from plumes as they travel from source to receptor due to deposition on surfaces such as vegetation and structures. In contrast, the model results with plume depletion may be considered as a more realistic refinement.

Further interpretation of the results presented in Table 7.7 and Table 7.8 are provided in Section 7.4.1.2.2.

Table 7.7 Exposure Ratios based on Maximum Predicted Ground Level Concentrations Along Modelled Mine Boundary During Construction Assuming No Plume Depletion

Chemical of Potential Concern	Exposure Period	Endpoint Type	Maximum Exposure Ratio (ER) [a,b] (Without Plume Depletion)		
			Baseline	Project Alone	Baseline Plus Project
Criteria Air Contaminants					
Nitrogen Dioxide (NO_2)[c]	Acute (1-hour)	EL	0.027	0.67	0.7
	Acute (24-hour)	EL	0.088	0.52	0.61
	Chronic (Annual)	EL	0.033	0.32	0.35
Sulphur Dioxide (SO_2)	Acute (10-minute)	EL	0.049	0.21	0.26
	Acute (24-hour)	EL	0.054	0.0012	0.055
Particulate Matter (Fine) ($PM_{2.5}$)	Acute (24-hour)	EL	0.83	0.34	**1.2**
	Chronic (Annual)	EL	**1.2**	0.16	**1.4**
Particulate Matter (Coarse) (PM_{10})	Acute (24-hour)	EL	0.29	0.96	**1.2**
	Chronic (Annual)	EL	0.55	0.41	0.96
Volatile Organic Compounds					
1,3-Butadiene	Acute (1-hour)	TC	0.002	0.000026	0.0021
	Chronic (Annual)	TC	0.28	0.000077	0.28
	Chronic (Annual)	RSC	0.33	0.000091	0.33
Acetaldehyde	Acute (1-hour)	TC	ND	0.0012	0.0012
	Chronic (Annual)	TC	ND	0.000048	0.000048
Benzene	Acute (1-hour)	TC	0.0021	0.00049	0.0026
	Acute (24-hour)	TC	0.016	0.0011	0.017
	Chronic (Annual)	RSC	0.62	0.0042	0.62
Formaldehyde	Acute (1-hour)	TC	ND	0.1	0.1
	Chronic (Annual)	TC	ND	0.0038	0.0038

Chemical of Potential Concern	Exposure Period	Endpoint Type	Maximum Exposure Ratio (ER) [a,b] (Without Plume Depletion)		
			Baseline	Project Alone	Baseline Plus Project
Diesel Particulate Matter					
Diesel particulate matter	Acute (2-hour)	TC	0.019	0.21	0.23
	Chronic (Annual)	TC	0.0036	0.0052	0.0088
	Chronic (Annual)	Other	**See text**	**See text**	**See text**
PAHs					
Naphthalene	Chronic (Annual)	TC	ND	0.00031	0.00031
Benzo(a)pyrene	Chronic (Annual)	TC	0.0051	0.000045	0.0051
Aromatic C_9-C_{16} [d]	Chronic (Annual)	TC	0.000017	0.000017	0.000034
Benzo(a)pyrene TPE [e]	Chronic (Annual)	RSC	0.00098	0.000021	0.001
Metals and Minerals					
Arsenic	Chronic (Annual)	RSC	0.8	0.031	0.83
Beryllium	Chronic (Annual)	TC	0.039	0.00015	0.039
	Chronic (Annual)	RSC	0.19	0.00073	0.19
Cadmium	Chronic (Annual)	RSC	0.11	0.0005	0.11
Chromium VI	Chronic (Annual)	TC	ND	0.00000015	0.00000015
	Chronic (Annual)	RSC	ND	0.00011	0.00011
Nickel (in PM_{10})	Chronic (Annual)	RSC	0.22	0.18	0.39
Chrysotile asbestos	Chronic (Annual)	RSC	16	**2.9**	19
Crystalline silica (Quartz) (in PM_{10})	Acute (24-hour)	TC	0.041	0.086	0.13
	Chronic (Annual)	TC	0.14	0.042	0.18

Notes:

a. **Bolding and shading** indicates that a more a more detailed evaluation of the significance of the estimated risk is required as described below:

i. For ERs based on exposure limit (EL) or tolerable concentration (TC), **bolding and shading** indicates that the ER for Baseline, Project Alone, or Baseline Plus Project is greater than 1.0 (if a baseline concentration is available) or greater than 0.2 (in the absence of applicable baseline data).

ii. For ERs based on a risk specific concentration (RSC), **bolding and shading** indicates that Project Alone values are greater than 1.0. Baseline and Baseline Plus Project Scenarios are not compared to a threshold of 1.0 in this case as the RSC is based on a target incremental lifetime cancer risk (ILCR) relative to baseline conditions.

iii. For diesel particulate matter, cancer risks will be evaluated using an additional lung cancer mortality (ALCM) calculation.

b. For NO_2, SO_2, $PM_{2.5}$, and PM_{10}, the 24-hour exposure limit is based on the 99th percentile of the annual distribution of 24-hour average concentrations (equivalent to 3-4 exceedance days per year). Therefore, the ERs for these CoPCs for the 24-hour period are based on the 99th percentile of the annual distribution of 24-hour average concentrations at the location with the maximum predicted ground level concentrations for that CoPC.

c. NO_2 concentrations modelled using the Ambient Ratio Method (ARM2) method, which applies a varying ambient ratio of NO_2 to total NO_X in the atmosphere to calculate NO_2 concentrations based on modelled NO_X concentrations. For further details see Chapter 12 of the Impact Statement (Assessment of Potential Effects on the Atmospheric Environment).

d. Sum of acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene

e. B(a)P total potency equivalents (TPE) calculated by summing concentrations of carcinogenic PAHs, adjusted by applying total potency equivalents (TPE)

EL - Exposure Limit; ND – No Data; RSC - Risk Specific Concentration; TC - Tolerable Concentration

Table 7.8 Exposure Estimates and Exposure Ratios During Construction at Human Receptor Locations Outside the Modelled Mine Boundary for CoPCs and Exposure Durations Identified as Requiring Further Risk Evaluation Based on Predicted Exposure Concentrations at Modelled Mine Boundary (With and Without Plume Depletion)

Chemical of Potential Concern	Exposure Period	Receptor	EL, TC, or RSC[a] (µg/m³ or fibres/cm³)[a]	Concentrations (µg/m³ or fibres/cm³)[a]					Exposure Ratios (ERs)[b,c]				
				Baseline	Without Plume Depletion		With Plume Depletion		Baseline	Without Plume Depletion		With Plume Depletion	
					Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project		Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Particulate Matter (Fine) ($PM_{2.5}$)	Acute (24-hour)	R6	15	12	0.49	13	0.17	13	0.83	0.03	0.86	0.01	0.84
		R7			1.1	13	0.38	13		0.07	0.90	0.03	0.85
		R8			1.5	14	0.62	13		0.10	0.93	0.04	0.87
		R9			1.9	14	0.73	13		0.12	0.95	0.05	0.88
		R10			0.51	13	0.18	13		0.03	0.86	0.01	0.84
		R11			0.52	13	0.16	13		0.03	0.86	0.01	0.84
		R12			0.52	13	0.16	13		0.03	0.86	0.01	0.84
		R13			0.50	13	0.16	13		0.03	0.86	0.01	0.84
	Chronic (Annual)	R6	5	6.2	0.03	6.2	0.01	6.2	**1.2**	0.006	**1.2**	0.002	**1.2**
		R7			0.05	6.3	0.03	6.2		0.011	**1.3**	0.005	**1.2**
		R8			0.08	6.3	0.04	6.2		0.017	**1.3**	0.009	**1.2**
		R9			0.10	6.3	0.04	6.2		0.019	**1.3**	0.009	**1.2**
		R10			0.03	6.2	0.01	6.2		0.006	**1.2**	0.002	**1.2**
		R11			0.03	6.2	0.01	6.2		0.005	**1.2**	0.002	**1.2**
		R12			0.03	6.2	0.01	6.2		0.006	**1.2**	0.002	**1.2**
		R13			0.03	6.2	0.01	6.2		0.006	**1.2**	0.002	**1.2**
Particulate Matter (Coarse) (PM_{10})	Acute (24-hour)	R6	45	13	4.3	17	1.5	15	0.29	0.10	0.39	0.03	0.32
		R7			9.5	23	3.4	16		0.21	0.50	0.08	0.37
		R8			13	26	5.6	19		0.29	0.58	0.12	0.42
		R9			16	29	6.5	20		0.35	0.64	0.14	0.44
		R10			4.6	18	1.7	15		0.10	0.39	0.04	0.33
		R11			4.5	18	1.5	15		0.10	0.39	0.03	0.32
		R12			4.5	18	1.5	15		0.10	0.39	0.03	0.32
		R13			4.4	17	1.5	15		0.10	0.39	0.03	0.32
	Chronic (Annual)	R6	15	8.3	0.24	8.5	0.09	8	0.55	0.02	0.57	0.01	0.56
		R7			0.45	8.7	0.24	9		0.03	0.58	0.02	0.57
		R8			0.69	9.0	0.38	9		0.05	0.60	0.03	0.58
		R9			0.79	9.1	0.37	9		0.05	0.60	0.02	0.58
		R10			0.23	8.5	0.09	8		0.02	0.57	0.01	0.56
		R11			0.22	8.5	0.08	8		0.01	0.57	0.01	0.56
		R12			0.26	8.5	0.10	8		0.02	0.57	0.01	0.56
		R13			0.25	8.5	0.10	8		0.02	0.57	0.01	0.56

Chemical of Potential Concern	Exposure Period	Receptor	EL, TC, or RSC[a] (µg/m³ or fibres/cm³)[a]	Concentrations (µg/m³ or fibres/cm³)[a]					Exposure Ratios (ERs)[b,c]				
				Baseline	Without Plume Depletion		With Plume Depletion		Baseline	Without Plume Depletion		With Plume Depletion	
					Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project		Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Chrysotile Asbestos (units are fibres/cm³)	Chronic (Annual)	R6	6.3E-05	1.0E-03	8.9E-06	1.0E-03	3.3E-06	1.0E-03	16	0.14	16	0.05	16
		R7			1.6E-05	1.0E-03	6.5E-06	1.0E-03		0.26	16	0.10	16
		R8			2.5E-05	1.0E-03	1.1E-05	1.0E-03		0.41	16	0.17	16
		R9			3.4E-05	1.0E-03	1.4E-05	1.0E-03		0.54	17	0.23	16
		R10			8.6E-06	1.0E-03	3.2E-06	1.0E-03		0.14	16	0.05	16
		R11			8.2E-06	1.0E-03	3.1E-06	1.0E-03		0.13	16	0.05	16
		R12			9.8E-06	1.0E-03	3.6E-06	1.0E-03		0.16	16	0.06	16
		R13			9.7E-06	1.0E-03	3.5E-06	1.0E-03		0.15	16	0.06	16
Diesel particulate matter	Chronic (Annual)	R6	NA	1.8E-02	1.3E-03	1.9E-02	4.6E-04	1.8E-02	NA	NA	NA	NA	NA
		R7			2.5E-03	2.1E-02	1.1E-03	1.9E-02		NA	NA	NA	NA
		R8			4.3E-03	2.2E-02	1.9E-03	2.0E-02		NA	NA	NA	NA
		R9			4.8E-03	2.3E-02	2.0E-03	2.0E-02		NA	NA	NA	NA
		R10			1.3E-03	1.9E-02	4.5E-04	1.8E-02		NA	NA	NA	NA
		R11			1.2E-03	1.9E-02	4.2E-04	1.8E-02		NA	NA	NA	NA
		R12			1.4E-03	1.9E-02	4.7E-04	1.8E-02		NA	NA	NA	NA
		R13			1.3E-03	1.9E-02	4.6E-04	1.8E-02		NA	NA	NA	NA

Notes:

a. Units are µg/m³ for all CoPCs except for chrysotile asbestos, for which the RSC and concentrations are reported as fibres/cm³.

b. **Bolding and shading** indicates that a more a more detailed evaluation of the significance of the estimated risk is required as described below:

i. For ERs based on exposure limit (EL) or tolerable concentration (TC), **bolding and shading** indicates that the ER for Baseline, Project Alone, or Baseline Plus Project is greater than 1.0 (if a baseline concentration is available) or greater than 0.2 (in the absence of applicable baseline data).

ii. For ERs based on a risk specific concentration (RSC), **bolding and shading** indicates that Project Alone values are greater than 1.0. Baseline and Baseline Plus Project Scenarios are not compared to a threshold of 1.0 in this case as the RSC is based on a target incremental lifetime cancer risk (ILCR) relative to baseline conditions.

iii. For diesel particulate matter, cancer risks will be evaluated using an additional lung cancer mortality (ALCM) calculation.

c. For $PM_{2.5}$, and PM_{10}, the 24-hour exposure limit is based on the 99th percentile of the annual distribution of 24-hour average concentrations (equivalent to 3-4 exceedance days per year). Therefore, the exposure concentrations and ERs for these CoPCs for the 24-hour period are based on the 99th percentile of the annual distribution of 24-hour average concentrations at the location with the maximum predicted ground level concentrations for that CoPC.

EL - Exposure Limit; ND – No Data; RSC - Risk Specific Concentration; TC - Tolerable Concentration; NA – Not Applicable

7.4.1.2.2 Risk Evaluation for Individual CoPCs

As described above additional risk evaluation for the construction phase was not required for CoPCs with a threshold or carcinogenic mode of action for which the ERs presented in Table 7.7 were less than their applicable target. Therefore, health risks associated with inhalation of these CoPCs in the LSA/RSA are expected to be negligible as defined by Health Canada (2023a).

However, further risk evaluation was required for the construction phase for the following CoPCs:

- Criteria air contaminants
  - CoPCs with threshold or carcinogenic modes of action with ERs greater than their applicable target (1.0 or 0.2, as described in Section 7.2.1) in Table 7.7, i.e.,chrysotile asbestos
- Diesel particulate matter (DPM)

Further discussion of each the potential for health risks due to inhalation for each of these CoPCs is provided below.

Criteria Air Contaminants (NO_2, SO_2, $PM_{2.5}$, and PM_{10})

As described in Section 7.2.4.1.1, NO_2, SO_2, $PM_{2.5}$, and PM_{10} are non-threshold contaminants. It is acknowledged that any increase in exposure to these contaminants may result in adverse health effects. Therefore, the increased ERs for these CoPCs related to the Project as shown in Table 7.7 may result in increased adverse health risks.

However, the severity of effects increases incrementally with exposure concentration and exposure duration. Most of the exposure limits for these CoPCs identified in Table 7.3 are WHO ambient air quality guidelines. According to WHO (2021), these guidelines represent the lowest level of exposure for which there is evidence of adverse health effects. It is assumed that adverse health effects do not occur or are minimal below this concentration level (WHO, 2021). The only exposure limit for a criteria air contaminant identified in Table 7.3 that is not a WHO ambient air quality guideline is the acute 10-minute exposure limit for SO_2, which is considered by Health Canada (2016c) to be protective of respiratory effects in humans, including sensitive populations like people with asthma. Therefore, adverse health effects are also considered to be minimal below this concentration level.

As such, the ERs less than 1.0 for criteria air contaminants calculated for the Baseline Plus Project Scenario in Table 7.7 are considered to represent negligible or minimal health risks. For criteria air contaminants and averaging periods for which an ER greater than 1.0 is presented in Table 7.7, additional rationale to discuss the potential for human health risks due to inhalation of Project-related emissions of these CoPCs is provided below:

- **Particulate Matter (PM_{10} and $PM_{2.5}$).** The ERs for the Baseline Plus Project scenario during Project construction based on the maximum predicted ground level concentration along the modelled mine boundary for $PM_{2.5}$ (24-hour and annual) and PM_{10} (24-hour) were greater than 1.0 (Table 7.7**)**. The isopleths for the Baseline Plus Project scenario during Project construction of these parameters for these exposure periods during construction are provided in Figures A.6 to A.8, Appendix A and the ERs for these parameters for the Baseline Plus Project scenario during Project construction specific to the receptor locations where people are expected to be regularly present during Project Construction are provided in Table 7.8.

  For $PM_{2.5}$ (24-hour), PM_{10} (24-hour), and PM_{10} (annual), ERs were less than 1.0 at each of the evaluated sensitive receptor locations outside the modelled mine boundary (Table 7.8). Given that these ERs were calculated based on comparison to guidelines considered to represent "the lowest level of exposure for which there is evidence of adverse health effects" per WHO (2021), adverse health effects due to exposure to $PM_{2.5}$ (24-hour), PM_{10} (24-hour), and PM_{10} (annual) are expected to be negligible at these receptor locations.

  For $PM_{2.5}$ (annual), the Baseline Concentration of 6.2 µg/m^3 is already greater than the WHO (2021) annual average $PM_{2.5}$ guideline of 5 µg/m^3. As such, the ER for baseline conditions was 1.2 (Table 7.7**,** Table 7.8**)**. As shown in Figure A.7, Appendix A, the spatial extent where modelled $PM_{2.5}$ concentrations increase by greater than 0.5 µg/m^3 (i.e., less than 10% of the pre-existing background concentration) is limited to areas north and east of the modelled mine boundary (< 2 km from the modelled mine boundary). These areas do not overlap with any of the sensitive receptor locations where people are most likely to be present in the future. As a result, there is very little change to ERs at the evaluated sensitive receptor locations, which range from 1.2 (at R6, R10, R11, R12, and R13) to 1.3 at R7, R8, and R9 (Table 7.8). Furthemore, if concentrations modelled with plume depletion are considered for the evaluated sensitive receptor locations for $PM_{2.5}$ (annual), the calculated ERs at these locations are all equal to 1.2 and therefore indistinguishable from baseline conditions (Table 7.8**)**. Based on these lines of evidence, it can be concluded that adverse health effects would be indistinguishable from baseline conditions throughout the LSA/RSA from long-term exposure to $PM_{2.5}$ during Project construction.

Chrysotile Asbestos

The ERs shown for chrysotile asbestos in Table 7.7 are based on a RSC derived to represent the concentration at which the calculated ILCR would be equivalent to one in one hundred thousand (1×10^{-5}), assuming a lifetime of exposure to that concentration (i.e., fraction of time exposed is assumed to be equal to 1.0). As such, the RSCs (and the ERs) are only applicable to the Project Alone scenario as they were developed to address cancer risks that are above existing conditions (i.e., the ILCR).

As shown in Table 7.7, the maximum ER for the Project Alone scenario at along the modelled mine boundary is 2.9. In comparison, the maximum ER for chrysotile asbestos in air at a human receptor location outside the modelled mine boundary for the Project Alone scenario was 0.54 (for receptor R9, see Table 7.8). Given that the human receptor locations outside the modelled mine boundary are most representative of locations where people may be present for chronic exposure periods and overnight stays, this finding suggests that inhalation of chrysotile asbestos produced by the Project during construction would not result in ILCRs greater than 1×10^{-5} for people at those locations, even if a lifetime of exposure at that concentration is assumed.

This estimate can be further refined by considering the expected duration of exposure during construction. Given that construction is expected to last three years, the ILCR at receptor R9 can be evaluated according to **Equation 7-5** (adapted to be applicable to count based units of fibres/ cm^3 for asbestos) as follows:

> ILCR = Air concentration (fibres/cm^3) x Fraction of Time Exposed x inhalation unit risk (fibres/cm^3)$^{-1}$, where

- the predicted annual air concentration of asbestos during construction at R9 (assuming no plume depletion) is 3.35×10^{-5} fibres/cm^3,
- the IUR from US EPA (2020) is 0.16 (fibres/cm^3)$^{-1}$,
- and the fraction of time exposed is set to 0.0375 (i.e., 3 years of exposure/80 years lifetime).

Consideration of these factors results in a predicted ILCR due to inhalation of asbestos during construction at receptor R9 of 2.0E-07 (or 0.02 in 100,000), which is less than the benchmark ILCR of 1E-05 (or 1 in 100,000) determined by regulatory agencies such as Health Canada to be “essentially negligible”. As such, asbestos inhalation during the construction phase alone will not result in unacceptable risk. Further consideration of the potential for additive cancer risk over all phases of the Project (construction, operation, and decommissioning) is provided in Section 7.4.1.3, below.

Diesel Particulate Matter (DPM)

The ERs based on non-cancer tolerable concentrations for DPM were less than the applicable target value of 1.0 for both acute and chronic exposure at all locations along the modelled mine boundary during construction (Table 7.7). However, as discussed in Section 7.2.4.1, IARC has classified diesel exhaust as a Group 1 human carcinogen. Specifically, diesel exhaust has exhibited a causal relationship with lung cancer, and a suggested relationship with bladder cancer (Health Canada, 2016b; IARC, 2014).

Within their human health risk assessment for diesel exhaust, Health Canada (2016b) did not evaluate studies for use in a quantitative exposure–response analysis of lung cancer risk for diesel exhaust and did not derive an ILCR. Similarly, when the US EPA reviewed the available data on this topic in 2002, they concluded that the uncertainties in the human exposure-response data for diesel exhaust were too large to derive a quantitative estimate of cancer unit risk with any degree of confidence (US EPA, 2002a). However, more recently, Health Canada (2022a) provided a quantitative estimate of the risk of lung cancer associated with exposure to $PM_{2.5}$ in Canada that may be used to provide an estimate of the additional lung cancer mortality (ALCM) from diesel exhaust using DPM as a surrogate according to Equation 7-2 as reported in Section 7.2.4.1.

Applying Equation 7-2 to the maximum predicted annual DPM concentration along the modelled mine boundary without plume depletion for the Project Alone Scenario (2.61E-02 µg/m^3 per Table 6.2) results in an ALCM of 0.04 per 100,000 population based on a three-year construction period. Modelled ALCM values would be lower at the identified human receptor locations outside the modelled mine boundary. Although Health Canada (2022a) did not provide a target ALCM that would be considered to represent a negligible level of risk, these predicted ALCM values are lower than the ILCR value of one in one hundred thousand (1 x 10^{-5}) considered to represent a negligible cancer risk by Health Canada (2021a). Overall, this suggests that there will be no unacceptable human health risks due to exposure to DPM from the Project via inhalation during Project construction. Further consideration of the potential for additive cancer risk over all phases of the Project (construction, operation, and decommissioning) is provided in Section 7.4.1.3, below**.**

7.4.1.3 Operations Phase

7.4.1.3.1 Exposure Ratios at the Modelled Mine Boundary and Human Receptor Locations

Exposure ratios (ERs) based on the maximum modelled air concentrations at the modelled mine boundary assuming no plume depletion for each human health CoPC in air during Project operations are presented in Table 7.9.

In Table 7.9, specific CoPCs and exposure durations are identified as requiring a more detailed evaluation of the significance of the estimated risk if one of the following conditions was met:

- For ERs based on a threshold effect endpoint (EL or TC), the ER for Baseline, Project Alone, or Baseline Plus Project is greater than 1.0 (if a baseline concentration is available) or greater than 0.2 (in the absence of applicable baseline data).

- For ERs based on a non-threshold effect endpoint (RSC), the Project Alone values are greater than 1.0. Baseline and Baseline Plus Project Scenarios are not compared to a threshold of 1.0 in this case as the RSC is based on a target ILCR relative to baseline conditions.

In addition, further evaluation was identified as applicable for diesel particulate matter to evaluate cancer risks based on an ALCM calculation.

Therefore, the analysis presented in Table 7.9, indicated that a more detailed evaluation of the significance of potential risk outside the modelled mine boundary was required for:

- NO_2 (1-hour and 24-hour),
- $PM_{2.5}$ (24-hour and annual),
- PM_{10} (24-hour and annual),
- Chrysotile asbestos (annual), and
- DPM (annual)

As such, exposure estimates and ERs for this subset of CoPCs and averaging periods are provided in Table 7.10 for the eight receptor locations outside the modelled mine boundary where people are most likely to be present (i.e., R6, R7, R8, R9, R10, R11, R12, and R13 as discussed in Section 6.1). The exposure estimates and ERs in Table 7.10 are provided for model results with and without plume depletion. As described in Section 6.1, model results generated without plume depletion will overestimate exposures because particulate and CoPCs in particulate are reduced as they travel from source to receptor due to deposition on surfaces such as vegetation and structures. In contrast, the model results that incorporate plume depletion may be considered as a more realistic refinement.

Further interpretation of the results presented in Table 7.9 and Table 7.10 are provided in Section 7.4.1.3.2.

Table 7.9 Exposure Ratios based on Maximum Predicted Ground Level Concentrations Along the Modelled Mine Boundary During Operation Assuming No Plume Depletion

Chemical of Potential Concern	Exposure Period	Endpoint Type	Maximum Exposure Ratio (ER) [a,b]		
			Baseline	Project Alone	Baseline Plus Project
Criteria Air Contaminants					
Nitrogen Dioxide (NO_2)[c]	Acute (1-hour)	EL	0.027	**1.1**	**1.2**
	Acute (24-hour)	EL	0.088	**1.6**	**1.7**
	Chronic (Annual)	EL	0.033	0.71	0.74
Sulphur Dioxide (SO_2)	Acute (10-minute)	EL	0.049	0.69	0.74
	Acute (24-hour)	EL	0.054	0.0029	0.056
Particulate Matter (Fine) ($PM_{2.5}$)	Acute (24-hour)	EL	0.83	0.78	**1.6**
	Chronic (Annual)	EL	**1.2**	0.35	**1.6**
Particulate Matter (Coarse) (PM_{10})	Acute (24-hour)	EL	0.29	**2.3**	**2.6**
	Chronic (Annual)	EL	0.55	0.89	**1.4**
Volatile Organic Compounds					
1,3-Butadiene	Acute (1-hour)	TC	0.002	0.000038	0.0021
	Chronic (Annual)	TC	0.28	0.00017	0.28
	Chronic (Annual)	RSC	0.33	0.0002	0.33
Acetaldehyde	Acute (1-hour)	TC	ND	0.0016	0.0016
	Chronic (Annual)	TC	ND	0.0001	0.0001
Benzene	Acute (1-hour)	TC	0.0021	0.00071	0.0028
	Acute (24-hour)	TC	0.016	0.0018	0.018
	Chronic (Annual)	RSC	0.62	0.009	0.63
Formaldehyde	Acute (1-hour)	TC	ND	0.14	0.14
	Chronic (Annual)	TC	ND	0.0082	0.0082

Chemical of Potential Concern	Exposure Period	Endpoint Type	Maximum Exposure Ratio (ER) [a,b]		
			Baseline	Project Alone	Baseline Plus Project
Diesel Particulate Matter					
Diesel particulate matter	Acute (2-hour)	TC	0.019	0.37	0.39
	Chronic (Annual)	TC	0.0036	0.013	0.017
	Chronic (Annual)	**See text**	**See text**	**See text**	**See text**
PAHs					
Naphthalene	Chronic (Annual)	TC	ND	0.00092	0.00092
Benzo(a)pyrene	Chronic (Annual)	TC	0.0051	0.00011	0.0052
Aromatic C_9-C_{16} [d]	Chronic (Annual)	TC	0.000017	0.00005	0.000067
Benzo(a)pyrene TPE [e]	Chronic (Annual)	RSC	0.00098	0.000053	0.001
Metals and Minerals					
Arsenic	Chronic (Annual)	RSC	0.8	0.075	0.88
Beryllium	Chronic (Annual)	TC	0.039	0.00035	0.039
	Chronic (Annual)	RSC	0.19	0.0017	0.19
Cadmium	Chronic (Annual)	RSC	0.11	0.0011	0.11
Chromium VI	Chronic (Annual)	TC	ND	0.0000003	0.0000003
	Chronic (Annual)	RSC	ND	0.00023	0.00023
Nickel (in PM_{10})	Chronic (Annual)	RSC	0.22	0.39	0.61

Chemical of Potential Concern	Exposure Period	Endpoint Type	Maximum Exposure Ratio (ER) [a,b]		
			Baseline	Project Alone	Baseline Plus Project
Chrysotile asbestos	Chronic (Annual)	RSC	16	**10**	26
Crystalline silica (Quartz) (in PM_{10})	Acute (24-hour)	TC	0.041	0.2	0.24
	Chronic (Annual)	TC	0.14	0.12	0.26

NOTES

a. **Bolding and shading** indicates that a more a more detailed evaluation of the significance of the estimated risk is required as described below:

i. For ERs based on exposure limit (EL) or tolerable concentration (TC), **bolding and shading** indicates that the ER for Baseline, Project Alone, or Baseline Plus Project is greater than 1.0 (if a baseline concentration is available) or greater than 0.2 (in the absence of applicable baseline data).

ii. For ERs based on a risk specific concentration (RSC), **bolding and shading** indicates that Project Alone values are greater than 1.0. Baseline and Baseline Plus Project Scenarios are not compared to a threshold of 1.0 in this case as the RSC is based on a target incremental lifetime cancer risk (ILCR) relative to baseline conditions.

iii. For diesel particulate matter, cancer risks will be evaluated using an additional lung cancer mortality (ALCM) calculation.

d. For NO_2, SO_2, $PM_{2.5}$, and PM_{10}, the 24-hour exposure limit is based on the 99th percentile of the annual distribution of 24-hour average concentrations (equivalent to 3-4 exceedance days per year). Therefore, the ERs for these CoPCs for the 24-hour period are based on the 99th percentile of the annual distribution of 24-hour average concentrations at the location with the maximum predicted ground level concentrations for that CoPC.

e. NO_2 concentrations modelled using the Ambient Ratio Method (ARM2) method, which applies a varying ambient ratio of NO_2 to total NO_X in the atmosphere to calculate NO_2 concentrations based on modelled NO_X concentrations. For further details see Chapter 12 of the Impact Statement (Assessment of Potential Effects on the Atmospheric Environment).

f. Sum of acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene

g. B(a)P total potency equivalents (TPE) calculated by summing concentrations of carcinogenic PAHs, adjusted by applying total potency equivalents (TPE)

EL - Exposure Limit; ND – No Data; RSC - Risk Specific Concentration; TC - Tolerable Concentration

Table 7.10 Exposure Estimates and Exposure Ratios During Operation at Human Receptor Locations Outside the Modelled Mine Boundary for CoPCs and Exposure Durations Identified as Requiring Further Risk Evaluation Based on Predicted Exposure Concentrations at Modelled Mine Boundary (With and Without Plume Depletion)

Chemical of Potential Concern	Exposure Period	Receptor	EL, TC, or RSC[a] (µg/m³ or fibres/cm³)[a]	Concentrations (µg/m³ or fibres/cm³)[a]					Exposure Ratios (ERs)[b,c]				
					Without Plume Depletion		With Plume Depletion			Without Plume Depletion		With Plume Depletion	
				Baseline	Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	Baseline	Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Nitrogen Dioxide (NO_2)[d]	Acute (1-hour)	R6	200	5.4	126	131	58	64	0.03	0.63	0.66	0.29	0.32
		R7			148	153	117	122		0.74	0.77	0.59	0.61
		R8			141	146	106	111		0.71	0.73	0.53	0.56
		R9			153	158	119	124		0.77	0.79	0.60	0.62
		R10			126	131	56	61		0.63	0.66	0.28	0.31
		R11			117	122	53	58		0.59	0.61	0.26	0.29
		R12			141	146	90	95		0.71	0.73	0.45	0.48
		R13			140	145	86	91		0.70	0.73	0.43	0.46
	Acute (24-hour)	R6	25	2.2	4.8	7.0	1.8	4.0	0.09	0.19	0.28	0.07	0.16
		R7			13	15	5.2	7.4		0.50	0.59	0.21	0.29
		R8			13	15	5.9	8.1		0.51	0.60	0.23	0.32
		R9			12	14	5.3	7.5		0.48	0.57	0.21	0.30
		R10			4.9	7.1	1.8	4.0		0.20	0.28	0.07	0.16
		R11			4.5	6.7	1.7	3.9		0.18	0.27	0.07	0.16
		R12			4.9	7.1	1.8	4.1		0.20	0.29	0.07	0.16
		R13			4.9	7.1	1.8	4.0		0.19	0.28	0.07	0.16
Particulate Matter (Fine) ($PM_{2.5}$)	Acute (24-hour)	R6	15	12	1.8	14	0.6	13	0.83	0.12	0.95	0.04	0.87
		R7			3.5	16	1.3	14		0.23	**1.1**	0.09	0.91
		R8			5.3	18	2.2	15		0.35	**1.2**	0.15	0.97
		R9			4.0	16	1.8	14		0.27	**1.1**	0.12	0.95
		R10			1.7	14	0.56	13		0.11	0.94	0.04	0.86
		R11			1.7	14	0.58	13		0.11	0.94	0.04	0.87
		R12			2.0	14	0.66	13		0.13	0.96	0.04	0.87
		R13			2.0	14	0.64	13		0.13	0.96	0.04	0.87
	Chronic (Annual)	R6	5	6.2	0.09	6.3	0.03	6.2	**1.2**	0.02	**1.3**	0.01	**1.2**
		R7			0.18	6.4	0.09	6.3		0.04	**1.3**	0.02	**1.3**
		R8			0.30	6.5	0.16	6.4		0.06	**1.3**	0.03	**1.3**
		R9			0.31	6.5	0.14	6.3		0.06	**1.3**	0.03	**1.3**
		R10			0.08	6.3	0.03	6.2		0.02	**1.3**	0.01	**1.2**
		R11			0.08	6.3	0.03	6.2		0.02	**1.3**	0.01	**1.2**
		R12			0.09	6.3	0.03	6.2		0.02	**1.3**	0.01	**1.2**
		R13			0.09	6.3	0.03	6.2		0.02	**1.3**	0.01	**1.2**

Chemical of Potential Concern	Exposure Period	Receptor	EL, TC, or RSC[a] (µg/m³ or fibres/cm³) [a]	Concentrations (µg/m³ or fibres/cm³)[a]					Exposure Ratios (ERs)[b,c]				
					Without Plume Depletion		With Plume Depletion			Without Plume Depletion		With Plume Depletion	
				Baseline	Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	Baseline	Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Particulate Matter (Coarse) (PM_{10})	Acute (24-hour)	R6	45	13	17	30	5.5	19	0.29	0.38	0.68	0.12	0.41
		R7			31	44	12	25		0.69	0.98	0.26	0.55
		R8			47	60	20	33		**1.0**	**1.3**	0.43	0.72
		R9			38	51	16	29		0.85	**1.1**	0.36	0.65
		R10			16	29	5.3	18		0.35	0.64	0.12	0.41
		R11			16	29	5.2	18		0.35	0.64	0.12	0.41
		R12			19	32	6.1	19		0.41	0.70	0.14	0.43
		R13			18	31	6.0	19		0.40	0.70	0.13	0.42
	Chronic (Annual)	R6	15	8.3	0.74	9	0.29	9	0.55	0.05	0.60	0.02	0.57
		R7			1.5	9.8	0.83	9.1		0.10	0.65	0.06	0.61
		R8			2.6	11	1.4	9.7		0.17	0.72	0.10	0.65
		R9			2.6	11	1.2	9.5		0.18	0.73	0.08	0.63
		R10			0.72	9.0	0.28	8.6		0.05	0.60	0.02	0.57
		R11			0.69	9.0	0.27	8.5		0.05	0.60	0.02	0.57
		R12			0.76	9.0	0.28	8.6		0.05	0.60	0.02	0.57
		R13			0.74	9.0	0.27	8.6		0.05	0.60	0.02	0.57
Chrysotile Asbestos (units are fibres/cm³)	Chronic (Annual)	R6	6.3E-05	0.001	4.88E-05	1.0E-03	2.15E-05	1.0E-03	16	0.78	17	0.34	16
		R7			9.73E-05	1.1E-03	5.19E-05	1.1E-03		**1.6**	18	0.83	17
		R8			1.66E-04	1.2E-03	9.19E-05	1.1E-03		**2.7**	19	**1.5**	17
		R9			1.92E-04	1.2E-03	9.92E-05	1.1E-03		**3.1**	19	**1.6**	18
		R10			4.75E-05	1.0E-03	2.10E-05	1.0E-03		0.76	17	0.34	16
		R11			4.48E-05	1.0E-03	1.99E-05	1.0E-03		0.72	17	0.32	16
		R12			5.03E-05	1.1E-03	2.14E-05	1.0E-03		0.80	17	0.34	16
		R13			4.92E-05	1.0E-03	2.08E-05	1.0E-03		0.79	17	0.33	16

Chemical of Potential Concern	Exposure Period	Receptor	EL, TC, or RSC[a] (µg/m³ or fibres/cm³) [a]	Concentrations (µg/m³ or fibres/cm³)[a]					Exposure Ratios (ERs)[b,c]				
					Without Plume Depletion		With Plume Depletion			Without Plume Depletion		With Plume Depletion	
				Baseline	Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project	Baseline	Project Alone	Baseline Plus Project	Project Alone	Baseline Plus Project
Diesel particulate matter	Chronic (Annual)	R6	NA	1.8E-02	3.8E-03	2.2E-02	1.2E-03	1.9E-02	NA	NA	NA	NA	NA
		R7			8.0E-03	2.6E-02	3.3E-03	2.1E-02		NA	NA	NA	NA
		R8			1.4E-02	3.2E-02	5.9E-03	2.4E-02		NA	NA	NA	NA
		R9			1.4E-02	3.2E-02	5.1E-03	2.3E-02		NA	NA	NA	NA
		R10			3.7E-03	2.2E-02	1.2E-03	1.9E-02		NA	NA	NA	NA
		R11			3.5E-03	2.2E-02	1.1E-03	1.9E-02		NA	NA	NA	NA
		R12			3.9E-03	2.2E-02	1.2E-03	1.9E-02		NA	NA	NA	NA
		R13			3.8E-03	2.2E-02	1.1E-03	1.9E-02		NA	NA	NA	NA

Notes

a. Units are µg/m³ for all CoPCs except for chrysotile asbestos, for which the RSC and concentrations are reported as fibres/cm³.

b. **Bolding and shading** indicates that a more a more detailed evaluation of the significance of the estimated risk is required as described below:

   i. For ERs based on exposure limit (EL) or tolerable concentration (TC), **bolding and shading** indicates that the ER for Baseline, Project Alone, or Baseline Plus Project is greater than 1.0 (if a baseline concentration is available) or greater than 0.2 (in the absence of applicable baseline data).

   ii. For ERs based on a risk specific concentration (RSC), **bolding and shading** indicates that Project Alone values are greater than 1.0. Baseline and Baseline Plus Project Scenarios are not compared to a threshold of 1.0 in this case as the RSC is based on a target incremental lifetime cancer risk (ILCR) relative to baseline conditions.

   iii. For diesel particulate matter, cancer risks will be evaluated using an additional lung cancer mortality (ALCM) calculation.

c. For NO_2, $PM_{2.5}$, and PM_{10}, the 24-hour exposure limit is based on the 99th percentile of the annual distribution of 24-hour average concentrations (equivalent to 3-4 exceedance days per year). Therefore, the exposure concentrations and ERs for these CoPCs for the 24-hour period are based on the 99th percentile of the annual distribution of 24-hour average concentrations at the location with the maximum predicted ground level concentrations for that CoPC.

d. NO_2 concentrations modelled using the Ambient Ratio Method (ARM2) method, which applies a varying ambient ratio of NO_2 to total NO_X in the atmosphere to calculate NO_2 concentrations based on modelled NO_X concentrations. For further details see Chapter 12 of the Impact Statement (Assessment of Potential Effects on the Atmospheric Environment).

EL - Exposure Limit; ND – No Data; RSC - Risk Specific Concentration; TC - Tolerable Concentration; NA – Not Applicable

7.4.1.3.2 Risk Evaluation for Individual CoPCs

As described above in the risk characterization methods for evaluating human health risks due to inhalation, further risk evaluation for the operations phase was not required for CoPCs with a threshold or carcinogenic mode of action for which the ERs presented in Table 7.9 were less than their applicable target. For these CoPCs, the ERs are less than the applicable target (1.0 or 0.2, as defined above) for that CoPC in the LSA area outside the Modelled Mine Boundary and at locations both inside and outside the Modelled Mine Boundary selected to represent places where people are likely to be present and could be exposed to emissions from the Project. Therefore, health risks associated with inhalation of these CoPCs in the LSA (and outside the LSA) are expected to be negligible as defined by Health Canada (2023a).

However, further risk evaluation was required for the operations phase for the following CoPCs:

- Criteria air contaminants
- CoPCs with threshold or carcinogenic modes of action with ERs greater than their applicable target (1.0 or 0.2, as described in Section 7.2.1) in Table 7.9, i.e.:
    - Chrysotile asbestos
- Diesel particulate matter (DPM)

Further discussion of each the potential for health risks due to inhalation for each of these CoPCs is provided below.

Criteria Air Contaminants (NO_2, SO_2, $PM_{2.5}$, and PM_{10})

As described in Section 7.2.4.1.1, NO_2, SO_2, $PM_{2.5}$, and PM_{10} are non-threshold contaminants, for which it is acknowledged that any increase in exposure to these contaminants may result in adverse health effects. Therefore, the increased ERs for these CoPCs related to the Project as demonstrated in Table 7.9 may result in increased adverse health risks.

However, the severity of effects increases incrementally with exposure concentration and exposure duration. Most of the exposure limits for these CoPCs identified in Table 7.3 are WHO ambient air quality guidelines, which are described by WHO (2021) as representative of the lowest level of exposure for which there is evidence of adverse health effects. It is assumed that adverse health effects do not occur or are minimal below this concentration level (WHO, 2021). The only exposure limit for a criteria air contaminant identified in Table 7.3 that is not a WHO ambient air quality guideline is the acute 10-minute exposure limit for SO_2, which is considered by Health Canada (2016c) to be protective of respiratory effects in humans, including sensitive populations like people with asthma. Therefore, adverse health effects are also considered to be minimal below this concentration level.

As such, the ERs less than 1.0 calculated for the Baseline Plus Project Scenario in Table 7.9 are considered to represent negligible health risks. For criteria air contaminants and averaging periods for which an ER greater than 1.0 is presented in either Table 7.9, additional rationale to discuss the potential for human health risks due to inhalation of Project-related emissions of these CoPC is provided below:

- **Nitrogen Dioxide (NO_2).**

  The maximum ERs for NO_2 for the Baseline Plus Project scenario during Project Operation along the modelled mine boundary presented in Table 7.9 were greater than 1.0 for the 1-hour and 24-hour averaging periods. However, as shown in Table 7.10, the ER for NO_2 (annual) was less than 1.0 at the modelled mine boundary. Additionally, as shown in Figures A.11 to A.12, Appendix A and Table 7.10, ERs were less than 1.0 for the for the 1-hour and 24-hour averaging periods for human receptor locations outside the modelled mine boundary. This suggests that the potential health risks due to inhalation at locations outside the modelled mine boundary are likely to be negligible for both acute and chronic time periods.

  As shown in Figure A.11, Appendix A, the area outside the modelled mine boundary where the 1-hour exposure limit is exceeded is limited in spatial extent. Although people may pass through this area for traditional land use or recreational purposes for periods of time longer than one hour, it is noted by the WHO (2021) that when the long-term exposures are compliant with the long-term guideline of 10 µg/m^3, days with concentrations approaching or greater than the 24-hour guideline of 25 µg/m^3 will correspond to the far upper tail of the distribution of daily exposures and most days will have much lower values, with close to half having concentrations below or far below the annual exposure limit. The health burden related to a few days with higher concentrations corresponds to a very small fraction of the total pollution related burden (WHO, 2021). Therefore, ERs greater than one for acute exposure periods outside the modelled mine boundary are likely to result in effects that would be mild, temporary, and reversible.

- **Particulate Matter (PM_{10} and $PM_{2.5}$).** The ERs for the Baseline Plus Project scenario during Project operation based on the maximum predicted ground level concentration along the modelled mine boundary for $PM_{2.5}$ (24-hour and annual) and PM_{10} (24-hour and annual) presented in Table 7.9 were greater than 1.0. The isopleths for the Baseline Plus Project scenario contribution of these parameters for these exposure periods during operation are provided in Figures A.13 to A.16, Appendix A and the ERs for these parameters for the Baseline Plus Project scenario during Project operation specific to the receptor locations where people are expected to be regularly present during Project operation are provided in Table 7.10. As shown in these figures and in Table 7.10, the magnitude by which modelled concentrations are greater than the applicable exposure limits is typically low and the spatial extent is limited.

  For special receptor locations that are most representative of where people will be present for periods of time equal to or greater than 24-hours during Project operation, ERs for these parameters are less than 1.0 for PM_{10} (annual) and range from less than 1.0 to 1.3 for $PM_{2.5}$ (24-hour), $PM_{2.5}$ (annual), and PM_{10} (24-hour) (Table 7.10) for results modelled without plume depletion. When ERs are recalculated using modelled concentrations with plume depletion (see Section 6.1), ERs for $PM_{2.5}$ (24-hour) and PM_{10} (24-hour and annual) are less than or equal to 1.0 for all special receptor locations (Table 7.10). The recalculated ERs for $PM_{2.5}$ (annual) range from 1.2 (for R6, R10, R11, R12, and R13) to 1.3 (for R7, R8, and R9), which are either indistinguishable from the baseline ER of 1.2 or represent only a minor increase above the baseline ER of 1.2 (Table 7.10). Therefore, the modelled concentrations for PM_{10} and $PM_{2.5}$ indicate that human health impacts due to inhalation of these parameters from the Project during operation will be negligible to low in comparison to pre-existing baseline conditions.

Chrysotile Asbestos

The ERs shown for chrysotile asbestos in Table 7.9 are based on a RSC derived to represent the concentration at which the calculated target ILCR would be equivalent to one in one hundred thousand (1×10^{-5}) assuming a lifetime of exposure to that concentration (i.e., fraction of time exposed is assumed to be equal to 1.0). As such, the RSC and the ER are only applicable to the Project Alone scenario as they were developed to address cancer risks that are above existing conditions (i.e., the ILCR).

As shown in Table 7.9, the maximum ER for the Project Alone scenario along the modelled mine boundary is 10, based on exposure estimates assuming no plume depletion. This is a conservative assumption given that concentrations of particulate are expected to be depleted from plumes as they travel from source to receptor due to deposition on surfaces such as vegetation and structures. When ERs are recalculated using modelled concentrations with plume depletion (see Section 6.1), this maximum ER along the modelled mine boundary decreases to 5.4.

These results suggest there is a possibility for asbestos concentrations associated with the Project to be high enough at certain locations outside the modelled mine boundary that chronic exposure at those locations would result in an ILCR greater than the target of 1×10^{-5} assuming 100% of their time is spent at that location over a lifetime. This will overestimate risk associated with the Project given that the duration of active Project phases (48 years based on three years of construction, 40 years of operation, and five years of active closure) is less than the assumed lifetime duration of 80 years described in Section 7.3.1. Additionally, there are a limited number of areas in the LSA where people are expected to be present for chronic exposure periods.

Therefore, a refined estimate of potential cancer risk dues to exposure to chrysotile asbestos during Project operation can be more accurately evaluated by considering the ILCR at the human receptor location for which the highest receptor-specific ER was calculated (R9, see Table 7.10). Given that the operation phase is expected to last 40 years, the ILCR at receptor R9 during Project operation can be evaluated according to Equation 7-5 (adapted to be applicable to count based units of fibres/ cm^3 for asbestos) as follows:

ILCR = Air concentration (fibres/cm^3) x Fraction of Time Exposed x inhalation unit risk (fibres/cm^3)$^{-1}$, where

- the predicted annual air concentration of asbestos during construction at R9 (assuming no plume depletion) is 1.92×10^{-4} fibres/cm^3,
- the IUR from US EPA (2020) is 0.16 (fibres/cm^3)$^{-1}$,
- and the fraction of time exposed is set to 0.5 (i.e., 40 years of exposure/80 years lifetime).

Consideration of these factors results in a predicted ILCR due to inhalation of asbestos during operation at receptor R9 of 1.54E-05 (or 1.5 in 100,000), which is slightly greater than the benchmark ILCR of 1E-05 (or 1 in 100,000) determined by regulatory agencies such as Health Canada to be “essentially negligible”. When this ILCR is recalculated with plume depletion accounted for at R9, it results in an ILCR of 7.9E-06, which is less than the benchmark ILCR of 1E-05 (or 1 in 100,000). As such, asbestos inhalation during the operation phase will not result in unacceptable risk.

Furthermore, to account for cancer risk over the Project lifetime due to inhalation of chrysotile asbestos from the Project for receptor location R9, the ILCR for the construction phase at this location can be summed with the ILCR calculated for the operation phase, as well as an ILCR calculated for the active decommissioning phase. The results of this analysis, based on model results including plume depletion, are summarized in Table 7.11. As shown in Table 7.11, adopting the more realistic concentrations predicted with plume depletion accounted for results in a total Project lifecycle ILCR at R9 of 8.2E-06, which is less than the benchmark ILCR of 1E-05 (or 1 in 100,000) and still likely to overestimate risk given that R9 is not a full time residence, but rather represents an overnight stay location that may be occupied temporarily at various points in the year.

As such, it can be concluded that asbestos inhalation throughout the Project lifetime will not result in unacceptable cancer risk to people spending time in the LSA/ RSA.

Table 7.11 Incremental Lifetime Cancer Risks due to Inhalation of Chrysotile Asbestos from Project Activities Calculated for the Active Phases of the Project (Construction, Operation, and Active Decommissioning) for Receptor R9 (with Plume Depletion)

Phase of Project	Predicted Project Alone Exposure Concentration for Chrysotile Asbestos (With Plume Depletion) (fibres/cm^{3})	Fraction of Time Exposed (Years of Project Phase/ 80 Year Lifetime) (unitless)	ILCR[a]
Construction	1.4E-05	3/80 = 0.0375	8.6E-08
Operation	9.9E-05	40/80 = 0.5	7.9E-06
Active Decommissioning[b]	1.4E-05	5/80 = 0.0625	1.4E-07
Total (Sum of ILCR from all three phases)			8.2E-06

Notes:

a. ILCR calculated according to Equation 7-6 adapted to be applicable to count based units of fibres/ cm^{3} for asbestos) using the IUR from US EPA (2020) of 0.16 (fibres/cm^{3})$^{-1}$

b. Air quality emissions during Project decommissioning and closure were not explicitly modelled given that active closure emissions are expected to be less than construction emissions and therefore the assessment of the construction-related scenarios were considered to implicitly address active closure phase emissions as well (see Section 6.1). As such, the predicted exposure concentration during active decommissioning was assumed to be equivalent to the predicted value during construction for this calculation.

Diesel Particulate Matter

As described in Section 7.2.4.1, diesel exhaust is recognized as a Group 1 human carcinogen with an identified causal relationship with lung cancer, and a suggested relationship with bladder cancer (Health Canada, 2016b; IARC, 2014). Although ERs were less than one during Project Operation for the non-cancer guidelines for DPM (a surrogate for diesel exhaust) in Table 7.9, further evaluation of diesel exhaust carcinogenicity was carried out using Equation 7-2.

Applying Equation 7-2 to the maximum modelled annual DPM concentrations along the modelled mine boundary for the Project Alone scenario in Table 6.3 assuming no plume depletion results in an ALCM of 1.4 per 100,000 population based on a 40 year operation period. This is assumption will overestimate risk given that concentrations of particulate are expected to be depleted from plumes as they travel from source to receptor due to deposition on surfaces such as vegetation and structures. When the ALCM is recalculated using modelled concentrations with plume depletion, the ALCM at the maximum location along the modelled mine boundary decreases to 0.65 per 100,000.

Furthermore, to account for cancer risk over the Project lifetime due to inhalation of diesel particulate matter from the Project, the ALCM for the construction phase can be summed with the ALCM for the operation phase, as well as an ALCM calculated for the active decommissioning phase. The results of this analysis, based on the maximum modelled DPM concentrations (including plume depletion) along the modelled mine boundary are summarized in Table 7.12. As shown in Table 7.12, adopting the more realistic concentrations predicted with plume depletion accounted for results in a total Project lifecycle ALCM of 0.71 per 100,000 at the location with the highest predicted DPM exposure along the modelled mine boundary. Modelled ALCM values would be lower at the remaining identified human receptor locations outside the modelled mine boundary. Although Health Canada (2022a) did not provide a target ALCM that would be considered to represent a negligible level of risk, given that the predicted ALCM values along the modelled mine boundary are lower than the ILCR value of one in one hundred thousand (1×10^{-5}) considered to represent a negligible cancer risk by Health Canada (2021a) (with plume depletion), this suggests that there will be no unacceptable cancer risk to people exposed to DPM from the Project.

Table 7.12 Additional Lung Cancer Mortality (ALCM) due to Inhalation of Diesel Particulate Matter from Project Activities Calculated for the Active Phases of the Project (Construction, Operations, and Active Decommissioning) for the Maximum Modelled Location Along the Modelled Mine Boundary

Phase of Project	Predicted Project Alone Exposure Concentration for Diesel Particulate Matter (With Plume Depletion) (µg/m^3)	Duration of Exposure (Years)	ALCM per 100,000 population
Construction	1.36E-02	3	0.02
Operation	2.99E-02	40	0.65
Active Decommissioning[b]	1.36E-02	5	0.04
Total (Sum of ALCM from all three phases)			0.71

Notes:

a. ALCM calculated according to Equation 7-2

b. Air quality emissions during Project decommissioning and closure were not explicitly modelled given that active closure emissions are expected to be less than construction emissions and therefore the assessment of the construction-related scenarios were considered to implicitly address active closure phase emissions as well (see Section 6.1). As such, the predicted exposure concentration during active decommissioning was assumed to be equivalent to the predicted value during construction for this calculation.

7.4.2 Human Health Risk Via Multimedia Exposure

For the multimedia human health risk estimates, receptors are assumed to be exposed to the highest modelled concentrations in the terrestrial and aquatic environments simultaneously, even though the highest modelled terrestrial exposures and highest modelled water exposures do not occur at the same time. For future scenarios, terrestrial exposure estimates incorporate the combined metal accumulation in the soil from deposition over the life of the Project (which occurs after Year 40, following construction and operations), while aquatic exposure estimates are modelled to occur at various times over the life of the Project, depending on FDP and parameter.

7.4.2.1 Quantitative Evaluation of Risk

Multimedia exposure pathways were quantitatively evaluated for the LSA. Separate calculations were completed for each watershed because water quality and aquatic components (e.g., fish) were modelled separately for each watershed (North Driftwood River, West Buskegau River and Jocko Creek), and exposure factors were not specific for each of the watersheds (e.g., it is not known what portion of fish may be obtained from each of the watersheds). The Indigenous Receptor and Residential Receptor were assumed to come in direct contact with soil and surface water, and consume fish, wild meat, and wild vegetation from the LSA. Indigenous and Recreational Receptors could come in direct contact with CoPC in soil through incidental ingestion, dermal contact and inhalation of suspended particulates outside of the PA. Receptors may use surface water as a potable water source and they could come into contact with, and incidentally ingest surface water within the LSA during recreational activities. Exposures to surface water via dermal contact are expected to be negligible.

It is recognized that differences exist in the types and amounts of country foods consumed by individuals. The species and tissues chosen for inclusion in the assessment are representative of those commonly consumed by receptor groups (Indigenous and Residential Receptors). Although not all species listed by Indigenous nations could be included in the assessment, the species selected were chosen as being the most abundant and likely to be commonly consumed, thereby providing a reasonable upper bound estimate of potential exposure for the receptor groups considered.

Total risk estimates of CoPCs greater than the threshold and non-threshold target values are summarized in Table 7.13 to Table 7.16. Though risk estimates are available for the two modelled discharge points within both the North Driftwood River and West Buskegau River watersheds (see Section 6.3), only the maximum risk estimates are shown in the summary tables. The toddler is the critical lifestage for non-carcinogenic risk, which is due to the ingestion rate to body weight ratio being greater than other lifestages. Carcinogenic risk is evaluated for the Indigenous Receptor and Recreational Receptor over a lifetime. Calculated risks for the applicable pathways for each receptor and lifestage are provided in Appendix E.

Where risk estimates are less than the target value, health risks associated with multimedia exposure (including project related exposure) of these CoPCs in the LSA are expected to be negligible as defined by Health Canada (2023a). However, further evaluation was required for CoPCs with risk estimates greater than their applicable target.

Table 7.13 Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler under Baseline, Project Alone, Baseline Plus Project Scenarios

CoPC	North Driftwood River Watershed			West Buskegau River Watershed			Jocko Creek Watershed		
	Baseline HQ	Project Alone HQ	Baseline Plus Project HQ	Baseline HQ	Project Alone HQ	Baseline Plus Project HQ	Baseline Scenario HQ	Project Alone HQ	Baseline Plus Project HQ
Arsenic	**0.4**	**2**	**3**	**0.3**	0.2	**0.6**	**0.5**	0.01	**0.5**
Manganese	**4**	0.09	**4**	**4**	0.09	**4**	**4**	0.1	**4**
Molybdenum	**0.3**	0.2	**0.5**	**0.3**	0.1	**0.3**	**0.3**	0.03	**0.3**
Thallium	**0.7**	0.002	**0.7**	**0.5**	0.01	**0.5**	**0.7**	0.04	**0.7**
Uranium	0.02	**0.3**	**0.4**	0.02	0.1	0.1	0.02	0.0002	0.02
Vanadium	**0.3**	**0.4**	**0.7**	**0.3**	0.1	**0.4**	**0.3**	0.04	**0.3**

Notes
Bolding and shading HQ above applicable target
Risk estimates have been rounded to one significant figure.

Table 7.14 Carcinogenic Risk Estimates for an Indigenous Receptor under Baseline, Project Alone, Baseline Plus Project Scenarios

CoPC	North Driftwood River Watershed			West Buskegau River Watershed			Jocko Creek Watershed		
	Baseline ILCR	Project Alone ILCR	Baseline Plus Project ILCR	Baseline ILCR	Project Alone ILCR	Baseline Plus Project ILCR	Baseline ILCR	Project Alone ILCR	Baseline Plus Project ILCR
Arsenic	1.E-04	**6.E-04**	8.E-04	9.E-05	**7.E-05**	2.E-04	1.E-04	2.E-06	1.E-04

Notes
Bolding and shading ILCR above applicable target for Project Alone
Risk estimates have been rounded to one significant figure.

Table 7.15 Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler under Baseline, Project, Baseline Plus Project Scenarios

CoPC	North Driftwood River Watershed			West Buskegau River Watershed			Jocko Creek Watershed		
	Baseline HQ	Project Alone HQ	Baseline Plus Project HQ	Baseline HQ	Project Alone HQ	Baseline Plus Project HQ	Baseline HQ	Project Alone HQ	Baseline Plus Project HQ
Arsenic	**0.3**	**1**	**2**	0.2	0.2	**0.4**	**0.3**	0.006	**0.3**
Manganese	**1**	0.02	**1**	**1**	0.02	**1**	**1**	0.03	**1**
Thallium	**0.3**	0.001	**0.3**	0.2	0.004	0.2	**0.3**	0.02	**0.3**
Uranium	0.01	**0.3**	**0.3**	0.01	0.07	0.08	0.01	0.00008	0.01
Vanadium	0.2	**0.3**	**0.5**	0.2	0.07	**0.3**	0.2	0.02	0.2

Notes
Bolding and shading HQ above applicable target
Risk estimates have been rounded to one significant figure.

Table 7.16 Carcinogenic Risk Estimates for a Recreational Receptor under Baseline, Project Alone, Baseline Plus Project Scenarios

CoPC	North Driftwood River Watershed			West Buskegau River Watershed			Jocko Creek Watershed		
	Baseline ILCR	Project Alone ILCR	Baseline Plus Project ILCR	Baseline ILCR	Project Alone ILCR	Baseline Plus Project ILCR	Baseline ILCR	Project Alone ILCR	Baseline Plus Project ILCR
Arsenic	7.E-05	**5.E-04**	5.E-04	6.E-05	**6.E-05**	1.E-04	8.E-05	1.E-06	8.E-05

Notes
Bolding and shading ILCR above applicable target for Project Alone
Risk estimates have been rounded to one significant figure.

7.4.2.1.1 Indigenous Receptor

North Driftwood River Watershed

Total HQs for arsenic, manganese, molybdenum, thallium and vanadium were greater than the target value of 0.2 for the Baseline Scenario. Under the Baseline Plus Project Scenario, total HQs for arsenic, manganese, molybdenum, thallium, uranium and vanadium were greater than the target value of 0.2. The HQs for the remaining CoPC were below the target value of 0.2 for both Baseline and Baseline Plus Project Scenarios.

The changes in total HQs between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) for arsenic, uranium and vanadium are greater than the target value of 0.2 indicating potential for Project-related non-carcinogenic health risks. Health Canada (2023a) indicates that a target HQ of less than or equal to 0.2 for project related exposures is negligible. The change in total HQ for manganese, molybdenum and thallium were less than the target value of 0.2 indicating Project-related health risks are negligible. Though Project-related health risks are negligible for manganese, molybdenum and thallium, total HQs (under the Baseline Plus Project Scenario) above the target value of 0.2 are discussed in Section 7.4.2.1.3.

The total ILCR for arsenic was greater than the target value of 1×10^{-5} under Project Alone Scenario indicating potential for Project-related carcinogenic health risks.

West Buskegau River Watershed

Total HQs for arsenic, manganese molybdenum, thallium and vanadium were greater than the target value of 0.2 for the Baseline Scenario and Baseline Plus Project Scenario. The HQs for the remaining CoPC were equal to, or below the target value of 0.2 for both Baseline and Baseline Plus Project Scenarios.

The changes in total HQ between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) were equal to, or less than, the target value of 0.2 indicating Project-related health risks are negligible. Though Project-related health risks are negligible, total HQs (under the Baseline Plus Project Scenario) above the target value of 0.2 are discussed in Section 7.4.2.1.3.

The total ILCR for arsenic was greater than the target value of 1×10^{-5} under Project Alone Scenario indicating potential for Project-related carcinogenic health risks.

Jocko Creek Watershed

Total HQs for arsenic, manganese, molybdenum, thallium and vanadium were greater than the target value of 0.2 for the Baseline Scenario and Baseline Plus Project Scenario. The HQs for the remaining CoPC were below the target value of 0.2 under both Baseline and Baseline Plus Project Scenarios.

The changes in total HQ between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) were equal to, or less than the target value of 0.2 indicating Project-related non-carcinogenic health risks are negligible. Though Project-related health risks are negligible, total HQs (under the Baseline Plus Project Scenario) above the target value of 0.2 are discussed in Section 7.4.2.1.3.

The total ILCR for arsenic was less than the target value of 1 x 10^{-5} under Project Alone Scenario indicating Project-related carcinogenic health risks are negligible.

7.4.2.1.2 Recreational Receptor

North Driftwood River Watershed

Total HQs for arsenic, manganese and thallium were greater than the target value of 0.2 for the Baseline Scenario. Under the Baseline Plus Project Scenario, total HQs for arsenic, manganese, thallium, uranium and vanadium were greater than the target value of 0.2. The HQs for the remaining CoPC were equal to, or below the target value of 0.2 for both Baseline and Baseline Plus Project Scenarios.

The changes in total HQ between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) for arsenic, uranium and vanadium are greater than the target value of 0.2 indicating potential for Project-related non-carcinogenic health risks. The change in total HQ for manganese and thallium were less than the target value of 0.2 indicating Project-related health risks are negligible. Though Project-related health risks are negligible for manganese and thallium, total HQs (under the Baseline Plus Project Scenario) above the target value of 0.2 are discussed in Section 7.4.2.1.3.

The total ILCR for arsenic was greater than the target value of 1 x 10^{-5} under Project Alone Scenario indicating potential for Project-related carcinogenic health risks.

West Buskegau River Watershed

The total HQ for manganese was greater than the target value of 0.2 for the Baseline Scenario. Under the Baseline Plus Project Scenario, total HQ for arsenic, manganese and vanadium were greater than the target value of 0.2. The HQs for the remaining CoPC were equal to, or below the target value of 0.2 under for Baseline and Baseline Plus Project Scenarios.

The changes in total HQ between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) were equal to, or less than the target value of 0.2 indicating Project-related health risks are negligible. Though Project-related health risks are negligible, total HQs (under the Baseline Plus Project Scenario) above the target value of 0.2 are discussed in Section 7.4.2.1.3.

The total ILCR for arsenic was greater than the target value of 1 x 10^{-5} under Project Alone Scenario indicating potential for Project-related carcinogenic health risks.

Jocko Creek Watershed

Total HQs for arsenic, manganese and thallium were greater than the target value of 0.2 for the Baseline and Baseline Plus Project Scenarios. The HQs for the remaining CoPC were equal to, or below the target value of 0.2 under both Baseline and Baseline Plus Project Scenarios.

The changes in total HQ between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) were less than the target value of 0.2 indicating Project-related non-carcinogenic health risks are negligible. Though Project-related health risks are negligible, total HQs (under the Baseline Plus Project Scenario) above the target value of 0.2 are discussed in Section 7.4.2.1.3.

The total ILCR for arsenic was less than the target value of 1×10^{-5} under Project Alone Scenario indicating Project-related carcinogenic health risks are negligible.

7.4.2.1.3 Discussion

Total HQs for arsenic, manganese, molybdenum, thallium, uranium and vanadium were greater than the target value of 0.2 under one or more of the Baseline Plus Project Scenarios within the North Driftwood River, West Buskegau River and Jocko Creek watersheds. Total ILCRs for arsenic were greater than the target value of 1×10^{-5} under the Project Alone Scenario within the North Driftwood River and West Buskegau River watersheds. Several assumptions were made in the HHRA that overestimated health risks.

For example, Indigenous and Recreational Receptors are assumed to obtain 100% of their wild vegetation, wild meat and fish from the LSA. However, information gathered through community and Indigenous engagement suggests that people obtain country foods from locations that extend beyond the LSA. In the absence of community-specific consumption for traditional foods, the assumption of 100% being obtained from the LSA may grossly overstate the risks to the Indigenous and Recreational Receptors. Also, baseline data for fish for the Jocko Creek watershed are not available. In the absence of these data, fish data for the North Driftwood watershed were used (see Section 6). As such, the HQs greater than the target value of 0.2 for the Baseline and Baseline Plus Project Scenarios may not be representative of actual conditions in the Jocko Creek watershed. A detailed discussion of uncertainty is provided in Section 7.5.

While it is important to assess the potential health risks associated with the Baseline Plus Project Scenario, the objective of the HHRA is to address the potential change in health risk for human receptors as a result of Project-related activities. The Project Alone Scenario best reflects that potential change in health risk for human receptors. Based on Health Canada (2023a) guidance, total HQ or ILCR less than or equal to the target value for project-related exposures is negligible. Based on the quantitative evaluation in Section 7.4.2.1:

- Project-related non-carcinogenic health risks for arsenic, uranium and vanadium were identified for the North Driftwood watershed.
- Project-related carcinogenic health risk for arsenic were identified for the North Driftwood and West Buskegau River watersheds.
- Project-related non-carcinogenic health risks are negligible for the West Buskegau River watershed.
- Project-related health risks are negligible for the Jocko Creek watershed.

In accordance with Health Canada (2023a) guidance, Project-related health risks for arsenic, uranium and vanadium are discussed further below.

Arsenic

The total HQ for arsenic under the Project Alone Scenario is greater than the target value within the North Driftwood River watershed and the total ILCR for arsenic is greater than the target value for the Project Alone Scenario within the North Driftwood River and West Buskegau River watersheds.

The risk estimates for arsenic are primarily affected by exposures resulting from modelled changes in surface water, specifically through fish and potable water consumption. Fish consumption represents the highest contribution to the risk estimates associated with modelled surface water changes within the North Driftwood River watershed. For example, the fish consumption HQs and ILCRs for arsenic contributes to more than 50% of total health risk (see Figure 7.2 to Figure 7.4). For the West Buskegau River watershed, the fish consumption and drinking water ILCRs for arsenic each contribute to approximately 30% to 60% of the total carcinogenic health risk (see Figure 7.3 and Figure 7.5). To better characterize the potential health risks from arsenic exposures, additional lines of evidence related to arsenic in fish and potable water were considered, as discussed below.

Figure 7.2 Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) and West Buskegau River (Pond 1) Watersheds – Arsenic

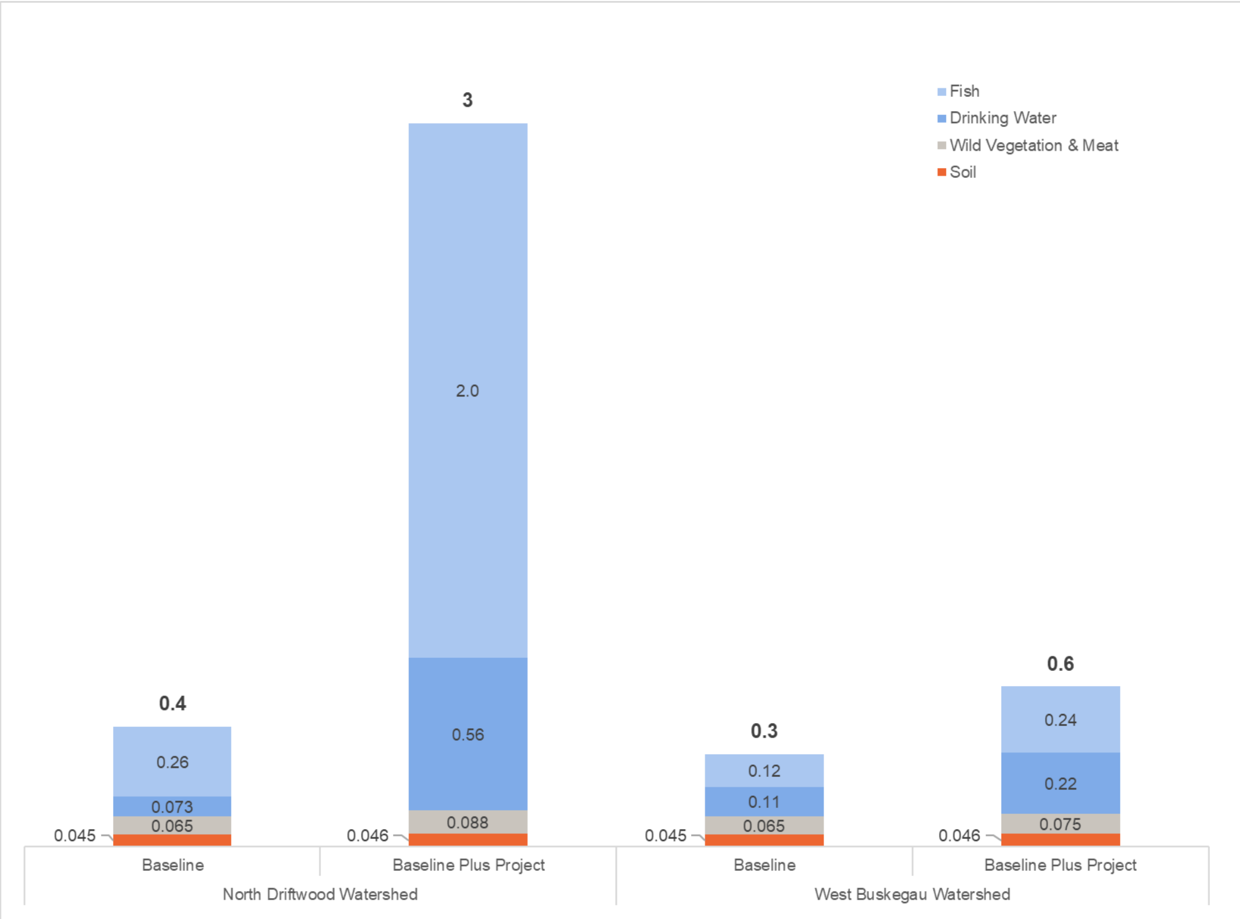


Figure 7.3 Carcinogenic Risk Estimates for an Indigenous Receptor at the North Driftwood River (TMF Ponds) and West Buskegau River (Pond 1) Watersheds – Arsenic

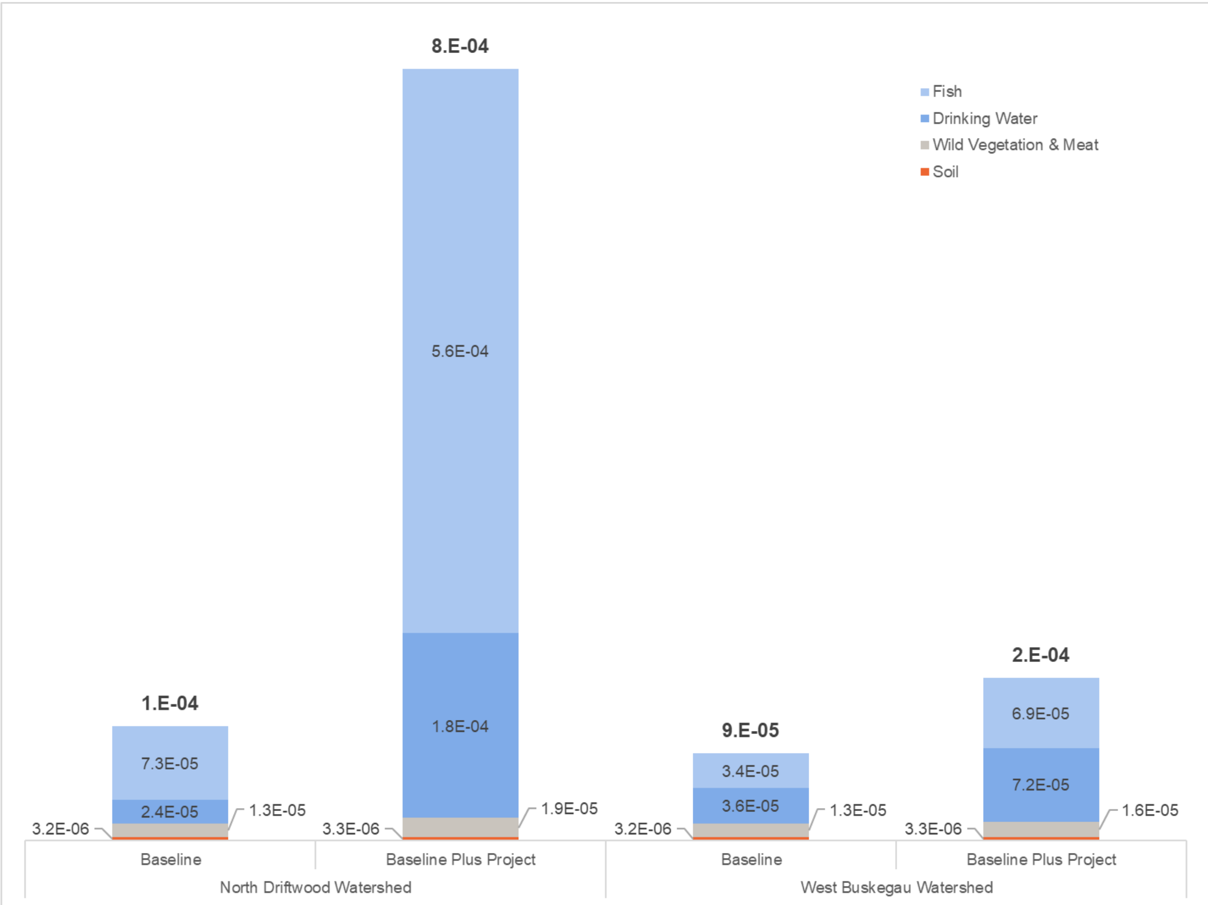


Figure 7.4 Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) and West Buskegau River (Pond 1) Watersheds – Arsenic

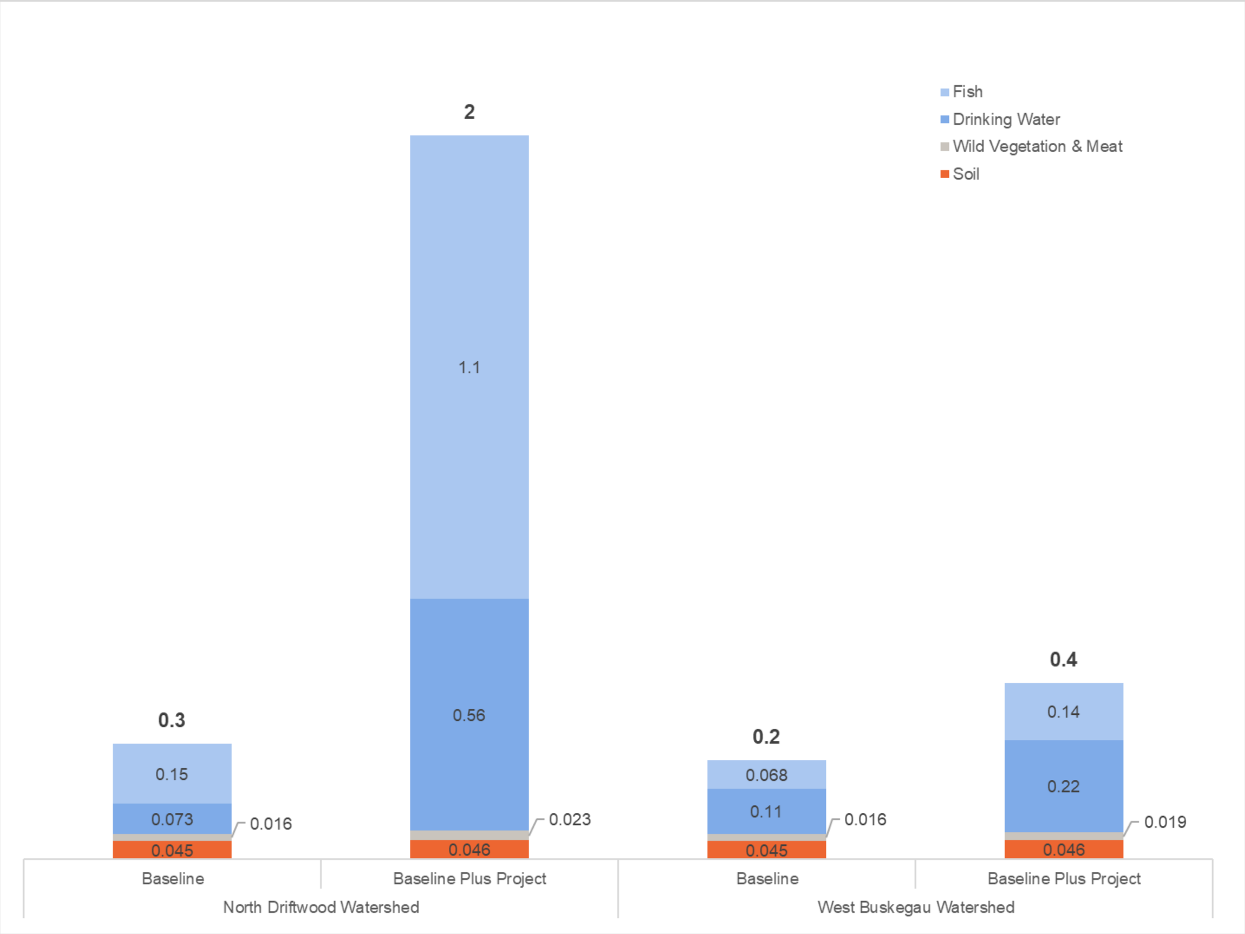
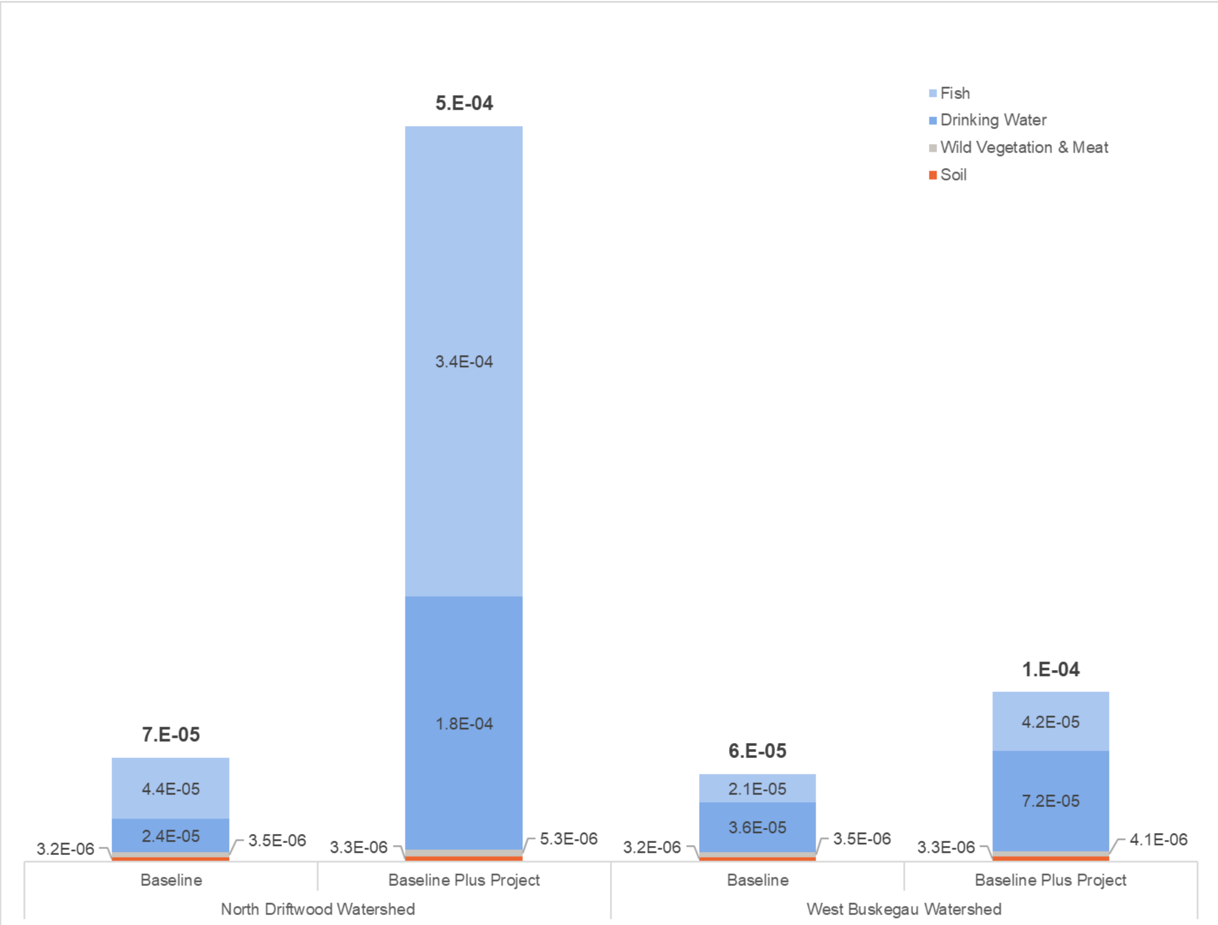


Figure 7.5 Carcinogenic Risk Estimates for a Recreational Receptor at the North Driftwood River (TMF Ponds) and West Buskegau River (Pond 1) Watersheds – Arsenic



As noted previously, it was assumed that total arsenic in fish tissue was present as the more toxic, inorganic form even though its occurrence in fish tissue is primarily in the organic form. Further, it was assumed that 100% of consumed angling fish were obtained from the LSA. Therefore, exposure estimates and risk calculations for arsenic in fish are overestimated (see Section 7.5.4.1). While guidelines for total arsenic in angling fish are limited, Health Canada (2022b) provides a maximum level of 3.5 ppm (or 3.5 mg/kg) for total arsenic in fish protein to help ensure that Canadians are not exposed to levels in their diet that may pose a health risk. The concentrations of arsenic in angling fish within the North Driftwood River and West Buskegau River watersheds (see Table 6.24 and Table 6.25) are well below Health Canada's maximum level. Based on the above, fish consumption and exposure to arsenic are not expected to result in unacceptable health risks.

With respect to drinking water, it was assumed that surface water may be used as a potable water supply. As discussed in Section 7.1.3.4, consumptions rates of surface water would be much less than a potable water supply. Importantly, modelled arsenic concentrations in surface water (maximum 0.0046 mg/L) are less than the maximum acceptable concentration of 0.010 mg/L for potable water established by Health Canada in their GCDWQ (see Table E-2, Appendix E). Based on the above, ingestion of surface water is not expected to result in unacceptable health risk.

Uranium

The total HQ for uranium under the Project Alone Scenario is greater than the target of 0.2 within the North Driftwood River watershed. The greatest contribution to health risk for uranium is related to exposures associated with soil under the Baseline Scenarios and surface water (e.g., fish consumption and drinking water) under the Baseline Plus Project Scenarios. Soil ingestion represents the highest contribution to health risk associated with soil and drinking water represents the highest contribution to health risk associated with surface water.

As discussed in Section 7.4, Health Canada (2023a) considers a target HQ of 1.0 to be applicable if all potential exposure pathways are evaluated, including background dietary intake. However, it is not appropriate to apply a target HQ of 1.0 to the Project Alone Scenario, as exposure may result in potentially unacceptable health risks under the Baseline Plus Project Scenario. For uranium, total HQs were greater than the target of 0.2, but were below 1 under the Project Alone and Baseline Plus Project Scenarios. The CCME CSQG Scientific Supporting Document for uranium was reviewed to an estimated daily intake (EDI) for background exposures of food, water, air, soil/dust that could be used to calculate a total HQ. CCME (2007) identify an EDI of 7.8×10^{-5} mg/kg bw/d for a toddler. The corresponding HQ (0.13) for the EDI of uranium was calculated using the oral TRV of 0.0006 mg/kg-day. The highest total HQ (including Project-related exposures and background dietary intake) for uranium is 0.5 for Baseline Plus Project Scenarios, which are less than the target value of 1. Potential health risks associated with multimedia exposure of uranium within the LSA are expected to be negligible.

Vanadium

The total HQ for vanadium under the Project Alone Scenario is greater than the target of 0.2 within the North Driftwood River watershed. The greatest contribution to health risk for vanadium is related to exposures associated with soil under the Baseline Scenario and surface water (e.g., fish consumption and drinking water) under the Baseline Plus Project Scenario. Soil ingestion represents the highest contribution to health risk associated with soil and drinking water represents the highest contribution to health risk associated with surface water.

For vanadium, total HQs were greater than the target of 0.2, but were below 1 under the Project Alone and Baseline Plus Project Scenarios. The ATSDR toxicological profile for vanadium was reviewed to identify a background dietary intake which could be used to calculate a total HQ. ATSDR (2012) identify a daily intake rate for food of 0.0065 mg/day for a toddler (two years old), which was converted using the body weight of a toddler (16.5 kg) to a dietary intake of 0.00039 mg/kg bw day. The corresponding HQ (0.39) for background dietary intake of vanadium was calculated using the oral TRV of 0.001 mg/kg-day. The total HQ (including Project-related exposures and background dietary intake) for vanadium is 0.8 for the Project Alone Scenario and 1 under the Baseline Plus Project Scenario, which is below or equal to the target value of 1. Potential health risks associated with multimedia exposure of vanadium within the LSA are expected to be negligible.

7.4.2.2 Qualitative Evaluation of Risk

When there is limited quantitative data to conduct a detailed quantitative risk assessment, or when assessing complex scenarios with substantive uncertainties, qualitative assessments of risk can provide useful context for understanding the potential for health effects, developing monitoring plans, and supporting mitigations.

7.4.2.2.1 Methyl Mercury

For the North Driftwood River channel realignment, changes in mercury and methyl mercury concentrations in surface water and how these changes may affect methyl mercury concentrations in fish consumed by human receptors were considered. As noted previously, changes in methyl mercury concentration in angling fish consumed is calculated to be low (approximately 4%; Table 6.41). As such, this change in concentration is not expected to markedly increase potential exposures to methyl mercury through fish consumption due to the North Driftwood River channel realignment.

While Project-related activities are not expected to result in increased concentrations of mercury in the environment, the presence of mercury in fish tissues and methyl mercury exposures due to consumption of fish is a regional concern. The Baseline Scenario methyl mercury concentrations in fish tissue are greater than Health Canada standard of 0.5 mg/kg in North Driftwood River, West Buskegau River and Jocko Creek watersheds. When establishing maximum levels for mercury in food, Health Canada's primary concern is human safety, although the availability, nutritional value, and importance of the food in the Canadian diet are also considered.

As discussed in Section 4.2.7, fishing is a popular activity in the region and local Indigenous nations rely heavily on locally-caught fish as part of their diet. The MECP has fish consumption advisories for waterbodies within the LSA (including fish consumption advisories for Bigwater Lake and Mattagami River downstream of Sturgeon Falls due to mercury). The advisories are meant to protect members of the general population as well as members of sensitive populations. People who consume fish from the LSA should follow the advice provided by the MECP in the consumption advisory document.

7.4.2.2.2 Tungsten

As noted previously, tungsten was not evaluated quantitatively due to limited toxicological and bioaccumulation information. A qualitative assessment of tungsten has been made based on estimated changes in environmental exposures and the toxicological profiles prepared by the ATSDR (2005)

The increase in tungsten concentrations in soil from Project-related activities is negligible (<1%), suggesting minimal changes to concentrations in terrestrial plants. Although surface water concentrations of tungsten are modelled to increase substantially (over seven-fold in the North Driftwood River), the overall concentrations remain low (<1 µg/L). For comparison, the (US EPA, 2024b) Regional Screening

Level for tungsten in tapwater is 3.2 µg/L (based on a target HQ of 0.2). While surface water concentrations could lead to higher human exposures through consumption of fish and aquatic plants, bioaccumulation data for tungsten is lacking. Monitoring of tungsten concentrations in surface water and fish would provide a better understanding of human exposure.

Because tungsten is a naturally occurring element, background exposure to very low levels of tungsten can occur through inhalation of air and ingestion of food or water that contains tungsten. Although very limited data are available, exposure to tungsten from air, food, and water is expected to be negligible (ATSDR, 2005). No specific health effects have been associated with low-level exposure in humans (ATSDR, 2005).

Because the overall concentrations of tungsten in the environment are expected to remain low and human health effects from low level exposures have not been identified, the health risk associated with tungsten exposures is considered low. Further assessment of the uncertainty associated with human health risks from tungsten exposure is provided in Section 7.5.4.2.

7.5 Uncertainty and Sensitivity Assessment

Uncertainty is inherent in many aspects of evaluating health risks to human receptors. The level of uncertainty is dependent upon the availability and quality of information, as well as the variability associated with many of the processes and factors being considered. Since uncertainty can influence the overall risk, it is important to identify and understand the uncertainties and potentially reduce the uncertainties through additional investigations.

7.5.1 Modelling Techniques

This HHRA was conducted according to accepted risk assessment methodologies and follows guidance published and endorsed by Health Canada. This approach is consistent with previous projects that have been reviewed by the Impact Assessment Agency of Canada (IAAC, formerly Canadian Environmental Assessment Agency (CEAA)). Risk estimates were refined through the inclusion of baseline data from multiple media (air, soil, sediment, water, tissue), modelling techniques following federal guidance (CCME 1996, CCME 2020, FCSAP 2012a) for the estimation of Baseline Plus Project scenario concentrations, information about likely species of interest through engagement of potentially affected Indigenous communities, and professional judgement.

7.5.2 Modelling Scenario

There are uncertainties inherent to predictive modelling techniques and associated with data inputs that are modelled independently of the HHRA (i.e., deposition, surface water and sediment quality modelling). These data inputs introduce uncertainties that are independent of the HHRA process, but affect the final risk estimate to human receptors. Differences between modelled and actual Baseline Plus Project scenario conditions for climate, wind, weather, and project influences may result in uncertainties. As part of the conservative approach to risk assessments, the worst-case modelling conditions are typically selected for application into the HHRA. To calculate EPCs in soil for the Baseline Plus Project scenario, the 95th percentile of the total deposition rates among the receptor locations was selected. To calculate the EPCs in surface water, the concentrations at the point of full mixing during average condition scenarios downstream each FDPs in the North Driftwood River and West Buskegau River watersheds were selected and the maximum concentrations for the Baseline Plus Project scenario in the Jocko Creek watershed were selected.

Measured baseline data for soil, terrestrial vegetation (berries and other), wild birds, sediment, fish tissue, and aquatic vegetation were collected in field programs carried out between 2021 and 2023. Since a sufficient measured baseline dataset was not available for wild meat (e.g., grouse), metal concentrations in wild meat were modelled using generalized equations from the US EPA (2005). The use of modelled wild meat concentrations is not expected to change the conclusions of the HHRA.

7.5.3 Receptor Selection

A susceptible population will exhibit a different or enhanced response to a CoPC than will most persons exposed to the same level of the chemical in the environment. The reasons for this may include genetic makeup, age (e.g., children or seniors), health and nutritional status, behaviour, and exposure to other toxic substances. Human receptors are selected such that the most sensitive individuals and individuals having the greatest potential for exposure to CoPC and adverse responses from such exposures are represented. Based on the above, the toddler receptor is the most sensitive receptor for non-carcinogens and because it was assumed that the Indigenous Receptor will consume higher levels of traditional foods, the Indigenous Toddler Receptor represents the most sensitive individual in the HHRA.

7.5.4 Toxicity Data

TRVs were obtained from Health Canada, US EPA IRIS, WHO, ATSDR, Netherlands and CalEPA. This approach is in accordance with standard practice and provides the current scientific basis with which to conduct a risk assessment. Uncertainties associated with the estimation of the toxicological effects of chemicals are inherent in the risk assessment process. For instance, when assessing the toxicity of a chemical, it is not generally considered appropriate to use human beings as test subjects. As a result, toxicologists must rely on animal data, toxicological models, and epidemiological studies to estimate the effects of chemicals on human receptors. In addition, the availability of toxicological data is often limited because of the vast number of chemicals potentially present in the environment and the high costs associated with conducting these studies; in relative terms only a fraction of existing compounds are well documented toxicologically.

To compensate for such shortcomings, the related uncertainties, and differences in effects to sensitive individuals, a number of uncertainty factors are typically built into the dose-response process, which estimates the toxicity of a chemical. This practice results in a conservative estimate of risk. The confidence in the accuracy of that risk is often the single largest contributor to conservatism in the risk assessment process.

7.5.4.1 Arsenic Toxicity

According to Health Canada (2022c), foods can contain both inorganic and organic forms of arsenic, with inorganic arsenic being more toxic to humans than organic arsenic. The organic arsenic compounds (e.g., arsenocholine and arsenobetaine) found in most fish have been determined to be relatively non-toxic (Health Canada, 2006b), and a national study determined that approximately 99.9% of the total arsenic analysed in domestic fish occurs as organic arsenic (CFIA, 2019). However, in the absence of site-specific arsenic speciation data, it was assumed that 100% of arsenic in fish tissue was present as inorganic arsenic. Therefore, exposure estimates and risk calculations for arsenic in fish are overestimated. Assuming that arsenic concentrations for fish tissue used in the HHRA could contain up to 10% inorganic arsenic, total HQs (within the three watersheds) and total ILCRs (within the West Buskegau River and Jocko Creek watersheds) for the Project Alone Scenarios would be less than the targets resulting in negligible health risk to people. The total ILCRs within the North Driftwood River watershed would be reduced, but would still be greater than the target value.

7.5.4.2 Tungsten Toxicity

No specific health effects have been associated with low-level exposure in humans (ATSDR, 2005). There is some emerging evidence indicates that tungsten can augment the effects of other toxicants, with some studies suggesting tungsten-cobalt mixtures seem to be more toxic than either metal alone (Bolt & Mann, 2016). Because modelling suggests that the overall concentrations of tungsten in the environment are expected to remain low, this uncertainty regarding the toxicity of tungsten is unlikely to affect the conclusions of the HHRA.

7.5.5 Relative Absorption Factors

It was assumed that the relative absorption rate for each CoPC via inhalation and ingestion is 100%. However, absorption is variable by CoPC and exposure route. For example, the absorption rate of iron, a metal and an essential nutrient in a healthy diet, from the consumption of organ meat can be as high as 30%, whereas it is less than 10% from vegetables (Piskin, Cianciosi, Gulec, Tomas, & Capanoglu, 2022). Further, some of the TRVs used in this HHRA were determined from studies in which the effects were based on administered doses rather than absorbed doses. Because studies administer CoPC in forms that are more readily absorbed that would be found in environmental media, the TRVs derived from these studies may overestimate the amount of CoPC that would be absorbed by the human receptor. Thus, using these TRVs overestimates the potential effects associated with the exposures experienced by the human receptors.

7.5.6 Air Quality Dispersion Modelling

The effects of Project related CoPCs in air are based on calculated emission rates and AERMOD dispersion modelling results as described in the Air Quality Assessment (Appendix C.1 of the Impact Statement). Prediction confidence with the modelling is high because emission rates used were estimated based on a combination of emission factors, engineering estimates and maximum emission levels. While actual emissions vary from hour to hour and day to day, emissions from the Project were modelled employing a conservative, worst-case hourly emissions approach that is expected to over-estimate longer-term averaging periods. Because of the nature of this approach, there is a high degree of confidence that emissions are over estimated. Air quality dispersion models such as AERMOD also employ assumptions to simplify the random behaviour of the atmosphere into short periods of average behaviour. These assumptions limit the capability of the model to replicate every individual meteorological event. To compensate for these simplifications, five years of meteorological data are applied to evaluate a wide range of possible conditions. Regulatory models, such as AERMOD, are also designed to have a bias toward over estimation of contaminant concentrations (e.g., to be conservative under most conditions).

As noted in the Air Quality Assessment (Appendix C.1 of the Impact Statement), the Base Method methodology that was used to model emissions of particulate matter and metals from in the dispersion modelling assessment did not account for deposition and depletion of particulate from the plume. This methodology is expected to over-estimate exposure to particulates and metals in particulates. Research has demonstrated that air quality modelling of haul roads typically over-predicts ambient air quality from these sources and that, in reality, air quality effects generally only extend a few hundred metres from the source. Much of the ground level fugitive dust is likely to be removed close to the source due to the low release height and turbulence which leaves the particles temporarily close to the ground where they are subject to removal due to deposition on surfaces such as vegetation and structures (Countess, et al., 2001).

7.5.7 Food Chain Interactions

Very limited "real world" data exist that allow quantification of the true relationship between a CoPC in an environmental medium and chemical transfer through the food chain. Only a few classes of chemicals (excluding metals) appear to be magnified through the food chain. The extent of food chain magnification is another uncertainty that is generally treated in a conservative manner. Baseline concentrations of trace metals in a wide variety of environmental media and food items were measured, including soil, surface water, sediment, fish, wild meat and vegetation. Future concentrations of trace metals in these environmental media and food items were estimated using methods and models that are considered to be realistic and/or conservative.

7.5.8 Consumption of Country Foods

With the exception of fish, generic consumption rates for traditional food (i.e., amount of food eaten in a day) are not provided by Health Canada. Also, site-specific consumption rates were not provided by the Indigenous nations included in the Project-specific Indigenous Engagement program.

The FNFNES conducted by Chan et al. (2014) provides estimates of traditional food intake for average and heavy consumers from 18 Indigenous communities in Ontario. With the exception of fish, the consumption rates for heavy consumers and average consumers in Chan et al. (2014) are assumed to be representative of Indigenous people and non-Indigenous people, respectively, living in Ontario, including those that may visit the LSA. In Table 10b of Chan et al. (2014) traditional food intake rates are provided by category (e.g., game meat, plants) but also for the top three species per category (e.g., moose, deer and rabbit). When the sum of the traditional food intake rates for the individual species per category was greater than the total per category (e.g., sum of moose, deer and rabbit was greater than total game meat), the individual food intake rates were used.

To estimate the daily intake rates of traditional foods consumed by younger age groups (i.e., for a toddler, child, and teen), a life stage conversion factor was calculated using information provided by Richardson (1997) for different food groupings. Although some people may introduce foods, such as berries, to infants between five and six months of age, this is not considered a substantive source of exposure and it was assumed that an infant would not consume traditional foods. Exclusion of the infant is not expected to change the overall HQs.

7.5.8.1 Fish

Recreational Receptors are assumed to harvest and consume smaller amounts of traditional foods. Health Canada (2007) provides fish consumption rates for the general population for adults, toddlers and children which were used in the HHRA.

The average consumer fish consumption rate from a survey of First Nations in Ontario, as provided by Chan et al. (2014) (approximately 35 g/day), was used in the risk assessment for the adult Indigenous Receptor. Chan et al. (2014) also provided fish consumption rates for an adult heavy consumer of approximately 180 g/day, which is about five times higher than the average adult consumer consumption rate. By increasing the consumption rates, the fish consumption HQs for the Indigenous Receptor (i.e., toddler, adult and composite receptors, where appropriate) would also increase by the same proportion (e.g., five times higher). While heavy consumers may fish within the LSA, it is considered unlikely that these receptors would obtain all of their fish from the three watersheds potentially affected by the Project activities.

The Ontario fish consumption advisories are focused on the consumption of fillet, which may not reflect the consumption pattern of all people that fish in the LSA (e.g., consumption of whole fish, organs and/or roe), but are meant to protect members of the general population as well as members of sensitive populations. MECP (2023) states that best practice when eating fish from any water body in the Province of Ontario, which would include within the LSA, is not to eat organs, eggs, or dead or dying fish, but rather to consume only fillets. Indigenous nations confirmed the traditional foods that they consumed within the LSA, as discussed in Section 4, and there was no mention of the consumption of other parts of the fish.

7.5.8.2 Wild Meat

It was assumed that people could obtain 100% of their wild meat from within the LSA. For small mammals, such as rabbit and beaver, and birds, the meat available from these animals does not contribute to a significant portion of a person's yearly meat intake. Conversely, the meat of a moose could contribute to a significant portion (up to 100%) of a person's yearly meat intake. Therefore, this assumption overestimates the exposure estimates for small mammals, as well as birds, while for larger mammals, such as the moose, this assumption is reasonable and does not over or underestimate the exposure estimates.

The food consumption rates selected for the HHRA were based on the top species per category (e.g., game meat, plants) from Chan et al. (2014). As such, the food consumption rates of some species (e.g., black bear) expected to be harvested within the LSA were not used in the estimation of human health risk. Based on a review of Chan et al. (2014), the black bear have percent consumption values of 1% or less. Also, the consumption rates of black bear were 0.01 g/day or less, which is below food consumption rates of other wild meats included in the HHRA. This suggests that black bear would have a negligible contribution to overall dietary exposures. Therefore, the use of consumption rates from top species is reasonable and does not over or underestimate the exposure estimates.

7.5.8.3 Vegetation

It was assumed that people could obtain 100% of their wild vegetation from within the LSA. Depending on the specific vegetation, this could overestimate the exposure estimates, such as for berries, since they may also be collected from areas outside of the LSA. However, given the large size of the LSA and the widespread occurrence of certain vegetation species with cultural importance, this assumption is reasonable and does not over or underestimate the exposure estimates.

Aquatic vegetation such as cattails and wild rice may be consumed by the identified receptors. Based on information provided by Chan et al. (2014), wild rice was identified as the third most consumed plant within Ecozone 1. Therefore, the consumption rate for wild rice was used as a surrogate for aquatic plants. In addition, in the absence of measured data for wild rice, measured data for cattails were used. Since it is unclear which part of the cattails were harvested for baseline sampling (roots, stem, seeds, etc.), modelling of Baseline Plus Project Scenario concentrations were based on general plant uptake factors, not specific to plant parts. These assumptions are expected to overestimate exposure estimates and risk estimates.

As discussed in Section 7.3.3, baseline data are available for other terrestrial plants, which included species such as Labrador tea; however, the Baseline and Baseline Plus Project Scenario EPCs for these species were not used in the estimation of human health risk. Based on a review of Chan et al. (2014), the berries and plants with a percent consumption of greater than 10% include blueberries (60%), wild strawberries (22%), raspberries (25%), and wild rice (23%). Other berries and plants included in the Chan et al. (2014) study have percent consumption values of 9% or less. This suggests that receptors would be unlikely to consume berries and plants outside the four listed above. Therefore, this assumption is reasonable and does not over or underestimate the exposure estimates.

For vegetation, both terrestrial and aquatic, modelled EPCs for uncovered vegetation were used. Concentrations for uncovered vegetation were higher than covered vegetation and would provide an overestimation of risk.

7.5.9 Exposure Frequency

It was assumed that receptors would spend 100% of their time within the LSA, resulting in an Exposure Term of one. This is a conservative assumption because there are no permanent residences (i.e., homes that are lived in year round) within the LSA; therefore, it is unlikely that receptors would spend 100% of their time within the LSA. In addition, exposure to certain media (i.e., soil, surface water and sediment) is less likely to occur during the winter months when snow and ice are present.

7.5.10 Chemical Interactions from Multiple CoPCs

Human receptors are exposed to multiple CoPC in the environment. The chemical interaction between multiple CoPC or modifying factors (e.g., pH or water hardness) may result in additive, synergistic or antagonistic effects that are not distinguishable when evaluating the toxicity of CoPC individually. There is only a weak scientific understanding of the interaction and effects of multiple CoPC and related modifying factors. Due to the lack of scientific evidence and approved assessment tools associated with modelling chemical interactions, these interactions were not evaluated in the HHRA. However, this does not make the HHRA non-conservative. Both interactions and modifying factors can influence the evaluation of potential risk. However, one of the main goals of the HHRA is to conservatively assess potential risks by adopting numerous conservative biases in the risk assessment approach, such as using a maximum or 95% UCLM to represent the concentration over the entire area. Efforts are made to err on the side of caution, providing a conservative level of risk without being unreasonable

7.5.11 Summary of Uncertainties

A summary of the important assumptions and uncertainties in the HHRA and the implications of these assumptions on risk estimates is provided in Table 7.17.

Table 7.17 Evaluation of Assumptions and Uncertainties Applied in the HHRA

Assumptions/Uncertainty	Discussion	Overestimate/ Underestimate Risk
Modelling Techniques	Risk estimates were derived using modelling techniques based on federal guidance (CCME 1996) (CCME 2020) (FCSAP 2012a) for the estimation of Baseline Plus Project scenario concentrations as well as Baseline scenario concentrations for parameters/media not measured.	Neutral
Modelling Scenario	As part of the conservative approach to risk assessments, the worst-case modelling conditions were selected for application into the HHRA. This approach is conservative as human receptors may not necessarily be exposed to the highest concentrations at the same location.	Overestimate
Receptor Selection	Human receptors are selected such that the most sensitive individuals and individuals having the greatest potential for exposure to CoPC and adverse responses from such exposures are represented. The Indigenous Toddler Receptor represents the most sensitive individual in the HHRA.	Neutral

Assumptions/Uncertainty	Discussion	Overestimate/ Underestimate Risk
Toxicity Data	TRVs were obtained from Health Canada, US EPA IRIS, WHO, ATSDR, Netherlands and CalEPA. Uncertainties associated with the estimation of the toxicological effects of chemicals are inherent in the risk assessment process. To compensate for such shortcomings, the related uncertainties, and differences in effects to sensitive individuals, a number of uncertainty factors are typically built into the dose-response process, which estimates the toxicity of a chemical. This practice results in a conservative estimate of risk.	Overestimate
Relative Absorption Factors	It was assumed that the relative absorption rate for each CoPC via inhalation and ingestion is 100%. Some of TRVs used in this HHRA were determined from studies in which the effects were based on administered doses rather than absorbed doses. TRVs derived from these studies may overestimate the amount of CoPC that would be absorbed by the human receptor.	Overestimate
Air Quality Dispersion Modelling	The Project is not currently in operation; therefore, future emissions and ground level air concentrations were estimated by air dispersion models. The air models are designed to provide a conservative estimation of future air quality related to the Project.	Overestimate
Food Chain Interactions	Baseline concentrations of trace metals in a wide variety of environmental media and food items were measured, including soil, surface water, sediment, fish, wild meat and vegetation. Future concentrations of trace metals in these environmental media and food items were estimated using methods and models that are considered to be realistic and/or conservative.	Neutral
Consumption of Country Foods	With the exception of fish, the consumption rates for heavy consumers and average consumers in Chan et al. (2014) are assumed to be representative of Indigenous people and non-Indigenous, respectively, people living in Ontario, including those that may visit the LSA. Health Canada (2007) provides fish consumption rates for the general population for adults, toddlers and children which were used in the HHRA. The average consumer fish consumption rate provided by Chan et al. (2014) for an adult was used for the Indigenous Receptor as it is considered highlight unlikely that a heavy consumer of fish would obtain all of their fish from the three watersheds.	Overestimate
Exposure Frequency	It was assumed that receptors would spend 100% of their time within the LSA, resulting in an Exposure Term of one. This is a conservative assumption because there are no permanent residences (i.e., homes that are lived in year round) within the LSA. In addition, exposure to certain media (i.e., soil, surface water and sediment) is less likely to occur during the winter months when snow and ice are present.	Overestimate
Chemical Interactions from Multiple CoPC	The chemical interaction between multiple CoPC and modifying factors (e.g., pH or water hardness) may result in additive, synergistic or antagonistic effects that are not distinguishable when evaluating the toxicity of CoPC individually. Due to the lack of scientific evidence and approved assessment tools associated with modelling chemical interactions, these interactions were not evaluated in the HHRA.	Neutral

7.6 HHRA Summary and Recommendations

The HHRA evaluated the potential for changes in risks to human health within the LSA and RSA as a result of Project-related activities during construction, operations, and decommissioning. This HHRA included an evaluation of risks associated with potential changes in contaminant concentrations in air as well as and other environmental media (e.g., soil, surface water, and country foods) due to Project activities.

The inhalation risk assessment, which evaluated the potential for human health risks due to inhalation of Project-related contaminants in air, demonstrated that Project-related contaminants in air are not likely to exceed applicable health-based exposure limits and toxicity reference values at locations where people are expected to be present for extended periods of time (including overnight stays or beyond) during Project construction or operation. However, given that some identified CoPCs are non-threshold contaminants for which any increase in exposure could result in increased health effects (e.g., $PM_{2.5}$), it is recommended that reasonable mitigations be undertaken to minimize releases of CoPCs to the environment during Project operation and that monitoring be undertaken to more accurately evaluate future health risks. Specific additional mitigation measures that may be identified through the provincial permitting process for air emissions (i.e., Environmental Compliance Approval) and detailed design are discussed in Chapter 12 (Assessment of Potential Effects on the Atmospheric Environment) of the Impact Statement.

Multimedia exposure pathways were quantitatively evaluated for the Indigenous Receptor and Recreational Receptor in the North Driftwood River, West Buskegau River and Jocko Creek watersheds. The Indigenous Receptor and Residential Receptor were assumed to come in direct contact with soil, and surface water, and consume fish, wild meat, and wild vegetation from the LSA.

While total HQs for manganese, molybdenum and thallium were greater than the target value of 0.2 under one or more of the Baseline Plus Project Scenarios, potential changes in health risk for these CoPCs as a result of Project-related activities were negligible. Similarly, while Baseline Plus Project scenario risk estimates for uranium and vanadium were greater than the initial target of 0.2 (used when background exposures are not known), once background exposures were included, the risk estimates were less than the target of 1.0 (used when background exposures are included).

Project-related risk estimates for arsenic were identified above targets for the North Driftwood River and West Buskegau River watersheds, while Project-related risk estimates were below targets for the Jocko Creek watershed. The risk estimates for arsenic are primarily affected by exposures resulting from modelled changes in surface water, specifically through fish and potable water consumption. To better characterize the potential health risks from arsenic exposures, the following additional lines of evidence related to arsenic in fish and potable water were considered.

- Concentrations of total arsenic in angling fish are well below Health Canada's maximum level for the protection of health. Also, it was assumed that arsenic in fish tissue was present in its more toxic inorganic form even though its occurrence in fish tissue is primarily in relatively non-toxic organic forms.

- Concentrations of arsenic in surface water were below Health Canada's maximum acceptable concentration for drinking water (Health Canada, 2024). Also, it was assumed that surface water may be used as a potable water supply even though the consumption rate of surface water would be much less than that of a potable water supply.

Based on the above, threshold. Because risk estimates are based on modelled concentrations, monitoring of arsenic in surface water and fish in each watershed assessed would better represent changes in exposure.

Tungsten was not evaluated quantitatively due to limited toxicological and bioaccumulation information. Because the overall concentrations of tungsten in the environment are expected to remain low and human health effects from low level exposures have not been identified, the health risk associated with tungsten exposures is considered low.

For the North Driftwood River channel realignment, changes in mercury in the aquatic environment may affect concentrations in fish consumed by human receptors. Changes in mercury concentration in angling fish is calculated to be low (approximately 4%) and are not expected to markedly increase potential exposures to methyl mercury through fish consumption. While Project-related activities are not expected to result in increased concentrations of mercury in the environment, the presence of mercury in fish is a regional concern. The Baseline Scenario mercury concentrations in fish tissue are greater than the Health Canada standard of 0.5 mg/kg and there are fish consumption advisories in the area. People who consume fish from the LSA should follow the fish consumption advisory.

8 Ecological Risk Assessment

8.1 Problem Formulation

The key tasks of the problem formulation for the ERA were:

- Identification of CoPC: Identification of those Project-related chemicals that may be released to the receiving environment and that have the potential to elicit adverse health effects on ecological receptors.
- Receptor Identification: Identification of the terrestrial and aquatic ecological receptors that may be affected by the Project.
- Exposure Pathway Identification: Identification of the potential ways in which CoPC move through the environment from a source to a point of contact with ecological receptors.
- Conceptual Site Model (CSM) Development: Development of a visual CSM showing the release mechanisms, source media, transport mechanisms, exposure pathways and CoPC for the identified receptors.
- Description of protection goals and acceptable effect levels.

The following sections provide a description of the ecological CoPCs, receptors, and exposure pathways related to the Project, as well as the protection goals and acceptable effect levels that are relevant for the ERA.

8.1.1 Identification of Ecological Contaminants of Potential Concern

CoPCs were determined based on the magnitude of change in parameter concentrations in soil and water between baseline conditions and modelled future conditions as discussed in Section 6. The following CoPCs were identified based on an estimated change of greater than 1% from baseline to future conditions in soil and/or surface water as well as whether that parameter is of general interest to the Project or risk assessment in general (e.g., nickel):

- <u>Terrestrial and Aquatic ERA CoPCs:</u> antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, tungsten, uranium, vanadium, zinc

It is noted that insufficient data were available to support quantitative assessment of tungsten for which limited toxicological and/or bioaccumulation information was identified. Tungsten will be discussed qualitatively and considered in the uncertainty analysis. The rest of the CoPCs were assessed quantitatively per the approach laid out in the subsequent sections.

In addition to the potential exposures of ecological receptors to the CoPCs listed above, potential exposure of plants to CACs was also considered. Of these, NO_2 and SO_2 may be directly absorbed from the air by terrestrial plants. As such, additional ERA CoPCs included:

- Air ERA CoPCs: NO_2 and SO_2

8.1.2 Selection of Ecological Receptors

With the large number of wildlife species present in and around the PA, it is neither practical nor necessary to conduct an assessment for each species. Rather, after reviewing the baseline reports on terrestrial ecology (Appendix B.7.4 of the Impact Statement [2023 Terrestrial Ecology Baseline Study]) and fish and fish habitat (Appendix B.2 of the Impact Statement [2021-2023 Fish and Fish Habitat Baseline]), a representative subset of ecological receptors was selected as the basis for this ERA. Ecological receptors, also referred to as receptors of concern (ROCs) were chosen for the ERA by considering wildlife species that were:

- native to the area
- most likely to receive the greatest exposure to chemical emissions due to their habitat and home range
- representative of various levels in the aquatic and terrestrial trophic web (e.g., carnivore, herbivore, insectivore, piscivore)
- suitable surrogates for federal and provincial species at risk that could be present
- of cultural, economic, or social significance

Selection of ecological receptors considered the applicable habitats and trophic levels in the RSA. The selected receptors are considered representative of other species occupying a similar position in the food web in order that results of the risk characterization stage for a selected ecological receptor can be used to make inferences about risk to other species occupying a similar trophic level or guild. For example, if results of the ERA indicate that no unacceptable risk is expected for American robin, an avian species that relies on a diet of soil invertebrates, then no unacceptable risks would be expected for other insectivorous bird species. Using these criteria, the ecological receptors assessed in the ERA (Table 8.1) are expected to be protective of the faunal and floral diversity in the RSA.

The selection of ecological receptors was informed by FCSAP guidance for standardization of wildlife receptor characteristics (FCSAP, 2012b).

Table 8.1 Ecological Receptors Selected for the Ecological Risk Assessment

Common Name of Species	Scientific Name	Feeding Guild
Mammals		
American Black Bear	*Ursus americanus*	Omnivorous mammal (terrestrial)
American Mink	*Mustela vison*	Omnivorous mammal (semi-aquatic)
Beaver	*Castor canadensis*	Herbivorous mammal (aquatic)
Bobcat	*Lynx rufus*	Carnivorous mammal (terrestrial)
Boreal Caribou [1]	*Rangifer tarandus*	Herbivorous mammal (terrestrial)
Masked Shrew [2]	*Sorex cinereus*	Insectivorous mammal (terrestrial)
Meadow Vole	*Microtus pennsylvanicus*	Herbivorous mammal (terrestrial)
Moose	*Alces alces*	Herbivorous mammal (terrestrial)
Northern River Otter	*Lontra canadensis*	Carnivorous mammal (aquatic)
Red Fox	*Vulpes vulpes*	Carnivorous mammal (terrestrial)
Snowshoe Hare	*Lepus americanus*	Herbivorous mammal (terrestrial)
White-tailed Deer	*Odocoileus viginianus*	Herbivorous mammal (terrestrial)
Birds		
American Robin	*Turdus migratorius*	Omnivorous bird (terrestrial)
Bald Eagle	*Haliaeetus leucocephalus*	Piscivorous/carnivorous bird (terrestrial)
Barn Swallow	*Hirundo rustica*	Insectivorous bird (terrestrial)
Common Merganser	*Mergus merganser*	Piscivorous/carnivorous bird (aquatic)
Lesser Scaup [3]	*Aythya affinis*	Insectivorous bird (aquatic)
Mallard	*Anas platyrhynchos*	Omnivorous bird (aquatic)
Red-tailed Hawk	*Buteo jamaicensis*	Carnivorous bird (terrestrial)
Short-eared Owl [4]	*Asio flammeus*	Carnivorous bird (terrestrial)
Spotted Sandpiper	*Actitis macularius*	Omnivorous bird (aquatic)
Spruce Grouse	*Falcipennis canadensis*	Herbivorous bird (terrestrial)
Herptiles		
Wood Frog	*Lithobates sylvaticus*	Insectivorous amphibian (semi-aquatic)
Common Gartersnake	*Thamnophis sirtalis*	Carnivorous reptile (terrestrial)
Community Receptors		
Terrestrial Plant Communities	Various	Various
Terrestrial Invertebrate Communities	Various	Various

Common Name of Species	Scientific Name	Feeding Guild
Benthic Communities	Various	Various
Aquatic Communities	Various	Various

Notes:

[1] Although no boreal caribou or tracks were reported during the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), critical habitat intersects part of the RSA, and boreal caribou have been recorded within 10 to 15 km of the Project boundaries (MECP, 2015).

[2] The Masked Shrew was not observed or recorded in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement); however, it is potentially present in the PA based on its geographic range throughout most of Canada (Lee, 2001). It was selected as an ecological receptor for the purposes of assessing insectivorous terrestrial mammals.

[3] The Lesser Scaup was not observed or recorded in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement); however, it was selected as an ecological receptor for the purposes of assessing avian receptors who may consume aquatic insects.

[4] Targeted surveys for Short-eared Owl were conducted in suitable habitat during the 2023 breeding season. This species was not observed in the LSA. There are eBird records within the RSA and suitable habitat is present within the LSA.

8.1.3 Ecological Receptor Profiles

Species profiles on the selected ecological receptors are provided in the sections below.

8.1.3.1 Mammalian Ecological Receptor Profiles

8.1.3.1.1 American Black Bear

The American black bear is found throughout most of Canada. Black bears prefer heavily wooded areas and dense bushland (CWS and CWF, 2007). Mean home ranges are 10 to 40 km^2 for females and often more than 100 km^2 for males (CWS and CWF, 2007). Their foraging range varies from 3 to 1147 km^2 (FCSAP, 2012b). An average sized black bear weighs approximately 68 kg (FCSAP, 2012b). Black bears consume primarily grasses and forbs in spring, shrub and tree-borne fruits in summer, and a mixture of hard and soft mast in fall. Only a small portion of the diet consists of animal matter, colonial insects (e.g., ants) and beetles. Most vertebrates are consumed in the form of carrion (Kronk, 2007). When available, they may also supplement their diet with fish (CWS and CWF, 2007). Black bears consume approximately 0.03 kg of dry weight food (or 0.19 kg of wet weight food) per kg body weight per day and 0.06 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the black bear's diet was modelled as 80% terrestrial plants (50% berries/seeds and 30% grasses and leaves), 5% terrestrial invertebrates, 10% terrestrial prey, and 5% freshwater fish. Based on the consumption of these foods and on soil and sediment ingestion rates from FCSAP (2012b), the black bear is estimated to incidentally ingest approximately 0.041 kg/day of dry soil and 0.0032 kg/day of dry sediment.

SOURCE: Vernon (2010) (2010) (photograph)

8.1.3.1.2 American Mink

The American mink is a small member of the weasel family and is the most abundant and widely distributed carnivorous mammal in North America (US EPA, 1993). Minks are active year-round and occupy aquatic habitats such as rivers, streams, lakes, ditches, swamps, marshes and backwater areas (US EPA, 1993). In winter, mink spend more time near dens and use a smaller portion of their home range than in summer. Adult male home ranges are generally larger than adult female home ranges. The average home range for females is 0.08 to 0.2 km^2, while that of males may be more than 7 km^2 (NatureServe, 2019). The area of their foraging range varies from 0.06 to 16.3 km^2 (FCSAP, 2012b). Mink are skilled swimmers and climbers. In searching for food, they can swim up to 30 meters underwater and dive to depths of 5 meters (Schlimme, 2003). An average sized American mink weighs approximately 0.82 kg (FCSAP, 2012b). The diet of mink varies with the season. During the summer it consists of crayfish, fish, frogs, small mammals such as shrews, rabbits, mice, muskrats, and water fowl. In the winter, they primarily prey on mammals (FCSAP, 2012b) (Schlimme, 2003). Minks consume approximately 0.14 kg of wet weight food per kg body weight per day and 0.03 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the mink's diet was modelled as 25% terrestrial prey items, 10% benthic invertebrates, and 65% fish. Based on its consumption of these foods and soil and sediment ingestion rates from FCSAP (2012b), the mink is estimated to incidentally ingest approximately 0.00018 kg/day of dry soil and 0.00043 kg/day of dry sediment.

SOURCE: Homler (2013) (photograph)

8.1.3.1.3 Beaver

The beaver is primarily a nocturnal mammal that lives a semi-aquatic lifestyle. Beavers construct bank dens and lodges, which are used for protection from predators and weather. Where beavers live exclusively in rivers or deep lakes, bank dens are typical, while lodges are built in ponds, shallow lakes, or on the shore. Individual beavers spend most of their lives in small extended-family units traditionally called colonies. Established colonies inhabit discrete and defended territories; therefore, beaver activity is restricted to a well-defined area within close range of the lodge (Baker & Hill, 2003). The home range of a beaver depends on sex, age, social organization of the family unit, type of occupied habitat, and seasonal constraints. The home range in the summer is 0.08 to 0.18 km^2, with smaller ranges in fall and winter (Baker & Hill, 2003). An adult beaver weighs 16 to 32 kg (CWS and CWF, 2005a) (average assumed 24 kg). Beavers are generalist herbivores that feed on a wide variety of herbaceous and woody terrestrial plants. Herbaceous plants can account for up to 90% of the diet in summer and up to 50% during spring and fall. Woody material may constitute up to 86% of the diet in winter and 16% in summer (Svendsen, 1980). Beavers also consume aquatic plants. Beavers occupying ponds appear to shift to a more aquatic diet in winter. Studies show that aquatic plants may compose 12% to 80% of the beaver's diet, depending on the season and the type of habitat occupied (Milligan & Humphries, 2010). For the present assessment, the beaver's diet was assumed to be 55% terrestrial plants and 45% aquatic plants. Based on the US EPA's food ingestion rates for rodents (US EPA, 1993), for this assessment a beaver is assumed to consume 0.022 kg of wet weight food per kg body weight per day and 0.072 L of water per kg body weight per day. The beaver is estimated to incidentally ingest approximately 0.0039 kg/day of dry soil and 0.0062 kg/day of dry sediment based on default soil and sediment ingestion rates from FCSAP (2012b).

SOURCE: Szmurlo (2005) (photograph)

8.1.3.1.4 Bobcat

The bobcat weighs between 4 and 15 kg (assumed to be approximately 7.5 kg) (Ciszek, 2002), measures between 65 to 105 cm long, and stands 45 to 58 cm tall at the shoulder (Ciszek, 2002). Southern Canada represents the northern limit of the bobcat range. The bobcat is primarily terrestrial, but can be found in a variety of habitats, including forests, semi-deserts, mountains, brushland, and swamps (Ciszek, 2002) (NatureServe, 2016). Mean home range estimates vary from 0.6 to 326 km^2 in size, reflecting the influence of factors such as habitat quality, prey availability, climatic conditions, latitude, species density, season, and breeding status. Male home ranges are generally 2-3 times larger than female ranges, and typically overlap the home ranges of several females. Home ranges tend to increase with latitude (Lovallo & Anderson, 1996). Male and female bobcats inhabiting the northern limit of the species distribution were recorded to have annual home ranges of approximately 60.4 km^2 and 28.5 km^2, respectively. Female home ranges decrease to approximately 19.8 km^2 in the summer (Lovallo & Anderson, 1996). Based on this information, it is recommended that a home range of 20 km^2 be used to describe the home range of bobcats in Canada. Depending on its location, the bobcat will eat rodents, rabbits, small ungulates, large ground birds, sometimes reptiles, and occasionally small, domesticated animals and poultry (Ciszek, 2002). Allometric models indicate that a bobcat consumes approximately 0.15 kg of wet weight food per kg body weight per day and 0.081 L of water per kg body weight per day (US EPA, 1993). The bobcat's diet was assumed to be 100% terrestrial mammals and birds (Ciszek, 2002). Based on its consumption of these foods and default soil ingestion rates from FCSAP (2012b), the bobcat is estimated to incidentally ingest 0.0038 kg/day of dry soil.

SOURCE: Harms (2011) (photograph)

8.1.3.1.1 Boreal Caribou

The boreal caribou includes several ecotypes (e.g., boreal, northern, mountain), which are defined on the basis of distinct patterns of habitat use and diet/feeding behaviour. Boreal caribou require large tracts of uninterrupted, lichen-rich mature coniferous forests interspersed by peatland complexes (Environment Canada, 2012). Boreal caribou exist in small, dispersed, relatively sedentary bands throughout the year. The winter and summer ranges typically overlap, and habitat use does not differ by season. The average home range of the boreal caribou is 710 km^2. Boreal caribou consume tree and ground lichens in winter,

and lichens, grasses, sedges, forbs, horsetails and shrub leaves in summer (Natural Resources Canada, 2024) with lichens as the most important year-round part of their diets (MNRF, 2014). A boreal caribou will consume approximately 0.05 kg of wet weight food per kg body weight per day and 0.059 L of water per kg body weight per day (Nagy, 1987). The boreal caribou's diet was modelled as 100% terrestrial plants (Natural Resources Canada, 2024). Based on its consumption of these foods and default soil ingestion rates from FCSAP (2012b), the boreal caribou was estimated to incidentally ingest 0.17 kg/day of dry soil.

SOURCE: Forrest (2007) (photograph)

8.1.3.1.2 Masked Shrew

The masked shrew is the most widely distributed shrew in North America and is found throughout most of Canada (Lee, 2001). It is common in open and closed forests, meadows, riverbanks, lakeshores, and willow thickets (Lee, 2001). The average home and foraging range of the masked shrew is 0.006 km^2 (Lee, 2001; FCSAP, 2012b). An average sized masked shrew weighs approximately 0.0041 kg (FCSAP, 2012b). Shrews are prey for many small predators such as weasels, hawks, falcons, owls, domestic cats, foxes, snakes, and short-tailed shrews (Lee, 2001). Although not strictly nocturnal, most of their activity takes place at night, hunting primarily on the ground and sometimes climbing into low vegetation and shrubs. The masked shrew primarily feeds on invertebrates including, insect larvae, ants, beetles, crickets, grasshoppers, spiders, harvestmen, centipedes, slugs, and snails. They also opportunistically consume seeds and fungi (Lee, 2001). Masked shrews consume approximately 0.34 kg of dry weight food (or 2.1 kg of wet weight food) per kg body weight per day and 0.17 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the masked shrew's diet was modelled as 5% terrestrial plants and 95% terrestrial invertebrates. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the masked shrew is estimated to incidentally ingest 0.000028 kg/day of dry soil.

SOURCE: US National Park Service (2008) (photograph)

8.1.3.1.3 Meadow Vole

The meadow vole is the most widely distributed small grazing herbivore in North America. It inhabits moist to wet habitats including grassy fields, marshes, and bogs (US EPA, 1993). It is a small rodent (approximately 0.035 kg) that is active year-round, making its burrows along surface runways in grasses or other herbaceous vegetation (US EPA, 1993; FCSAP, 2012b). The home range of the meadow vole varies from 2.0E-06 km^2 in winter to 8.0E-04 km^2 in summer (US EPA, 1993) and their mean foraging range is 6.9E-05 km^2 (FCSAP, 2012b). Meadow voles are a major prey item for predators such as hawks and foxes. They feed primarily on vegetation such as grasses, leaves, sedges, seeds, roots, bark, fruits, and fungi, but will occasionally feed on insects and animal matter (US EPA, 1993). The meadow vole consumes approximately 0.33 kg of wet weight food per kg body weight per day and 0.21 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the meadow vole's diet was modelled as 100% terrestrial plants (60% berries/seeds, 30% grasses, 10% mushrooms). Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the meadow vole is estimated to incidentally ingest approximately 0.000041 kg/day of dry soil.

SOURCE: US National Park Service (2005) (photograph)

8.1.3.1.4 Moose

The moose can be found inhabiting forests from the Alaskan boundary to the eastern tip of Newfoundland and Labrador (CWS and CWF, 1997). Their geographic distribution follows, but is not confined to, the boundaries of the boreal forest. Moose are highly dimorphic between sexes, with cows weighing much less than bulls. The mean body weight (for both sexes) is 400 kg, although bulls of the northern subspecies, *A. A. gigans*, can weigh as much as 800 kg (CWS and CWF, 1997) (FCSAP, 2012b). Seasonal home ranges seldomly exceed 51 km^2, while annual home ranges can be up to 1,932 km^2 depending on habitat and food availability (Hundertmark, 2007). Their foraging range varies from 4.6 to 262 km^2 (FCSAP, 2012b). Moose are entirely herbivorous, consuming a mixture of terrestrial and aquatic vegetation. In the summer, moose prefer to browse on new growth of trees and shrubs (leaves, twigs, and bark), and vegetation associated with water (high-sodium aquatic plants). In the winter, their diet is typically restricted to conifer and hardwood twigs (NatureServe, 2019). A moose will consume approximately 0.02 kg of dry weight food (or 0.13 kg of wet weight food) per kg body weight per day and 0.05 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the moose's diet was modelled as 80% terrestrial plants and 20% aquatic plants. Based on its consumption of these foods and soil and sediment ingestion rates from FCSAP (2012b), the moose was estimated to incidentally ingest 0.12 kg/day of dry soil and 0.026 kg/day of dry sediment.

SOURCE: Woelber (2014) (photograph)

8.1.3.1.5 Northern River Otter

The North American (or northern) river otter occurs throughout Canada. It inhabits streams, rivers, estuaries, lakes, marshes, and swamps (Ellis & Dewey, 2003) (US EPA, 1993). Their home range is typically linear and can vary from 2 to 78 km depending on the habitat type and the availability of food resources (Ellis & Dewey, 2003). The area of their foraging range varies from 9 to 231 km^2 (FCSAP, 2012b). An average sized river otter weighs approximately 7.5 kg (FCSAP, 2012b). Otters are preyed upon by bigger mammals and birds of prey. They primarily eat fish but may also opportunistically consume crustaceans (e.g., crayfish), benthic invertebrates, birds, small mammals, reptiles and amphibians (Ellis & Dewey, 2003) (US EPA, 1993). Active year-round (US EPA, 1993), northern river otters consume approximately 0.03 kg of dry weight food (or 0.12 kg wet weight food) per kg body weight per day and 0.08 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the northern river otter's diet was modelled as 5% terrestrial prey, 15% benthic invertebrates, and 80% fish. Based on its consumption of these foods and soil and sediment ingestion rates from FCSAP (2012b), the northern river otter was estimated to incidentally ingest 0.00029 kg/day of dry soil and 0.0042 kg/day of dry sediment.

SOURCE: Thomas (2008) (photograph)

8.1.3.1.6 Red Fox

The red fox is found throughout continental Canada and is the most widely distributed carnivore in the world (US EPA, 1993). It is found in habitats as diverse as the Arctic and the temperate desert and prefers areas with broken and diverse upland habitats (US EPA, 1993). Family territories, which consist of home ranges of individuals from the same family, vary from approximately 57 ha to over 3,000 ha (US EPA, 1993). Their foraging range is between 2.8 and 34.2 km^2 (FCSAP, 2012b). The red fox has an average weight of 3.8 kg (FCSAP, 2012b). Red foxes are active year-round and prey heavily on small mammals such as voles, mice, and rabbits, and will also consume birds, insects, fruits, berries, and nuts; they are also noted scavengers (US EPA, 1993). Red foxes consume approximately 0.09 kg (wet weight) per kg body weight of food per day and 0.09 L of water per kg body weight per day. Based on FCSAP (2012b), the red fox's diet was modelled as including 15% terrestrial plants (fruits and berries), 25% terrestrial invertebrates, and 60% small mammal and bird prey. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the red fox is estimated to incidentally ingest approximately 0.0024 kg/day of dry soil.

SOURCE: Redwood (2017) (photograph)

8.1.3.1.7 Snowshoe Hare

The snowshoe hare is found in every province and territory throughout Canada (CWS and CWF, 2005b). Snowshoe hares weigh approximately 1.3 kg (FCSAP, 2012b). The snowshoe hare tends to inhabit forests, swamps, and riverside thickets (US EPA, 1993). It has a home range of approximately 0.04 km^2 (US EPA, 1993) and a foraging range from 0.016 to 0.10 km^2 (FCSAP, 2012b). The snowshoe hare is a frequent prey item, making it a keystone species in boreal forest food webs (CWS and CWF, 2005b). Active year-round, it feeds on herbaceous plants and leaves in summer, and small twigs, buds, and bark in winter (CWS and CWF, 2005b). The snowshoe hare consumes approximately 0.06 kg of dry weight food (or 0.40 kg wet weight food) per kg body weight per day and 0.10 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the snowshoe hare's diet was modelled as 100% terrestrial plants (10% berries, 60% shrubs, and 30% grasses). Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the snowshoe hare is estimated to incidentally ingest 0.0049 kg/day of dry soil.

SOURCE: Siegmund (2008) (photograph)

8.1.3.1.8 White-tailed Deer

The white-tailed deer is North America's most abundant and widely distributed large herbivore and is commonly hunted for meat or sport. The average body weight is 75 kg; however, they are a sexually dimorphic ungulate: males have a mean body weight of 91 kg, compared to females at 60 kg (FCSAP, 2012b); full-grown males frequently exceed 110 kg and individuals may weigh up to 200 kg in the northern part of their range (CWS and CWF, 1990). In Canada, white-tailed deer are found occupying a variety of terrestrial habitats from the east coast to south-central British Columbia. Although mostly occupying the Southern parts of this range, they are also found in limited numbers as far North as Great Slave Lake. The home range of the white-tailed deer is quite small, generally less than a square kilometer, but can be much larger depending on availability of food, water, and cover (Dewey, 2003) (Sample, Opresko, & Suter II, 1996). White-tailed deer are entirely herbivorous, feeding on a wide variety of woody browse and herbaceous forage. In the spring and summer months, buds, grasses, herbs, and forbs comprise a major portion of the diet. In fall and winter, deer will forage more on twigs, buds, acorns, corn, and even conifers (Dewey, 2003) (CWS and CWF, 1990). A white-tailed deer will consume approximately 0.03 kg of dry weight food (or 0.18 kg wet weight food) per kg body weight per day and 0.06 L of water or its equivalent per kg body weight per day. Based on FCSAP (2012b), the white-tailed deer's diet was modelled as 100% terrestrial plant material (10% fruits, 90% other: trees, herbaceous plants, leaves, mushrooms, grasses, and lichens). Based on its consumption of these foods and soil ingestion rates from FCSAP

(2012b) and using the white-tailed deer average body weight of 70 kg, the white-tailed deer was estimated to incidentally ingest an average of 0.04 kg/day of dry soil.

SOURCE: St. John (2011) (photograph)

8.1.3.2 Avian Ecological Receptor Profiles

8.1.3.2.1 American Robin

The American robin is the largest, most abundant, and most broadly distributed thrush in North America. The breeding habitat of the robin includes moist forest, swamps, open woodlands, orchards, parks, and lawns (US EPA, 1993). During the non-breeding season, robins migrate to lower elevations and latitudes. However, not all populations are migratory - some spend the winter months close to their breeding grounds (Vanderhoff, Pyle, Patten, Sallabanks, & James, 2020). The robin's home range is approximately 0.002 to 0.008 km^2 (US EPA, 1993), while the foraging range varies from 0.007 to 0.28 km^2 (FCSAP, 2012b). An average sized American robin weighs 0.08 kg (FCSAP, 2012b). Its diet is highly variable throughout the year, changing from primarily soft-bodied invertebrates (e.g., earthworms) in spring and summer, to primarily fruit in autumn and winter (Vanderhoff, Pyle, Patten, Sallabanks, & James, 2020). The American robin consumes approximately 1.2 kg of wet weight food per kg body weight per day and 0.14 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the robin's diet was modelled as 60% terrestrial plants (i.e., fruit, including berries) and 40% terrestrial invertebrates. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the American robin was estimated to incidentally ingest 0.00059 kg/day of dry soil.

SOURCE: Morffew (2012) (photograph)

8.1.3.2.2 Bald Eagle

The bald eagle is the second largest bird of prey found in North America, and the largest found in Canada (CWS and CWF, 1992). Adult birds are readily identified by their striking appearance, characterized by dark brown body plumage contrasting sharply with white head and tail plumage (Buehler, 2022). The bald eagle prefers seacoasts, lake shores, or riverine habitat possessing suitable nesting trees in which to breed. Female bald eagles are typically larger than males by up to 25% (Buehler, 2022). Bald eagles are opportunistic feeders, taking live prey when available but preferring to scavenge carrion or freshly killed prey from other predators (CWS and CWF, 1992) (US EPA, 1993). Their preferred food items include fish, aquatic birds, and mammals; however, choice of prey is site-specific and may vary widely across their range (Buehler, 2022). Adult birds are more likely to hunt and kill food items whereas immature birds are more prone to obtaining food through scavenging and piracy (CWS and CWF, 1992).

The typical body mass of the bald eagle ranges from 3.7 to 6.4 kg (FCSAP, 2012b), although masses of 7.0 kg have been recorded (CWS and CWF, 1992). Bald eagles consume an average of 0.12 kg of wet weight food per kg body weight per day and 0.04 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), bald eagles are modelled as consuming 65% fish and 35% terrestrial prey. Based on the consumption of these foods and soil and sediment ingestion rates from FCSAP (2012b), the bald eagle also ingests 0.0013 kg/day of dry soil and 0.0018 kg/day of dry sediment.

SOURCE: Morffew (2016) (photograph)

8.1.3.2.3 Barn Swallow

The barn swallow is a long-distance migrant moving between its breeding range in North America and overwintering range in Central and South America (Brown & Brown, 2020). Breeding habitats include open areas (e.g., fields, meadows, wetlands) for foraging, a nest site that includes a vertical or horizontal substrate with some type of roof or ceiling, and a body of water that provides mud for nest building (Brown & Brown, 2020). Barn swallows are not territorial while foraging. Foraging ranges vary from 0.8 to 4.5 km^2 (FCSAP, 2012b). An average sized barn swallow weighs 0.0187 kg (FCSAP, 2012b). The barn swallow's diet consists primarily of aerial insects year-round. Seeds may also be consumed to a lesser extent. Grit or small pebbles are often consumed to aid digestion of insects and possibly also for calcium (Brown & Brown, 2020). Barn swallows consume approximately 0.26 kg of dry weight food (or 1.6 kg wet weight food) per kg body weight per day and 0.22 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the barn swallow's diet was modelled as 1% terrestrial plants (i.e., seeds and berries) and 99% terrestrial invertebrates. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the barn swallow is estimated to incidentally ingest approximately 0.000096 kg/day of dry soil.

SOURCE: Hempel (2009) (photograph)

8.1.3.2.4 Common Merganser

The Common Merganser is a large diving duck with an average weight of approximately 1.5 kg (FCSAP, 2012b). It is found along large lakes, rivers, coastal bays, and estuaries across the northern hemisphere. In Canada, it breeds along lakes and rivers bordered by forests south from Alaska to James Bay and Newfoundland; mergansers may also overwinter in southern Canada where there is open water (Cornell Lab of Ornithology). Foraging ranges are 0.04 to 13.9 km^2 or 0.7 to 2.5 km of linear river (FCSAP, 2012b). The common merganser feeds primarily on aquatic invertebrates as ducklings, and primarily on small fish as adults (Cornell Lab of Ornithology). Adults consume approximately 0.05 kg of dry weight food (or 0.20 kg of wet weight food) per kg body weight per day and 0.05 L of water or its equivalent per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the common merganser's diet is modelled as 90% freshwater fish, 8% aquatic invertebrates, and 2% aquatic plants. Based on its consumption of these foods and sediment ingestion rates from FCSAP (2012b), the Common Merganser is estimated to incidentally ingest 0.0015 kg/day of dry freshwater sediment.

SOURCE: Danese (2024) (photograph)

8.1.3.2.5 Lesser Scaup

The lesser scaup is one of the most abundant and widespread diving ducks in North America. The lesser scaup is a late fall migrant, one of the last waterfowl to leave an area at freeze-up (Anteau, et al., 2020). They winter along coastal areas in the southern states and into Mexico. The core nesting habitats of the lesser scaup are in boreal forests and parklands. Their primary brood habitat is characterized by permanent wetlands dominated by emergent vegetation. Females nest in late May through June and build nests on the ground near or over water, as well as in uplands (Anteau, et al., 2020). The average size of their home range is 0.9 km^2 (US EPA, 1993), while their foraging range varies from 0.1 to 17.1 km^2 (FCSAP, 2012b). An average sized lesser scaup weighs 0.71 kg (FCSAP, 2012b). During spring and summer, lesser scaup forage in the open-water zone of shallow wetlands and lakes (generally less than 3 m deep). Lesser scaup are mainly carnivorous, consuming mostly aquatic invertebrates (e.g., crustaceans, insects, molluscs, snails, polychaetes). Seeds and vegetative parts of aquatic plants may also be part of the diet in certain areas (Anteau, et al., 2020). The lesser scaup consumes approximately 0.07 kg of dry weight food (or 0.29 kg wet weight food) per kg body weight per day and 0.066 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the lesser scaup's diet was modelled as 10% aquatic plants and 90% benthic invertebrates. Based on its consumption of these foods and sediment ingestion rates from FCSAP (2012b), the lesser scaup was estimated to incidentally ingest 0.00093 kg/day of dry sediment.

SOURCE: Mah (2015) (photograph)

8.1.3.2.6 Mallard

The mallard is the most abundant dabbling duck species in North America. Most mallard populations in North America are sedentary, undergoing only short to medium-distance migrations during winter (Drilling, Titman, & McKinney, 2020). Their preferred foraging habitats are natural bottomland wetlands and rivers with water depths of 0.2 to 0.4 m. Their nesting habitat consists of dense grassy vegetation that provides concealment from predators. Their home ranges vary from 5.4 to 6.2 km^2 (US EPA, 1993), while their foraging range varies from 0.09 to 2.4 km^2 (FCSAP, 2012b). An average sized mallard weighs approximately 1.2 kg (FCSAP, 2012b). The mallard feeds primarily on aquatic invertebrates during the breeding season and on aquatic and terrestrial plants during the non-breeding season (CWS and CWF, 1996). The mallard consumes approximately

0.05 kg of dry weight food (or 0.31 kg wet weight food) per kg body weight per day and 0.056 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the mallard's diet was modelled as 5% terrestrial plants (i.e., berries/seeds), 5% terrestrial invertebrates, 50% aquatic plants, and 40% benthic invertebrates. Based on its consumption of these foods and soil and sediment ingestion rates from FCSAP (2012b), the mallard was estimated to incidentally ingest 0.00019 kg/day of dry soil and 0.0020 kg/day of dry sediment.

SOURCE: Kiran (2018) (photograph)

8.1.3.2.7 Red-tailed Hawk

The red-tailed hawk is the most common and widespread hawk in North America. It is typically found in open areas with scattered, elevated perches in diverse habitats including scrub deserts, plains and montane grasslands, agricultural fields, pastures, urban parks, patchy coniferous and deciduous woodlands. The red-tailed hawk makes diurnal, short- to intermediate distance migrations (up to 1500 km) (Preston & Beane, 2020). Northern populations of the red-tailed hawk are migratory, while populations from southern Canada may be year-round residents (US EPA, 1993). Home range size can vary from 2 to over 15 km^2, depending on the habitat (US EPA, 1993) (Stout, Temple, & Cary, 2006). The area of their foraging range varies from 0.2 to 50 km^2 (FCSAP, 2012b). An average sized red-tailed hawk weighs approximately 1.1 kg (FCSAP, 2012b). Red-tailed hawks generally hunt from an elevated perch, foraging primarily on small rodents such as mice, voles, shrews, rabbits, and squirrels, as well as birds and reptiles (US EPA, 1993). They consume approximately 0.1 kg of wet weight food per kg body weight per day and 0.057 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the red-tailed hawk's diet was modelled as 100% terrestrial prey items. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the red-tailed hawk was estimated to incidentally ingest approximately 0.00070 kg/day of dry soil.

SOURCE: Jurvetson (2006) (photograph)

8.1.3.2.8 Short-eared Owl

The short-eared owl is widespread throughout North America (Lewis, 2024). The short-eared owl has an average weight of approximately 0.35 kg (Doan, 1999). Found in open, treeless areas, this migratory species is a daylight and twilight hunter found in marshes and bogs and uses similar habitats during the summer and winter (Doan, 1999). Short-eared owls have relatively small home ranges of approximately 0.15 km^2 to 2 km^2 (Lewis, 2024). Short-eared owls nest on the ground on dry sites in open country where small mammal prey is abundant (Doan, 1999). In addition to small mammals such as voles and mice, short-eared owls also prey upon birds and occasionally insects (Lewis, 2024). They consume approximately 0.26 kg of wet weight food per kg body weight per day (Nagy, 1987; US EPA, 1993) and 0.086 L of water or its equivalent per kg body weight per day (Calder & Braun, 1983; US EPA, 1993). The short-eared owl's diet is modelled as 95% small mammals and 5% terrestrial invertebrates (Lewis, 2024). Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the short-eared owl is estimated to incidentally ingest 0.00036 kg/day of dry soil.

SOURCE: Moghe (2017) (photograph)

8.1.3.2.9 Spotted Sandpiper

The spotted sandpiper is one of the most widespread shorebirds in North America. It is found east to west across the continent and north to south from the southern edge of the Arctic to the southern states. Spotted sandpipers are considered intermediate- to long-distance migrants. In the winter, they migrate to the southern United States and South America (Reed, Oring, & Gray, 2020). The spotted sandpiper prefers open water for bathing and drinking, semi-open habitat for nesting and dense vegetation along the edges of bodies of water for breeding (US EPA, 1993). Their mean home range is 0.003 km^2 (US EPA, 1993), while their foraging range varies from 0.0008 to 0.012 km^2 (FCSAP, 2012b). In inland areas, spotted sandpipers feed along the shores of sandy ponds and streams, sometimes straying into meadows and fields. An average sized spotted sandpiper weighs 0.038 kg (FCSAP, 2012b). Their diet is composed primarily of terrestrial and aquatic insects. While flying insects comprise the bulk of the diet, crustaceans, leeches, molluscs, small fish, and carrion also are eaten (US EPA, 1993). The spotted sandpiper consumes approximately 0.18 kg of dry weight food (or 0.98 kg wet weight food) per kg body weight per day and 0.17 L of water per kg body weight per day (FCSAP, 2012b). Based on FCSAP (2012b), the spotted sandpiper's diet was modelled as 60% terrestrial invertebrates, 5% aquatic plants, 30% benthic invertebrates and 5% fish. Based on its consumption of these foods and soil and sediment ingestion rates from FCSAP (2012b), the spotted sandpiper is estimated to incidentally ingest 0.000070 kg/day of dry soil and 0.000067 kg/day of dry sediment.

SOURCE: Matsubara (2019) (photograph)

8.1.3.2.10 Spruce Grouse

The spruce grouse is a non-migratory year-round resident species that almost exclusively inhabits coniferous forests. Spruce grouse prefer relatively young stands over more mature conifer forest. Their home range varies from 0.03 to 3.5 km^2 (USDA Forest Service, 2004). Females nest on the ground in a small depression at the base of a tree with overhanging branches that conceal the nest. Spruce grouse sometimes gather in small flocks in autumn but become solitary by spring; some remain solitary year-round. They do not undergo long-distance movements out of their northern forest habitats but can have localized seasonal movements (short-distance migratory movements of up to 11 km) between breeding and wintering ranges (Schroeder, Blomberg, Boag, Pyle, & Patten, 2021). An average sized spruce grouse weighs 0.6 kg (FCSAP, 2012b). Their diet consists mainly of conifer needles. Spruce grouse usually forage higher in trees, where they can access newer needles, but may also forage on the ground, eating growing tips, flowers, fruit of small plants, mushrooms, small arthropods, and terrestrial (Schroeder, Blomberg, Boag, Pyle, & Patten, 2021). Their foraging range varies from 0.03 to 0.24 km^2 (FCSAP, 2012b). Spruce grouse consume approximately 0.07 kg of dry weight food (or 0.46 kg wet weight food) per kg body weight per day and 0.07 L of water, per kg body weight, per day (FCSAP, 2012b). Based on FCSAP (2012b), the spruce grouse's diet was modelled as 95% terrestrial plants (30% berries, 65% conifer needles and buds) and 5% terrestrial invertebrates. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the spruce grouse is estimated to incidentally ingest approximately 0.00083 kg/day of dry soil.

SOURCE: Barrette (2010) (photograph)

8.1.3.3 Herptile Ecological Receptor Profiles

8.1.3.3.1 Wood Frog

The wood frog is the second most widely distributed frog in North America. Wood frogs use a variety of habitats and have a multiphasic life history (i.e., obligatory aquatic egg and tadpole phases plus terrestrial adult). Their preferred breeding habitats include ponds that have emergent vegetation, still water, and shallow, sloping shores, as well as moist grassy meadows, willow bogs, or forests with moderate to thick leaf litter (Muths, Rittman, Irwin, Keinath, & Scherer, 2005). Their average foraging range is 0.25 km^2 (FCSAP, 2012b). An average sized wood frog weighs

0.008 kg (FCSAP, 2012b). Adult wood frogs are carnivorous, feeding primarily on arthropods such as ants, flies, beetles, spiders and to a lesser extent snails, slugs, and earthworms. Tadpoles are omnivorous, feeding on algae, bacteria, and periphyton (Muths, Rittman, Irwin, Keinath, & Scherer, 2005). Food and water ingestion rates for the wood frog are unknown (FCSAP, 2012b).

SOURCE: Zahniser (2007) (photograph)

8.1.3.3.2 Common Gartersnake

The common gartersnake is one of the most widespread snake species in North America (Crowley, 2022). It is a habitat generalist and may live in wetlands, grasslands, savannah, forest, shorelines of lakes and rivers, rocky outcrops, mountain slopes, and human-modified areas such as roadsides and ditches, tending to be most common near aquatic habitats such as wetlands, lakes, and rivers (Crowley, 2022). In some areas, common gartersnakes spend the cold winter months completely submerged in water (BC Conservation Data Centre, 2010). They hibernate communally underground in places such as rock crevices, mammal burrows, root hollows or the foundations of old buildings (Crowley, 2022). They have an average foraging range of 0.01 km^2 (FCSAP 2012b). In some areas in the northern part of the range, common gartersnakes make long migrations between winter hibernacula and summer range (BC Conservation Data Centre, 2010).

Common gartersnakes weigh an average of 0.090 kg (FCSAP, 2012b). They primarily eat amphibians and earthworms, but they also consume insects, spiders, leeches, slugs, snails, crayfish, mice, fish, other snakes, and occasionally small birds and bird eggs (Crowley, 2022). The average common gartersnake consumes approximately 0.03 kg wet food per kg body weight per day; water ingestion rates are unknown (FCSAP, 2012b). Based on FCSAP (2012b), the common gartersnake's diet comprises of 30% terrestrial invertebrates, 4% terrestrial prey, 60% freshwater benthic invertebrates, and 6% freshwater fish. Based on its consumption of these foods and soil ingestion rates from FCSAP (2012b), the common gartersnake is estimated to incidentally ingest approximately 0.0000033 kg/day of dry soil and 0.0000086 kg/day of dry sediment.

SOURCE: Wilson (2010) (photograph)

8.1.3.4 Summary of Ecological Receptor Profiles

Profiles on the selected ecological receptors are summarised in Table 8.2.

Table 8.2 Summary of Ecological Receptor Profiles

Receptor	Average Weight (kg)	Foraging Range (km^2)	Food Ingestion (kg wet weight food/kg BW/day)	Water Ingestion (L/kg BW/day)	Soil/Sediment Ingestion (kg dry weight soil/day)	Diet (Specific to Assessment)
Mammals						
American Black Bear	68	3 to 1,147	0.19	0.06	0.041 (soil) 0.0032 (sediment)	80% Terrestrial plants 5% Terrestrial invertebrates 10% Terrestrial prey 5% Freshwater fish
American Mink	0.82	0.06 to 16.3	0.14	0.03	0.00018 (soil) 0.00043 (sediment)	25% Terrestrial prey 10% Benthic invertebrates 65% Freshwater fish
Beaver	24	16 to 32	0.022	0.072	0.0039 (soil) 0.0062 (sediment)	55% Terrestrial plants 45% Aquatic plants
Bobcat	7.5	20	0.15	0.081	0.0038 (soil)	100% Terrestrial prey
Boreal Caribou	160	710	0.05	0.059	0.17 (soil)	100% Terrestrial plants
Masked Shrew	0.0041	0.006	2.1	0.17	0.000028 (soil)	5% Terrestrial plants 95% Terrestrial invertebrates
Meadow Vole	0.035	0.000069 to 0.0035	0.33	0.21	0.000041 (soil)	100% Terrestrial plants
Moose	400	4.6 to 262	0.13	0.05	0.12 (soil) 0.026 (sediment)	80% Terrestrial plants 20% Aquatic plants
Northern River Otter	7.5	9 to 231	0.12	0.08	0.00029 (soil) 0.0042 (sediment)	5% Terrestrial prey 15% Benthic invertebrates 80% Freshwater fish
Red Fox	3.8	2.8 to 34.2	0.09	0.09	0.0024 (soil)	15% Terrestrial plants 25% Terrestrial invertebrates 60% Terrestrial prey
Snowshoe Hare	1.3	0.016 to 0.102	0.40	0.10	0.0049 (soil)	100% Terrestrial plants
White-tailed Deer	75	0.3 to 24.35	0.18	0.06	0.04 (soil)	100% Terrestrial plants
Birds						
American Robin	0.079	0.007 to 0.28	1.2	0.14	0.00059 (soil)	60% Terrestrial plants 40% Terrestrial invertebrates

Receptor	Average Weight (kg)	Foraging Range (km²)	Food Ingestion (kg wet weight food/kg BW/day)	Water Ingestion (L/kg BW/day)	Soil/Sediment Ingestion (kg dry weight soil/day)	Diet (Specific to Assessment)
Bald Eagle	4.7	2.1 to 21.6	0.12	0.04	0.0013 (soil) 0.0018 (sediment)	35% Terrestrial prey 65% Freshwater fish
Barn Swallow	0.0187	0.8 to 4.5	1.6	0.22	0.000096 (soil)	1% Terrestrial plants 99% Terrestrial invertebrates
Common Merganser	1.5	0.04 to 13.9	0.20	0.05	0.0015 (sediment)	2% Aquatic plants 8% Aquatic invertebrates 90% Freshwater Fish
Lesser Scaup	0.71	0.10 to 17	0.29	0.066	0.00093 (sediment)	10% Aquatic plants 90% Benthic Invertebrates
Mallard	1.2	0.09 to 2.4	0.31	0.056	0.00019 (soil) 0.0020 (sediment)	5% Terrestrial plants 5% Terrestrial invertebrates 50% Aquatic plants 40% Benthic invertebrates
Red-tailed Hawk	1.1	0.2 to 50	0.10	0.057	0.00070 (soil)	100% Terrestrial prey
Short-eared Owl	0.35	0.15 to 2.0	0.26	0.086	0.00036 (soil)	5% Terrestrial invertebrates 95% Terrestrial prey
Spotted Sandpiper	0.038	0.0008 to 0.012	0.98	0.17	0.000070 (soil) 0.000067 (sediment)	60% Terrestrial invertebrates 5% Aquatic plants 30% Benthic invertebrates 5% Freshwater fish
Spruce Grouse	0.60	0.03 to 0.24	0.46	0.070	0.00083 (soil)	95% Terrestrial plants 5% Terrestrial invertebrates
Herptiles [1]						
Wood Frog	0.008	0.25	n/a	n/a	n/a	100% Terrestrial invertebrates

Receptor	Average Weight (kg)	Foraging Range (km²)	Food Ingestion (kg wet weight food/kg BW/day)	Water Ingestion (L/kg BW/day)	Soil/Sediment Ingestion (kg dry weight soil/day)	Diet (Specific to Assessment)
Common Gartersnake	0.090	0.01	0.03	n/a	0.0000033 (soil) 0.0000086 (sediment)	30% Terrestrial invertebrates 4% Terrestrial prey 60% Benthic invertebrates 6% Freshwater fish

Notes:
n/a - information is not available.
[1] As there are not sufficient exposure and toxicity data to evaluate herptiles quantitatively, a qualitative assessment will be conducted.

8.1.4 Community Based Ecological Receptors

The primary exposure pathway for some flora and fauna is from direct contact with a single abiotic environmental medium (e.g., soil). Accordingly, toxicity benchmarks are commonly derived based on CoPC media concentrations and the adverse environmental effects thresholds for organisms that reside/rely on those media. Additionally, these benchmarks are typically generated using toxicity data for not one, but several species that rely on that medium, and are intended to represent a CoPC concentration that will be protective of most, if not all species associated with that medium. For these reasons, the following ecological receptors were evaluated in this ERA at the community level, rather than as individual species:

- Terrestrial plant communities
- Terrestrial invertebrate communities
- Benthic communities, including invertebrates, plants, and fish living in close association with sediment (i.e., benthic species)
- Aquatic communities, including invertebrates, plants, and fish living within the water column (i.e, pelagic species)

8.1.5 Species at Risk and Species of Conservation Concern

Species at Risk (SAR) are those species designated under Schedule 1 of the federal *Species at Risk Act* (SARA) (Government of Canada, 2002) or the *Ontario Endangered Species Act* (ESA) list (MECP, 2023b). Species of Conservation Concern (SOCC) are those identified as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC, 2022a) or those identified as provincially rare by Ontario's Natural Heritage Information Centre (NHIC) (i.e., with subnational rank S1 – extremely rare, S2 – very rare, S3 – rare to uncommon, or SH – historically present in Ontario) (NHIC, 2023).

SAR and SOCC identified within the RSA are summarized in Table 8.3. This information was considered in the selection of ecological receptors for the ERA. SAR and SOCC were identified within the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement). No SAR or SOCC plants were encountered, documented, or otherwise identified within the RSA, with the exception of black ash (*Fraxinus nigra*) for which two occurrences were recorded, one in the LSA and another immediately west of the LSA. This species is designated Endangered under the ESA but not listed under SARA.

One SAR, lake sturgeon (*Acipenser fulvescens*), was identified within the RSA (Appendix B.2 of the Impact Statement [2021-2023 Fish and Fish Habitat Baseline]). Lake sturgeon is listed as "Special Concern" under SARA and the ESA. The Southern Hudson Bay-James Bay population unit of lake sturgeon includes populations known to inhabit the Mattagami River, Abitibi River (of which the North Driftwood River is a tributary), and Frederick House River within the RSA; lake sturgeon DNA was detected in the Mattagami River in May 2023, although adults or eggs were not observed or recorded. Lake sturgeon DNA was not detected in the North Driftwood River (Appendix B.2 of the Impact Statement [2021-2023 Fish and Fish Habitat Baseline]). The Project is not within the Mattagami River watershed; Jocko Creek drains into the Mattagami River as discussed in Section 8.1.6. Based on this information, lake sturgeon are not receptors expected to be exposed to Project related CoPC.

Through engagement, two cougar sightings were reported by Taykwa Tagamou Nation near Highway 655 (Taykwa Tagamou Nation, 2023a; Impact Assessment Agency of Canada, 2024). Taykwa Tagamou Nation also noted a single eastern wolf sighting (Taykwa Tagamou Nation, 2023a); however, the range of this species is considered limited to central Ontario based on genetic testing, with only a few records extending to Sault Ste. Marie and Manitoulin Island (COSSARO, 2022). The wolves in the area are considered to be northern gray wolf and therefore, eastern wolf are not considered in the Wildlife and Wildlife Habitat VC in Chapter 19 of the Impact Statement. Further details are also provided in the 2023 Terrestrial Ecology Baseline Study in Appendix B.7.4 of the Impact Statement).

Table 8.3 Summary of SAR and SOCC within the RSA

Common Name	Scientific Name	Confirmed or Potential	SARA Status	ESA Status	Occurrence within the RSA
Mammals					
Cougar	*Puma concolor*	Potential [3]	Not listed	Special Concern	Although no cougars or evidence of cougars were reported in the 2023 Terrestrial Ecology Baseline Study(Appendix B.7.4 of the Impact Statement), two cougar sightings within the RSA were noted during traditional knowledge studies.
Little Brown Myotis	*Myotis lucifugus*	Confirmed	Endangered	Endangered	Recorded at bat acoustic monitoring stations.

Common Name	Scientific Name	Confirmed or Potential	SARA Status	ESA Status	Occurrence within the RSA
Northern Myotis	*Myotis septentrionalis*	Potential [1]	Endangered	Endangered	Not recorded; however, recordings of calls identifiable as northern myotis are extremely rare and therefore occurrence in the RSA could not be ruled out based on bat acoustic monitoring stations.
Tri-colored Bat	*Perimyotis subflavus*	Potential	Endangered	Endangered	Low potential; the tri-colored bat was not identified in the RSA. No tri-colored bat was identified by automated or manual methods.
Eastern Red Bat	*Lasiurus borealis*	Confirmed	Not listed, under consideration	Endangered (effective January 31, 2025)	Recorded at bat acoustic monitoring stations within RSA.
Hoary Bat	*Lasiurus cinereus*	Confirmed	Not listed, under consideration	Endangered (effective January 31, 2025)	Recorded at bat acoustic monitoring stations within RSA.
Silver-haired Bat	*Lasionycteris noctivagans*	Confirmed	Not listed, under consideration	Endangered (effective January 31, 2025)	Recorded at bat acoustic monitoring stations within RSA.
Wolverine	*Gulo gulo*	Potential [3]	Endangered	Threatened	Although no wolverines or evidence of wolverines were reported in the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), wolverines are noted to be of importance for hunting, fishing, or trapping to the Taykwa Tagamou Nation based on traditional knowledge studies; therefore, the wolverine was carried forward as SAR/SOCC.
Boreal Caribou	*Rangifer tarandus*	Potential [2]	Threatened	Threatened	Although no boreal caribou or tracks were reported during the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement), critical habitat intersects part of the RSA, and boreal caribou have been recorded within 10 to 15 km of the Project boundaries (MECP, 2015).

Common Name	Scientific Name	Confirmed or Potential	SARA Status	ESA Status	Occurrence within the RSA
Birds					
Bank Swallow	*Riparia riparia*	Potential [1]	Threatened	Threatened	Species was not observed during breeding bird surveys and not detected at Autonomous Recording Units. Suitable habitat was not observed during field surveys within RSA but may be present in areas that were not surveyed.
Barn Swallow	*Hirundo rustica*	Confirmed	Threatened	Special Concern	One barn swallow was observed during breeding bird surveys. Potential nesting habitat in structures such as those within the Kidd Mine. Barn swallows that breed north of the RSA would migrate through the RSA.
Canada Warbler	*Cardellina canadensis*	Confirmed	Threatened	Special Concern	Observed during breeding bird surveys and recorded at Autonomous Recording Units
Common Nighthawk	*Chordeiles minor*	Confirmed	Special Concern	Special Concern	Recorded at Autonomous Recording Units within RSA.
Eastern Whip-poor-will	*Antrostomus vociferus*	Potential [1]	Threatened	Threatened	This species was not recorded during targeted surveys, but the RSA is within the species' range and suitable habitat is present.
Evening Grosbeak	*Coccothraustes vespertinus*	Confirmed	Special Concern	Special Concern	Observed during breeding bird surveys within RSA.
Lesser Yellowlegs	*Tringa flavipes*	Confirmed	Not listed	Threatened	Observed during breeding bird surveys and recorded at Autonomous Recording Units within RSA.
Olive-Sided Flycatcher	*Contopus cooperi*	Confirmed	Special Concern	Special Concern	Observed incidentally and recorded at Autonomous Recording Units within RSA.
Peregrine Falcon	*Falco peregrinus*	Potential [1]	Special Concern	Special Concern	Not observed or recorded. The RSA lacks appropriate nest sites. The peregrine falcon likely migrates through the RSA.
Redhead	*Aythya americana*	Confirmed	Not listed [4]	Not listed [4]	Observed during breeding bird surveys within RSA.
Rusty Blackbird	*Euphagus carolinus*	Confirmed	Special Concern	Special Concern	Observed during breeding bird surveys and migratory bird surveys and recorded at Autonomous Recording Units within RSA.

Common Name	Scientific Name	Confirmed or Potential	SARA Status	ESA Status	Occurrence within the RSA
Short-eared Owl	*Asio flammeus)*	Potential [1]	Special Concern	Threatened	Targeted surveys for Short-eared Owl were conducted in suitable habitat during the 2023 breeding season. This species was not observed in the LSA. There are eBird records within the RSA and suitable habitat is present within the LSA.
Yellow Rail	*Coturnicops noveboracensis*	Potential [1]	Special Concern	Special Concern	Not observed or recorded. There is abundant habitat for the yellow rail (wetlands) within the RSA.
Reptiles and Amphibians					
Blanding's Turtle	*Emydoidea blandingii*	Potential [1]	Endangered	Threatened	Suitable habitat is present within the RSA; individuals were not confirmed during field studies; however, there have been three historical observations (>20 years) from community members.
Midland Painted Turtle	*Chrysemys picta marginata*	Potential [1]	Special Concern	Not listed	Not observed or recorded. However, there is abundant habitat (lakes, mashes, ponds, and creeks) within the RSA.
Snapping Turtle	*Chelydra serpentina*	Potential [1]	Special Concern	Special Concern	Not observed or recorded. However, there is abundant habitat (lakes, mashes, ponds, and creeks) within the RSA.
Insects [6]					
Monarch	*Danaus plexippus*	Potential [1]	Endangered	Special Concern	Not observed or recorded. Potential suitable habitat may be present within the RSA.
Yellow-Banded Bumble Bee	*Bombus terricola*	Potential [1]	Special Concern	Special Concern	Not observed or recorded. Potential suitable habitat may be present within the RSA.

Notes:

[1] SAR/SOCC determined to have a potential occurrence based on the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement).

[2] SAR/SOCC with lower than moderate potential occurrence according to the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement) that is included due to its cultural importance based on traditional knowledge studies.

[3] SAR/SOCC not observed or recorded within the 2023 Terrestrial Ecology Baseline Study (Appendix B.7.4 of the Impact Statement)but reported in traditional knowledge studies as discussed in Section 4.2.

[4] Non-SAR SOCC; identified as provincially rare (NHIC, 2023).

[5] Sufficient information is not available to assess fish at the species level within the ERA. Instead, these species will be assessed on a community level as part of aquatic communities.

[6] Sufficient information is not available to assess insects at the species level within the ERA. Instead, these species will be assessed on a community level as part of terrestrial invertebrates.

It is difficult in ERA to quantitatively address CoPC risk to SAR/SOCC because quantitative information is often lacking on diet, inadvertent soil ingestion, water intake and toxicological reference data. To accommodate SAR/SOCC in this ERA, ecological receptors found within the same class and within a similar trophic level or feeding guild were used as surrogates to assess toxicological risk from exposure to CoPCs listed in Section 8.1.1). The results of the ERA for those species can be applied to the SAR/SOCC, with added level of protection as described in Section 8.3.1. If characteristics of the SAR/SOCC were available then this species was identified as a ROC, and included the Boreal caribou, the barn swallow, and the short-eared owl. However, in the absence of suitable information, a surrogate species was selected for the characterization of risk as summarized in Table 8.4. Ecological surrogates were selected based on characteristics including class, size, habitat, and feeding guild.

Table 8.4 SAR/SOCC and Surrogate Ecological Receptors Used in the ERA

Common Name of SAR/SOCC	Common Name of Ecological Receptor used as Surrogate in ERA
Mammals	
Cougar	Bobcat
Little Brown Myotis	Common Masked Shrew
Northern Myotis	Common Masked Shrew
Tri-colored Bat	Common Masked Shrew
Eastern Red Bat	Common Masked Shrew
Hoary Bat	Common Masked Shrew
Silver-haired Bat	Common Masked Shrew
Wolverine	Bobcat
Birds	
Bank Swallow	Barn Swallow
Canada Warbler	Barn Swallow/American Robin
Common Nighthawk	Barn Swallow
Eastern Whip-poor-will	Barn Swallow
Evening Grosbeak	American Robin
Lesser Yellowlegs	Spotted Sandpiper
Olive-Sided Flycatcher	Barn Swallow
Peregrine Falcon	Red-tailed Hawk
Redhead	Mallard
Rusty Blackbird	American Robin
Yellow Rail	Spotted Sandpiper
Herptiles	
Blanding’s Turtle	Aquatic community
Midland Painted Turtle	Aquatic community
Snapping Turtle	Aquatic community

Common Name of SAR/SOCC	Common Name of Ecological Receptor used as Surrogate in ERA
Insects	
Monarch	Terrestrial invertebrates
Yellow-Banded Bumble Bee	Terrestrial invertebrates

8.1.6 Ecological Receptor Locations

Potential risks to ecological receptors were assessed for the LSA (described in Section 2.2), according to three watersheds previously discussed in Section 6:

- North Driftwood River watershed
- West Buskegau River watershed
- Jocko Creek watershed

8.1.7 Exposure Pathway Screening

Exposure pathways included in the ERA are summarised in Table 8.5.

Table 8.5 Rationale for Exposure Pathway Inclusion in the ERA

Exposure Pathway	Carried Forward in the ERA	Rationale
Direct Exposure from Air	Yes	Some CoPC (e.g., NO_2 and SO_2) may be directly absorbed from the air by terrestrial plants.
Soil Ingestion	Yes	Soil ingestion is an important dietary component for many ecological receptors including herbivores and ungulates. Direct ingestion of soil provides essential minerals such as sodium, calcium, iron, and zinc to supplement diets that are naturally low in mineral content. Incidental soil ingestion may occur through the ingestion of food items. Examples include soil bound to browse, forage and root vegetation when consumed by herbivores; or soil bound to prey items on the ground. Incidental soil ingestion may also occur through grooming activities. Therefore, the ingestion of soil constitutes a potential source of exposure for wildlife.
Soil Contact	Yes	Direct contact with soil is the primary exposure pathway for soil invertebrates and plants as well as reptiles and amphibians (FCSAP, 2012b). Direct (dermal) contact with soil could be a potential exposure pathway for mammals and birds. However, it is not expected to represent a major source of exposure for most mammalian and avian receptors because fur and feathers will substantially reduce soil contact with skin as per Sample et al. (1997) and BC MOECC (2023). Soil adhering to fur and feathers may be ingested during grooming activity, which is included in the incidental soil ingestion estimates.

Exposure Pathway	Carried Forward in the ERA	Rationale
Inhalation	No	Ecological receptors may be exposed to CoPC through the inhalation of dust. However, this exposure pathway is included with soil ingestion since it was assumed that most inhaled particulates will be caught in the mucus membrane, coughed up, and/or swallowed by the animal. With respect to potential effects on the respiratory system, there is insufficient toxicological dose-response information available to properly evaluate the potential effects associated with inhalation exposures to CoPC for ecological receptors and the biological mechanisms of action associated with inhalation exposures often differ from those associated with ingestion exposures. Thus, using exposure benchmarks derived for ingestion exposures to assess potential risks associated with inhalation exposures is often incorrect. Therefore, inhalation is not considered further in the ERA.
Ingestion of Terrestrial Foods	Yes	The consumption of terrestrial plants, terrestrial invertebrates and terrestrial prey can be a source of exposure for mammals, birds, reptiles, and amphibians.
Surface Water Ingestion	Yes	The ingestion of surface water containing CoPC can be an exposure pathway for wildlife.
Ingestion of Aquatic Foods	Yes	The ingestion of aquatic plants, invertebrates, and fish can be an exposure pathway for wildlife.
Direct Contact with Surface Water	Yes	Direct contact with surface water is an exposure pathway to aquatic receptors such as fish, aquatic reptiles and amphibians, aquatic plants, and benthic invertebrates. Exposure to CoPC from direct contact with water was assumed to be a minor exposure pathway relative to direct ingestion of water and ingestion of foods (e.g., fish) from the aquatic environment, both of which have been included in the ERA.
Ingestion of Sediment	Yes	Ecological receptors that consume aquatic plants and benthic invertebrates may also ingest sediments incidentally. Other activities such as grooming and constructing nests or dens may also result in incidental sediment ingestion. Therefore, this exposure pathway is considered in the ERA.
Ingestion of Benthic Aquatic Foods	Yes	The diets of some wildlife receptors include a proportion of benthic invertebrates. Therefore, this exposure pathway is considered in the ERA.
Direct Contact with Sediment	Yes	Benthic invertebrates live in or are associated with sediments for most of their lifespan. Therefore, direct contact with sediments is the primary exposure pathway for benthic invertebrates. For wildlife receptors, direct contact with sediment is considered to be minor exposure pathway relative to the exposures from ingestion of sediment benthic foods.

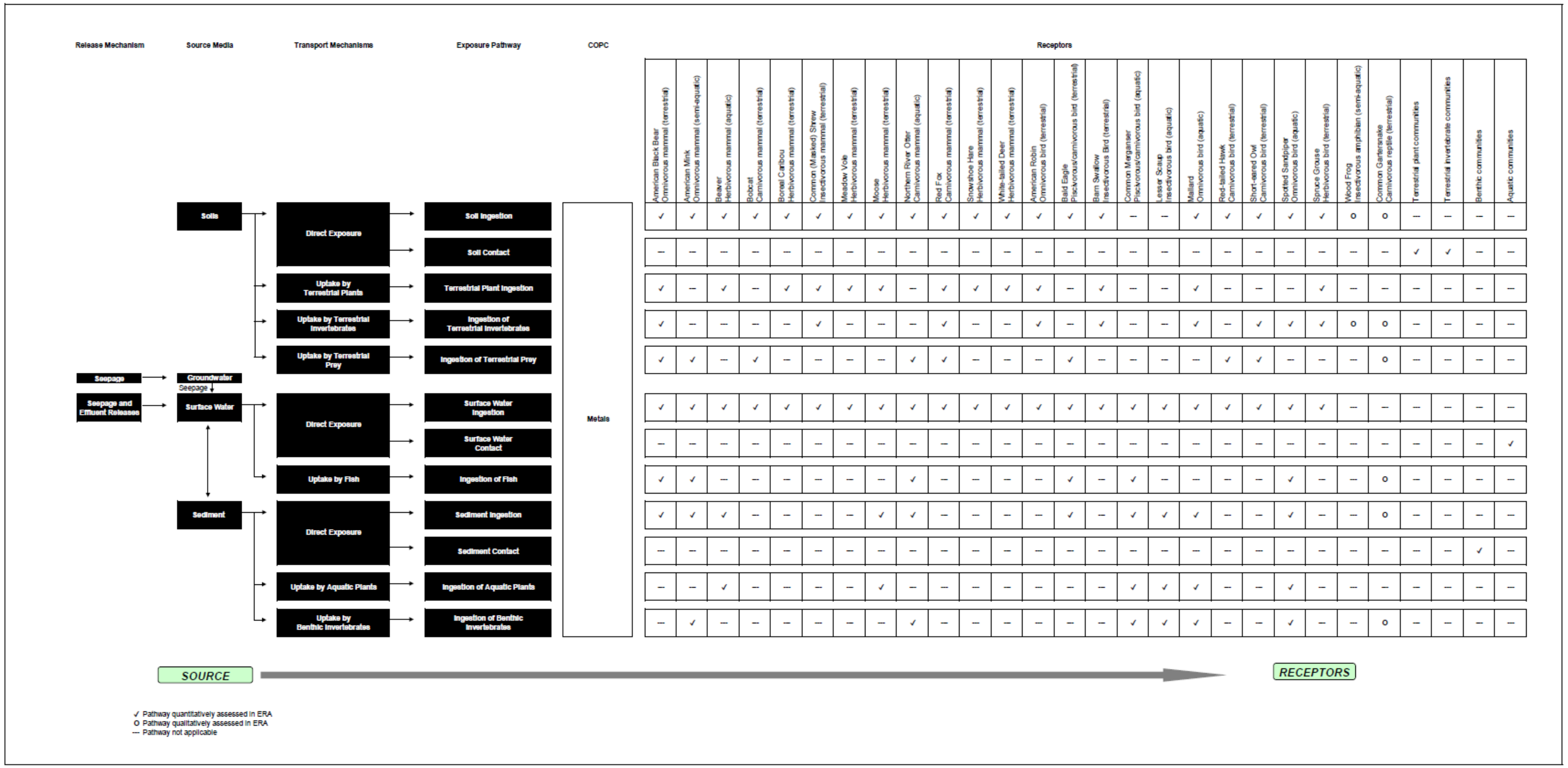
8.1.8 Conceptual Site Model

The objective of the problem formulation stage is to develop a CSM that will aid in subsequent stages of quantitative analyses. The CSM illustrates the pathways by which ecological receptors could be exposed to CoPC released into the environment from the Project. Chemical transport and exposure pathways are used to describe the movement of CoPC from a release point or source (e.g., dust released by Project activities and treated effluent discharge or other releases to watercourses) to the point where an ecological receptor may come into contact with the CoPC (e.g., direct exposure or ingestion). The exposure pathway screening process incorporates information about the Project-related CoPC emissions, activities in the area, receptor characteristics and the exposure pathways. The chemical exposure pathways considered in the ERA, and the rationale for the exposure pathway being included or excluded in the assessment, is found in Table 8.5 above.

The CSM for the ERA represents the interactions between the receptors and the CoPC, via the identified exposure pathways. The relevant exposure pathways are designated by arrows from the source media leading to the receptor by various exposure pathways (i.e., direct exposure or ingestion). Pathway exposure boxes marked with an "✓" indicate pathways that have been quantitatively evaluated in the ERA, while those marked with an "o" indicate pathways that have been qualitatively evaluated.

The CSM is shown on Figure 8.1.

Figure 8.1 Conceptual Site Model for Ecological Risk Assessment



8.1.9 Protection Goals and Acceptable Effect Levels

Changes to individual health do not necessarily equate to eventual changes in population health over time. The goal of an ERA is typically to identify potential risks to ecological receptors at the population/community level rather than at the individual level, with the notable exception being species protected under federal or provincial legislation (e.g., SARA in Ontario and the federal SARA). As mentioned in Section 8.1.5, SAR and SOCC have been reported in the RSA. Consequently, for the purpose of this ERA, the primary assessment endpoints were the protection of populations and communities for standard species (i.e., not species at risk) and the protection of individuals for species at risk (i.e., SOCC), based on predicted changes to growth, reproduction, or survival (CCME, 2020).

8.2 Exposure Assessment

The purpose of the exposure assessment is to quantify an ecological receptor's total exposure to a CoPC. The total exposure to a CoPC is calculated as the sum of exposures (i.e., EPC) from the contributing exposure pathways identified in the CSM and Table 8.5 (e.g., soil ingestion). The determination of EPCs used in the ERA to estimate risk resulting from the Baseline and Baseline Plus Project Scenarios were previously discussed in Section 6.

8.2.1 Calculation of Average Daily Dose

To conduct a quantitative risk assessment for wildlife (mammals, birds, reptiles, and amphibians), it is necessary to estimate the rate of exposure to a CoPC on a mg/kg-day basis (referred to as the average daily dose or ADD). The exposure assessment estimates the ADD of each CoPC to a receptor based on the sum of the contribution from each complete exposure pathway illustrated in the CSM and described in Table 8.5. It is conservatively assumed in this ERA that the ingested CoPC contained in food, water, soil, and sediment will be completely absorbed. The generalized formula to estimate ADD is:

$$\boldsymbol{ADD_i = IF \times AF \times EPC_i}$$ **Equation 8-1**

where:

- ADD_i = Average daily dose for CoPC "i" (mg CoPC/kg body weight/day);
- IF = Intake factor (kg medium/kg body weight/day);
- AF = Absorption factor for CoPC (unitless; assumed to be 1 or 100% absorption); and
- EPC_i = Exposure point concentration for CoPC "i" (mg CoPC/kg medium).

The IF is calculated based on the ingestion rate of each media type (i.e., ingestion of food, water, soil and sediment) for each ecological receptor, the fraction of time each receptor spends at the site (f_{SITE}), and the receptor's body weight (BW). The f_{SITE} is conservatively set at 1.0 for this ERA, which assumes that receptors spend 100% of their time within the LAA, and a function of the receptor's body weight (BW) in kilograms, as follows:

$$IF = \frac{(IR \times f_{site})}{BW} \qquad \textbf{Equation 8-2}$$

The generalized formula for ADD applies to a single exposure pathway (e.g., ingestion of water or small prey). The total ADD that is used to compare against the TRV is the sum of the ADDs for the relevant exposure pathways. The results of the calculation of the ADD for each ecological receptor and CoPC are provided in Appendix F.

8.3 Toxicity Assessment

The objective of the Toxicity Assessment is to identify the potential adverse effects associated with chronic exposure of ecological receptors to each CoPC. The amount of a substance that can be tolerated, below which adverse effects are not expected to be observed in a population, is referred to as the toxicity reference value, or TRV. For community receptors screening benchmarks are used as markers of toxicity, below which adverse effects are not expected to be observed at a community level.

The TRVs and screening benchmarks for each CoPC applicable to ecological receptors are presented in Appendix F. Numerous literature sources were reviewed to obtain the most applicable TRV/benchmarks for ecological receptors as discussed in the sections below.

8.3.1 Mammals and Birds

For mammals and birds, TRVs for this ERA were taken from FCSAP Ecological Risk Assessment Guidance Module 7: Default Wildlife Toxicity Reference Values Recommended for Federal Contaminated Sites (FCSAP, 2021). For those CoPCs for which TRVs were not available through FCSAP Module 7, additional TRVs were mainly derived using the US EPA Guidance for Developing Ecological Soil Screening Levels (US EPA, 2005) and Ecological Soil Screening Levels Documents specific to each contaminant. Primary scientific literature was also consulted. TRVs used in this ERA were based on dose response studies, typically conducted with laboratory animals, where the lowest observed adverse effects level (LOAEL) or no observed adverse effects level (NOAEL) has been quantified. The preferred toxicity measure used in this ERA is the LOAEL; however, in the absence of a suitable value, NOAEL-based TRVs were used.

The focus of an ERA is to assess the risk for receptors at the population level. The application of TRVs derived from LOAELs is preferred in the calculation of risk. LOAELs are based on long-term growth or survival, or sublethal reproductive outcomes determined from chronic exposure studies. As such, these endpoints are relevant to the maintenance of wildlife populations. This is in contrast to human toxicology and human health risk assessment, where protection of individuals is of paramount concern. An exception to this occurs in ERA when federally or provincially designated SAR or SOCC are evaluated. To afford these species an appropriate level of protection in the ERA, TRVs that are NOAEL based are preferred; if NOAELs are not available then a sensitive species factor (a numerical value of 3) is applied to LOAELs.

In addition to the sensitive species factor, other uncertainty factors were applied as deemed necessary. If the TRV was based on an acute lethal dose (LD_{50}, the amount of an ingested substance that kills 50 percent of a test sample), then it was adjusted by a factor of 100 to make it comparable to a chronic LOAEL. A subchronic LOAEL or NOAEL was adjusted by 3 to make it comparable to a chronic LOAEL. A body mass scaling factor was also applied to extrapolate toxicity data between species with different body masses. The application of this factor only applies when TRVs were based on individual studies (rather than geometric means from numerous animals) and only when the test organism was smaller than the ecological receptor. Body-mass scaling or "dose-scaling" (as it is often referred) provides a more conservative estimate of the TRV when the toxic response observed for small animals is used to extrapolate the expected response for larger animals (Knopper, Smith, Ollson, & Stephenson, 2009). This was the only circumstance under which it was applied. Therefore, the primary uncertainty was that the assessment would potentially overestimate the health risks to the ecological receptors. The uncertainty factor scheme outlined here is based on guidance provided by Ohio EPA (2003; 2008), US EPA (2002c), Sample and Arenal (1999) and the professional judgement of the ERA authors.

The scaling process itself is described by Sample et al. (1996). If a toxicity value for a given test species (At), an allometric scaling factor (b), and the body weights of the test species (BWt) and a selected wildlife species (BWw) are known, then the unknown toxicity value for a particular wildlife species (Aw) may be estimated using the following equation:

$$\mathbf{Aw} = \mathbf{At} \times \left(\frac{\mathbf{BWt}}{\mathbf{BWw}}\right)^{(\mathbf{1-b})} \qquad \textbf{Equation 8-3}$$

For both birds and mammals, (b) was assigned a value of 0.75.

8.3.2 Herptiles

There are limited toxicity data to support the assessment of herptiles (i.e., amphibians and reptiles). Therefore, herptiles were evaluated qualitatively.

8.3.3 Community Receptors

For community receptors, regulatory benchmarks protective of vegetation, soil invertebrates, benthic invertebrates and freshwater aquatic life were used in the ERA when available. Information from the primary literature was used when regulatory benchmarks were not available for a specific CoPC and community receptor. Regulatory benchmarks are based on toxicity studies for multiple species; to establish the adverse environmental effects thresholds for organisms that reside or rely on these media. They are intended to represent a CoPC concentration that will be protective of most species associated with that medium.

8.3.3.1 Terrestrial Plants and Terrestrial Invertebrates

When selecting soil screening benchmarks for the terrestrial plant and soil invertebrate community, priority was given to CCME Soil Quality Guidelines for the protection of Environmental Health (SQG_E) for agricultural land use (the most sensitive land use). The SQGs for agricultural land use were developed to confirm that the soil is capable of sustaining soil-dependent species and considers direct soil contact by microbes (and their effect on nutrient cycling), soil invertebrates, crops, and plants. In the event that guidelines were not available from CCME, the US EPA Ecological Soil Screening Levels (Eco-SSL) were used. The soil screening benchmarks for each CoPC are summarized in Appendix F.

8.3.3.2 Benthic Invertebrates

When selecting sediment screening benchmarks for the benthic invertebrate community, priority was given to CCME Sediment Quality Guidelines for the Protection of Aquatic Life, Freshwater Probable Effect Level (PEL) (CCME, 2023). In the event that PELs were not available, sediment screening benchmarks were based on guidelines from Verbruggen, Posthumus and Wezel (2001) and Vlaardingen, Posthumus and Posthuma-Doodema (2005) for the National Institute for Public Health and the Environment, The Netherlands (hereafter, RIVM). The RIVM sediment screening benchmarks are based on the ecotoxicological serious risk concentration (SRC_{eco}) which they defined as the “concentration of a substance in the soil, sediment or groundwater at which functions in these compartments will be seriously affected or are threatened to be negatively affected. This is assumed to occur when 50% of the species and/or 50% of the microbial and enzymatic processes are possibly affected”. Therefore, the SRC_{eco} is similar to the Probable Effects Level (PEL) as defined in the CCME sediment quality guidelines (i.e., it is expected that adverse effects occur more than half the time at concentrations above the PEL). However, recognizing the potential uncertainty associated with the SRC_{eco} values for these elements, the SRC_{eco} values were modified by dividing them by an additional factor of 10 before using them as screening benchmarks.

The sediment screening benchmarks for each CoPC are summarized in Appendix F.

8.3.3.3 Freshwater Aquatic Life

When selecting surface water screening benchmarks for the freshwater aquatic community, priority was given to Ontario guidance (Ontario MECP PWQO (MECP, 1994) and updates) and federal guidance (Environment and Climate Change Canada (ECCC) Federal Environmental Quality Guidelines (FEQGs) (Environment and Climate Change Canada, 2024) and CCME Water Quality Guidelines for the Protection of Aquatic Life (CWQG-FAL) (CCME, 1999) and updates). FEQGs set a concentration so that if a given chemical is at or below the FEQG threshold, there is low likelihood of direct adverse effects from the chemical on aquatic life exposed via the water (Environment and Climate Change Canada, 2024). The CWQG-FALs are intended to be protective of all forms of aquatic life and all aspects of the aquatic lifecycle during acute and/or chronic exposure regimes (i.e., short-term or long-term exposure). The PWQO are set at a level of water quality which is “protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure to the water” (MECP, 1994). In the event that guidelines were not available from these sources, freshwater aquatic life benchmarks were obtained from RIVM (Crommentuijn, et al., 2000).

The water screening benchmarks for each CoPC are summarized in Appendix F.

8.4 Risk Characterization

The purpose of the Risk Characterization step in ERA is to evaluate potential adverse effects of identified CoPC by combining information from the Exposure and Toxicity Assessments. For the assessment of mammalian and avian receptors, the potential for adverse effects is quantified by comparing the dose of a substance that can be tolerated on a daily basis, or below which adverse environmental effects are not expected (i.e., TRV), to the expected daily dose, which is the amount of a CoPC an organism is expected to be exposed to on a daily basis (i.e., the ADD). The quotient of the two is unitless and referred to as a Hazard Quotient (HQ). The magnitude by which HQs differ from parity (i.e., TRV = ADD, target HQ of 1.0) is used to make inferences about the magnitude of ecological risks. For the assessment of potential risk to community-based receptors, HQs are defined as the EPC of the CoPC in the associated environmental media (e.g., soil) divided by a toxicological benchmark for the community receptors (e.g., terrestrial plants).

For this ERA, HQs were calculated for the Baseline and Baseline Plus Project scenarios for each CoPCs and ecological receptors assessed. When calculated HQs for the Baseline Plus Project scenario were less than the target HQ of 1.0, then unacceptable levels of risk to ecological receptors at the population level are not expected. When calculated HQs for the Baseline Plus Project scenario were greater than the target HQ of 1.0, further consideration was extended to the difference between HQs calculated for the Baseline Plus Project scenario and HQs calculated for the Baseline scenario (i.e., the Project Alone scenario). The HQs for the Project Alone scenario were considered as representative of contributions from Project activities to the calculated HQs. When the change in HQ between Baseline scenario and Baseline Plus Project scenario is less than 1.0, unacceptable levels of risk to ecological receptors at the population level, as a result of the Project, are expected to be negligible. When the change in HQ between Baseline scenario and Baseline Plus Project scenario is greater than 1.0, there is a potential (but not a certainty) that adverse effects to the ecological receptor as a result of the Project may exist. In these cases, additional analysis and considerations are required including a review of the assumptions applied in the assessment to provide a more accurate estimation of ecological risk. If it is ultimately determined that the HQ indicates an unacceptable ecological health risk, mitigation or remediation activities may be recommended to reduce potential risks to ecological receptors.

8.4.1 Ecological Risk Characterization Results

8.4.1.1 Mammals and Birds

The detailed HQ contribution from each exposure pathway for each ecological receptor species are provided in Appendix F. This includes calculation of total HQs for multiple exposure pathways for CoPCs identified in Section 8.1.1, with the exception of tungsten.

As noted previously, quantitative evaluation of tungsten was not conducted for mammalian and avian species due to limited toxicological and bioaccumulation information. The calculated increase in the concentration of tungsten in soil as a result of Project-related activities is negligible (<1%). As such, baseline and future exposures associated with the terrestrial environment are expected to remain essentially unchanged. However, the calculated increase in concentrations of tungsten in surface water as a result of Project-related activities is as high as 738% in the North Driftwood River watershed, 256% in the West Buskegau River watershed, and 154% in the Jocko Creek watershed. The modelled increase in concentrations of tungsten in surface water as a result of Project-related activities is high (over seven-fold increase in one location); however, the concentrations remain low (<0.001 mg/L). The increases in surface water concentrations for tungsten may be reflected in increase of exposures through various pathways associated with the aquatic environment. Actual increases in tungsten concentrations in surface water may be lower than those modelled.

With the exception of tungsten (for which HQs could not be calculated), calculated HQs were less than 1.0 for most CoPCs and most ecological receptors assessed, with the exception of the following:

- selenium for the American mink
- cadmium, chromium, nickel, selenium, and zinc for the masked shrew (standard and representative SAR):
- selenium for the northern river otter
- copper for the American robin (representative SAR)
- cadmium, chromium, copper, lead, nickel, vanadium, and zinc for the barn swallow
- copper for the lesser scaup
- copper and vanadium for the mallard (standard and representative SAR)
- chromium, copper, nickel, vanadium, and zinc for the spotted sandpiper (standard and representative SAR)
- cadmium for the spotted sandpiper (representative SAR)

Changes in calculated HQs between the Baseline scenario and the Baseline Plus Project scenario (i.e., Project Alone scenario) were less than 1.0 for most CoPCs and most ecological receptors assessed, with the exception of:

- nickel in all three watersheds assessed for the masked shrew (standard and representative of SAR), and
- nickel in all three watersheds assessed for the barn swallow.

Modelled Project-related increases in risks between the Baseline scenario and Baseline Plus Project scenario for mammals and birds for other CoPCs and ecological receptors combinations are considered negligible.

The HQs for other CoPCs as well as for other mammalian and avian receptors were less than 1.0 as shown in Appendix F. The HQs greater than 1.0 are summarized in Table 8.6 through Table 8.16 according to maximum values calculated at two points of full mixing for both the North Driftwood River and West Buskegau River watersheds, as well as maximum modelled Baseline Plus Project EPCs in Jocko Creek for the Jocko Creek watershed and discussed in the sections below.

8.4.1.1.1 American Mink

For the American mink, an HQ of 1.1 was calculated for the Baseline Plus Project scenario for the North Driftwood River watershed for selenium (Table 8.6); however, the Project-related contributions are less than 1.0 (Baseline Plus Project HQ – Baseline HQ = 0.84). Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed.

Table 8.6 Hazard Quotients Greater than Target for the American Mink

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Selenium	0.25	**1.1**	0.21	0.36	0.25	0.3

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

The maximum total HQ of 1.1 for selenium is driven by the mink's consumption of fish (specific pathway maximum HQ of 1.0). The American mink also has a larger foraging range (0.06 to 16.3 km^2 (FCSAP 2012b)) than that conservatively represented by the area of full mixing in the North Driftwood River (30 m downstream of the FDP for both discharges) that was used to represent concentrations in surface water for surface water-to-fish uptake calculations. Given this large foraging range, it is expected that the exposure that they would receive from consuming fish would be less than calculated. As such, given the relatively low contributions to the selenium HQs by the Project (less than 1.0 in the three watersheds assessed), and calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to American mink and those species it represents.

8.4.1.1.2 Masked Shrew

For the masked shrew (standard and representative of SAR such as bats – the little brown myotis, northern myotis, tri-colored bat, eastern red bat, hoary bat, and silver-haired bat), HQs greater than 1.0 we calculated for both Baseline and Baseline Plus Project scenarios for all three assessed watersheds for cadmium, chromium, nickel, selenium, and zinc (Table 8.7 and Table 8.8). Similar HQs were obtained for the masked shrew across the three watersheds assessed because the masked shrew is predominantly exposed to potential contaminants through terrestrial exposure pathways, with much smaller contributions from aquatic exposure pathways (mainly through drinking water). In most of these cases, the Project-related contributions are less than 1.0, with the exception of nickel. For nickel, Baseline and Baseline Plus Project HQs of 3.3 and 9.1, respectively, were calculated for the masked shrew (standard and representative of SAR) for all three watersheds assessed (Table 8.7 and Table 8.8). The HQs for the Project Alone scenario (Baseline Plus Project HQ – Baseline HQ = 5.8) are greater than 1.0 for nickel; however, HQs for the Project Alone scenario are below than 1.0 for cadmium, chromium, selenium, and zinc. Calculated HQs for other CoPCs assessed are also less than 1.0 across the three watersheds assessed.

Table 8.7 Hazard Quotients Greater than Target for the Masked Shrew

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Cadmium	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
Chromium	**1.1**	**2.0**	**1.1**	**2.0**	**1.1**	**2.0**
Nickel	**3.3**	**9.1**	**3.3**	**9.1**	**3.3**	**9.1**
Selenium	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
Zinc	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

Table 8.8 Hazard Quotients Greater than Target for the Masked Shrew (SAR Representative)

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Cadmium	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
Chromium	**1.1**	**2.0**	**1.1**	**2.0**	**1.1**	**2.0**
Nickel	**3.3**	**9.1**	**3.3**	**9.1**	**3.3**	**9.1**
Selenium	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
Zinc	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

For the masked shrew, the terrestrial invertebrate ingestion pathway represents a substantial contribution to the overall HQ (more than 90%) calculated for nickel (as well as for cadmium, chromium, selenium, and zinc). As measured data were not available for terrestrial invertebrates, CoPC concentrations in terrestrial invertebrates were estimated by applying soil-to-terrestrial invertebrate uptake factors obtained from Sample et al. (1998a). These uptake factors are predictive of CoPC concentrations in earthworms based on soil EPCs, which were based on the 95% UCLMs (Baseline Scenario) and the 95th percentile of the total deposition rates among the receptor locations (Baseline Plus Project Scenario). Due to the differences in habitat and diet of invertebrate taxa, some soil invertebrate species are more likely to accumulate metals in greater amount than others (Heikens, Peijnenburg, & Hendriks, 2001). In general, the most important route for assimilation of metals by soil invertebrates is through ingestion (Efroymson, Will, & Suter, 1997). Earthworms are geophagus organisms that ingest a large amount of soil during feeding and therefore, are more highly exposed to soil contaminants than other species which have less intensive contact with contaminated soil (Gall, Boyd, & Rajakaruna, 2015). Moreover, earthworms can constitute a large fraction of the biomass of soil-dwelling invertebrates, are important in the formation of soils, and constitute a significant fraction of the diet of some vertebrates (Nahmani, Hodson, & Black, 2007). Because of this, and because there are no widely accepted uptake factors for other types of insects, the use of uptake factors predictive of concentrations in earthworms has become standard practice to conservatively estimate potential exposures to CoPCs in terrestrial invertebrates. As such, earthworms serve as model organisms in toxicology studies and are considered to be representative of soil invertebrates in ERAs. The common masked shrew may consume earthworms; however, earthworms represent only a single component of the soil invertebrate community, and as such, only a portion of the diet of the masked shrew. The combination of relying on uptake factors for earthworms and soil EPCs that are based on upper limits (95%UCLMs and 95th percentiles) is expected to substantially overestimate exposures to the masked shrew.

With respect to nickel, additional considerations are the regional context and the TRV used. The geology of the area exhibits elevated concentrations of nickel in soil, and a highest bounded NOAEL (which as stated previously is representative of a no observable adverse effect level) was used in this evaluation consistent with federal guidance (FCSAP, 2021). Given the likely exaggerated exposure estimates, the regional context, and the TRV, unacceptable risks to population of masked shrews due to exposure to nickel are not expected.

As the overall exposure to nickel (and several other metals) for the masked shrew is mainly associated with the terrestrial invertebrate ingestion pathway, sampling and analysis of metals in terrestrial invertebrates could support refinements of assumptions associated with this pathway. In addition, given the relatively low contributions to HQs for cadmium, chromium, selenium, and zinc by the Project (less than 1.0 in the three watersheds assessed), and calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to masked shrew and those species it represents.

Since receptor characteristics for bats are not provided in the Ecological Risk Assessment Guidance Module 3: Standardization of Wildlife Receptor Characteristics (FCSAP, 2012b) and reliable receptor characteristics were not identified elsewhere, the masked shrew was selected as a reasonable surrogate. Masked shrew and bats are part of the same feeding guild (i.e., insectivorous mammals) and have similar body masses. Masked shrews are also expected to be more exposed to soil CoPCs compared to bats due to their behaviors (masked shrew burrow in soil, while bats roost in buildings and trees). Bats also have larger home ranges and generally capture insects in flight. They feed on a variety of small, flying insects such as moths, flies, mosquitoes, mayflies, caddisflies, beetles, and midges; many of which have aquatic life stages (COSEWIC, 2013a). Aerial insects have minimal contact with soil and are thus not expected to be highly exposed to soil CoPCs. Therefore, exposure estimates for the insectivorous bat based on consumption of earthworms likely overestimate their exposures. Given that the modelled CoPC concentrations in terrestrial invertebrates are based on earthworms, and that bats do not actually consume earthworms, it expected that the exposure that bats would receive from consuming aerial invertebrates in the three watersheds assessed would be much less than calculated based on earthworm ingestion. As such, unacceptable risks to bats due to exposure to nickel and other CoPCs assessed are also not expected.

The calculated HQs (including those for the Baseline and Baseline Plus Project scenarios) are based on calculated concentrations of nickel (and other CoPCs) in the tissue of terrestrial invertebrates (earthworm). Actual Baseline and Baseline Plus Project concentrations of nickel (and other CoPCs) in terrestrial invertebrates may be different in various species and may be lower than those assumed in the ERA. Monitoring concentrations of nickel (and other CoPCs) in terrestrial invertebrates (both earthworms and flying insects) would better represent current and changes in exposure for the masked shrew and those species they represent.

8.4.1.1.3 Northern River Otter

For the northern river otter, an HQ of 1.1 was calculated for the Baseline Plus Project scenario for the North Driftwood River watershed for selenium (Table 8.9); however, the Project-related contributions are less than 1.0 (Baseline Plus Project HQ – Baseline HQ = 0.88). Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed.

Table 8.9 Hazard Quotients for the Northern River Otter

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Selenium	0.24	**1.1**	0.19	0.35	0.23	0.28

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

The maximum total HQ of 1.1 for selenium is driven by the otter's consumption of fish (specific pathway maximum HQ of 1.1). The northern river otter also has a larger foraging range (9 to 231 km^2 (FCSAP 2012b)) than that conservatively represented by the area of full mixing in the North Driftwood River (30 m downstream of the FDP for both discharges) that was used to represent concentrations in surface water for surface water-to-fish uptake calculations. Given this large foraging range, it is expected that the exposure that they would receive from consuming fish would be less than calculated. As such, given the relatively low contributions to the selenium HQs by the Project (less than 1.0 in the three watersheds assessed), and low contributions to HQs for other CoPCs (also less than 1.0 in the three watersheds assessed), Project activities are not expected to result in unacceptable risks to northern river otter and those species it represents.

8.4.1.1.4 American Robin

For the American robin (representative of SAR such as the Canada warbler, evening grosbeak, and rusty blackbird), HQs greater than 1.0 were calculated for both Baseline and Baseline Plus Project scenarios for all three assessed watersheds for copper (Table 8.10). Similar HQs were obtained for the American robin across the three watersheds assessed because the American robin is predominantly exposed to potential contaminants through terrestrial exposure pathways, with much smaller contributions from aquatic exposure pathways (mainly through drinking water). However, the Project-related contributions for copper are negligible (Baseline Plus Project HQ – Baseline HQ < 0.1). Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed for the American robin (representative of SAR). The HQs calculated for the American robin (standard) are less than 1.0 for CoPCs assessed across the three watersheds assessed.

Table 8.10 Hazard Quotients for the American Robin (SAR Representative)

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Copper	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
Notes: **Bolding and shading** indicates HQ greater than target of 1.0.						

The HQs greater than 1.0 for copper are driven by ingestion of terrestrial invertebrates and ingestion of terrestrial plants which together generally contribute more than 90% to the total HQs. As discussed for the masked shrew, CoPC concentrations in terrestrial invertebrates were estimated by applying soil-to-terrestrial invertebrate uptake factors obtained from Sample et al. (1998a) which are predictive of CoPC concentrations in earthworms, based on soil EPCs which were based on the 95th percentile of the total deposition rates among the receptor locations. The American robin's diet is approximately 40% invertebrates; earthworms are one of their most important food sources in many areas, although during the period before reproduction insects make up a significant component of the diet, and insects are also fed to their young (FCSAP, 2012b). Of the other SAR that it represents in this assessment, diets are as follows:

- Canada warbler: flying insects and spiders (COSEWIC, 2020)
- Evening grosbeak: seeds and defoliating insects such as the spruce budworm (COSEWIC, 2016a)
- Rusty blackbird: invertebrates, such as aquatic insect larvae, crustaceans, and snails that are associated with aquatic environments, supplemented with seeds and fruits (COSEWIC, 2006)

Given that the modelled CoPC concentrations in terrestrial invertebrates are based on earthworms which are not consumed by the other insectivorous bird SAR it represents, it expected that the exposure that they would receive from consuming aerial invertebrates in the three watersheds assessed would be much less than calculated based on earthworm ingestion. Additionally, considering the low contributions to copper HQs by the Project (less than 0.1 in the three watersheds assessed) and calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to American robin and those species that it represents, including SAR.

8.4.1.1.5 Barn Swallow

For the barn swallow (representative of insectivorous birds and SAR such as itself, eastern whip-poor-will, bank swallow, Canada warbler, common nighthawk, and olive-sided flycatcher), HQs greater than 1.0 were calculated for both Baseline and Baseline Plus Project scenarios for all three assessed watersheds for cadmium, copper, lead, vanadium, and zinc. For the Baseline Plus Project scenario only, HQs greater than 1.0 were calculated for chromium (total) and nickel (Table 8.11). Similar HQs were obtained for the barn swallow across the three watersheds assessed because the barn swallow is predominantly exposed to potential contaminants through terrestrial exposure pathways, with much smaller contributions from aquatic exposure pathways (mainly through drinking water). In most of these cases, the Project-related contributions are less than 1.0, with the exception of nickel. For nickel, Baseline and Baseline Plus Project HQs of 0.65 and 1.8, respectively, were calculated for the barn swallow for the three watersheds assessed, yielding a Project Alone HQ marginally greater than 1.0 (Baseline Plus Project HQ – Baseline HQ = 1.2); however, HQs for the Project Alone scenario are below than 1.0 for cadmium, chromium, copper, lead, vanadium, and zinc. Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed.

Table 8.11 Hazard Quotients for the Barn Swallow (SAR)

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Cadmium	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**
Chromium	0.81	**1.4**	0.81	**1.4**	0.81	**1.4**
Copper	**2.1**	**2.2**	**2.1**	**2.2**	**2.1**	**2.2**
Lead	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
Nickel	0.65	**1.8**	0.65	**1.8**	0.65	**1.8**
Vanadium	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**
Zinc	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

The HQs greater than 1.0 for nickel (and other CoPCs in Table 8.11) are driven by ingestion of terrestrial invertebrates, which generally contributes more than 95% to the total HQs. As discussed for the masked shrew, CoPC concentrations in terrestrial invertebrates were estimated by applying soil-to-terrestrial invertebrate uptake factors obtained from Sample et al. (1998a) which are predictive of CoPC concentrations in earthworms, based on soil EPCs which were based on the 95th percentile of the total deposition rates among the receptor locations. Barn swallows are not known for consumption of earthworms, instead eating flying insects such as flies, moths, butterflies, dragonflies, and beetles during flight (FCSAP, 2012b). Of the other SAR that it represents in this assessment, diets are as follows:

- eastern whip-poor-will: flying insects (COSEWIC, 2022b)
- bank swallow: mostly flying insects, although sometimes terrestrial/aquatic insects or spiders when locally abundant (COSEWIC, 2013b)
- Canada warbler: flying insects and spiders (COSEWIC, 2020)
- common nighthawk: flying insects (COSEWIC, 2018b)
- olive-sided flycatcher: flying insects (COSEWIC, 2018c)

The barn swallow also has a larger foraging range (0.8 to 80 km^2 (FCSAP, 2012b)) than that conservatively represented by the receptor location with the 95th percentile of total deposition that was used to represent concentrations in soil and for soil-to-invertebrate uptake calculations. Given this large foraging range, and that the modelled CoPC concentrations in terrestrial invertebrates are based on earthworms, which are not generally consumed by the barn swallow and the other insectivorous birds and SAR it represents, it is expected that the exposure that they would receive from consuming aerial invertebrates would be much less than calculated based on earthworm ingestion. Based on this, and the relatively low contributions to the HQs by the Project for the CoPCs assessed (only marginally greater than 1.0 for nickel, less than 1.0 for other CoPCs) in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to barn swallow and those species it represents, including SAR.

The calculated HQs (including those for the Baseline and Baseline Plus Project scenarios) are based on calculated concentrations of nickel (and other CoPCs) in the tissue of terrestrial invertebrates (earthworm). Actual Baseline and Baseline Plus Project concentrations of nickel (and other CoPCs) in terrestrial invertebrates may be different in various species and may be lower than those assumed in the ERA. Monitoring concentrations of nickel (and other CoPCs) in terrestrial invertebrates (both earthworms and flying insects) would better represent current and changes in exposure for the barn swallow and those species they represent.

8.4.1.1.6 Lesser Scaup

For the lesser scaup, HQs greater than 1.0 were calculated for both Baseline and Baseline Plus Project scenarios for all three assessed watersheds for copper (Table 8.12); however, the Project-related contributions for copper are less than 1.0 (highest Baseline Plus Project HQ – Baseline HQ = 0.24). Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed.

Table 8.12 Hazard Quotients for the Lesser Scaup

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Copper	**1.8**	**2.1**	**1.5**	**1.6**	**1.8**	**1.8**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

Calculated HQs for copper are driven by the lesser scaup's consumption of benthic invertebrates (contributing more than 95% to the total HQ). The lesser scaup has a larger foraging range (0.1 to 17.1 km^2 (FCSAP 2012b)) than that conservatively represented by the area of full mixing in the North Driftwood River and West Buskegau River (approximately 30 m downstream of the FDP for both discharges) that was used to represent concentrations in surface water for sediment concentrations estimations and subsequently sediment-to-benthic invertebrates uptake calculations. Therefore, and given the relatively low contributions to the copper HQs by the Project (less than 1.0 in the three watersheds assessed), and calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to lesser scaup and those species it represents.

8.4.1.1.7 Mallard

For the mallard, HQs greater than 1.0 were calculated for copper for the Baseline Plus Project scenario in the North Driftwood River watershed and for vanadium for Baseline Plus Project scenarios for the North Driftwood River and West Buskegau River watersheds (Table 8.13). For the mallard (representative of SAR such as the redhead), HQs greater than 1.0 were calculated for copper for both the Baseline and Baseline Plus Project scenarios for the three assessed watersheds and for vanadium for Baseline Plus Project scenarios for the North Driftwood River and West Buskegau River watersheds (Table 8.14). In these cases, the Project-related contributions are less than 1.0. Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed.

Table 8.13 Hazard Quotients for the Mallard

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Copper	0.95	**1.1**	0.8	0.84	0.95	0.95
Vanadium	0.90	**1.5**	0.89	**1.0**	0.90	0.90

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

Table 8.14 Hazard Quotients for the Mallard (SAR Representative)

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Copper	**2.9**	**3.3**	**2.4**	**2.5**	**2.9**	**2.9**
Vanadium	0.90	**1.5**	0.89	**1.0**	0.90	0.90

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

The HQs for copper are driven by the mallard's consumption of benthic invertebrates which generally contributes more than 85% to the total HQs. The HQs for vanadium are driven by the mallard's consumption of aquatic plants as well as benthic invertebrates which together generally contributes more than 80% to the total HQs. The mallard has a larger foraging range (0.092 to 2.4 km^2 (FCSAP 2012b)) than that conservatively represented by the area of full mixing in the North Driftwood River and West Buskegau River (approximately 30 m downstream of the FDP for both discharges) that was used to represent concentrations in surface water for sediment concentrations estimations and subsequently sediment-to-aquatic plants and sediment-to-benthic invertebrates uptake calculations. Therefore, and given the relatively low contributions for copper and vanadium to the mallard (standard and representative of SAR) HQ by the Project (less than 1.0 for the three watersheds), and calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to the mallard and those species it represents, including SAR.

8.4.1.1.8 Spotted Sandpiper

For the spotted sandpiper and the spotted sandpiper (representative of SAR such as the lesser yellowlegs and yellow rail), HQs greater than 1.0 were calculated for the Baseline and Baseline Plus Project scenarios for the assessed watersheds for copper, vanadium, and zinc as well as for the Baseline Plus Project scenarios for the assessed watersheds chromium (total) and for the Baseline Plus Project scenarios for nickel in the North Driftwood River watershed (Table 8.15 and Table 8.16). Additionally, HQs greater than 1.0 were calculated for the Baseline and Baseline Plus Project scenarios for the assessed watersheds for cadmium for the spotted sandpiper (representative of SAR) (Table 8.16). However, the Project-related contributions for cadmium, chromium, copper, nickel, vanadium, and zinc are less than 1.0 across the three watersheds assessed (highest Baseline Plus Project HQ – Baseline HQ = 0.97 for copper in the North Driftwood River watershed for the spotted sandpiper (representative of SAR)). Calculated HQs for other CoPCs assessed are less than 1.0 across the three watersheds assessed.

Table 8.15 Hazard Quotients for the Spotted Sandpiper

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Chromium	0.96	**1.2**	0.96	**1.2**	0.96	**1.2**
Copper	**2.4**	**2.7**	**2.0**	**2.1**	**2.4**	**2.4**
Nickel	0.38	**1.2**	0.36	0.87	0.38	0.82
Vanadium	**1.2**	**1.8**	**1.1**	**1.3**	**1.1**	**1.2**
Zinc	**1.3**	**1.3**	**1.2**	**1.2**	**1.3**	**1.3**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

Table 8.16 Hazard Quotients for the Spotted Sandpiper (SAR Representative)

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Cadmium	**1.1**	**1.1**	**1.0**	**1.0**	**1.1**	**1.1**
Chromium	0.96	**1.2**	0.96	**1.2**	0.96	**1.2**

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Copper	**7.2**	**8.1**	**6.1**	**6.3**	**7.2**	**7.2**
Nickel	0.38	**1.2**	0.36	0.87	0.38	0.82
Vanadium	**1.2**	**1.8**	**1.1**	**1.3**	**1.1**	**1.2**
Zinc	**1.3**	**1.3**	**1.2**	**1.2**	**1.3**	**1.3**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

Exposure pathways contributing the most to the total HQs for the spotted sandpiper (standard and representative of SAR) vary according to CoPCs and watersheds but are mainly associated with ingestion invertebrates (either terrestrial invertebrates, benthic invertebrates, or both). For cadmium, the largest contributions are from the ingestion of terrestrial invertebrates (approximately 60%) followed by benthic invertebrates (approximately 35% to 40%). For chromium, the largest contributions are from the ingestion of benthic invertebrates (approximately 40 to 50%) followed by terrestrial invertebrates (approximately 25% to 40%). For copper, the largest contributions are from the ingestion of benthic invertebrates (approximately 80 to 90%) followed by terrestrial invertebrates (approximately 10%). For nickel, the largest contributions are from the ingestion of terrestrial invertebrates (approximately 60 to 80%) followed by benthic invertebrates (approximately 15 to 35%). For vanadium, the largest contributions are from the ingestion of benthic invertebrates (approximately 40 to 50%) followed by terrestrial invertebrates (approximately 15% to 40%). For zinc, the largest contributions are from the ingestion of benthic invertebrates (approximately 60%) followed by terrestrial invertebrates (approximately 35%).

Aquatic and aerial insects consumed by species such as the lesser yellowlegs and the yellow rail are expected to have minimal contact with soil and sediment and are thus not expected to be highly exposed to soil and sediment CoPC. Therefore, exposure estimates for these species based on consumption of invertebrates in soil and in sediment likely overestimate their exposures. Given that the modelled CoPC concentrations in terrestrial invertebrates are based on earthworms and those in benthic invertebrates are based on variety of macroinvertebrates found in close association with sediment, and that species such as the lesser yellowlegs and the yellow rail have a varied diet that includes aquatic and aerial insects, it is expected that the exposure those species would receive from consuming aquatic and aerial invertebrates in the three watersheds assessed would be much less than calculated based on ingestion of species living in close association with soil or sediment.

Given the relatively low contributions to the spotted sandpiper HQ by the Project (less than 1.0 for cadmium, chromium, copper, nickel, vanadium, and zinc in the three watersheds assessed), and calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, Project activities are not expected to result in unacceptable risks to the spotted sandpiper and those species it represents, including SAR.

The calculated HQs (including those for the Baseline and Baseline Plus Project scenarios) are based on calculated concentrations of cadmium, chromium, copper, nickel, vanadium, and zinc (as well as other CoPCs) in the tissue of terrestrial invertebrates (earthworm) and of benthic invertebrates. Actual Baseline and Baseline Plus Project concentrations of CoPCs in terrestrial and benthic invertebrates may be different in various species and may be lower than those assumed in the ERA. Monitoring concentrations of CoPCs in terrestrial invertebrates (both earthworms and flying insects) and benthic invertebrates would better represent current and changes in exposure for the spotted sandpiper and those species they represent.

8.4.1.2 Reptiles

Reptiles include snakes and turtles. Although FCSAP (2012b) provides receptor characteristics for one reptile, the common gartersnake, there is generally limited exposure and limited toxicity data to support the assessment of reptiles (CCME, 2020). Therefore, reptiles were evaluated qualitatively.

As noted in Section 8.1.5, three turtles SAR or SOCC have been reported as potentially present within the RSA. Snake SAR or SOCC have not been identified as potentially present within the RSA; as such, the qualitative assessment of reptiles focused on turtles. Dietary information, including water intake rate, for turtles has not been reported by FCSAP (2012b). Diets of turtles can vary, depending on whether they rely mainly on the aquatic or terrestrial environments. The three SAR or SOCC turtle species listed as potentially present within the RSA rely mainly on the aquatic environments with diet's largely consisting of aquatic insects, gastropods, crustaceans, plants, and small prey (COSEWIC, 2016b; COSEWIC, 2018a; COSEWIC, 2008). As mainly aquatic turtles, these three turtle species spend most of their time in the aquatic environment except when travelling between aquatic features, or when nesting which occurs in upland areas (COSEWIC, 2016b; COSEWIC, 2018a; COSEWIC, 2008). Once eggs are laid in upland areas, female turtles return to the aquatic environment. Following two to three months of development, turtle hatchlings generally emerge from their nest and head directly for the aquatic environment (COSEWIC, 2016b; COSEWIC, 2018a; COSEWIC, 2008).

The most sensitive life stage for turtles is the hatchling stage, during which turtles live in close association with their surrounding environment. Similarly, the hatchling stage would also be considered the most sensitive for other reptiles such as snakes. As such, animals living in close proximity to their surrounding environment may be suitable surrogate. As aquatic turtle hatchlings generally emerge from their nest and head directly for the aquatic environment, fish may be a suitable surrogate for aquatic turtle exposure or other aquatic reptiles. Hatchlings of other reptiles may live in close proximity to the terrestrial environment and as such the terrestrial community may be a suitable surrogate for reptiles that rely mainly on the terrestrial environment. Aquatic receptors were evaluated in Section 8.4.1.6 and Project activities are not expected to result in unacceptable risks to aquatic communities. Terrestrial communities were evaluated in Section 8.4.1.4 and Project activities are not expected to result in unacceptable risks to terrestrial invertebrate communities. Thus, unacceptable risks to reptiles are not anticipated either.

8.4.1.3 Amphibians

There is limited exposure and toxicity data to support the assessment of amphibians. Therefore, amphibians were also evaluated qualitatively. Most amphibians require water for survival and reproduction. Early life stages of most amphibians live completely in permanent or temporary water bodies. Direct contact with surface water is one of the most important exposure pathways for early life stages because the skin of amphibians can absorb waterborne contaminants. Sediment and sediment porewater are also major exposure pathways for early amphibian life stages as well as for mature life stages. Some amphibian species deposit their embryos directly in sediment. Once hatched, the larvae can forage in sediment and are thus exposed to contaminants through direct contact and incidental ingestion. When amphibians complete metamorphosis, they reside mostly in the terrestrial environment. Direct contact with soil is a major exposure pathway for adults because some amphibians bury themselves in soil to stay moist during dry seasons or hibernate in the soil during winter. Amphibians also absorb much of the water in the soil through their skin as a way to remain hydrated in the terrestrial environment; thus, dermal uptake of dissolved contaminants from soil porewater is a significant exposure pathway. Adult amphibians rarely ingest water, except under extremely dry conditions (FCSAP, 2019).

Dietary information on amphibians is extremely limited and food and water intake rates are unknown. Most amphibian larvae are herbivorous, but a few species become omnivorous. Most amphibian adults are carnivorous, feeding on a variety of aquatic and terrestrial invertebrates, fish and other amphibians, and occasionally on small mammals, such as mice and birds (FCSAP, 2019).

The most sensitive life stage for amphibians is the tadpole stage, during which the amphibian is immersed in water. As such, fish may be a suitable surrogate for amphibian exposure. Aquatic receptors were evaluated in Section 8.4.1.6 and Project activities are not expected to result in unacceptable risks to aquatic communities. Thus, unacceptable risks to amphibians are not anticipated either.

8.4.1.4 Terrestrial Plant and Terrestrial Invertebrate Communities

HQs for terrestrial plant and invertebrate communities exposed to CoPC in soil were calculated by comparing soil EPCs to the applicable soil quality guidelines and to CAAQs for CACs. The HQs for terrestrial plants and invertebrates, for the Baseline scenario and Baseline Plus Project scenario are presented in Appendix F. Results are summarized in Table 8.17 (for metal parameters with HQs greater than 1.0) and Table 8.18 (for CACs).

The HQs for terrestrial invertebrate communities are less than 1.0, while HQs for terrestrial plant communities are less than 1.0 other than for manganese. There was little difference in risks to terrestrial plants exposed to manganese in soil between the Baseline scenario and the Baseline Plus Project scenario (i.e., a Project Alone contribution of 0.1). The calculated HQs greater than the target benchmark of 1.0 are related largely to pre-existing baseline metal concentrations in the soil. Given the relatively low contributions to these HQs by the Project (less than 1.0 for the CoPCs assessed), Project activities are not expected to result in unacceptable risks to terrestrial plant and terrestrial invertebrate communities.

Table 8.17 Hazard Quotients Above Target for Terrestrial Plants and Soil Invertebrate Communities – Metals

CoPC	HQs Greater than Target			
	Terrestrial Plant Communities		Terrestrial Invertebrate Communities	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Manganese	**1.7**	**1.8**	0.84	0.88
Notes: **Bolding and shading** indicates HQ greater than target of 1.0.				

Toxicity benchmarks were not identified for tungsten; therefore, an HQ could not be calculated. However, inferences about the magnitude of risk for terrestrial plants and invertebrates from exposure to tungsten in the soil as a result of the Project can be made by looking at the difference in the tungsten concentration in soil between the Baseline scenario and the Baseline Plus Project scenario. The increase in the concentration of tungsten in soil as a result of Project-related activities is negligible (<1%). As such, baseline risks and future risks are expected to remain essentially unchanged; thus, unacceptable risks to terrestrial plants and invertebrates as a result of Project-related contributions of tungsten to soil are not expected.

Calculated HQs for terrestrial plant communities exposed to NO_2 and SO_2 in air were calculated by comparing the maximum annual average air EPCs to the applicable CAAQs meant to be protective of environmental (and human) health. The HQs for terrestrial plant communities were below 1.0 for both the Baseline scenario and the Baseline Plus Project scenario. As such, unacceptable risks to terrestrial plants from exposure to NO_2 and SO_2 in air are not expected.

Table 8.18 Hazard Quotients for Terrestrial Plants and Soil Invertebrate Communities – CACs

CoPC	Hazard Quotients for Terrestrial Plants and Soil Invertebrates (unitless)	
	Baseline	Baseline Plus Project
NO_2	0.014	0.32
SO_2	0.035	0.037

8.4.1.5 Benthic Communities

The HQs for benthic communities exposed to CoPC in sediment were calculated by comparing sediment concentrations to sediment quality guidelines. The HQs for benthic communities, for the Baseline scenario and Baseline Plus Project scenario are presented in Appendix F. Results are summarized in Table 8.19.

Table 8.19 Hazard Quotients Above Target for Benthic Invertebrate Communities

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
None identified.						

The HQs for benthic communities are less than 1.0 for the CoPCs assessed in the three watersheds assessed. As HQs were less than 1.0 for the Baseline Plus Project scenario, these were also less than 1.0 for the Project Alone scenario. Given the relatively low contributions to these HQs by the Project (less than 1.0 for the CoPCs assessed), Project activities are not expected to result in unacceptable risks to benthic communities.

The HQs for the benthic communities were not calculated for manganese, thallium, and uranium in sediment as suitable toxicity benchmarks were not identified. For tungsten, HQs were also not calculated as data was not available to support evaluation of EPCs in sediment. However, inferences about the magnitude of risk for benthic communities from exposure to these CoPCs in the sediment as a result of the Project can be made by looking at the differences in the sediment concentrations between Baseline scenario and Baseline Plus Project scenario.

Manganese is estimated to increase by less than 1%. As such, Baseline and Baseline Plus Project exposures for benthic communities to manganese in sediment are expected to remain essentially unchanged.

Concentrations of thallium are estimated to increase by <1% to 4.2%, with the highest change in concentrations within the Jocko Creek watershed. Concentrations of uranium are estimated to increase by <1% to 930%, with the highest change in concentrations within the North Driftwood River watershed); however, the concentrations of uranium remain low (highest calculated value of 13 mg/kg) and are within concentrations measured in lake and stream sediment from across Canada (95^{th} percentile value of 21.2 mg/kg) (CCME, 2007). In addition, concentrations of uranium in surface water are also estimated to remain low (highest calculated value of 0.004 mg/L) and below the interim PWQO (value of 0.005 mg/L). As noted previously, the PWQO are set at a level of water quality which is “protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure to the water”, which would also include benthic communities in close association with water.

While proportioning for tungsten from surface water to sediment was not evaluated due to limited information, concentrations in sediment should generally reflect those in surface water. As noted previously, the calculated increase in concentrations of tungsten in surface water as a result of Project-related activities is as high as 738% in the North Driftwood River watershed, and lower in the other two watersheds assessed (256% in the West Buskegau River watershed and 154% in the Jocko Creek watershed).

Actual increases in thallium and uranium concentrations in sediment, as well as increases in tungsten concentrations in surface water may be lower than those modelled. Monitoring of thallium, tungsten, and uranium in sediment in each watershed assessed would better represent changes in exposure for benthic communities.

8.4.1.6 Freshwater Aquatic Communities

The HQs for freshwater aquatic communities (i.e., aquatic plants, aquatic invertebrates, and fish) exposed to CoPC in surface water were calculated by comparing surface water concentrations to freshwater aquatic life quality guidelines. In cases where the benchmark was dependent on hardness, pH, and/or dissolved organic carbon (DOC), conservative assumptions were used to derived site-specific guidelines.

The HQs for the Baseline scenario and the Baseline Plus Project scenario, which are based on the freshwater aquatic life benchmarks, are provided in Appendix F. Results are summarized in Table 8.20 (for parameters with HQs greater than 1.0).

Table 8.20 Hazard Quotients Above Target for Freshwater Aquatic Communities

CoPC	HQs Greater than Target According to Each Watershed					
	North Driftwood River		West Buskegau River		Jocko Creek	
	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project	Baseline	Baseline Plus Project
Cadmium	0.50	0.53	0.98	0.98	**1.1**	**1.1**
Copper	0.60	**1.8**	0.85	**1.1**	**1.2**	**1.2**

Notes:
Bolding and shading indicates HQ greater than target of 1.0.

Calculated HQs for aquatic communities are less than 1.0 for the parameters assessed, except for cadmium and copper in the Baseline and Baseline Plus Project scenarios in the Jocko Creek watershed, and copper in the Baseline Plus Project scenario in the North Driftwood River and West Buskegau River watersheds. For the Jocko Creek watershed, the increase in the concentration of cadmium in water as a result of Project-related activities is negligible (<1%). Because baseline risks and future risks are expected to remain essentially unchanged, unacceptable risks to aquatic communities as a result of Project-related contributions of cadmium in water, in the Jocko Creek watershed and the other two watersheds assessed, are not expected.

Copper is estimated to increase in surface water between <0.1% and 200%, with the highest change in concentrations within the North Driftwood River watershed. However, the concentrations of copper in surface water remain low (highest calculated value of 0.0036 mg/L) and within concentrations measured in Canadian surface waters (0.001 to 0.068 mg/L in the central region) (CCME, 1999). The highest calculated value of 0.0036 mg/L for copper in surface water is above the default CCME surface water quality guideline of 0.002 mg/L; however, it is noted that the CCME surface water quality guideline for copper is hardness dependent, and ranges from 0.002 to 0.004 mg/L for hardness values of <82 mg/L to >180 mg/L (CCME, 2023). Hardness in the North Driftwood River has been measured as ranging from approximately 10 mg/L to 230 mg/L, with an average of 63 mg/L. Hardness is estimated to increase to a highest value of 210 mg/L in the North Driftwood River watershed at the point of full mixing with discharge from the TMF, which also corresponds to the same location as that of the highest calculated copper concentration (0.0036 mg/L). Adjusting the CCME surface water quality guideline for copper using the calculated hardness of 210 mg/L yields a hardness-adjusted guideline of 0.0037 mg/L. Furthermore, the highest calculated value of 0.0036 mg/L for copper in surface water is below the interim PWQO (value of 0.005 mg/L). As noted previously, the PWQO are set at a level of water quality which is "protective of all forms of aquatic life and all aspects of the aquatic life cycles during indefinite exposure to the water".

Given the relatively low contributions to the cadmium and copper HQs by the Project (less than 1.0 for cadmium in the three watersheds assessed and marginally greater than 1.0 in the North Driftwood River watershed for copper), that calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, and that conservative assumptions were made during surface water modelling and selection of EPCs as discussed in Section 6.3, Project activities are not expected to result in unacceptable risks to aquatic communities.

The HQs for the aquatic communities were not calculated for tungsten as a suitable toxicity benchmark was not identified. However, inferences about the magnitude of risk for aquatic communities from exposure to this CoPC in the sediment as a result of the Project can be made by looking at the differences in the surface water concentrations between Baseline scenario and Baseline Plus Project scenario. The calculated increase in concentrations of tungsten in surface water as a result of Project-related activities is as high as 738% in the North Driftwood River watershed, 256% in the West Buskegau River watershed, and 154% in the Jocko Creek watershed; however, the concentrations remain low (<0.001 mg/L). The increases in surface water concentrations for tungsten may be reflected in increase of exposures through various pathways associated with the aquatic environment. Actual increases in tungsten concentrations in surface water may be lower than those modelled.

8.4.2 North Driftwood River Channel Realignment

For the North Driftwood River channel realignment, changes in mercury and methyl mercury concentrations in surface water and how these changes may affect methyl mercury concentrations in fish consumed by ecological receptors were considered. As noted previously, changes in methyl mercury concentration in forage fish consumed by ecological receptors is calculated to be low (approximately 4%; Table 6.41). As such, this change in concentration is not expected to markedly increase potential exposures to methyl mercury through fish consumption for ecological receptors due to the North Driftwood River channel realignment.

While the North Driftwood River channel realignment is not expected to result in increased concentrations of methyl mercury in the fish tissue, the presence of methyl mercury in forage fish tissue and exposures to ecological receptors due to consumption of forage fish is noted as a potential pre-Project concern. Specifically, the Baseline Scenario methyl mercury concentration in forage fish tissue (0.046 mg/kg wet weight) is greater than the Canadian Tissue Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota (0.033 mg/kg wet weight (CCME, 2000)).

8.5 Uncertainty Analysis

Ecological risk assessments have inherent uncertainty related to the assumptions applied in the risk calculations. This uncertainty is often the result of conservative assumptions aimed at overestimating health risks. This section provides more details on the nature of the uncertainties and the conservative approach that was used.

8.5.1 Modelling Techniques

This ERA was conducted according to accepted risk assessment methodologies and follows guidance published and endorsed by regulatory agencies such as CCME and FCSAP. This approach is consistent with previous projects that have been reviewed by the CEAA. Risk estimates were refined through the inclusion of baseline data from multiple media (air, soil, sediment, water, tissue), modelling techniques following federal ERA guidance (CCME, 1996; CCME, 2020; FCSAP, 2012a) for the estimation of Baseline Plus Project scenario concentrations, information about likely species of interest through engagement of potentially affected Indigenous communities, and professional judgement.

8.5.2 Modelling Scenario

There are uncertainties inherent to predictive modelling techniques and associated with data inputs that are modelled independently of the ERA (i.e., deposition, surface water and sediment quality modelling). These data inputs introduce uncertainties that are independent of the ERA process, but affect the final risk estimate to ecological receptors. Differences between modelled and actual Baseline Plus Project scenario conditions for climate, wind, weather, and project influences may result in uncertainties. As part of the conservative approach to risk assessments, the worst-case modelling conditions are typically selected for application into the ERA. To calculate EPCs in soil for the Baseline Plus Project scenario, the 95th percentile of the total deposition rates among the receptor locations was selected. To calculate the EPCs in surface water, the concentrations at the point of full mixing during average condition scenarios downstream each FDPs in the North Driftwood River and West Buskegau River watersheds were selected and the maximum concentrations for the Baseline Plus Project scenario in the Jocko Creek watershed were selected.

8.5.3 Receptor Scenario

The ecological receptors that were selected are known to be present near the Project or can reasonably be expected to be present based on territory as noted in Table 8.1 and as identified in baseline reports on terrestrial ecology (Appendix B.7.4 of the Impact Statement) and fish and fish habitat (Appendix B.8.1 of the Impact Statement). These receptors are also suitable surrogates for other species that may be present, including species at risk. The use of site-specific receptors decreases the uncertainty in the assessment.

8.5.4 Use of Ecological Receptors to Represent Other Organisms

The use of receptors as surrogates is intended focus the evaluation on a select number of ecological receptors evaluated. The receptors chosen are considered to be sensitive, regularly present at or near the Project, and to be exposed to the CoPC via relevant exposure pathways. Therefore, it is reasonable to assume that conclusions that are reached in respect of the modelled receptor organisms can be generalized to other biota that might use the region near the Project.

8.5.5 Receptor-Specific Toxicity Data

For most CoPC and receptors, toxicity data are available in some form. However, toxicity data are not necessarily available for the particular ecological receptor under consideration (e.g., black bear), or to a reproductive or population-level endpoint. As a result, there is uncertainty associated with the extrapolations that may be used to translate toxicity data for one species into a TRV for a second species. The toxicity data represent an organism or organisms that are expected to be sensitive to the CoPC. The conversion factors that are used are scientifically based and are applied in a reasonable manner consistent with standard practice.

8.5.6 Food Chain Interactions

Very limited "real world" data exist that allow quantification of the true relationship between a CoPC in an environmental medium and chemical transfer through the food chain. Only a few classes of chemicals (excluding metals) appear to be magnified through the food chain. The extent of food chain magnification is another uncertainty that is generally treated in a conservative manner. Baseline concentrations of trace metals in a wide variety of environmental media and food items were measured, including soil, surface water, sediment, fish, plants, and berries. Future concentrations of trace metals in these environmental media and food items were estimated using methods and models that are considered to be realistic and/or conservative.

8.5.7 Wildlife Exposure Factors

Most factors incorporated into dose calculations for ecological receptor species possess a site-specific component. Validity of each exposure factor is dependent on consideration of the site-specific nature of these factors. In the absence of site-specific validation, exposure factors are incorporated based on validations performed elsewhere for other cases and sometimes for other species. Considerations such as food ingestion rates, water ingestion rates, incidental soil ingestion rates, dietary composition, home range, and time spent near the Project were collected from the scientific literature based on other sites and locations.

8.5.8 Measurement Endpoints from the Toxicity Data

The limited amount of toxicity data available for many chemicals restricted the measurement endpoints that were available. Given the overall tendency to introduce conservatism (using data or assumptions that are likely to overstate, rather than understate risk) into risk assessments, it is highly likely that adverse environmental effects will not exist below the HQ target value of less than 1.0. However, an HQ greater than 1.0 is not by itself an indication that harm to ecological receptors will occur. The conservatisms inherent in the model development mitigate this conclusion, and the movements of wildlife receptors and consequent risk-averaging tend to reduce their actual exposure level in comparison with the exposure level estimated at point locations.

8.5.9 Exposure Assumptions

Generally, uncertainties are addressed by incorporating conservative assumptions (i.e., assumptions that are likely to overstate risk) in the analysis. Where several conservative assumptions are involved in the same calculation, a high level of conservatism can result from the combination of the assumptions. As a result, risk assessments tend to overstate the actual risk with the result that conclusions are robust. Although many factors are considered in preparation of a risk assessment, the results are generally most sensitive to a few key assumptions. Some of these modelling assumptions related to exposures are provided below.

- Baseline EPCs were not available for sediment in the Jocko Creek watershed due to unexpected shipping issues and broken bottles. As such, and due to proximity, Baseline EPCs for sediment in the North Driftwood River watershed were assumed to be representative of baseline conditions in the Jocko Creek watershed. This approach is further supported by considering that baseline sediment conditions were generally similar between the North Driftwood River and West Buskegau River watersheds, as such, baseline sediment conditions may be similar across the three nearby watersheds.

- Plants tissue sampled and analyzed were assumed to be representative of food items and parts of food items ingested by ecological receptors.

- The uptake rate of CoPC from ingestion and dermal exposure to environmental media is assumed to be 100% (i.e., AF = 1.0).

- Ecological receptors are assumed to spend their entire lifetime in the area that could be affected by the Project.

- For the Baseline scenario, ecological receptors were assumed to be exposed to measured concentrations of CoPC in baseline environmental media based upon the 95% UCLM or maximum concentrations (soil, sediment, surface water, small prey, fish, plants).

- For the Baseline Plus Project scenario, ecological receptors were assumed to be exposed to modelled concentrations of CoPC in environmental media based upper limit exposures (soil, sediment, surface water, small prey, fish, plants).

- In the case of terrestrial invertebrate ingestion, for both the Baseline scenario and the Baseline Plus Project scenario, ecological receptors were assumed to be exposed to estimated concentrations of CoPC in terrestrial invertebrates (measured concentrations were not avialable). This was done by applying soil-to-terrestrial invertebrate uptake factors for earthworms even if earthworms are not typically consumed by some ecological receptors or consumed in limited amounts. This is a common approach used in ERA as reliable data and models are not available for other types of terrestrial invertebrates. Earthworms are geophagus organisms that ingest a large amount of soil during feeding and therefore, are more highly exposed to soil contaminants than other species which have less intensive contact with contaminated soil (Gall, Boyd, & Rajakaruna, 2015).

- Ecological receptors were assumed to be exposed to upper limit concentrations in environmental media regardless of their relative geographical proximity (e.g., surface water and sediment concentrations may be at distance from soil concentrations).

- Modelled concentrations of CoPC in sediment are based on site-adjusted partitioning factors between surface water and sediment. Estimated concentrations of CoPC in other media are also based on site-adjusted partitioning factors.

- Modelled concentrations of CoPC in biota are based on exposure to CoPC in environmental media. Biota are assumed to have been exposed to concentrations in environmental media long enough for their tissues to equilibrate with the surrounding media. For example, estimated concentrations of CoPC in fish are based on exposure to CoPC in the water column. Fish are assumed to have been exposed to these concentrations long enough for their tissues to equilibrate with the surrounding water.

8.5.10 Chemical Interactions from Multiple CoPCs

Ecological receptors are exposed to multiple CoPC in the environment. The chemical interaction between multiple CoPC or modifying factors (e.g., pH or water hardness) may result in additive, synergistic or antagonistic effects that are not distinguishable when evaluating the toxicity of CoPC individually. Similar to the situation for human health, there is only a weak scientific understanding of the interaction and effects of multiple CoPC and related modifying factors. Due to the lack of scientific evidence and approved assessment tools associated with modelling chemical interactions, these interactions were not evaluated in the ERA. However, this does not make the ERA non-conservative. Both interactions and modifying factors can influence the evaluation of potential risk. However, one of the main goals of the ERA is to conservatively assess potential risks by adopting numerous conservative biases in the risk assessment approach, such as using a maximum or 95% UCLM to represent the concentration over the entire area and using the most sensitive endpoint for the most sensitive species to represent the potential dose-response for all species within the study area. Efforts are made to err on the side of caution, providing a conservative level of risk without being unreasonable.

8.5.11 Summary of Uncertainties

A summary of the important assumptions and uncertainties in the ERA and the implications of these assumptions on risk estimates is provided in Table 8.21.

Table 8.21 Evaluation of Assumptions and Uncertainties Applied in the ERA

Assumptions/ Uncertainty	Discussion of Conservatism	Analysis Likely to Overestimate/ Underestimate Risk
Modelling Techniques	Risk estimates were derived using modelling techniques based on federal ERA guidance (CCME, 1996) (CCME, 2020) (FCSAP, 2012a) for the estimation of Baseline Plus Project scenario concentrations as well as Baseline scenario concentrations for parameters/media not measured.	Neutral
Modelling Scenario	As part of the conservative approach to risk assessments, the worst-case modelling conditions were selected for application into the ERA. Ecological receptors were assumed to be exposed to potential upper limit exposures for each media at each region, regardless of specific locations of these concentrations. This approach is conservative as ecological receptors would be expected to move around at the site and not necessarily be exposed to the highest concentrations at the same location.	Overestimate
Receptor Selection	The ecological receptors that were selected are known to be present, or can reasonably be expected to be present, near the Project.	Neutral
Using Receptors as Surrogates for other Organisms	The receptors selected are considered to be sensitive, regularly present at or near the Project, and to be exposed to the CoPC via relevant exposure pathways.	Neutral
Receptor-Specific Toxicity Data	The toxicity data represent an organism or organisms that are expected to be sensitive to the CoPC. The conversion factors that are used are scientifically based and are applied in a reasonable manner. This approach is considered conservative as selected receptors may be similarly or less sensitive.	Overestimate
Food Chain Interactions	Baseline concentrations of trace metals in a wide variety of environmental media and food items were measured, including soil, surface water, sediment, fish, plants, and berries. Future concentrations of trace metals in these environmental media and food items were estimated using methods and models that are considered to be realistic and/or conservative.	Neutral
Wildlife Exposure Factors	Most factors incorporated into dose calculations for ecological receptor species possess a site-specific component. In the absence of site-specific validation, exposure factors are incorporated based on validations performed elsewhere for other cases and sometimes for other species.	Neutral
Exposure Assumptions	The uptake rate of CoPC from ingestion and direct exposure to environmental media is assumed to be 100% (i.e., AF = 1.0). This approach is conservative as CoPC may not be 100% bioavailable in the environmental media and may not be expected to be completely up taken through the gut and direct exposure.	Overestimate
Exposure Assumptions	Ecological receptors are assumed to spend their entire lifetime in the area that could be affected by the Project. This approach is conservative as some receptors may not spend 100% of their time in the areas of highest concentrations (i.e., their foraging/home ranges may extend beyond the area that could be affected by the Project).	Overestimate

Assumptions/ Uncertainty	Discussion of Conservatism	Analysis Likely to Overestimate/ Underestimate Risk
	Ecological receptors were assumed to be exposed to measured/estimated concentrations of CoPC in environmental media (e.g., soil, sediment, surface water, small prey, fish, terrestrial plants) based upon upper limit exposures, such as the 95% UCLM or maximum concentrations. The 95% UCLM is a conservative upper-level estimate of the mean of concentrations at each region. The use of the 95% UCLM or maximum concentrations represents a conservative approach, as the concentrations in the food items ingested by wildlife would likely be at a lower concentration.	Overestimate
	Ecological receptors were assumed to be exposed to estimated concentrations of CoPC in terrestrial invertebrates based on soil-to-terrestrial invertebrate uptake factors predictive of CoPC concentrations in earthworms even if diet of some ecological receptors generally comprised of no or limited earthworms. The use of these uptake represents a conservative approach, as the concentrations in the terrestrial invertebrates ingested by wildlife would likely be at a lower concentration.	Overestimate
	Ecological receptors were assumed to be exposed to upper limit concentrations in environmental media regardless of their relative geographical proximity (e.g., surface water and sediment concentrations may be at distance from soil concentrations). This approach is conservative as ecological receptors would be expected to move around at the site and not necessarily be exposed to the highest concentrations in each medium at the same time or location.	Overestimate
	Estimated concentrations of CoPC in sediment are based on site-adjusted partitioning factors between surface water and sediment. Estimated concentrations of CoPC in other media are also based on site-adjusted partitioning factors.	Neutral
	Estimated concentrations of CoPC in biota are based on exposure to CoPC in environmental media. Biota are assumed to have been exposed to concentrations in environmental media long enough for their tissues to equilibrate with the surrounding media. For example, estimated concentrations of CoPC in fish are based on exposure to CoPC in the water column. Fish are assumed to have been exposed to these concentrations long enough for their tissues to equilibrate with the surrounding water.	Neutral
Chemical Interactions from Multiple CoPC	The chemical interaction between multiple CoPC and modifying factors (e.g., pH or water hardness) may result in additive, synergistic or antagonistic effects that are not distinguishable when evaluating the toxicity of CoPC individually. Due to the lack of scientific evidence and approved assessment tools associated with modelling chemical interactions, these interactions were not evaluated in the ERA.	Neutral

8.6 ERA Summary

In general, Project-related contributions of CoPC are not expected to result in unacceptable levels of risk to birds and mammals based on a comparison of HQs to a target of 1.0. Calculated HQs were less than 1.0 for most CoPCs and most ecological receptors assessed across the three watersheds assessed.

In some cases, HQs were greater than the threshold of 1.0 in both the Baseline scenario and the Baseline Plus Project scenario. However, the differences between HQs for the Baseline scenario and the Baseline Plus Project scenario (i.e., the Project Alone scenario) were less than 1.0 for most CoPCs and most ecological receptors assessed in the three watersheds assessed, suggesting that the Project-related risks for ecological receptors are expected to be negligible for most CoPCs.

However, differences in HQs for the Baseline scenario and the Baseline Plus Project scenario for some CoPCs and ecological receptors combinations were greater than the target of 1.0. Greater than 1.0 HQs calculated for the Project Alone scenario are:

- nickel in all three watersheds assessed for the masked shrew (standard and representative of SAR), and
- nickel in all three watersheds assessed for the barn swallow.

For the masked shrew and the barn swallow, the terrestrial invertebrate ingestion pathway represents a substantial contribution to the overall HQ (more than 90%) calculated for nickel. As measured data were not available for terrestrial invertebrates, CoPC concentrations in terrestrial invertebrates were estimated by applying soil-to-terrestrial invertebrate uptake factors for earthworms. For the masked shrew, given the likely exaggerated exposure estimates, the regional context, and the TRV, unacceptable risks to population of masked shrews due to exposure to nickel (as well as other COPCs assessed) are not expected. The masked shrew was also selected as a representative of bat SAR. Masked shrew and bats are part of the same feeding guild and have similar body masses; however, masked shrew are expected to be more exposed to soil CoPCs compared to bats due to their behaviors. Therefore, unacceptable risks to bats due to exposure to nickel as well as other CoPCs assessed are not expected. Furthermore, considering the extensive foraging range of the barn swallow, and that the likely exaggerated exposure estimates, unacceptable risks to barn swallows and other species it represents due to exposure to nickel as well as other CoPCs assessed are not expected.

It is noted, however, that the overall exposure to nickel (and several other metals) for the masked shrew and the barn swallow is mainly associated with the terrestrial invertebrate ingestion pathway. As such, sampling and analysis of metals in terrestrial invertebrates could support refinements of assumptions associated with this pathway. Monitoring of nickel concentrations in terrestrial invertebrates (both earthworms and flying insects) would better represent changes in exposure for the masked shrew, the barn swallow, and those species they represent.

Reptiles are evaluated by considering their most sensitive life stage, the hatching stage, during which turtles live in close association with their surrounding environment. As such, animals living in close proximity to their surrounding environment may be suitable surrogate. Unacceptable risks to reptiles are not anticipated based on evaluation of terrestrial and aquatic communities. Similarly, amphibians are evaluated by considering their most sensitive life stage, the tadpole stage, during which the amphibian is immersed in water. As such, fish may be a suitable surrogate for amphibian exposure. Unacceptable risks to amphibians are not anticipated based on evaluation of aquatic communities.

For the terrestrial invertebrate communities calculated HQs are less than 1.0. Calculated HQs for terrestrial plant communities are also less than 1.0 other than for manganese; however, this is largely related to pre-existing baseline manganese concentrations in the soil. The HQs for terrestrial plant communities exposed to NO_2 and SO_2 were also below 1.0. Although toxicity benchmarks were not identified for tungsten for terrestrial communities, the increase in the concentration of tungsten in soil as a result of Project-related activities is negligible (<1%). As such, baseline risks and future risks are expected to remain essentially unchanged for tungsten. As such, unacceptable risks to terrestrial communities as a result of Project-related contributions of metals to soil and CACs assessed are not expected.

For benthic communities, HQs are less than 1.0 for the CoPCs assessed in the three watersheds. As HQs were less than 1.0 for the Baseline Plus Project scenario, Project activities are not expected to result in unacceptable risks to benthic communities. The HQs for the benthic communities could not be calculated for manganese, thallium, tungsten, and uranium in sediment. As manganese is estimated to increase by less than 1% in sediment, baseline and future exposures for benthic communities to manganese in sediment are expected to remain essentially unchanged. Thallium is also estimated to increase by less than 1% in sediment from the North Driftwood River and West Buskegau River watersheds and approximately 4% in the Jocko Creek watershed. Concentrations of uranium in sediment are estimated to markedly increase in the North Driftwood River and West Buskegau River watersheds, with less than 1% change in the Jocko Creek watershed; however estimated concentrations are expected to remain below and within values generally encountered in sediment in lakes and streams across Canada. While proportioning for tungsten from surface water to sediment was not evaluated due to limited information, concentrations in sediment should generally reflect those in surface water which are modelled to markedly increase in the three watersheds assessed. Monitoring of tungsten and uranium in sediment in each watershed assessed would better represent changes in exposure for benthic communities.

For freshwater aquatic communities, calculated HQs for aquatic communities are less than 1.0 other than for cadmium and copper in the Baseline and Baseline Plus Project scenarios in the Jocko Creek watershed, and copper in the Baseline Plus Project scenario in the North Driftwood River and West Buskegau River watersheds. Given the relatively low contributions to the cadmium and copper HQs by the Project (less than 1.0 for cadmium in the three watersheds assessed and marginally greater than 1.0 in the North Driftwood River watershed for copper), that calculated HQs for other CoPCs less than the target of 1.0 in the three watersheds assessed, and that conservative assumptions were made during surface water modelling and selection of EPCs, Project activities are not expected to result in unacceptable risks to aquatic communities.

For the aquatic communities, HQs were not calculated for tungsten due to lack of supporting information. The calculated increase in concentrations of tungsten in surface water as a result of Project-related activities is as high (up to a seven-fold increase); however, the concentrations remain low (<0.001 mg/L). The increases in surface water concentrations for tungsten may be reflected in increase of exposures through various pathways associated with the aquatic environment. Actual increases in tungsten concentrations in surface water may be lower than those modelled. Monitoring of tungsten in surface water in each watershed assessed would better represent changes in exposure for aquatic communities.

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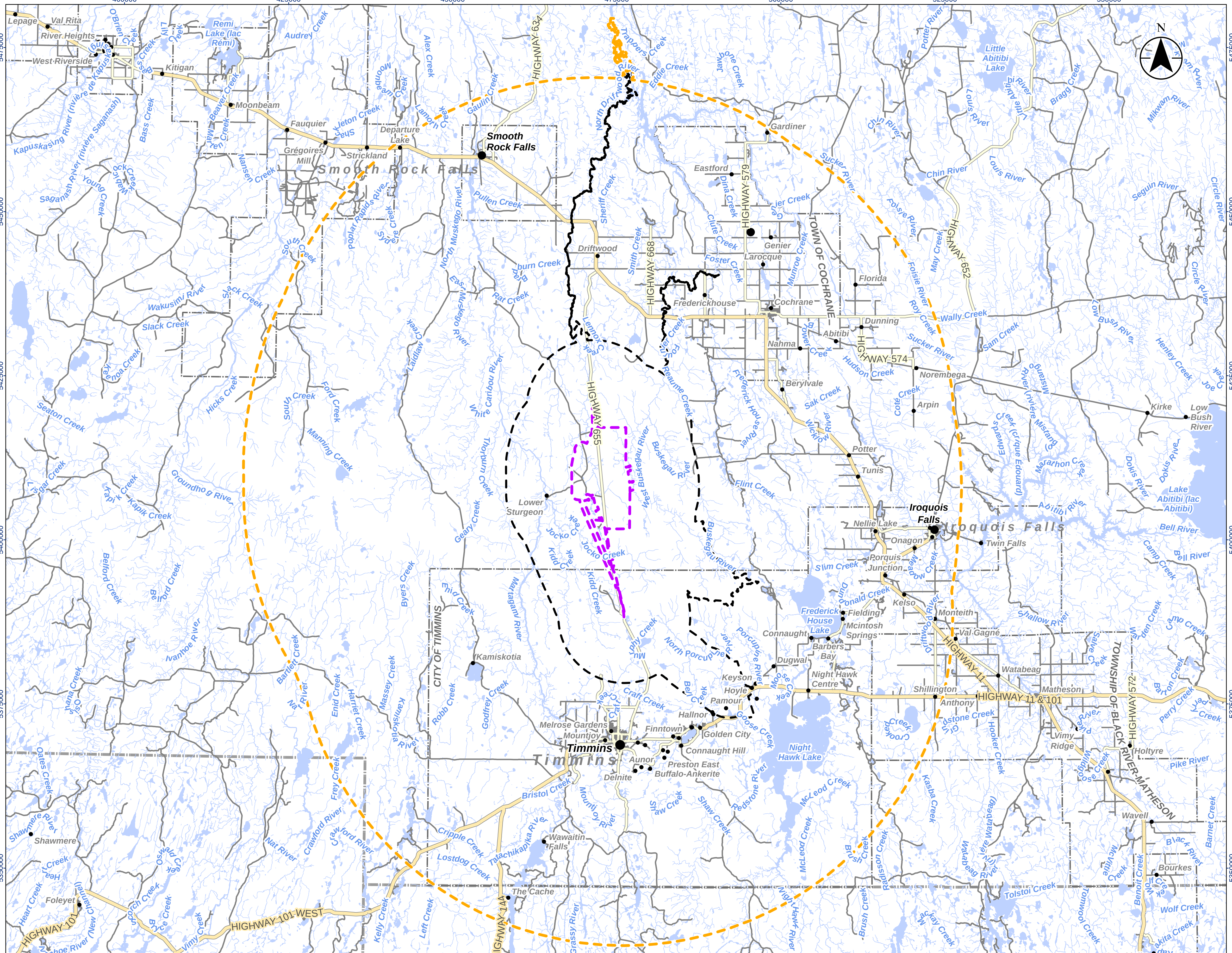
Appendices

Appendix A Figures



Legend

- Project Area
- Local Study Area
- Regional Study Area

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 10 20 km

1:600,000 (At original document size of 11x17)

Notes

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Project Location
Timmins, Ontario

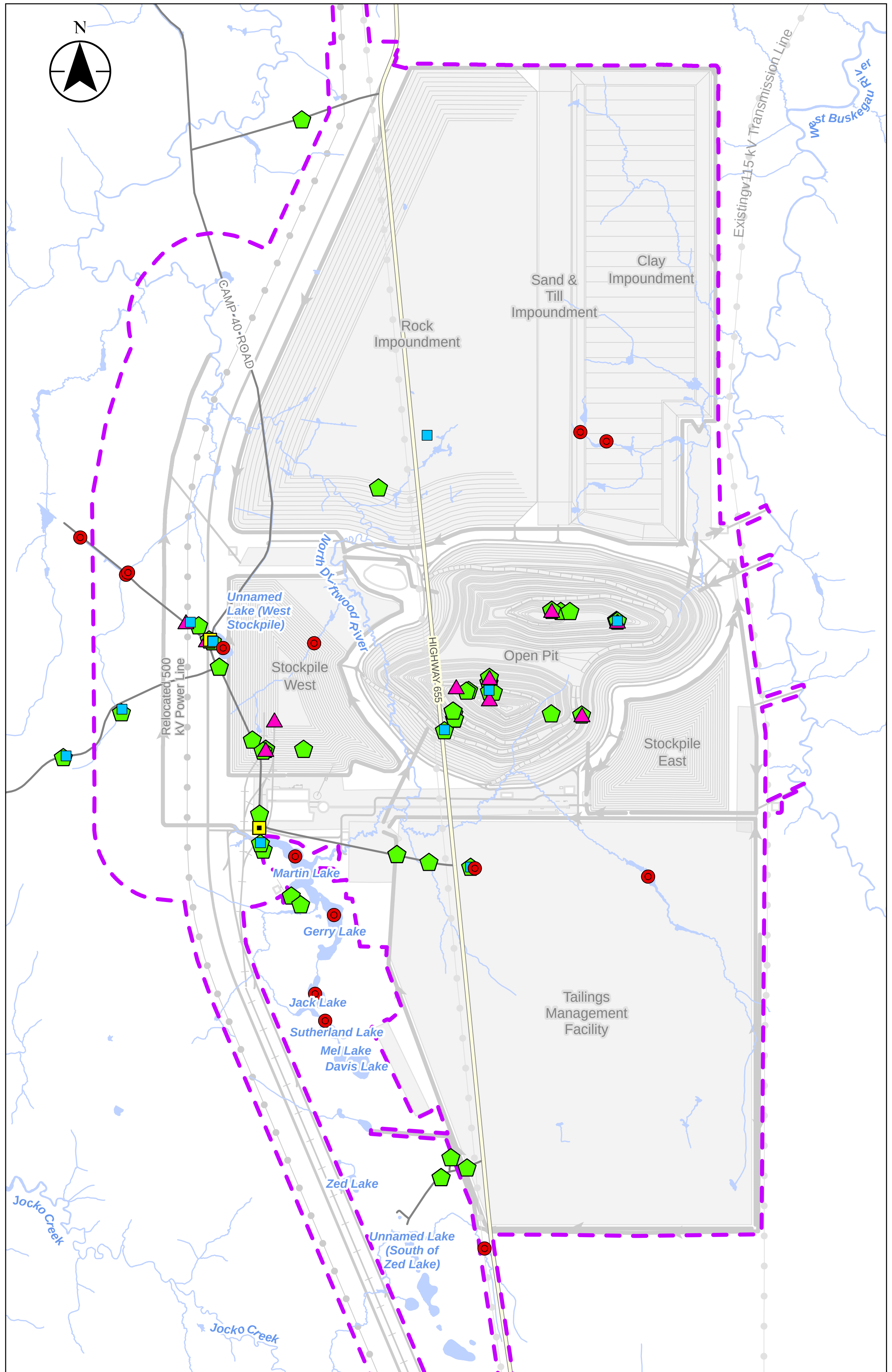
160930456 REVA
Prepared by malcazaren on 2024-11-19

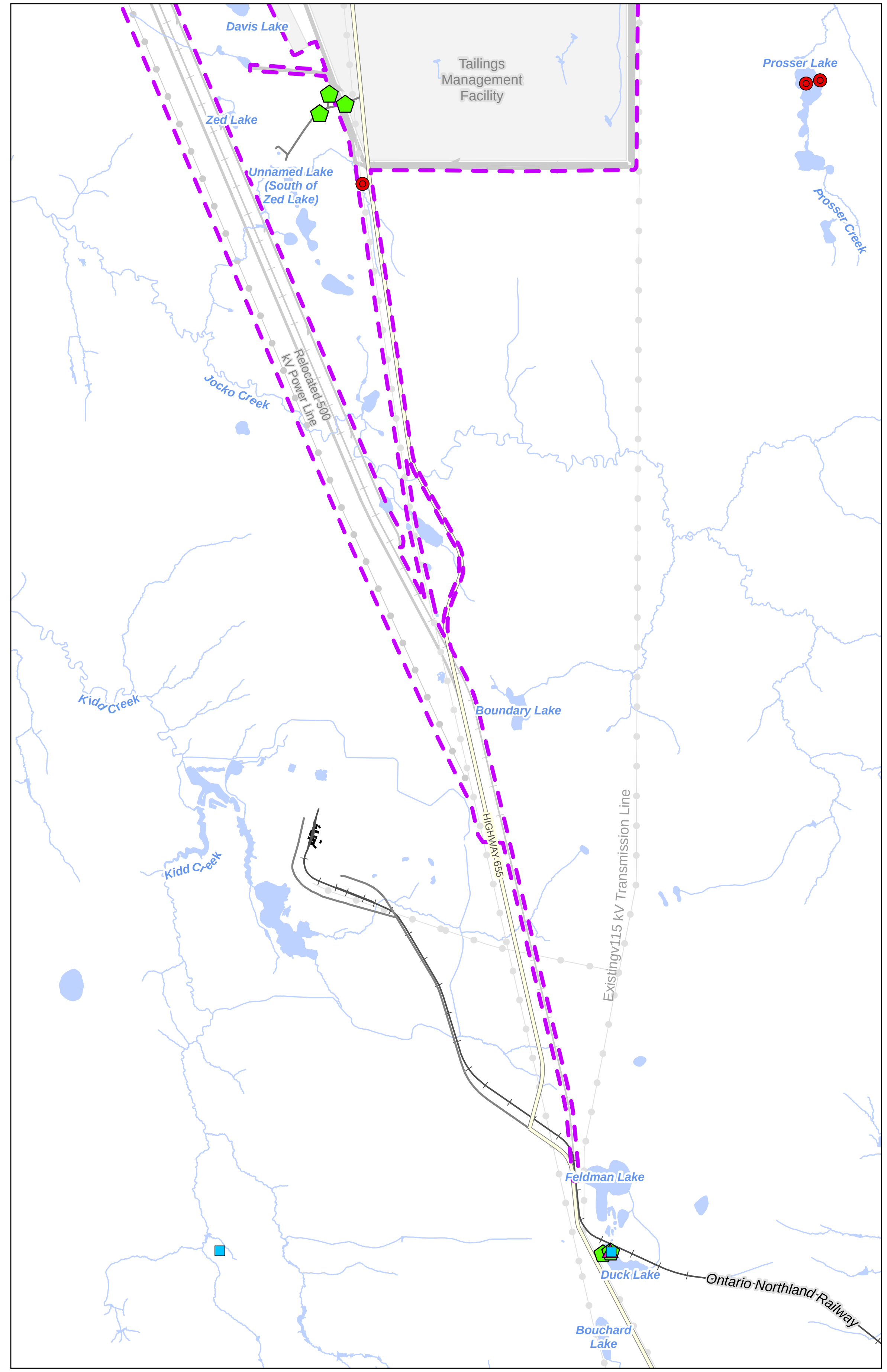
Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.1

Title
Project Area, Local Study Area and Regional Study Area

Revised: 2024-11-19 By: malcazaren





Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Proposed Project Components

Toxicology Sampling Location

- Aquatic plant
- Fish
- Game (bird)
- Terrestrial Plant - Berry
- Terrestrial Plant - Other

Base Features

- Major Road
- Minor Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 1 2 km

1:75,000 (At original document size of 11x17)

Notes

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Project Location
Timmins, Ontario

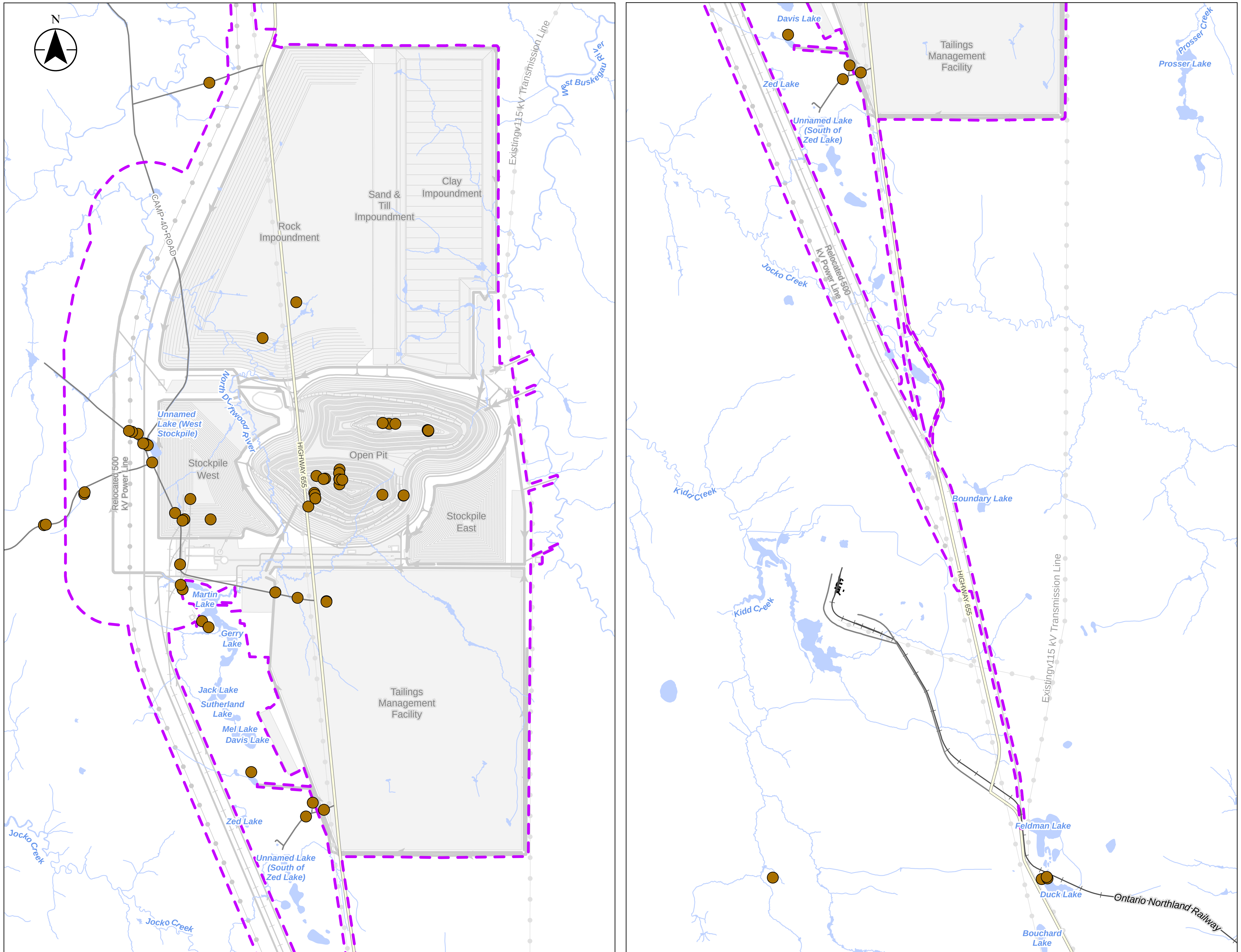
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.2

Title
Baseline Country Food Sampling Locations

Revised: 2024-11-19 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Proposed Project Components

Toxicology Sampling Location

- Soil

Base Features

- Major Road
- Minor Road
- Existing Transmission Line
- Watercourse
- Waterbody

0 1 2 km

1:75,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

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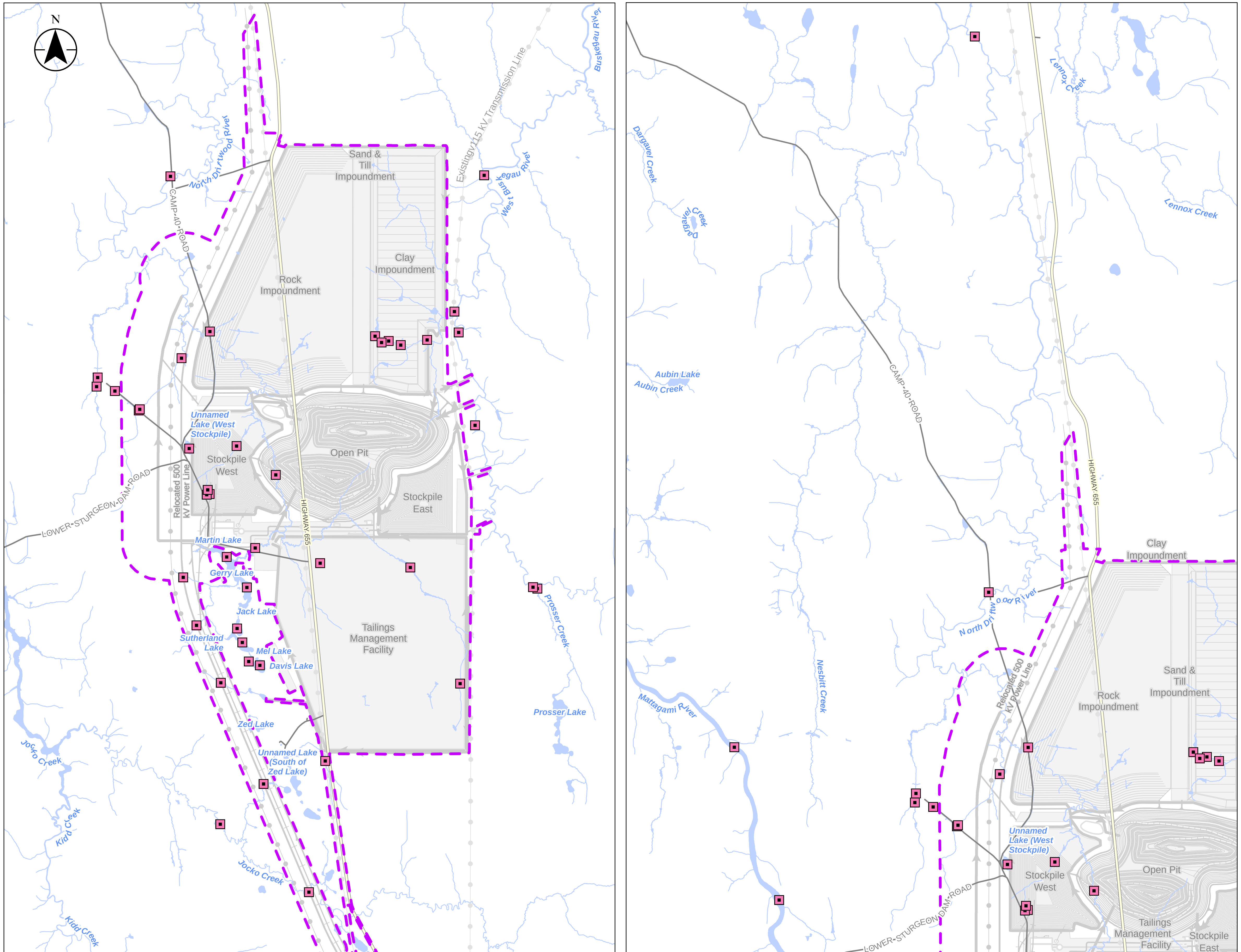
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.3

Title
Baseline Soil Sampling Locations



Stantec

CANADA NICKEL COMPANY

Legend

Project Area

Benthic Sediment Sampling Location

Proposed Project Components

Base Features

Major Road

Minor Road

Existing Transmission Line

Watercourse

Waterbody

0 1 2 km

1:100,000 (At original document size of 11x17)

Notes

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Project Location
Timmins, Ontario

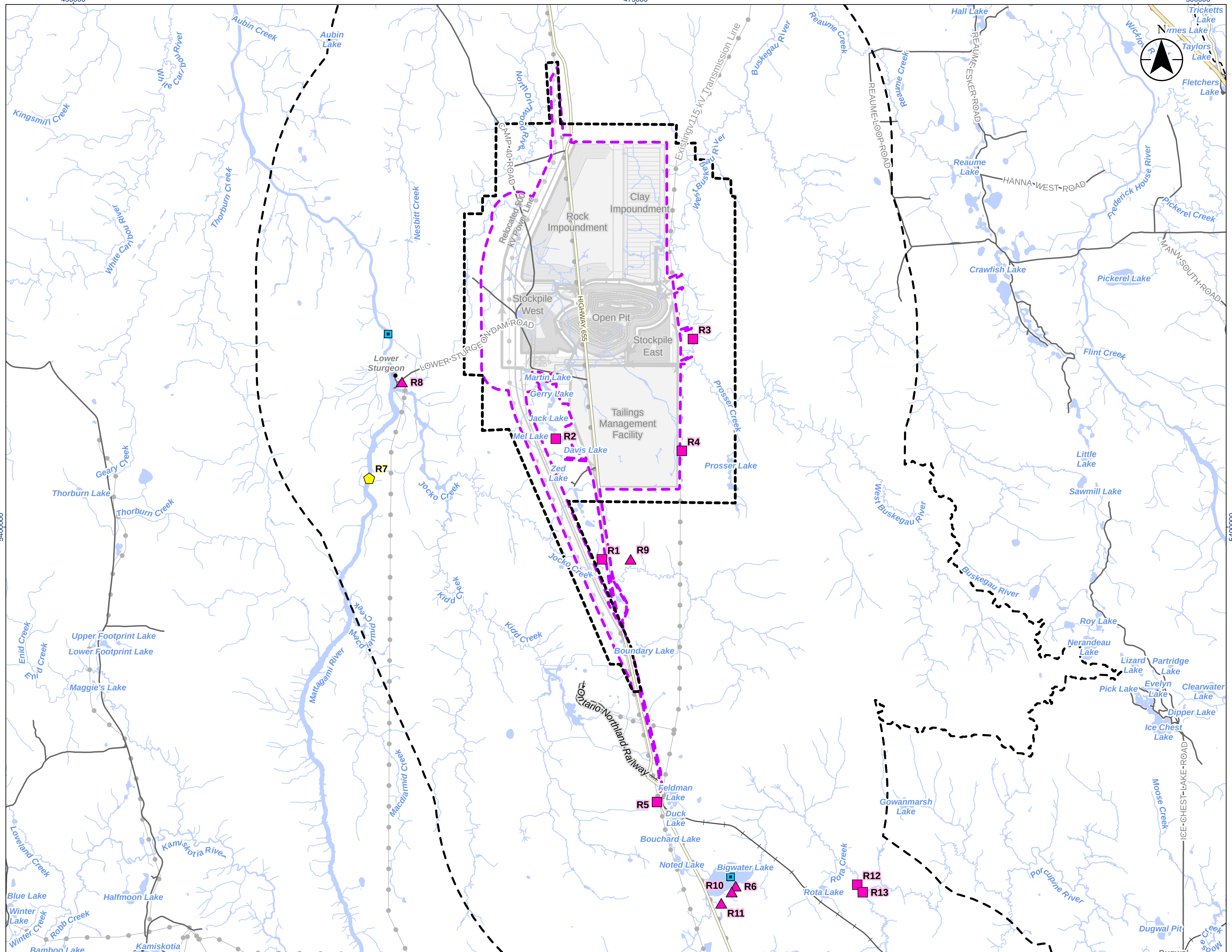
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.4

Title
Baseline Sediment Sampling Locations

Revised: 2024-11-19 By: malcazaren



Legend

- Project Area
- Local Study Area
- Modelled Mine Boundary

Base Features

- Expressway / Highway
- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- GAS Natural Gas Pipeline
- UP Unknown Pipeline
- Watercourse
- Waterbody
- Proposed Project Components
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- MECP Fish Consumption Advisory

0 5 10 km

1:175,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

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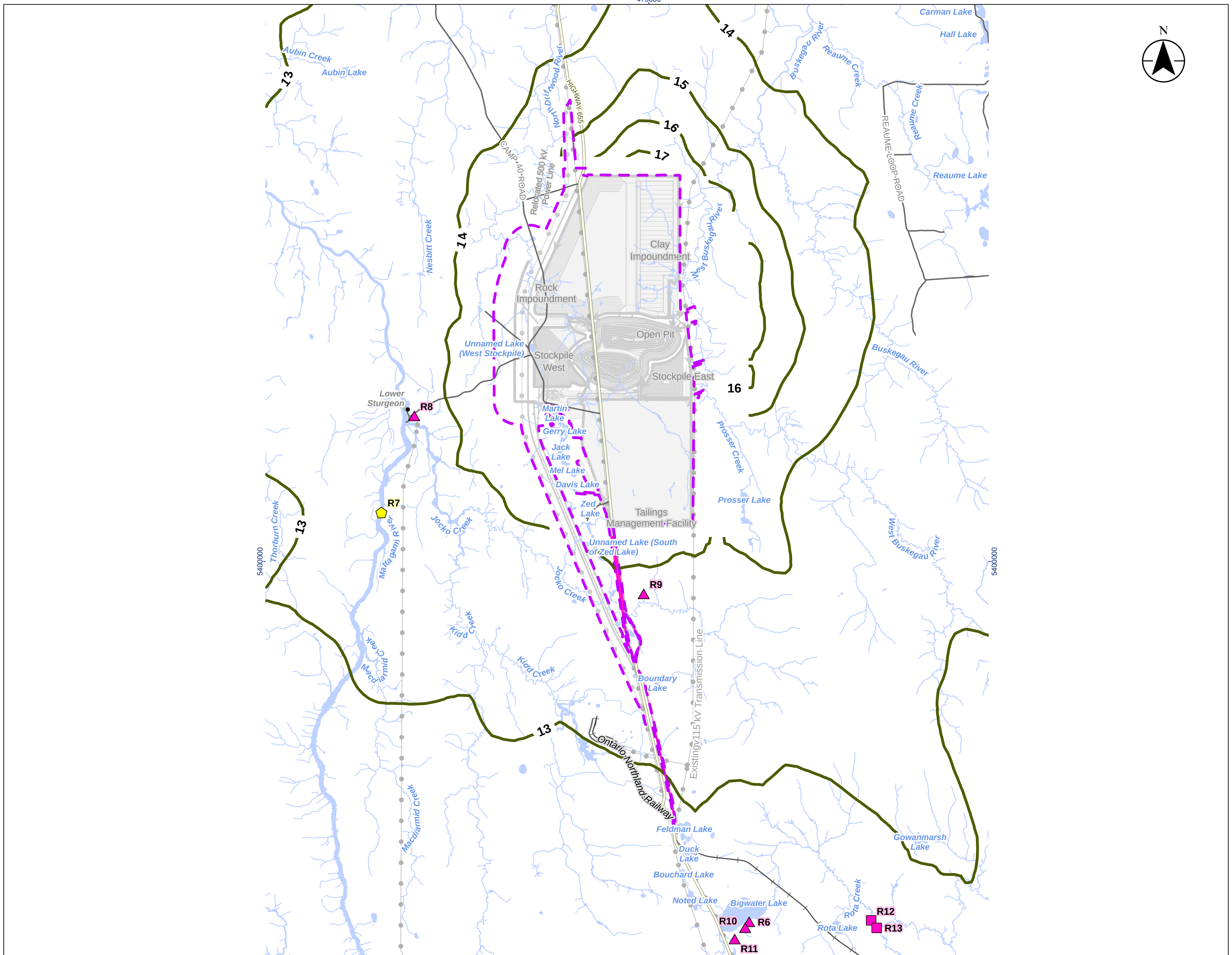
Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.5

Title
Human Receptor Locations and Modelled Mine Boundary

Revised: 2024-11-19 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
$PM_{2.5}$ 24-Hour Exposure Limit: 15 μg/m^3 (WHO 2021)
Background Concentration (included): 12.4 μg/m^3

0 5 10 km

1:175,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

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Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.6

Title
Concentration Contour Plot for Baseline Plus Project, Construction Scenario - 99th Percentile 24-Hour Average $PM_{2.5}$ (Without Plume Depletion)

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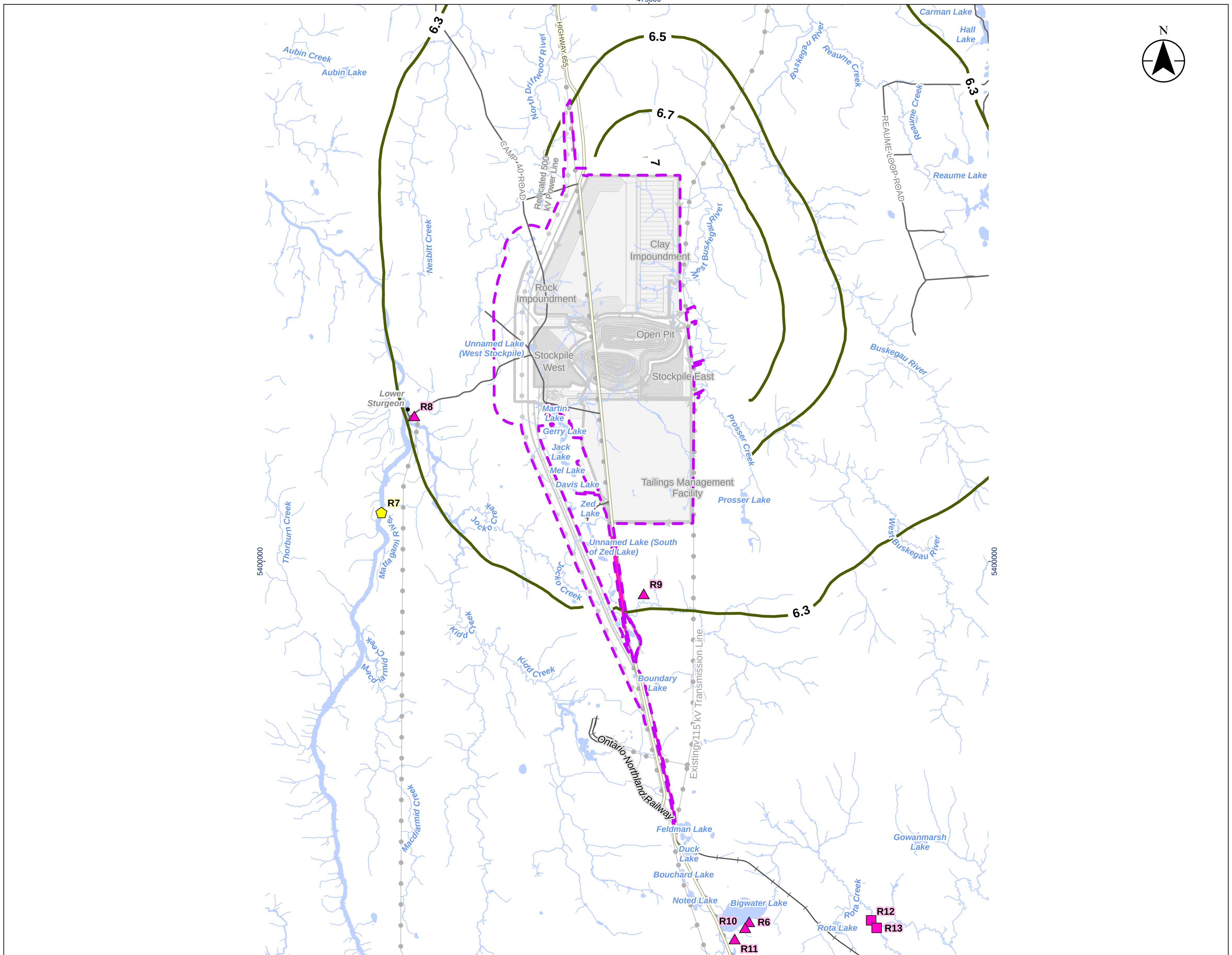

Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
$PM_{2.5}$ Annual Exposure Limit: 5 µg/m^3 (WHO 2021)
Background Concentration (included): 6.2 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
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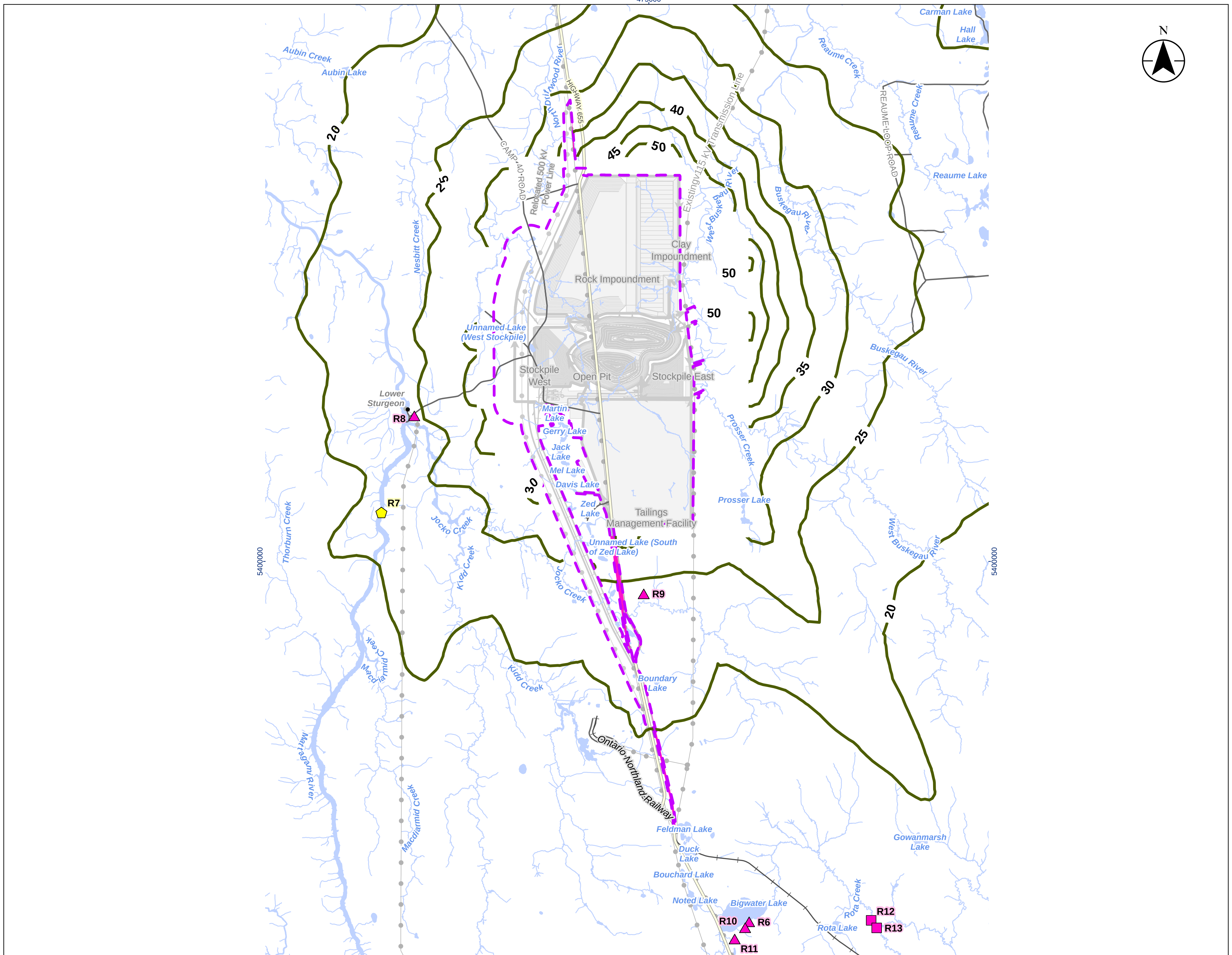
Project Location
Timmins, Ontario

160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.7

Title
Concentration Contour Plot for Baseline Plus Project, Construction Scenario - Annual Average $PM_{2.5}$ (Without Plume Depletion)



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
PM_{10} 24-Hour Exposure Limit: 45 µg/m^3 (WHO 2021)
Background Concentration (included): 13.1 µg/m^3

0 5 10 km

1:175,000 (At original document size of 11x17)

Notes

1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

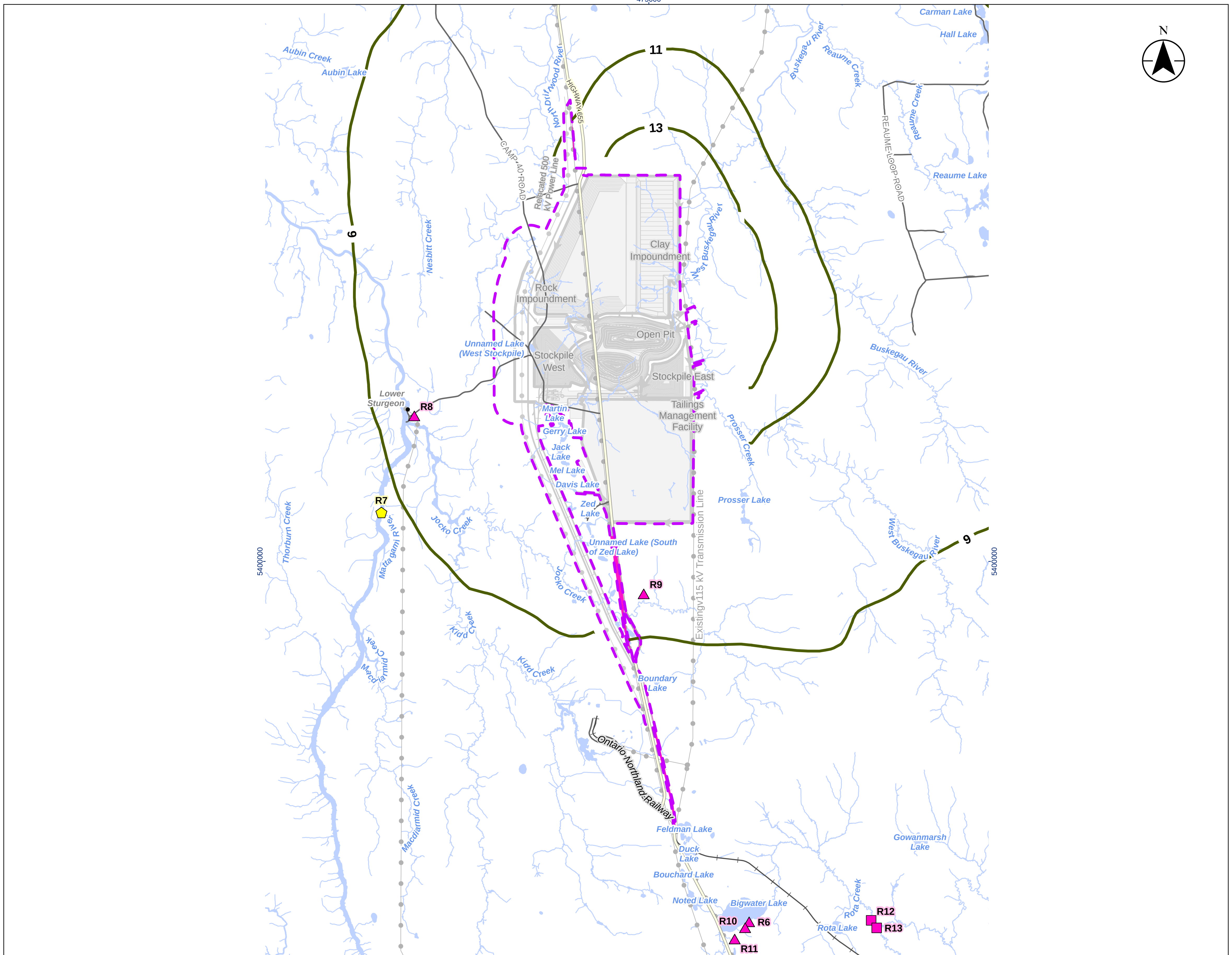
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.8

Title
Concentration Contour Plot for Baseline Plus Project, Construction Scenario - 99th Percentile 24-Hour Average PM_{10}

Revised: 2024-11-19 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
PM_{10} Annual Exposure Limit: 15 µg/m^3 (WHO 2021)
Background Concentration (included): 8.3 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

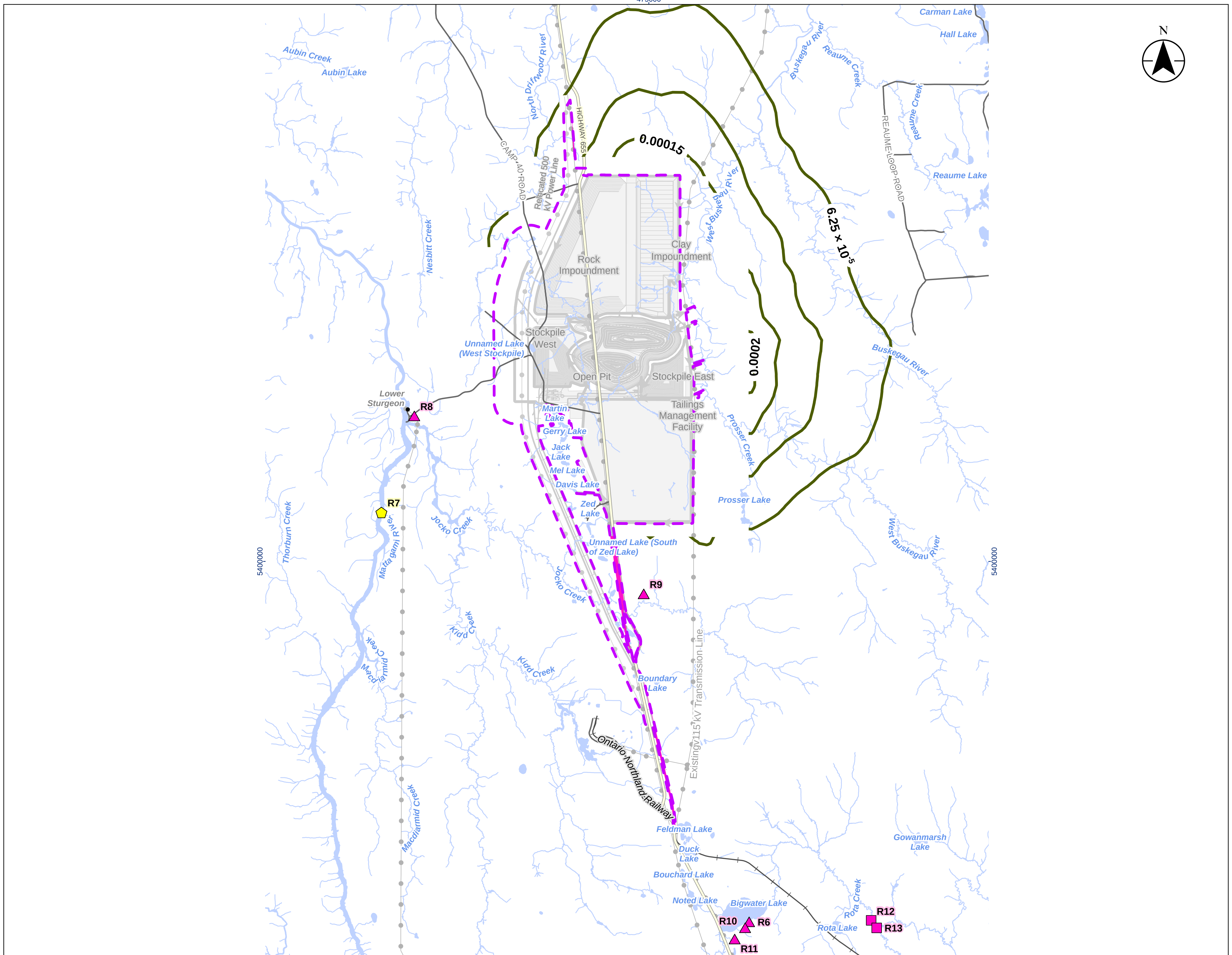
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.9

Title
Concentration Contour Plot for Baseline Plus Project, Construction Scenario - Annual Average PM_{10}

Revised: 2024-11-19 By: malcazaren



Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
Risk Specific Concentration: 6.25×10^{-5} fibres/cm^3 (EPA 2020)
Background Concentration (not included): 0.001 fibres/cm^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

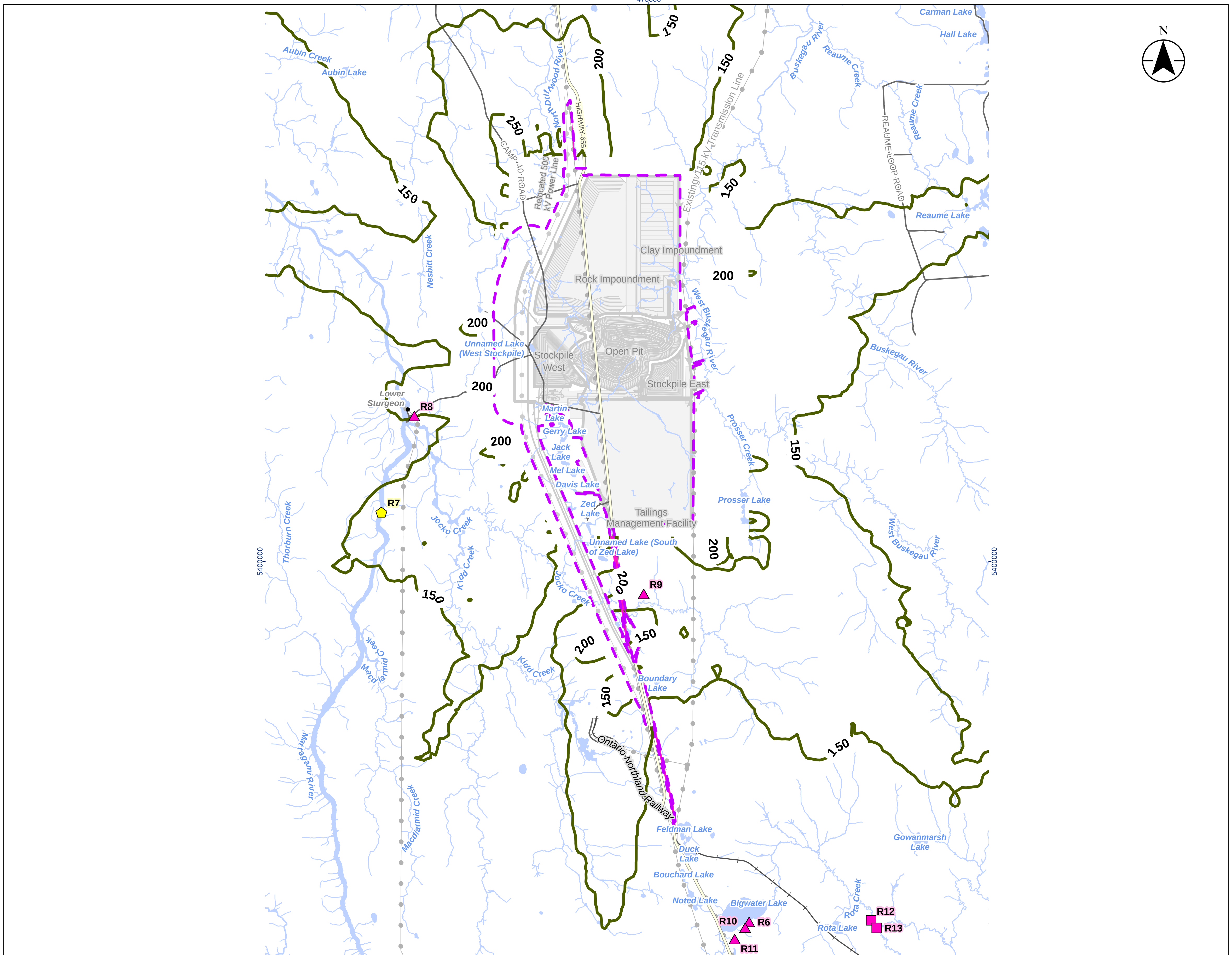
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.10

Title
Concentration Contour Plot for Project Alone, Construction Scenario - Annual Average Chrysotile Asbestos

\\cd1004-f01\01609\active\160930456\160930456\gis_cad\gis\mxds\STDR\160930456_IS-TDR_Health.aprx\160930456_IS-TDR_Health_FigA.06_A.17_ConcentrationContourPlot Revised: 2024-11-19 By: malcazaren



Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
NO_2 1-Hour Exposure Limit: 200 µg/m^3 (WHO 2021)
Background Concentration (included): 5.4 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

Project Location
Timmins, Ontario

160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.11

Title
Concentration Contour Plot for Baseline Plus Project, Operation Scenario - 1-Hour Average NO_2 (Using ARM2 method)

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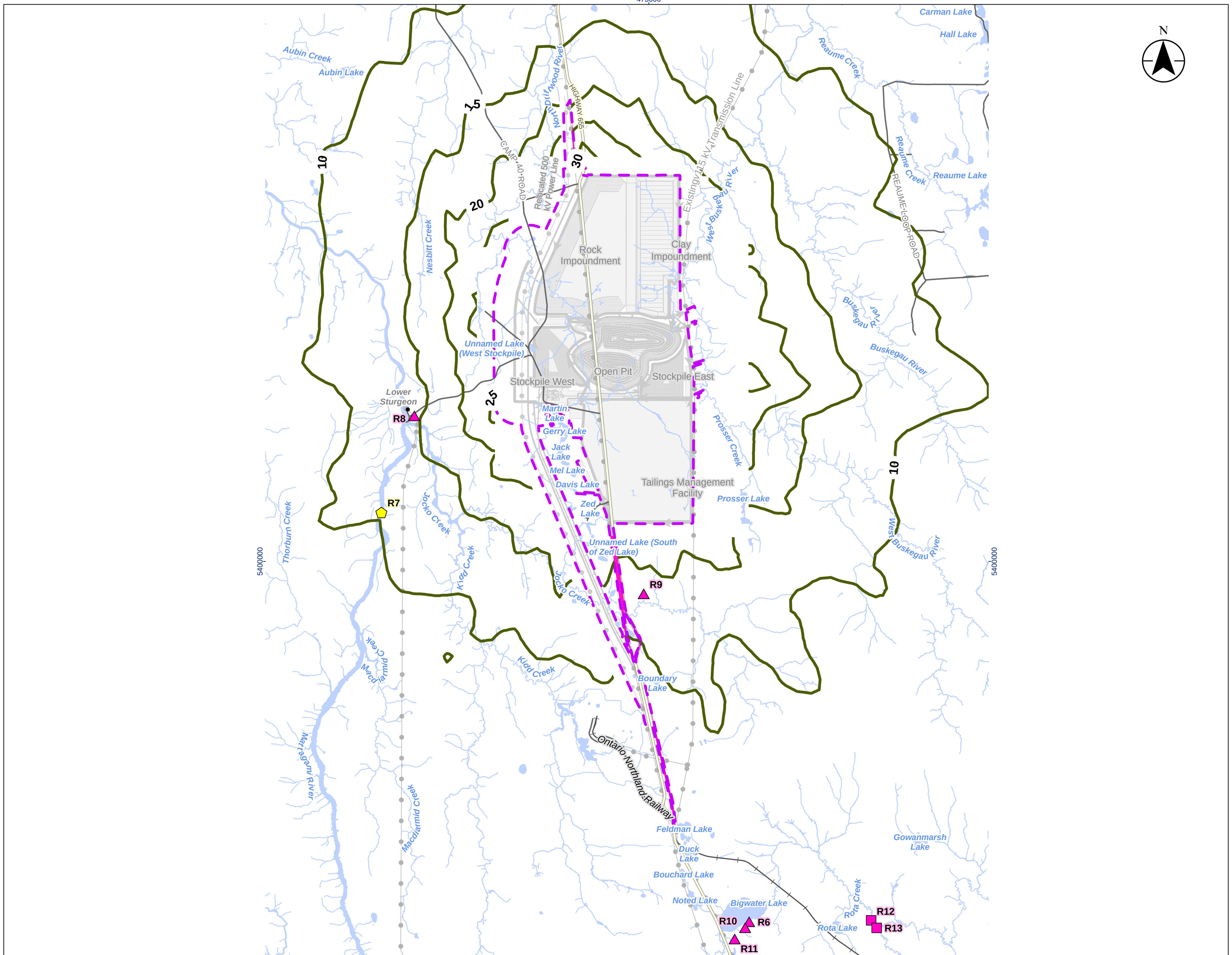

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
NO_2 24-Hour Exposure Limit: 25 µg/m^3 (WHO 2021)
Background Concentration (included): 2.2 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

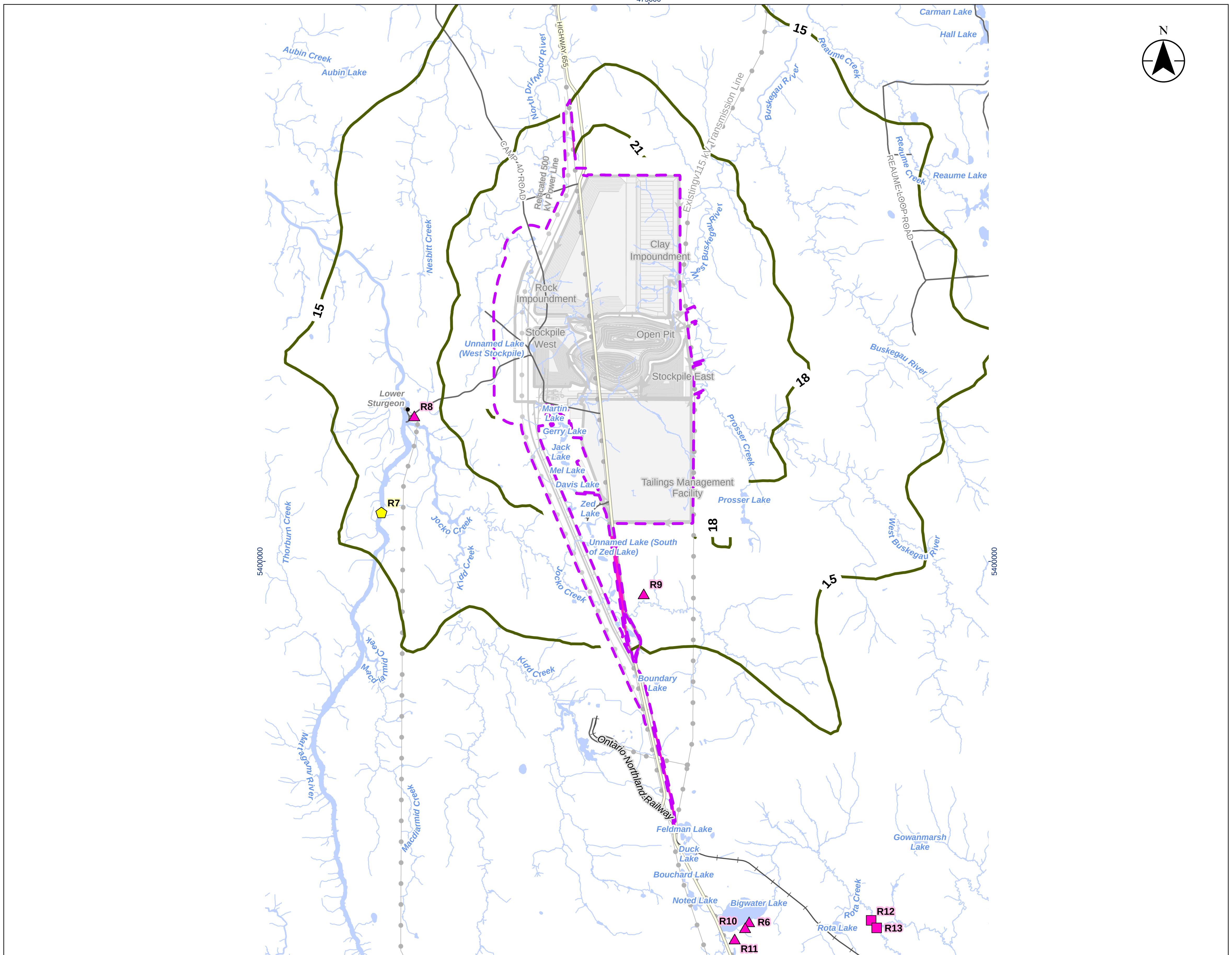
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.12

Title
Concentration Contour Plot for Baseline Plus Project, Operation Scenario - 99th Percentile 24-Hour Average NO_2 (Using ARM2 Method) (Without Plume Depletion)

\\cd1004-f01\01609\active\160930456\gis_cad\gis\mxds\STDR\160930456_IS-TDR_Health.aprx\160930456_IS-TDR_Health_FigA.06_A.17_ConcentrationContourPlot Revised: 2024-11-19 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
$PM_{2.5}$ 24-Hour Exposure Limit: 15 µg/m^3 (WHO 2021)
Background Concentration (included): 12.4 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

Project Location
Timmins, Ontario

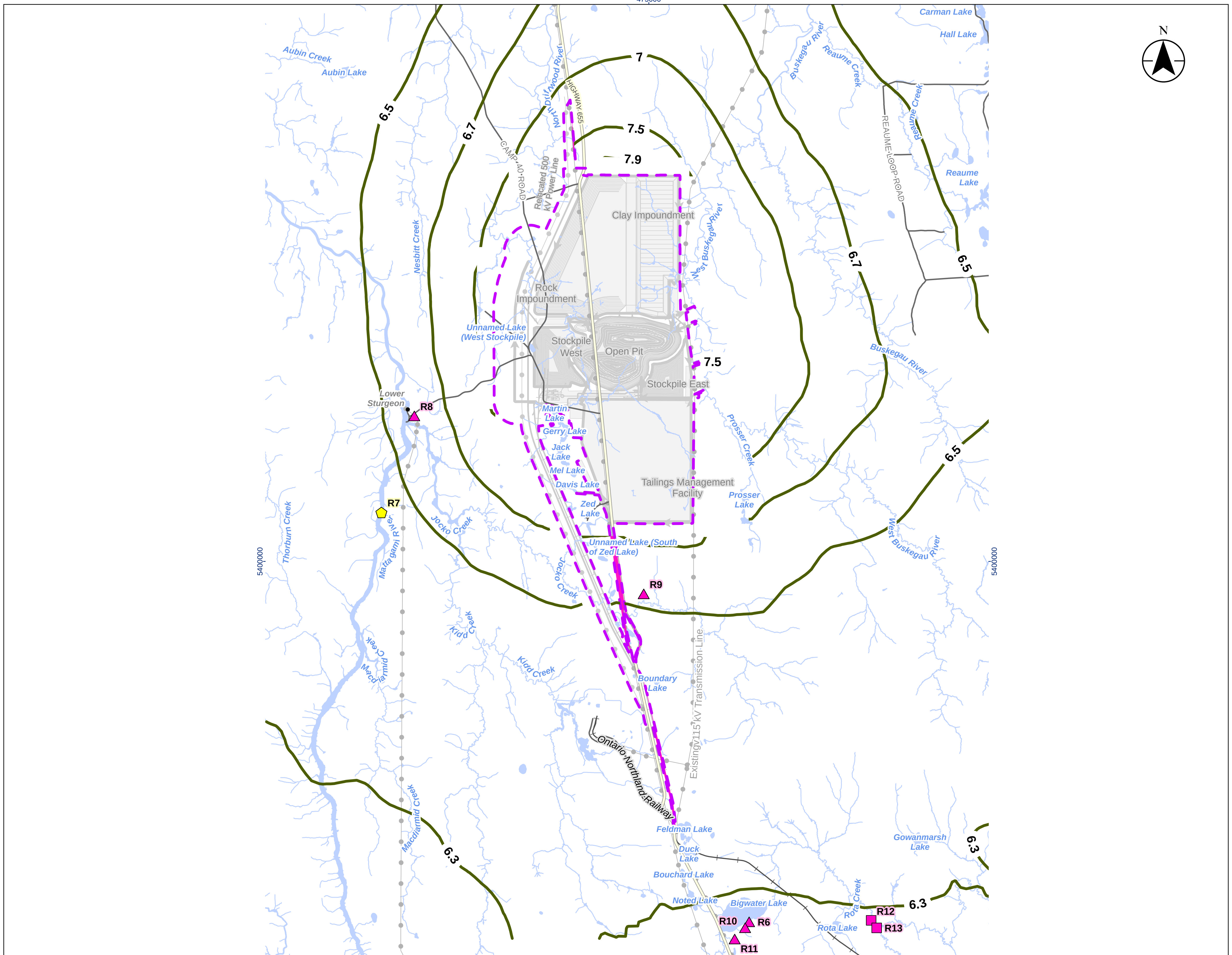
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.13

Title
Concentration Contour Plot for Baseline Plus Project, Operation Scenario - 99th Percentile 24-Hour Average $PM_{2.5}$ (Without Plume Depletion)

Revised: 2024-11-19 By: malcazaren



Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
$PM_{2.5}$ Annual Exposure Limit: 5 µg/m^3 (WHO 2021)
Background Concentration (included): 6.2 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

Project Location
Timmins, Ontario

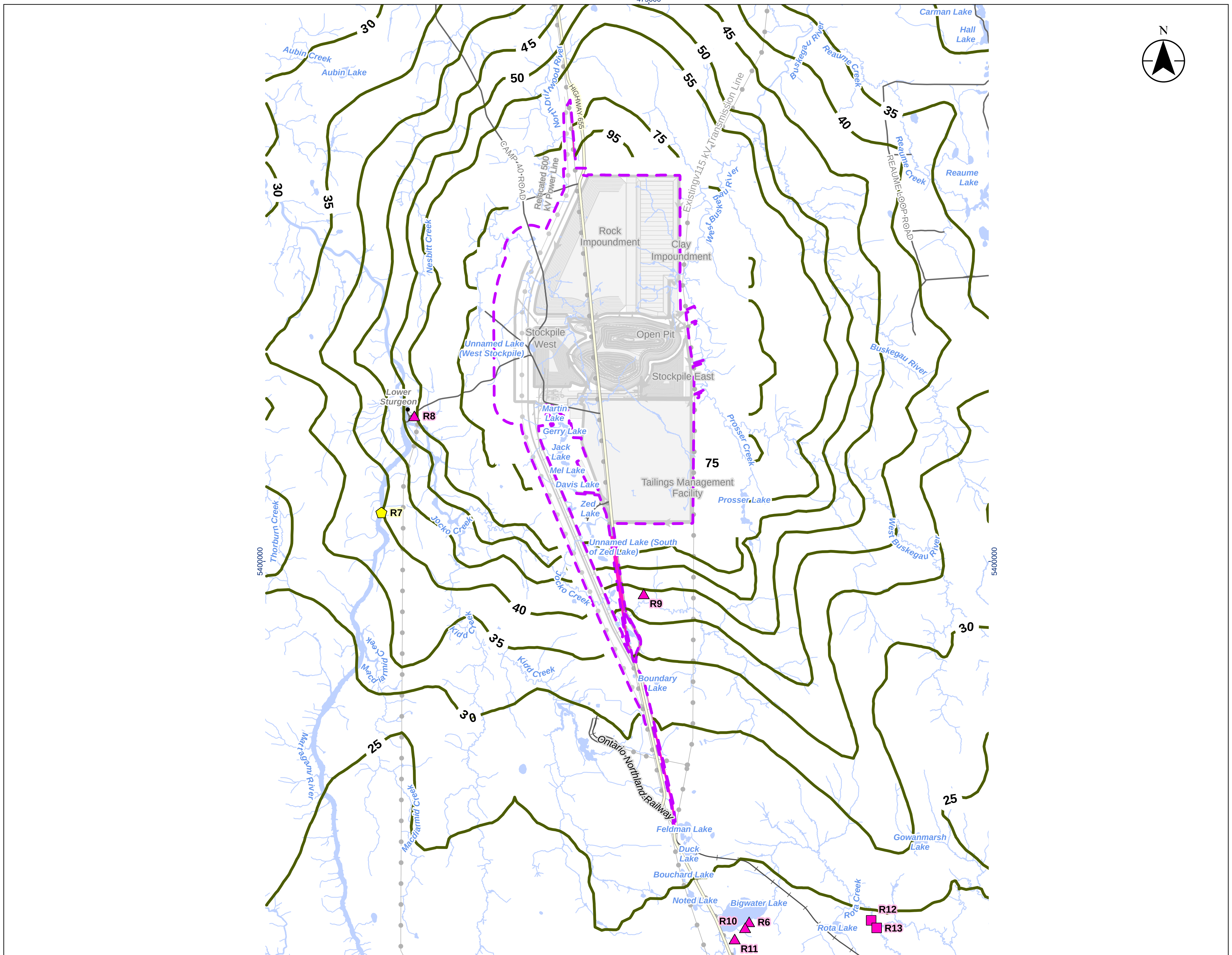
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.14

Title
Concentration Contour Plot for Baseline Plus Project, Operation Scenario - Annual Average $PM_{2.5}$ (Without Plume Depletion)

Revised: 2024-11-19 By: malcazaren



Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
PM_{10} 24-Hour Exposure Limit: 45 µg/m^3 (WHO 2021)
Background Concentration (included): 13.1 µg/m^3

0 5 10 km

1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

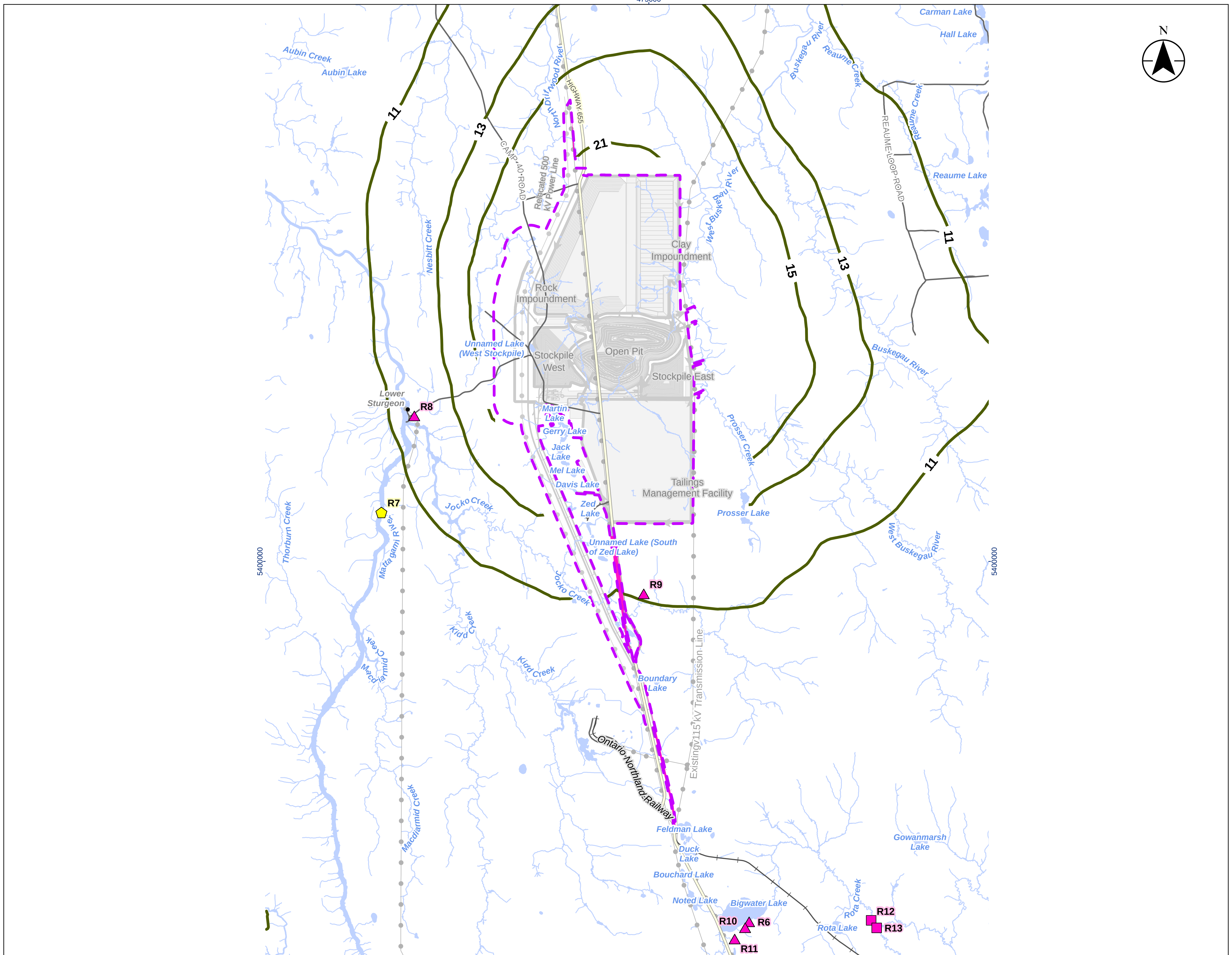
Project Location
Timmins, Ontario

160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.15

Title
Concentration Contour Plot for Baseline Plus Project, Operation Scenario - 99th Percentile 24-Hour Average PM_{10} (Without Plume Depletion)



Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
PM_{10} Annual Exposure Limit: 15 µg/m^3 (WHO 2021)
Background Concentration (included): 8.3 µg/m^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System:NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2023.

Project Location
Timmins, Ontario

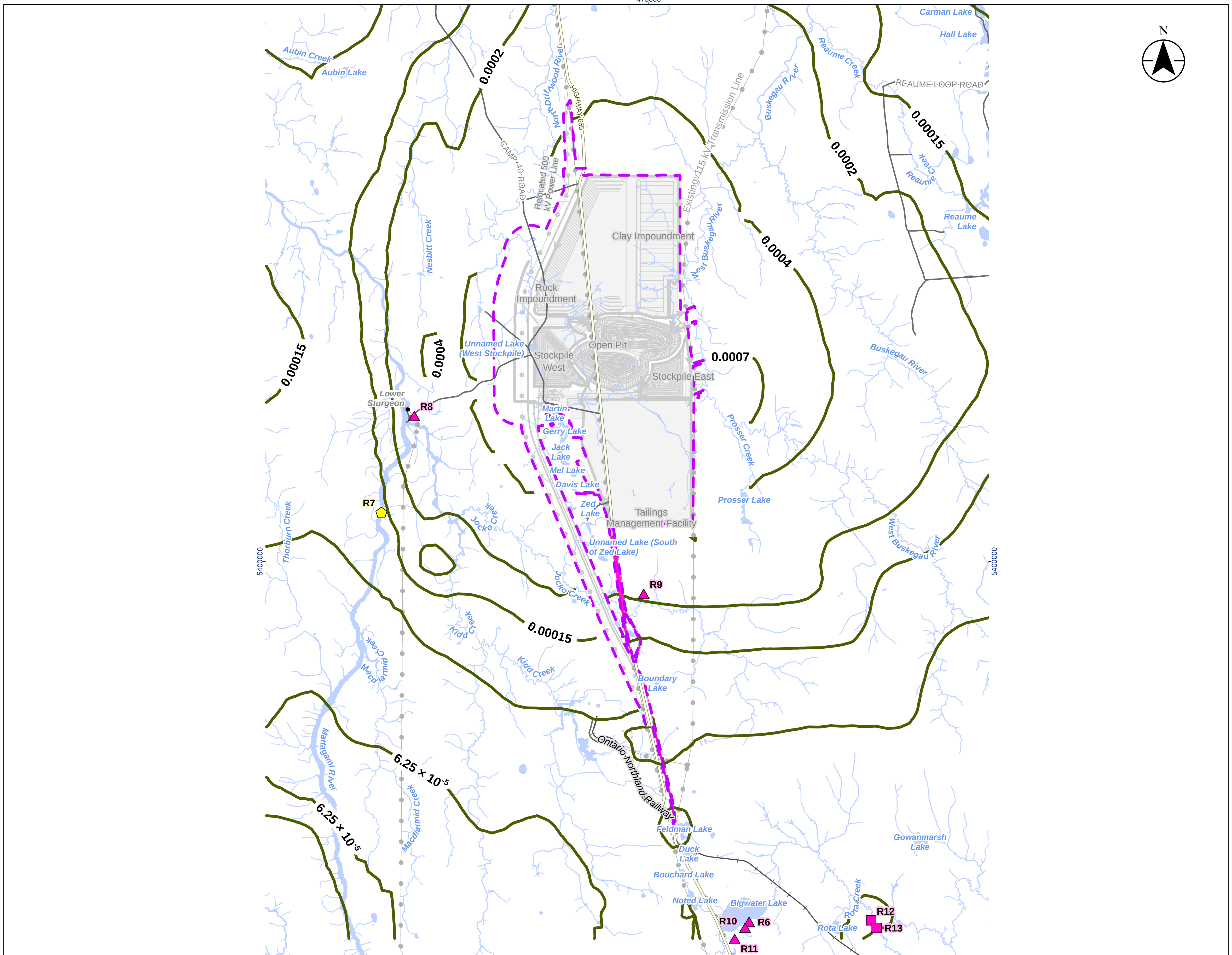
160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.16

Title
Concentration Contour Plot for Baseline Plus Project, Operation Scenario - Annual Average PM_{10} (Without Plume Depletion)

Revised: 2024-11-19 By: malcazaren



Stantec

CANADA NICKEL COMPANY

Legend

- Project Area
- Project Area - Existing Highway 655 and Transmission Line
- Sensitive Receptor - Non-Indigenous
- Sensitive Receptor - Indigenous
- Representative Receptor - Indigenous
- Concentration Contours
- Proposed Project Components

Base Features

- Major Road
- Minor Road
- Railway
- Existing Transmission Line
- Watercourse
- Waterbody

Legend Notes:
Risk Specific Concentration: 6.25×10^{-5} fibres/cm^3 (EPA 2020)
Background Concentration (not included): 0.001 fibres/cm^3

0 5 10 km
1:175,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
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Project Location
Timmins, Ontario

160930456 REVA
Prepared by malcazaren on 2024-11-19

Client/Project
Canada Nickel Company (CNC)
Crawford Nickel Project

Figure No.
A.17

Title
Concentration Contour Plot for Project Alone, Operation Scenario - Annual Average Chrysotile Asbestos (Without Plume Depletion)

Revised: 2024-11-19 By: malcazaren

Appendix B Baseline EPCs and Additional Information

B.1 Exposure Point Concentration Summary Tables

B.1.1 Soil EPC Summary Table

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg	70	70	100%	31000	N/A	6100	16000	8900	95% Student's-t UCL
Antimony	mg/kg	70	50	71%	0.73	0.3	0.14	0.53	0.23	95% KM (t) UCL
Arsenic	mg/kg	70	70	100%	5.09	N/A	2.5	4.2	2.7	95% Student's-t UCL
Barium	mg/kg	70	70	100%	155	N/A	38	86	50	95% Student's-t UCL
Beryllium	mg/kg	70	45	64%	1.25	0.3	0.2	0.66	0.35	95% KM (t) UCL
Bismuth	mg/kg	70	4	6%	0.43	0.6	0.2	0.32	0.43	Non-parametric (Maximum Detect)
Boron	mg/kg	70	36	51%	19	15.1	7.6	15	9.5	95% KM (t) UCL
Boron, hot water soluble	mg/kg	45	27	60%	1.48	0.99	0.4	1.1	0.48	95% KM (t) UCL
Cadmium	mg/kg	70	70	100%	2.09	N/A	0.29	1.5	0.52	95% Approximate Gamma UCL
Calcium	mg/kg	70	70	100%	126000	N/A	19000	85000	38000	95% H-UCL
Chromium	mg/kg	70	70	100%	70.1	N/A	21	42	26	95% Student's-t UCL
Chromium, hexavalent [Cr VI]	mg/kg	45	11	24%	0.25	0.4	0.11	0.4	0.13	95% KM (t) UCL
Cobalt	mg/kg	70	70	100%	14.6	N/A	5.3	11	6	95% Student's-t UCL
Copper	mg/kg	70	70	100%	109	N/A	15	48	22	95% Student's-t UCL
Cyanide, free	mg/kg	45	1	2%	0.193	0.268	0.1	0.19	0.193	Non-parametric (Maximum Detect)
Iron	mg/kg	70	70	100%	34600	N/A	9800	22000	13000	95% Student's-t UCL
Lead	mg/kg	70	70	100%	59.2	N/A	10	28	15	95% Approximate Gamma UCL
Lithium	mg/kg	70	49	70%	36.5	6	7.2	24	12	95% KM (t) UCL
Magnesium	mg/kg	70	70	100%	35100	N/A	5400	29000	11000	95% Approximate Gamma UCL
Manganese	mg/kg	70	70	100%	1950	N/A	310	800	380	95% Student's-t UCL
Mercury	mg/kg	70	68	97%	0.321	0.005	0.053	0.21	0.096	95% KM (t) UCL
Molybdenum	mg/kg	70	65	93%	5.36	0.1	0.4	1.1	0.59	KM H-UCL
Nickel	mg/kg	70	70	100%	40.6	N/A	14	25	16	95% Student's-t UCL
Phosphorus	mg/kg	70	70	100%	1250	N/A	480	820	580	95% Student's-t UCL
Potassium	mg/kg	70	68	97%	5680	300	830	2900	1500	95% KM (t) UCL
Selenium	mg/kg	70	41	59%	2.14	0.2	0.37	1	0.57	95% KM (t) UCL
Silver	mg/kg	70	9	13%	0.5	0.3	0.1	0.24	0.5	Non-parametric (Maximum Detect)
Sodium	mg/kg	70	55	79%	354	76	110	280	160	95% KM (t) UCL
Strontium	mg/kg	70	70	100%	89.9	N/A	32	75	40	95% Approximate Gamma UCL
Sulfur	mg/kg	70	10	14%	2900	3000	1000	1900	1200	95% KM (t) UCL
Thallium	mg/kg	70	47	67%	0.256	0.151	0.09	0.17	0.11	95% KM (t) UCL
Tin	mg/kg	70	1	1%	2.3	6	2	3	2.3	Non-parametric (Maximum Detect)
Titanium	mg/kg	70	70	100%	1260	N/A	390	1000	510	95% Student's-t UCL
Tungsten	mg/kg	70	0	0%	N/A	1.51	0.5	0.76	1.51	Non-parametric (Maximum Non-Detect)
Uranium	mg/kg	70	63	90%	13.5	0.151	0.43	1.9	1.1	95% KM (t) UCL
Vanadium	mg/kg	70	70	100%	61.6	N/A	18	41	23	95% Student's-t UCL
Zinc	mg/kg	70	70	100%	436	N/A	38	140	67	95% Student's-t UCL
Zirconium	mg/kg	70	48	69%	18.2	3	2	13	5.5	95% GROS Approximate Gamma UCL

B.1.2 Sediment EPC Summary Table: North Driftwood Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg	45	45	100%	24700	N/A	10000	21000	12000	95% Student's-t UCL
Antimony	mg/kg	45	30	67%	0.66	0.1	0.12	0.56	0.2	95% KM (t) UCL
Arsenic	mg/kg	45	45	100%	9.05	N/A	2.9	6.7	4	95% H-UCL
Barium	mg/kg	45	45	100%	200	N/A	64	170	88	95% Student's-t UCL
Beryllium	mg/kg	45	45	100%	0.75	N/A	0.36	0.7	0.42	95% Student's-t UCL
Bismuth	mg/kg	45	14	31%	0.65	0.2	0.2	0.41	0.27	95% KM (t) UCL
Boron	mg/kg	45	31	69%	19.8	5	6.2	16	9.1	95% KM (t) UCL
Cadmium	mg/kg	45	45	100%	1.9	N/A	0.65	1.4	0.85	95% Adjusted Gamma UCL
Calcium	mg/kg	45	45	100%	57800	N/A	12000	27000	16000	95% Adjusted Gamma UCL
Chromium	mg/kg	45	45	100%	59.1	N/A	27	53	32	95% Student's-t UCL
Cobalt	mg/kg	45	45	100%	14.3	N/A	7.3	12	8.3	95% Student's-t UCL
Copper	mg/kg	45	45	100%	47.6	N/A	15	33	20	95% Student's-t UCL
Iron	mg/kg	45	45	100%	38100	N/A	13000	36000	17000	95% Student's-t UCL
Lead	mg/kg	45	45	100%	71.7	N/A	12	46	22	95% Student's-t UCL
Lithium	mg/kg	45	45	100%	34.8	N/A	14	30	17	95% H-UCL
Magnesium	mg/kg	45	45	100%	18200	N/A	4800	16000	7400	95% Student's-t UCL
Manganese	mg/kg	45	45	100%	1660	N/A	520	1400	700	95% Student's-t UCL
Mercury	mg/kg	24	24	100%	0.138	N/A	0.089	0.12	0.095	95% Student's-t UCL
Molybdenum	mg/kg	45	45	100%	2.97	N/A	0.39	1.9	0.79	95% Student's-t UCL
Nickel	mg/kg	45	45	100%	34.9	N/A	16	33	20	95% H-UCL
Phosphorus	mg/kg	45	45	100%	1570	N/A	650	1200	790	95% Adjusted Gamma UCL
Potassium	mg/kg	45	45	100%	3520	N/A	1300	3100	1600	95% Student's-t UCL
Selenium	mg/kg	45	36	80%	2.08	0.2	0.46	1.6	0.7	95% KM (t) UCL
Silver	mg/kg	45	14	31%	0.25	0.1	0.1	0.15	0.12	95% KM (t) UCL
Sodium	mg/kg	45	45	100%	501	N/A	150	360	210	95% Student's-t UCL
Strontium	mg/kg	45	45	100%	48.1	N/A	28	43	30	95% Student's-t UCL
Sulfur	mg/kg	45	28	62%	13200	1000	1200	11000	3500	95% KM (t) UCL
Thallium	mg/kg	45	45	100%	0.237	N/A	0.13	0.22	0.15	95% Student's-t UCL
Tin	mg/kg	45	14	31%	5.6	2	1.4	3.5	1.7	95% KM (t) UCL
Titanium	mg/kg	45	45	100%	1040	N/A	480	800	530	95% Student's-t UCL
Tungsten	mg/kg	45	0	0%	N/A	0.56	0.5	0.53	0.56	Non-parametric (Maximum Non-Detect)
Uranium	mg/kg	45	45	100%	4.58	N/A	0.9	3.5	1.3	95% Student's-t UCL
Vanadium	mg/kg	45	45	100%	52.5	N/A	23	46	28	95% Student's-t UCL
Zinc	mg/kg	45	45	100%	171	N/A	94	170	110	95% Student's-t UCL
Zirconium	mg/kg	45	45	100%	13.6	N/A	4.9	12	6.4	95% Student's-t UCL

B.1.3 Sediment EPC Summary Table: West Buskegau Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg	18	18	100%	18100	N/A	9100	18000	12000	95% Student's-t UCL
Antimony	mg/kg	18	11	61%	0.15	0.1	0.11	0.15	0.12	95% KM (t) UCL
Arsenic	mg/kg	18	18	100%	4.02	N/A	2.7	3.9	2.9	95% Student's-t UCL
Barium	mg/kg	18	18	100%	89.5	N/A	68	88	70	95% Student's-t UCL
Beryllium	mg/kg	18	18	100%	0.72	N/A	0.32	0.58	0.4	95% Student's-t UCL
Bismuth	mg/kg	18	2	11%	0.24	0.2	0.2	0.21	0.24	Non-parametric (Maximum Detect)
Boron	mg/kg	18	12	67%	9.5	5	5.4	8.7	6.8	95% KM (t) UCL
Cadmium	mg/kg	18	18	100%	1.66	N/A	0.38	1.5	0.76	95% Adjusted Gamma UCL
Calcium	mg/kg	18	18	100%	37300	N/A	9100	28000	16000	95% Adjusted Gamma UCL
Chromium	mg/kg	18	18	100%	47	N/A	26	41	31	95% Student's-t UCL
Cobalt	mg/kg	18	18	100%	11.1	N/A	8.2	11	8.8	95% Student's-t UCL
Copper	mg/kg	18	18	100%	17.4	N/A	10	16	12	95% Student's-t UCL
Iron	mg/kg	18	18	100%	21900	N/A	13000	21000	15000	95% Student's-t UCL
Lead	mg/kg	18	18	100%	33.3	N/A	9.2	27	15	95% Student's-t UCL
Lithium	mg/kg	18	18	100%	24.5	N/A	13	23	16	95% Student's-t UCL
Magnesium	mg/kg	18	18	100%	12000	N/A	5200	10000	6600	95% Student's-t UCL
Manganese	mg/kg	18	18	100%	2050	N/A	620	1300	920	95% Student's-t UCL
Mercury	mg/kg	12	12	100%	0.133	N/A	0.027	0.13	0.086	95% Adjusted Gamma UCL
Molybdenum	mg/kg	18	14	78%	0.93	0.1	0.26	0.91	0.5	95% KM (t) UCL
Nickel	mg/kg	18	18	100%	24.4	N/A	14	23	17	95% Student's-t UCL
Phosphorus	mg/kg	18	18	100%	1110	N/A	560	900	640	95% Student's-t UCL
Potassium	mg/kg	18	18	100%	2410	N/A	1200	2200	1500	95% Student's-t UCL
Selenium	mg/kg	18	9	50%	0.78	0.2	0.22	0.65	0.78	Non-parametric (Maximum Detect)
Silver	mg/kg	18	0	0%	N/A	0.1	0.1	0.1	0.1	Non-parametric (Maximum Non-Detect)
Sodium	mg/kg	18	18	100%	248	N/A	130	230	160	95% Student's-t UCL
Strontium	mg/kg	18	18	100%	53.3	N/A	26	41	30	95% Student's-t UCL
Sulfur	mg/kg	18	5	28%	2100	1000	1000	2000	2100	Non-parametric (Maximum Detect)
Thallium	mg/kg	18	15	83%	0.179	0.05	0.11	0.17	0.13	95% KM (t) UCL
Tin	mg/kg	18	1	6%	1.3	2	1	2	1.3	Non-parametric (Maximum Detect)
Titanium	mg/kg	18	18	100%	953	N/A	480	760	550	95% Student's-t UCL
Tungsten	mg/kg	18	0	0%	N/A	0.5	0.5	0.5	0.5	Non-parametric (Maximum Non-Detect)
Uranium	mg/kg	18	18	100%	2.1	N/A	0.71	1.8	1.1	95% Adjusted Gamma UCL
Vanadium	mg/kg	18	18	100%	37.6	N/A	24	36	27	95% Student's-t UCL
Zinc	mg/kg	18	18	100%	134	N/A	64	130	80	95% Student's-t UCL
Zirconium	mg/kg	18	17	94%	7.9	1	3.3	7.1	4.6	95% KM (t) UCL

B.1.4 Terrestrial Vegetation EPC Summary Table: Berries

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg wwt	11	10	91%	21.5	0.4	1.2	12	6.3	95% KM (t) UCL
Antimony	mg/kg wwt	11	0	0%	N/A	0.002	0.002	0.002	0.002	Non-parametric (Maximum Non-Detect)
Arsenic	mg/kg wwt	11	5	45%	0.0086	0.004	0.004	0.0084	0.0086	Non-parametric (Maximum Detect)
Barium	mg/kg wwt	11	11	100%	3.59	N/A	1.2	3.6	2.2	95% Student's-t UCL
Beryllium	mg/kg wwt	11	0	0%	N/A	0.002	0.002	0.002	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	11	0	0%	N/A	0.002	0.002	0.002	0.002	Non-parametric (Maximum Non-Detect)
Boron	mg/kg wwt	11	11	100%	6.18	N/A	1.7	5.3	3.4	95% Student's-t UCL
Cadmium	mg/kg wwt	11	7	64%	0.0226	0.001	0.0027	0.02	0.0226	Non-parametric (Maximum Detect)
Calcium	mg/kg wwt	11	11	100%	2460	N/A	340	1800	950	95% Student's-t UCL
Chromium	mg/kg wwt	11	3	27%	0.06	0.01	0.01	0.043	0.06	Non-parametric (Maximum Detect)
Cobalt	mg/kg wwt	11	2	18%	0.0186	0.004	0.004	0.012	0.0186	Non-parametric (Maximum Detect)
Copper	mg/kg wwt	11	11	100%	1.5	N/A	0.71	1.5	1.1	95% Student's-t UCL
Iron	mg/kg wwt	11	11	100%	30.3	N/A	3.4	18	10	95% Student's-t UCL
Lead	mg/kg wwt	11	3	27%	0.0113	0.004	0.004	0.009	0.0113	Non-parametric (Maximum Detect)
Lithium	mg/kg wwt	11	0	0%	N/A	0.1	0.1	0.1	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	11	11	100%	492	N/A	160	470	300	95% Student's-t UCL
Manganese	mg/kg wwt	11	11	100%	75.4	N/A	11	60	33	95% Student's-t UCL
Mercury	mg/kg wwt	11	3	27%	0.001	0.001	0.001	0.001	0.001	Non-parametric (Maximum Detect)
Molybdenum	mg/kg wwt	11	11	100%	0.632	N/A	0.036	0.45	0.69	95% H-UCL
Nickel	mg/kg wwt	11	9	82%	0.167	0.04	0.071	0.15	0.167	Non-parametric (Maximum Detect)
Phosphorous	mg/kg wwt	11	11	100%	706	N/A	240	580	400	95% Student's-t UCL
Potassium	mg/kg wwt	11	11	100%	4500	N/A	1200	4400	2800	95% Student's-t UCL
Selenium	mg/kg wwt	11	0	0%	N/A	0.01	0.01	0.01	0.01	Non-parametric (Maximum Non-Detect)
Sodium	mg/kg wwt	11	7	64%	24.5	4	5	18	24.5	Non-parametric (Maximum Detect)
Strontium	mg/kg wwt	11	11	100%	3.96	N/A	0.38	2.5	1.6	95% H-UCL
Thallium	mg/kg wwt	11	0	0%	N/A	0.0004	0.0004	0.0004	0.0004	Non-parametric (Maximum Non-Detect)
Tin	mg/kg wwt	11	11	100%	8.76	N/A	0.82	5	2.9	95% Student's-t UCL
Uranium	mg/kg wwt	11	1	9%	0.0011	0.0004	0.0004	0.00075	0.0011	Non-parametric (Maximum Detect)
Vanadium	mg/kg wwt	11	1	9%	0.052	0.02	0.02	0.036	0.052	Non-parametric (Maximum Detect)
Zinc	mg/kg wwt	11	11	100%	3.91	N/A	1.7	3.5	2.5	95% Student's-t UCL
Zirconium	mg/kg wwt	11	1	9%	0.055	0.04	0.04	0.048	0.055	Non-parametric (Maximum Detect)

B.1.5 Terrestrial Vegetation EPC Summary Table: Other

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg wwt	53	52	98%	518	0.4	8.2	370	160	KM H-UCL
Antimony	mg/kg wwt	53	12	23%	0.0085	0.002	0.002	0.0055	0.0028	95% KM (t) UCL
Arsenic	mg/kg wwt	53	42	79%	0.131	0.004	0.0097	0.086	0.029	95% KM (t) UCL
Barium	mg/kg wwt	53	53	100%	37.1	N/A	1.4	28	9.3	95% H-UCL
Beryllium	mg/kg wwt	53	9	17%	0.0176	0.002	0.002	0.012	0.0176	Non-parametric (Maximum Detect)
Bismuth	mg/kg wwt	53	7	13%	0.0047	0.002	0.002	0.0034	0.0047	Non-parametric (Maximum Detect)
Boron	mg/kg wwt	53	53	100%	15.6	N/A	4.2	11	5.7	95% Student's-t UCL
Cadmium	mg/kg wwt	53	44	83%	0.2	0.001	0.018	0.11	0.043	95% KM Approximate Gamma UCL
Calcium	mg/kg wwt	53	53	100%	10700	N/A	2000	5300	2900	95% Approximate Gamma UCL
Chromium	mg/kg wwt	53	45	85%	1.82	0.01	0.047	0.86	0.26	95% KM (t) UCL
Cobalt	mg/kg wwt	53	47	89%	0.49	0.004	0.014	0.24	0.079	95% KM (t) UCL
Copper	mg/kg wwt	53	53	100%	4.26	N/A	1.2	3.4	1.7	95% Student's-t UCL
Iron	mg/kg wwt	53	53	100%	756	N/A	17	510	130	95% Student's-t UCL
Lead	mg/kg wwt	53	34	64%	0.771	0.004	0.011	0.36	0.11	95% KM (t) UCL
Lithium	mg/kg wwt	53	10	19%	1.38	0.1	0.1	0.67	0.23	95% KM (t) UCL
Magnesium	mg/kg wwt	53	53	100%	1760	N/A	470	1300	590	95% Approximate Gamma UCL
Manganese	mg/kg wwt	53	53	100%	172	N/A	11	130	39	95% Student's-t UCL
Mercury	mg/kg wwt	53	32	60%	0.0046	0.001	0.0013	0.0036	0.002	95% KM (t) UCL
Molybdenum	mg/kg wwt	53	53	100%	3.01	N/A	0.22	1.4	0.66	95% H-UCL
Nickel	mg/kg wwt	53	50	94%	1.25	0.04	0.11	0.56	0.24	95% KM (t) UCL
Phosphorus	mg/kg wwt	53	53	100%	1230	N/A	430	840	520	95% Student's-t UCL
Potassium	mg/kg wwt	53	53	100%	6410	N/A	3000	6100	3500	95% Student's-t UCL
Selenium	mg/kg wwt	53	6	11%	0.027	0.01	0.01	0.017	0.027	Non-parametric (Maximum Detect)
Sodium	mg/kg wwt	53	29	55%	51.6	4	4.5	35	12	95% KM (t) UCL
Strontium	mg/kg wwt	53	53	100%	10.4	N/A	2.2	7.9	3.4	95% Approximate Gamma UCL
Thallium	mg/kg wwt	53	29	55%	0.0301	0.0004	0.00056	0.0078	0.0024	KM H-UCL
Tin	mg/kg wwt	53	36	68%	1.3	0.02	0.078	0.61	0.23	KM H-UCL
Uranium	mg/kg wwt	53	23	43%	0.0306	0.0004	0.0004	0.024	0.0054	95% KM (t) UCL
Vanadium	mg/kg wwt	53	24	45%	1.63	0.02	0.02	1.1	0.25	95% KM (t) UCL
Zinc	mg/kg wwt	53	53	100%	35.3	N/A	6.1	23	9.8	95% H-UCL
Zirconium	mg/kg wwt	53	12	23%	0.598	0.04	0.04	0.33	0.11	95% KM (t) UCL

B.1.6 Terrestrial Vegetation EPC Summary Table: Berries & Other

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg wwt	64	62	97%	518	0.4	4.8	340	72	95% KM (t) UCL
Antimony	mg/kg wwt	64	12	19%	0.0085	0.002	0.002	0.0046	0.0027	95% KM (t) UCL
Arsenic	mg/kg wwt	64	47	73%	0.131	0.004	0.0081	0.082	0.025	95% KM (t) UCL
Barium	mg/kg wwt	64	64	100%	37.1	N/A	1.4	25	6.5	95% H-UCL
Beryllium	mg/kg wwt	64	9	14%	0.0176	0.002	0.002	0.01	0.0176	Non-parametric (Maximum Detect)
Bismuth	mg/kg wwt	64	7	11%	0.0047	0.002	0.002	0.0033	0.0047	Non-parametric (Maximum Detect)
Boron	mg/kg wwt	64	64	100%	15.6	N/A	3.9	11	5.2	95% Approximate Gamma UCL
Cadmium	mg/kg wwt	64	51	80%	0.2	0.001	0.013	0.1	0.037	95% KM Approximate Gamma UCL
Calcium	mg/kg wwt	64	64	100%	10700	N/A	1700	5000	2500	95% Approximate Gamma UCL
Chromium	mg/kg wwt	64	48	75%	1.82	0.01	0.032	0.8	0.22	95% KM (t) UCL
Cobalt	mg/kg wwt	64	49	77%	0.49	0.004	0.013	0.22	0.066	95% KM (t) UCL
Copper	mg/kg wwt	64	64	100%	4.26	N/A	1.1	3.1	1.6	95% H-UCL
Iron	mg/kg wwt	64	64	100%	756	N/A	15	460	110	95% Student's-t UCL
Lead	mg/kg wwt	64	37	58%	0.771	0.004	0.0084	0.35	0.09	95% KM (t) UCL
Lithium	mg/kg wwt	64	10	16%	1.38	0.1	0.1	0.57	0.21	95% KM (t) UCL
Magnesium	mg/kg wwt	64	64	100%	1760	N/A	390	1100	540	95% Approximate Gamma UCL
Manganese	mg/kg wwt	64	64	100%	172	N/A	11	120	39	95% H-UCL
Mercury	mg/kg wwt	64	35	55%	0.0046	0.001	0.001	0.0034	0.0018	95% KM (t) UCL
Molybdenum	mg/kg wwt	64	64	100%	3.01	N/A	0.21	1.2	0.58	95% H-UCL
Nickel	mg/kg wwt	64	59	92%	1.25	0.04	0.099	0.54	0.22	95% KM (t) UCL
Phosphorous	mg/kg wwt	64	64	100%	1230	N/A	410	820	490	95% Student's-t UCL
Potassium	mg/kg wwt	64	64	100%	6410	N/A	2700	6000	3300	95% Student's-t UCL
Selenium	mg/kg wwt	64	6	9%	0.027	0.01	0.01	0.015	0.027	Non-parametric (Maximum Detect)
Sodium	mg/kg wwt	64	36	56%	51.6	4	4.6	33	11	95% KM (t) UCL
Strontium	mg/kg wwt	64	64	100%	10.4	N/A	1.8	7.5	3	95% Approximate Gamma UCL
Thallium	mg/kg wwt	64	29	45%	0.0301	0.0004	0.0004	0.0074	0.0019	KM H-UCL
Tin	mg/kg wwt	64	47	73%	8.76	0.02	0.09	1.2	0.78	95% KM Approximate Gamma UCL
Uranium	mg/kg wwt	64	24	38%	0.0306	0.0004	0.0004	0.022	0.0046	95% KM (t) UCL
Vanadium	mg/kg wwt	64	25	39%	1.63	0.02	0.02	0.93	0.21	95% KM (t) UCL
Zinc	mg/kg wwt	64	64	100%	35.3	N/A	5.4	20	8.5	95% Approximate Gamma UCL
Zirconium	mg/kg wwt	64	13	20%	0.598	0.04	0.04	0.26	0.097	95% KM (t) UCL

B.1.7 Terrestrial Small Prey EPC Summary Table

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	EPC	EPC Type
Aluminum	mg/kg wwt	2	2	100%	0.77	N/A	0.67	0.76	0.77	Non-parametric (Maximum Detect)
Antimony	mg/kg wwt	2	1	50%	0.0048	0.002	0.0034	0.0047	0.0048	Non-parametric (Maximum Detect)
Arsenic	mg/kg wwt	2	2	100%	0.0165	N/A	0.011	0.016	0.0165	Non-parametric (Maximum Detect)
Barium	mg/kg wwt	2	2	100%	0.193	N/A	0.12	0.19	0.193	Non-parametric (Maximum Detect)
Beryllium	mg/kg wwt	2	0	0%	N/A	0.002	0.002	0.002	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	2	0	0%	N/A	0.002	0.002	0.002	0.002	Non-parametric (Maximum Non-Detect)
Boron	mg/kg wwt	2	2	100%	0.43	N/A	0.37	0.42	0.43	Non-parametric (Maximum Detect)
Cadmium	mg/kg wwt	2	2	100%	0.0104	N/A	0.0084	0.01	0.0104	Non-parametric (Maximum Detect)
Calcium	mg/kg wwt	2	2	100%	690	N/A	540	680	690	Non-parametric (Maximum Detect)
Chromium	mg/kg wwt	2	0	0%	N/A	0.01	0.01	0.01	0.01	Non-parametric (Maximum Non-Detect)
Cobalt	mg/kg wwt	2	1	50%	0.004	0.004	0.004	0.004	0.004	Non-parametric (Maximum Detect)
Copper	mg/kg wwt	2	2	100%	1.81	N/A	1.1	1.7	1.81	Non-parametric (Maximum Detect)
Iron	mg/kg wwt	2	2	100%	39.2	N/A	22	38	39.2	Non-parametric (Maximum Detect)
Lead	mg/kg wwt	2	2	100%	0.015	N/A	0.0095	0.015	0.015	Non-parametric (Maximum Detect)
Lithium	mg/kg wwt	2	0	0%	N/A	0.1	0.1	0.1	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	2	2	100%	330	N/A	320	330	330	Non-parametric (Maximum Detect)
Manganese	mg/kg wwt	2	2	100%	0.571	N/A	0.34	0.55	0.571	Non-parametric (Maximum Detect)
Mercury	mg/kg wwt	2	1	50%	0.0022	0.001	0.0016	0.0021	0.0022	Non-parametric (Maximum Detect)
Molybdenum	mg/kg wwt	2	2	100%	0.0111	N/A	0.01	0.011	0.0111	Non-parametric (Maximum Detect)
Nickel	mg/kg wwt	2	0	0%	N/A	0.04	0.04	0.04	0.04	Non-parametric (Maximum Non-Detect)
Phosphorous	mg/kg wwt	2	2	100%	2950	N/A	2700	2900	2950	Non-parametric (Maximum Detect)
Potassium	mg/kg wwt	2	2	100%	3040	N/A	3000	3000	3040	Non-parametric (Maximum Detect)
Selenium	mg/kg wwt	2	2	100%	0.244	N/A	0.16	0.24	0.244	Non-parametric (Maximum Detect)
Sodium	mg/kg wwt	2	2	100%	829	N/A	760	820	829	Non-parametric (Maximum Detect)
Strontium	mg/kg wwt	2	2	100%	1.85	N/A	0.99	1.8	1.85	Non-parametric (Maximum Detect)
Thallium	mg/kg wwt	2	1	50%	0.00313	0.0004	0.0018	0.003	0.00313	Non-parametric (Maximum Detect)
Tin	mg/kg wwt	2	0	0%	N/A	0.02	0.02	0.02	0.02	Non-parametric (Maximum Non-Detect)
Uranium	mg/kg wwt	2	0	0%	N/A	0.0004	0.0004	0.0004	0.0004	Non-parametric (Maximum Non-Detect)
Vanadium	mg/kg wwt	2	0	0%	N/A	0.02	0.02	0.02	0.02	Non-parametric (Maximum Non-Detect)
Zinc	mg/kg wwt	2	2	100%	6.3	N/A	5.4	6.2	6.3	Non-parametric (Maximum Detect)
Zirconium	mg/kg wwt	2	0	0%	N/A	0.04	0.04	0.04	0.04	Non-parametric (Maximum Non-Detect)

B.1.8 Angling Fish EPC Summary Table: North Driftwood (nd) Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	Distribution	EPC	EPC Type
Aluminum	mg/kg wwt	16	11	69%	1.86	0.4	0.81	1.4	0	0.99	95% KM (t) UCL
Antimony	mg/kg wwt	16	1	6%	0.0022	0.002	0.002	0.0021	N/A	0.0022	Non-parametric (Maximum Detect)
Arsenic	mg/kg wwt	16	16	100%	0.167	N/A	0.046	0.13	0	0.072	95% Student's-t UCL
Barium	mg/kg wwt	16	16	100%	0.073	N/A	0.037	0.064	0	0.047	95% Student's-t UCL
Beryllium	mg/kg wwt	16	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	16	3	19%	0.0034	0.002	0.002	0.0028	N/A	0.0034	Non-parametric (Maximum Detect)
Boron	mg/kg wwt	16	0	0%	N/A	0.2	0.2	0.2	N/A	0.2	Non-parametric (Maximum Non-Detect)
Cadmium	mg/kg wwt	16	1	6%	0.0011	0.001	0.001	0.001	N/A	0.0011	Non-parametric (Maximum Detect)
Calcium	mg/kg wwt	16	16	100%	1270	N/A	640	1200	0	800	95% Student's-t UCL
Chromium	mg/kg wwt	16	4	25%	0.036	0.01	0.01	0.031	N/A	0.036	Non-parametric (Maximum Detect)
Cobalt	mg/kg wwt	16	0	0%	N/A	0.004	0.004	0.004	N/A	0.004	Non-parametric (Maximum Non-Detect)
Copper	mg/kg wwt	16	16	100%	0.207	N/A	0.14	0.19	0	0.16	95% Student's-t UCL
Iron	mg/kg wwt	16	16	100%	4.55	N/A	2.3	4.4	0	2.9	95% Student's-t UCL
Lead	mg/kg wwt	16	2	13%	0.0091	0.004	0.004	0.0082	N/A	0.0091	Non-parametric (Maximum Detect)
Lithium	mg/kg wwt	16	0	0%	N/A	0.1	0.1	0.1	N/A	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	16	16	100%	350	N/A	320	340	0	330	95% Student's-t UCL
Manganese	mg/kg wwt	16	16	100%	0.866	N/A	0.57	0.72	0	0.6	95% Student's-t UCL
Mercury	mg/kg wwt	16	16	100%	6.03	N/A	0.52	3.1	0	1.7	95% H-UCL
Methylmercury	mg/kg wwt	16	16	100%	6.23	N/A	0.54	3.6	0	2.4	95% H-UCL
Molybdenum	mg/kg wwt	16	0	0%	N/A	0.004	0.004	0.004	N/A	0.004	Non-parametric (Maximum Non-Detect)
Nickel	mg/kg wwt	16	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)
Phosphorous	mg/kg wwt	16	16	100%	2900	N/A	2400	2900	0	2600	95% Student's-t UCL
Potassium	mg/kg wwt	16	16	100%	4620	N/A	3900	4400	0	4000	95% Student's-t UCL
Selenium	mg/kg wwt	16	16	100%	0.148	N/A	0.1	0.14	0	0.12	95% Student's-t UCL
Sodium	mg/kg wwt	16	16	100%	461	N/A	340	450	0	370	95% Student's-t UCL
Strontium	mg/kg wwt	16	16	100%	0.326	N/A	0.18	0.31	0	0.21	95% Student's-t UCL
Thallium	mg/kg wwt	16	16	100%	0.00586	N/A	0.0031	0.0054	0	0.0039	95% Student's-t UCL
Tin	mg/kg wwt	16	8	50%	0.234	0.02	0.021	0.12	N/A	0.234	Non-parametric (Maximum Detect)
Uranium	mg/kg wwt	16	0	0%	N/A	0.0004	0.0004	0.0004	N/A	0.0004	Non-parametric (Maximum Non-Detect)
Vanadium	mg/kg wwt	16	0	0%	N/A	0.02	0.02	0.02	N/A	0.02	Non-parametric (Maximum Non-Detect)
Zinc	mg/kg wwt	16	16	100%	6.51	N/A	4.3	6.1	0	4.9	95% Student's-t UCL
Zirconium	mg/kg wwt	16	1	6%	0.042	0.04	0.04	0.041	N/A	0.042	Non-parametric (Maximum Detect)

B.1.9 Angling Fish EPC Summary Table: West Buskegau (wb) Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	Distribution	EPC	EPC Type
Aluminum	mg/kg wwt	3	0	0%	N/A	0.4	0.4	0.4	N/A	0.4	Non-parametric (Maximum Non-Detect)
Antimony	mg/kg wwt	3	0	0%	N/A	0.002	NA	0.0018	N/A	0.002	Non-parametric (Maximum Non-Detect)
Arsenic	mg/kg wwt	3	3	100%	0.0337	N/A	0.012	0.032	N/A	0.0337	Non-parametric (Maximum Detect)
Barium	mg/kg wwt	3	1	33%	0.021	0.01	0.01	0.02	N/A	0.021	Non-parametric (Maximum Detect)
Beryllium	mg/kg wwt	3	0	0%	N/A	0.002	NA	0.0018	N/A	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	3	1	33%	0.0022	0	NA	0.002	N/A	0.0022	Non-parametric (Maximum Detect)
Boron	mg/kg wwt	3	0	0%	N/A	0.2	0.2	0.2	N/A	0.2	Non-parametric (Maximum Non-Detect)
Cadmium	mg/kg wwt	3	1	33%	0.0029	0.001	0.001	0.0027	N/A	0.0029	Non-parametric (Maximum Detect)
Calcium	mg/kg wwt	3	3	100%	775	N/A	340	730	N/A	775	Non-parametric (Maximum Detect)
Chromium	mg/kg wwt	3	1	33%	0.023	0.01	0.01	0.022	N/A	0.023	Non-parametric (Maximum Detect)
Cobalt	mg/kg wwt	3	0	0%	N/A	0.004	NA	0.0036	N/A	0.004	Non-parametric (Maximum Non-Detect)
Copper	mg/kg wwt	3	3	100%	0.165	N/A	0.12	0.16	N/A	0.165	Non-parametric (Maximum Detect)
Iron	mg/kg wwt	3	3	100%	2.2	N/A	1.6	2.1	N/A	2.2	Non-parametric (Maximum Detect)
Lead	mg/kg wwt	3	0	0%	N/A	0.004	NA	0.0036	N/A	0.004	Non-parametric (Maximum Non-Detect)
Lithium	mg/kg wwt	3	0	0%	N/A	0.1	0.1	0.1	N/A	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	3	3	100%	319	N/A	180	310	N/A	319	Non-parametric (Maximum Detect)
Manganese	mg/kg wwt	3	3	100%	0.139	N/A	0.05	0.13	N/A	0.139	Non-parametric (Maximum Detect)
Mercury	mg/kg wwt	3	3	100%	1.46	N/A	0.31	1.3	N/A	1.46	Non-parametric (Maximum Detect)
Methylmercury	mg/kg wwt	3	3	100%	1.84	N/A	0.23	1.7	N/A	1.84	Non-parametric (Maximum Detect)
Molybdenum	mg/kg wwt	3	0	0%	N/A	0.004	NA	0.0036	N/A	0.004	Non-parametric (Maximum Non-Detect)
Nickel	mg/kg wwt	3	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)
Phosphorous	mg/kg wwt	3	3	100%	1830	N/A	1600	1800	N/A	1830	Non-parametric (Maximum Detect)
Potassium	mg/kg wwt	3	3	100%	3170	N/A	3000	3200	N/A	3170	Non-parametric (Maximum Detect)
Selenium	mg/kg wwt	3	3	100%	0.273	N/A	0.2	0.27	N/A	0.273	Non-parametric (Maximum Detect)
Sodium	mg/kg wwt	3	3	100%	848	N/A	780	840	N/A	848	Non-parametric (Maximum Detect)
Strontium	mg/kg wwt	3	3	100%	0.388	N/A	0.11	0.36	N/A	0.388	Non-parametric (Maximum Detect)
Thallium	mg/kg wwt	3	3	100%	0.00209	N/A	0.0019	0.0021	N/A	0.00209	Non-parametric (Maximum Detect)
Tin	mg/kg wwt	3	2	67%	0.109	0.02	0.032	0.1	N/A	0.109	Non-parametric (Maximum Detect)
Uranium	mg/kg wwt	3	0	0%	N/A	0.0004	NA	0.00036	N/A	0.0004	Non-parametric (Maximum Non-Detect)
Vanadium	mg/kg wwt	3	0	0%	N/A	0.02	0.02	0.02	N/A	0.02	Non-parametric (Maximum Non-Detect)
Zinc	mg/kg wwt	3	3	100%	8.91	N/A	7	8.7	N/A	8.91	Non-parametric (Maximum Detect)
Zirconium	mg/kg wwt	3	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)

B.1.10 Forage Fish EPC Summary Table: North Driftwood (nd) Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	Distribution	EPC	EPC Type
Aluminum	mg/kg wwt	33	33	100%	12.8	N/A	2.4	8.1	0	4.2	95% Student's-t UCL
Antimony	mg/kg wwt	33	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Arsenic	mg/kg wwt	33	33	100%	0.0353	N/A	0.021	0.035	0	0.024	95% Student's-t UCL
Barium	mg/kg wwt	33	33	100%	12.8	N/A	2.8	7.4	0	3.8	95% Adjusted Gamma UCL
Beryllium	mg/kg wwt	33	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	33	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Boron	mg/kg wwt	33	0	0%	N/A	0.2	0.2	0.2	N/A	0.2	Non-parametric (Maximum Non-Detect)
Cadmium	mg/kg wwt	33	33	100%	0.0415	N/A	0.012	0.033	0	0.018	95% Student's-t UCL
Calcium	mg/kg wwt	33	33	100%	13000	N/A	8200	11000	0	8800	95% Student's-t UCL
Chromium	mg/kg wwt	33	27	82%	0.16	0.01	0.017	0.054	0	0.038	95% KM Adjusted Gamma UCL
Cobalt	mg/kg wwt	33	33	100%	0.0435	N/A	0.013	0.034	0	0.018	95% Student's-t UCL
Copper	mg/kg wwt	33	33	100%	5.81	N/A	1.1	3.7	0	1.9	95% Student's-t UCL
Iron	mg/kg wwt	33	33	100%	51	N/A	38	48	0	39	95% Student's-t UCL
Lead	mg/kg wwt	33	33	100%	0.0782	N/A	0.024	0.053	0	0.031	95% Adjusted Gamma UCL
Lithium	mg/kg wwt	33	0	0%	N/A	0.1	0.1	0.1	N/A	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	33	33	100%	444	N/A	350	410	0	360	95% Student's-t UCL
Manganese	mg/kg wwt	33	33	100%	23.6	N/A	6.4	14	0	8.1	95% Student's-t UCL
Mercury	mg/kg wwt	33	33	100%	0.128	N/A	0.034	0.083	0	0.048	95% Student's-t UCL
Methylmercury	mg/kg wwt	33	33	100%	0.132	N/A	0.032	0.089	0	0.046	95% Student's-t UCL
Molybdenum	mg/kg wwt	33	33	100%	0.0443	N/A	0.031	0.04	0	0.033	95% Student's-t UCL
Nickel	mg/kg wwt	33	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)
Phosphorous	mg/kg wwt	33	33	100%	8620	N/A	6200	7600	0	6500	95% Student's-t UCL
Potassium	mg/kg wwt	33	33	100%	3200	N/A	2800	3100	0	2900	95% Student's-t UCL
Selenium	mg/kg wwt	33	33	100%	0.408	N/A	0.22	0.39	0	0.26	95% Student's-t UCL
Sodium	mg/kg wwt	33	33	100%	1130	N/A	830	1100	0	850	95% Student's-t UCL
Strontium	mg/kg wwt	33	33	100%	13.8	N/A	7.5	13	0	9	95% Student's-t UCL
Thallium	mg/kg wwt	33	33	100%	0.0105	N/A	0.0039	0.0078	0	0.0046	95% Student's-t UCL
Tin	mg/kg wwt	33	27	82%	0.397	0.02	0.12	0.19	0	0.15	95% GROS Adjusted Gamma UCL
Uranium	mg/kg wwt	33	30	91%	0.00609	0.0004	0.00099	0.0054	0	0.0022	95% KM (t) UCL
Vanadium	mg/kg wwt	33	5	15%	0.067	0.02	0.02	0.04	N/A	0.067	Non-parametric (Maximum Detect)
Zinc	mg/kg wwt	33	33	100%	76.8	N/A	37	74	0	47	95% Student's-t UCL
Zirconium	mg/kg wwt	33	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)

B.1.11 Forage Fish EPC Summary Table: West Buskegau (wb) Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	Distribution	EPC	EPC Type
Aluminum	mg/kg wwt	13	13	100%	21.2	N/A	3.1	17	0	9.1	95% Student's-t UCL
Antimony	mg/kg wwt	13	1	8%	0.0027	0.002	0.002	0.0023	N/A	0.0027	Non-parametric (Maximum Detect)
Arsenic	mg/kg wwt	13	13	100%	0.0484	N/A	0.034	0.047	0	0.038	95% Student's-t UCL
Barium	mg/kg wwt	13	13	100%	7.54	N/A	3.5	7.2	0	4.9	95% Student's-t UCL
Beryllium	mg/kg wwt	13	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	13	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Boron	mg/kg wwt	13	0	0%	N/A	0.2	0.2	0.2	N/A	0.2	Non-parametric (Maximum Non-Detect)
Cadmium	mg/kg wwt	13	13	100%	0.0246	N/A	0.014	0.023	0	0.017	95% Student's-t UCL
Calcium	mg/kg wwt	13	13	100%	11900	N/A	7900	12000	0	9300	95% Student's-t UCL
Chromium	mg/kg wwt	13	12	92%	0.064	0.01	0.019	0.059	0	0.038	95% KM (t) UCL
Cobalt	mg/kg wwt	13	13	100%	0.0436	N/A	0.023	0.04	0	0.029	95% Student's-t UCL
Copper	mg/kg wwt	13	13	100%	1.52	N/A	0.97	1.4	0	1.1	95% Student's-t UCL
Iron	mg/kg wwt	13	13	100%	66	N/A	42	60	0	49	95% Student's-t UCL
Lead	mg/kg wwt	13	13	100%	0.0933	N/A	0.054	0.09	0	0.068	95% Student's-t UCL
Lithium	mg/kg wwt	13	0	0%	N/A	0.1	0.1	0.1	N/A	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	13	13	100%	299	N/A	270	290	0	270	95% Student's-t UCL
Manganese	mg/kg wwt	13	13	100%	35.5	N/A	10	32	0	17	95% Student's-t UCL
Mercury	mg/kg wwt	13	13	100%	0.0643	N/A	0.024	0.045	0	0.033	95% Student's-t UCL
Methylmercury	mg/kg wwt	13	13	100%	0.0506	N/A	0.022	0.039	0	0.029	95% Student's-t UCL
Molybdenum	mg/kg wwt	13	13	100%	0.0655	N/A	0.032	0.052	0	0.041	95% Student's-t UCL
Nickel	mg/kg wwt	13	3	23%	0.075	0.04	0.04	0.066	N/A	0.075	Non-parametric (Maximum Detect)
Phosphorous	mg/kg wwt	13	13	100%	7040	N/A	4900	6900	0	5800	95% Student's-t UCL
Potassium	mg/kg wwt	13	13	100%	1040	N/A	700	910	0	750	95% Student's-t UCL
Selenium	mg/kg wwt	13	13	100%	0.225	N/A	0.16	0.22	0	0.18	95% Student's-t UCL
Sodium	mg/kg wwt	13	13	100%	350	N/A	240	320	0	270	95% Student's-t UCL
Strontium	mg/kg wwt	13	13	100%	15.2	N/A	9	13	0	10	95% Student's-t UCL
Thallium	mg/kg wwt	13	13	100%	0.00816	N/A	0.0048	0.0069	0	0.0056	95% Student's-t UCL
Tin	mg/kg wwt	13	13	100%	0.142	N/A	0.12	0.14	0	0.13	95% Student's-t UCL
Uranium	mg/kg wwt	13	9	69%	0.00227	0.0004	0.00057	0.0022	N/A	0.00227	Non-parametric (Maximum Detect)
Vanadium	mg/kg wwt	13	6	46%	0.078	0.02	0.02	0.068	N/A	0.078	Non-parametric (Maximum Detect)
Zinc	mg/kg wwt	13	13	100%	58.3	N/A	48	58	0	52	95% Student's-t UCL
Zirconium	mg/kg wwt	13	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)

B.1.12 Forage Fish EPC Summary Table: Jocko Creek (jc) Watershed

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	Distribution	EPC	EPC Type
Aluminum	mg/kg wwt	7	7	100%	3.47	N/A	1.9	3.2	N/A	3.47	Non-parametric (Maximum Detect)
Antimony	mg/kg wwt	7	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Arsenic	mg/kg wwt	7	7	100%	0.0222	N/A	0.017	0.021	N/A	0.0222	Non-parametric (Maximum Detect)
Barium	mg/kg wwt	7	7	100%	2.19	N/A	1.1	2.1	N/A	2.19	Non-parametric (Maximum Detect)
Beryllium	mg/kg wwt	7	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Bismuth	mg/kg wwt	7	0	0%	N/A	0.002	0.002	0.002	N/A	0.002	Non-parametric (Maximum Non-Detect)
Boron	mg/kg wwt	7	0	0%	N/A	0.2	0.2	0.2	N/A	0.2	Non-parametric (Maximum Non-Detect)
Cadmium	mg/kg wwt	7	7	100%	0.0531	N/A	0.025	0.049	N/A	0.0531	Non-parametric (Maximum Detect)
Calcium	mg/kg wwt	7	7	100%	10600	N/A	7100	11000	N/A	10600	Non-parametric (Maximum Detect)
Chromium	mg/kg wwt	7	0	0%	N/A	0.01	0.01	0.01	N/A	0.01	Non-parametric (Maximum Non-Detect)
Cobalt	mg/kg wwt	7	7	100%	0.0135	N/A	0.0092	0.013	N/A	0.0135	Non-parametric (Maximum Detect)
Copper	mg/kg wwt	7	7	100%	1.59	N/A	1.1	1.5	N/A	1.59	Non-parametric (Maximum Detect)
Iron	mg/kg wwt	7	7	100%	26	N/A	22	25	N/A	26	Non-parametric (Maximum Detect)
Lead	mg/kg wwt	7	7	100%	0.163	N/A	0.082	0.16	N/A	0.163	Non-parametric (Maximum Detect)
Lithium	mg/kg wwt	7	0	0%	N/A	0.1	0.1	0.1	N/A	0.1	Non-parametric (Maximum Non-Detect)
Magnesium	mg/kg wwt	7	7	100%	390	N/A	340	380	N/A	390	Non-parametric (Maximum Detect)
Manganese	mg/kg wwt	7	7	100%	11.5	N/A	8.2	11	N/A	11.5	Non-parametric (Maximum Detect)
Mercury	mg/kg wwt	7	7	100%	0.131	N/A	0.074	0.12	N/A	0.131	Non-parametric (Maximum Detect)
Methylmercury	mg/kg wwt	7	7	100%	0.152	N/A	0.061	0.14	N/A	0.152	Non-parametric (Maximum Detect)
Molybdenum	mg/kg wwt	7	7	100%	0.0258	N/A	0.023	0.025	N/A	0.0258	Non-parametric (Maximum Detect)
Nickel	mg/kg wwt	7	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)
Phosphorous	mg/kg wwt	7	7	100%	7960	N/A	6000	7800	N/A	7960	Non-parametric (Maximum Detect)
Potassium	mg/kg wwt	7	7	100%	3100	N/A	2700	3000	N/A	3100	Non-parametric (Maximum Detect)
Selenium	mg/kg wwt	7	7	100%	0.253	N/A	0.19	0.24	N/A	0.253	Non-parametric (Maximum Detect)
Sodium	mg/kg wwt	7	7	100%	828	N/A	800	830	N/A	828	Non-parametric (Maximum Detect)
Strontium	mg/kg wwt	7	7	100%	6.88	N/A	6.2	6.8	N/A	6.88	Non-parametric (Maximum Detect)
Thallium	mg/kg wwt	7	7	100%	0.0106	N/A	0.0054	0.0099	N/A	0.0106	Non-parametric (Maximum Detect)
Tin	mg/kg wwt	7	7	100%	0.186	N/A	0.13	0.18	N/A	0.186	Non-parametric (Maximum Detect)
Uranium	mg/kg wwt	7	4	57%	0.00066	0.0004	0.00045	0.00064	N/A	0.00066	Non-parametric (Maximum Detect)
Vanadium	mg/kg wwt	7	0	0%	N/A	0.02	0.02	0.02	N/A	0.02	Non-parametric (Maximum Non-Detect)
Zinc	mg/kg wwt	7	7	100%	45.1	N/A	38	44	N/A	45.1	Non-parametric (Maximum Detect)
Zirconium	mg/kg wwt	7	0	0%	N/A	0.04	0.04	0.04	N/A	0.04	Non-parametric (Maximum Non-Detect)

B.1.13 Aquatic Vegetation EPC Summary Table

Variable	Units	N	Number Detected	% Detected	Maximum Detected Value	Maximum Reported Detection Limit	Median	95th Percentile	Distribution	EPC	EPC Type
Aluminum	mg/kg wwt	13	13	100%	429	N/A	33	290	0	150	95% Student's-t UCL
Antimony	mg/kg wwt	13	7	54%	0.0064	0.002	0.0025	0.0063	N/A	0.0064	Non-parametric (Maximum Detect)
Arsenic	mg/kg wwt	13	11	85%	0.306	0.004	0.032	0.26	0	0.3	95% Hall's Bootstrap
Barium	mg/kg wwt	13	13	100%	11.4	N/A	1.3	9.1	0	4.7	95% Student's-t UCL
Beryllium	mg/kg wwt	13	5	38%	0.0162	0.002	0.002	0.0097	N/A	0.0162	Non-parametric (Maximum Detect)
Bismuth	mg/kg wwt	13	5	38%	0.006	0.002	0.002	0.0051	N/A	0.006	Non-parametric (Maximum Detect)
Boron	mg/kg wwt	13	13	100%	5.36	N/A	1.7	5.3	0	2.8	95% Student's-t UCL
Cadmium	mg/kg wwt	13	13	100%	0.0435	N/A	0.014	0.043	0	0.025	95% Student's-t UCL
Calcium	mg/kg wwt	13	13	100%	2450	N/A	1900	2400	0	2000	95% Student's-t UCL
Chromium	mg/kg wwt	13	13	100%	1.05	N/A	0.098	1	0	0.48	95% Student's-t UCL
Cobalt	mg/kg wwt	13	12	92%	0.413	0.004	0.033	0.33	0	0.18	95% KM (t) UCL
Copper	mg/kg wwt	13	13	100%	3.32	N/A	0.58	2.6	0	1.6	95% Student's-t UCL
Iron	mg/kg wwt	13	13	100%	828	N/A	59	760	0	350	95% Student's-t UCL
Lead	mg/kg wwt	13	11	85%	0.57	0.004	0.05	0.52	0	0.23	95% KM (t) UCL
Lithium	mg/kg wwt	13	5	38%	0.6	0.1	0.1	0.4	N/A	0.6	Non-parametric (Maximum Detect)
Magnesium	mg/kg wwt	13	13	100%	946	N/A	340	680	0	470	95% Student's-t UCL
Manganese	mg/kg wwt	13	13	100%	234	N/A	50	180	0	98	95% Student's-t UCL
Mercury	mg/kg wwt	13	8	62%	0.0072	0.001	0.0014	0.0041	N/A	0.0072	Non-parametric (Maximum Detect)
Molybdenum	mg/kg wwt	13	13	100%	1.34	N/A	0.1	1.2	0	0.68	95% Adjusted Gamma UCL
Nickel	mg/kg wwt	13	9	69%	0.939	0.04	0.088	0.81	N/A	0.939	Non-parametric (Maximum Detect)
Phosphorus	mg/kg wwt	13	13	100%	509	N/A	130	430	0	270	95% Student's-t UCL
Potassium	mg/kg wwt	13	13	100%	5180	N/A	1700	4700	0	2900	95% Student's-t UCL
Selenium	mg/kg wwt	13	5	38%	0.035	0.01	0.01	0.025	N/A	0.035	Non-parametric (Maximum Detect)
Sodium	mg/kg wwt	13	13	100%	734	N/A	67	550	0	250	95% Student's-t UCL
Strontium	mg/kg wwt	13	13	100%	5.59	N/A	2.8	5.4	0	3.8	95% Student's-t UCL
Thallium	mg/kg wwt	13	11	85%	0.0415	0.0004	0.0042	0.039	0	0.049	95% Hall's Bootstrap
Tin	mg/kg wwt	13	12	92%	0.092	0.02	0.041	0.091	0	0.062	95% KM (t) UCL
Uranium	mg/kg wwt	13	9	69%	0.122	0.0004	0.0029	0.058	N/A	0.122	Non-parametric (Maximum Detect)
Vanadium	mg/kg wwt	13	8	62%	1.26	0.02	0.07	0.92	N/A	1.26	Non-parametric (Maximum Detect)
Zinc	mg/kg wwt	13	13	100%	19	N/A	5.8	16	0	9.4	95% Student's-t UCL
Zirconium	mg/kg wwt	13	7	54%	0.501	0.04	0.047	0.32	N/A	0.501	Non-parametric (Maximum Detect)

B.2 Exposure Point Concentration ProUCL Outputs

B.2.1 Soil EPC ProUCL Output

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.2 3/15/2024 1:36:52 PM								
5			From File	WorkSheet_b.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Result (aluminum_soil)**											
12												
13	**General Statistics**											
14					Total Number of Observations	70					Number of Distinct Observations	68
15											Number of Missing Observations	0
16					Minimum	731					Mean	7672
17					Maximum	31000					Median	6085
18					SD	6348					Std. Error of Mean	758.7
19					Coefficient of Variation	0.827					Skewness	1.152
20												
21	**Normal GOF Test**											
22					Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**					
23					1% Shapiro Wilk P Value	7.5559E-8	Data Not Normal at 1% Significance Level					
24					Lilliefors Test Statistic	0.137	**Lilliefors GOF Test**					
25					1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level					
26	**Data Not Normal at 1% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30					95% Student's-t UCL	8936					95% Adjusted-CLT UCL (Chen-1995)	9031
31											95% Modified-t UCL (Johnson-1978)	8954
32												
33	**Gamma GOF Test**											
34					A-D Test Statistic	1.163	**Anderson-Darling Gamma GOF Test**					
35					5% A-D Critical Value	0.773	Data Not Gamma Distributed at 5% Significance Level					
36					K-S Test Statistic	0.122	**Kolmogorov-Smirnov Gamma GOF Test**					
37					5% K-S Critical Value	0.109	Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41					k hat (MLE)	1.311					k star (bias corrected MLE)	1.264
42					Theta hat (MLE)	5854					Theta star (bias corrected MLE)	6070
43					nu hat (MLE)	183.5					nu star (bias corrected)	177
44					MLE Mean (bias corrected)	7672					MLE Sd (bias corrected)	6824
45											Approximate Chi Square Value (0.05)	147.2
46					Adjusted Level of Significance	0.0466					Adjusted Chi Square Value	146.6
47												
48	**Assuming Gamma Distribution**											
49					95% Approximate Gamma UCL	9223					95% Adjusted Gamma UCL	9259
50												
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**					

Row	Label	F	Label	L
53	10% Shapiro Wilk P Value	5.3773E-5	Data Not Lognormal at 10% Significance Level	
54	Lilliefors Test Statistic	0.123	**Lilliefors Lognormal GOF Test**	
55	10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	
56	**Data Not Lognormal at 10% Significance Level**			
57				
58	**Lognormal Statistics**			
59	Minimum of Logged Data	6.594	Mean of logged Data	8.518
60	Maximum of Logged Data	10.34	SD of logged Data	1.03
61				
62	**Assuming Lognormal Distribution**			
63	95% H-UCL	11252	90% Chebyshev (MVUE) UCL	12135
64	95% Chebyshev (MVUE) UCL	13823	97.5% Chebyshev (MVUE) UCL	16165
65	99% Chebyshev (MVUE) UCL	20766		
66				
67	**Nonparametric Distribution Free UCL Statistics**			
68	**Data do not follow a Discernible Distribution**			
69				
70	**Nonparametric Distribution Free UCLs**			
71	95% CLT UCL	8919	95% BCA Bootstrap UCL	8936
72	95% Standard Bootstrap UCL	8908	95% Bootstrap-t UCL	9049
73	95% Hall's Bootstrap UCL	9073	95% Percentile Bootstrap UCL	8932
74	90% Chebyshev(Mean, Sd) UCL	9948	95% Chebyshev(Mean, Sd) UCL	10979
75	97.5% Chebyshev(Mean, Sd) UCL	12410	99% Chebyshev(Mean, Sd) UCL	15220
76				
77	**Suggested UCL to Use**			
78	95% Student's-t UCL	8936		
79				
80	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
81	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
82	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
83				
84	**Result (antimony_soil)**			
85				
86	**General Statistics**			
87	Total Number of Observations	70	Number of Distinct Observations	29
88	Number of Detects	50	Number of Non-Detects	20
89	Number of Distinct Detects	27	Number of Distinct Non-Detects	3
90	Minimum Detect	0.1	Minimum Non-Detect	0.1
91	Maximum Detect	0.73	Maximum Non-Detect	0.3
92	Variance Detects	0.0251	Percent Non-Detects	28.57%
93	Mean Detects	0.241	SD Detects	0.158
94	Median Detects	0.185	CV Detects	0.658
95	Skewness Detects	1.303	Kurtosis Detects	0.876
96	Mean of Logged Detects	-1.605	SD of Logged Detects	0.585
97				
98	**Normal GOF Test on Detects Only**			
99	Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk GOF Test**	
100	1% Shapiro Wilk Critical Value	0.93	Detected Data Not Normal at 1% Significance Level	
101	Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**	
102	1% Lilliefors Critical Value	0.146	Detected Data Not Normal at 1% Significance Level	
103	**Detected Data Not Normal at 1% Significance Level**			
104				

105	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
106	KM Mean	0.201	KM Standard Error of Mean	0.0177
107	90KM SD	0.146	95% KM (BCA) UCL	0.23
108	95% KM (t) UCL	0.231	95% KM (Percentile Bootstrap) UCL	0.232
109	95% KM (z) UCL	0.231	95% KM Bootstrap t UCL	0.238
110	90% KM Chebyshev UCL	0.255	95% KM Chebyshev UCL	0.279
111	97.5% KM Chebyshev UCL	0.312	99% KM Chebyshev UCL	0.378
112				
113	**Gamma GOF Tests on Detected Observations Only**			
114	A-D Test Statistic	2.208	**Anderson-Darling GOF Test**	
115	5% A-D Critical Value	0.757	Detected Data Not Gamma Distributed at 5% Significance Level	
116	K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**	
117	5% K-S Critical Value	0.126	Detected Data Not Gamma Distributed at 5% Significance Level	
118	**Detected Data Not Gamma Distributed at 5% Significance Level**			
119				
120	**Gamma Statistics on Detected Data Only**			
121	k hat (MLE)	2.935	k star (bias corrected MLE)	2.772
122	Theta hat (MLE)	0.082	Theta star (bias corrected MLE)	0.0868
123	nu hat (MLE)	293.5	nu star (bias corrected)	277.2
124	Mean (detects)	0.241		
125				
126	**Gamma ROS Statistics using Imputed Non-Detects**			
127	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
128	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
129	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
130	This is especially true when the sample size is small.			
131	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
132	Minimum	0.01	Mean	0.179
133	Maximum	0.73	Median	0.121
134	SD	0.166	CV	0.926
135	k hat (MLE)	0.98	k star (bias corrected MLE)	0.948
136	Theta hat (MLE)	0.183	Theta star (bias corrected MLE)	0.189
137	nu hat (MLE)	137.2	nu star (bias corrected)	132.7
138	Adjusted Level of Significance (β)	0.0466		
139	Approximate Chi Square Value (132.69, α)	107.1	Adjusted Chi Square Value (132.69, β)	106.6
140	95% Gamma Approximate UCL	0.222	95% Gamma Adjusted UCL	0.223
141				
142	**Estimates of Gamma Parameters using KM Estimates**			
143	Mean (KM)	0.201	SD (KM)	0.146
144	Variance (KM)	0.0214	SE of Mean (KM)	0.0177
145	k hat (KM)	1.893	k star (KM)	1.822
146	nu hat (KM)	265	nu star (KM)	255
147	theta hat (KM)	0.106	theta star (KM)	0.111
148	80% gamma percentile (KM)	0.305	90% gamma percentile (KM)	0.401
149	95% gamma percentile (KM)	0.492	99% gamma percentile (KM)	0.697
150				
151	**Gamma Kaplan-Meier (KM) Statistics**			
152	Approximate Chi Square Value (255.02, α)	219	Adjusted Chi Square Value (255.02, β)	218.3
153	95% KM Approximate Gamma UCL	0.235	95% KM Adjusted Gamma UCL	0.235
154				
155	**Lognormal GOF Test on Detected Observations Only**			
156	Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk GOF Test**	

	A B C D E	F	G H I J K	L
157	10% Shapiro Wilk Critical Value	0.955	Detected Data Not Lognormal at 10% Significance Level	
158	Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**	
159	10% Lilliefors Critical Value	0.114	Detected Data Not Lognormal at 10% Significance Level	
160	**Detected Data Not Lognormal at 10% Significance Level**			
161				
162	**Lognormal ROS Statistics Using Imputed Non-Detects**			
163	Mean in Original Scale	0.19	Mean in Log Scale	-1.957
164	SD in Original Scale	0.156	SD in Log Scale	0.778
165	95% t UCL (assumes normality of ROS data)	0.221	95% Percentile Bootstrap UCL	0.222
166	95% BCA Bootstrap UCL	0.224	95% Bootstrap t UCL	0.226
167	95% H-UCL (Log ROS)	0.233		
168				
169	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
170	KM Mean (logged)	-1.796	KM Geo Mean	0.166
171	KM SD (logged)	0.578	95% Critical H Value (KM-Log)	1.924
172	KM Standard Error of Mean (logged)	0.07	95% H-UCL (KM -Log)	0.224
173	KM SD (logged)	0.578	95% Critical H Value (KM-Log)	1.924
174	KM Standard Error of Mean (logged)	0.07		
175				
176	**DL/2 Statistics**			
177	**DL/2 Normal**		**DL/2 Log-Transformed**	
178	Mean in Original Scale	0.189	Mean in Log Scale	-1.969
179	SD in Original Scale	0.157	SD in Log Scale	0.775
180	95% t UCL (Assumes normality)	0.22	95% H-Stat UCL	0.229
181	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
182				
183	**Nonparametric Distribution Free UCL Statistics**			
184	**Data do not follow a Discernible Distribution**			
185				
186	**Suggested UCL to Use**			
187	95% KM (t) UCL	0.231		
188				
189	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
190	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
191	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
192				
193				
194	**Result (arsenic_soil)**			
195				
196	**General Statistics**			
197	Total Number of Observations	70	Number of Distinct Observations	62
198			Number of Missing Observations	0
199	Minimum	0.69	Mean	2.482
200	Maximum	5.09	Median	2.535
201	SD	1.028	Std. Error of Mean	0.123
202	Coefficient of Variation	0.414	Skewness	0.391
203				
204	**Normal GOF Test**			
205	Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**	
206	1% Shapiro Wilk P Value	0.112	Data appear Normal at 1% Significance Level	
207	Lilliefors Test Statistic	0.0806	**Lilliefors GOF Test**	
208	1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.686	95% Adjusted-CLT UCL (Chen-1995)	2.69
		95% Modified-t UCL (Johnson-1978)	2.687
Gamma GOF Test			
A-D Test Statistic	0.417	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0957	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.107	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	5.424	k star (bias corrected MLE)	5.201
Theta hat (MLE)	0.458	Theta star (bias corrected MLE)	0.477
nu hat (MLE)	759.3	nu star (bias corrected)	728.1
MLE Mean (bias corrected)	2.482	MLE Sd (bias corrected)	1.088
		Approximate Chi Square Value (0.05)	666.5
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	665.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL	2.711	95% Adjusted Gamma UCL	2.716
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0306	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.121	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.371	Mean of logged Data	0.814
Maximum of Logged Data	1.627	SD of logged Data	0.46
Assuming Lognormal Distribution			
95% H-UCL	2.778	90% Chebyshev (MVUE) UCL	2.935
95% Chebyshev (MVUE) UCL	3.131	97.5% Chebyshev (MVUE) UCL	3.402
99% Chebyshev (MVUE) UCL	3.935		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2.684	95% BCA Bootstrap UCL	2.682
95% Standard Bootstrap UCL	2.682	95% Bootstrap-t UCL	2.7
95% Hall's Bootstrap UCL	2.697	95% Percentile Bootstrap UCL	2.682
90% Chebyshev(Mean, Sd) UCL	2.85	95% Chebyshev(Mean, Sd) UCL	3.017
97.5% Chebyshev(Mean, Sd) UCL	3.249	99% Chebyshev(Mean, Sd) UCL	3.704
Suggested UCL to Use			

	A-E	F	G-K	L
261	95% Student's-t UCL	2.686		
262				
263	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
264	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
265	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
266				
267				
268	**Result (barium_soil)**			
269				
270	**General Statistics**			
271	Total Number of Observations	70	Number of Distinct Observations	69
272			Number of Missing Observations	0
273	Minimum	7.01	Mean	44.38
274	Maximum	155	Median	38.1
275	SD	27.45	Std. Error of Mean	3.281
276	Coefficient of Variation	0.619	Skewness	1.356
277				
278	**Normal GOF Test**			
279	Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**	
280	1% Shapiro Wilk P Value	1.1339E-5	Data Not Normal at 1% Significance Level	
281	Lilliefors Test Statistic	0.115	**Lilliefors GOF Test**	
282	1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level	
283	**Data appear Approximate Normal at 1% Significance Level**			
284				
285	**Assuming Normal Distribution**			
286	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
287	95% Student's-t UCL	49.85	95% Adjusted-CLT UCL (Chen-1995)	50.35
288			95% Modified-t UCL (Johnson-1978)	49.94
289				
290	**Gamma GOF Test**			
291	A-D Test Statistic	0.376	**Anderson-Darling Gamma GOF Test**	
292	5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level	
293	K-S Test Statistic	0.0965	**Kolmogorov-Smirnov Gamma GOF Test**	
294	5% K-S Critical Value	0.107	Detected data appear Gamma Distributed at 5% Significance Level	
295	**Detected data appear Gamma Distributed at 5% Significance Level**			
296				
297	**Gamma Statistics**			
298	k hat (MLE)	2.766	k star (bias corrected MLE)	2.657
299	Theta hat (MLE)	16.05	Theta star (bias corrected MLE)	16.71
300	nu hat (MLE)	387.2	nu star (bias corrected)	371.9
301	MLE Mean (bias corrected)	44.38	MLE Sd (bias corrected)	27.23
302			Approximate Chi Square Value (0.05)	328.2
303	Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	327.4
304				
305	**Assuming Gamma Distribution**			
306	95% Approximate Gamma UCL	50.29	95% Adjusted Gamma UCL	50.42
307				
308	**Lognormal GOF Test**			
309	Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**	
310	10% Shapiro Wilk P Value	0.327	Data appear Lognormal at 10% Significance Level	
311	Lilliefors Test Statistic	0.124	**Lilliefors Lognormal GOF Test**	
312	10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.947	Mean of logged Data	3.601
Maximum of Logged Data	5.043	SD of logged Data	0.651

Assuming Lognormal Distribution

95% H-UCL	52.88	90% Chebyshev (MVUE) UCL	56.57
95% Chebyshev (MVUE) UCL	61.76	97.5% Chebyshev (MVUE) UCL	68.95
99% Chebyshev (MVUE) UCL	83.09		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	49.78	95% BCA Bootstrap UCL	50.05
95% Standard Bootstrap UCL	49.69	95% Bootstrap-t UCL	50.61
95% Hall's Bootstrap UCL	50.93	95% Percentile Bootstrap UCL	49.83
90% Chebyshev(Mean, Sd) UCL	54.23	95% Chebyshev(Mean, Sd) UCL	58.69
97.5% Chebyshev(Mean, Sd) UCL	64.88	99% Chebyshev(Mean, Sd) UCL	77.03

Suggested UCL to Use

95% Student's-t UCL	49.85		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (beryllium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	30
Number of Detects	45	Number of Non-Detects	25
Number of Distinct Detects	29	Number of Distinct Non-Detects	3
Minimum Detect	0.1	Minimum Non-Detect	0.1
Maximum Detect	1.25	Maximum Non-Detect	0.3
Variance Detects	0.0594	Percent Non-Detects	35.71%
Mean Detects	0.409	SD Detects	0.244
Median Detects	0.44	CV Detects	0.596
Skewness Detects	1.142	Kurtosis Detects	2.309
Mean of Logged Detects	-1.078	SD of Logged Detects	0.639

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

365	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
366	KM Mean	0.302	KM Standard Error of Mean	0.0291
367	90KM SD	0.241	95% KM (BCA) UCL	0.353
368	95% KM (t) UCL	0.351	95% KM (Percentile Bootstrap) UCL	0.351
369	95% KM (z) UCL	0.35	95% KM Bootstrap t UCL	0.359
370	90% KM Chebyshev UCL	0.39	95% KM Chebyshev UCL	0.429
371	97.5% KM Chebyshev UCL	0.484	99% KM Chebyshev UCL	0.592
372				
373	**Gamma GOF Tests on Detected Observations Only**			
374	A-D Test Statistic	0.997	**Anderson-Darling GOF Test**	
375	5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level	
376	K-S Test Statistic	0.152	**Kolmogorov-Smirnov GOF**	
377	5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level	
378	**Detected Data Not Gamma Distributed at 5% Significance Level**			
379				
380	**Gamma Statistics on Detected Data Only**			
381	k hat (MLE)	2.877	k star (bias corrected MLE)	2.7
382	Theta hat (MLE)	0.142	Theta star (bias corrected MLE)	0.151
383	nu hat (MLE)	258.9	nu star (bias corrected)	243
384	Mean (detects)	0.409		
385				
386	**Gamma ROS Statistics using Imputed Non-Detects**			
387	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
388	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
389	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
390	This is especially true when the sample size is small.			
391	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
392	Minimum	0.01	Mean	0.285
393	Maximum	1.25	Median	0.18
394	SD	0.259	CV	0.911
395	k hat (MLE)	0.905	k star (bias corrected MLE)	0.875
396	Theta hat (MLE)	0.315	Theta star (bias corrected MLE)	0.325
397	nu hat (MLE)	126.6	nu star (bias corrected)	122.5
398	Adjusted Level of Significance (β)	0.0466		
399	Approximate Chi Square Value (122.55, α)	97.98	Adjusted Chi Square Value (122.55, β)	97.52
400	95% Gamma Approximate UCL	0.356	95% Gamma Adjusted UCL	0.358
401				
402	**Estimates of Gamma Parameters using KM Estimates**			
403	Mean (KM)	0.302	SD (KM)	0.241
404	Variance (KM)	0.0579	SE of Mean (KM)	0.0291
405	k hat (KM)	1.578	k star (KM)	1.52
406	nu hat (KM)	221	nu star (KM)	212.8
407	theta hat (KM)	0.192	theta star (KM)	0.199
408	80% gamma percentile (KM)	0.467	90% gamma percentile (KM)	0.628
409	95% gamma percentile (KM)	0.784	99% gamma percentile (KM)	1.136
410				
411	**Gamma Kaplan-Meier (KM) Statistics**			
412	Approximate Chi Square Value (212.84, α)	180.1	Adjusted Chi Square Value (212.84, β)	179.4
413	95% KM Approximate Gamma UCL	0.357	95% KM Adjusted Gamma UCL	0.359
414				
415	**Lognormal GOF Test on Detected Observations Only**			
416	Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**	

10% Shapiro Wilk Critical Value	0.953	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.12	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.299	Mean in Log Scale	-1.543
SD in Original Scale	0.246	SD in Log Scale	0.853
95% t UCL (assumes normality of ROS data)	0.348	95% Percentile Bootstrap UCL	0.349
95% BCA Bootstrap UCL	0.352	95% Bootstrap t UCL	0.355
95% H-UCL (Log ROS)	0.384		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.484	KM Geo Mean	0.227
KM SD (logged)	0.748	95% Critical H Value (KM-Log)	2.059
KM Standard Error of Mean (logged)	0.0915	95% H-UCL (KM -Log)	0.361
KM SD (logged)	0.748	95% Critical H Value (KM-Log)	2.059
KM Standard Error of Mean (logged)	0.0915		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.289	Mean in Log Scale	-1.631
SD in Original Scale	0.253	SD in Log Scale	0.914
95% t UCL (Assumes normality)	0.34	95% H-Stat UCL	0.379

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 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.351		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (bismuth_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	6
Number of Detects	4	Number of Non-Detects	66
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.3	Minimum Non-Detect	0.2
Maximum Detect	0.43	Maximum Non-Detect	0.6
Variance Detects	0.0043	Percent Non-Detects	94.29%
Mean Detects	0.375	SD Detects	0.0656
Median Detects	0.385	CV Detects	0.175
Skewness Detects	-0.312	Kurtosis Detects	-4.226
Mean of Logged Detects	-0.993	SD of Logged Detects	0.179

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.21	KM Standard Error of Mean	0.00599
90KM SD	0.0431	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.22	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.22	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.228	95% KM Chebyshev UCL	0.236
97.5% KM Chebyshev UCL	0.248	99% KM Chebyshev UCL	0.27

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.467	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.656	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.332	**Kolmogorov-Smirnov GOF**	
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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	42.36	k star (bias corrected MLE)	10.76
Theta hat (MLE)	0.00885	Theta star (bias corrected MLE)	0.0349
nu hat (MLE)	338.8	nu star (bias corrected)	86.04
Mean (detects)	0.375		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.067
Maximum	0.43	Median	0.01
SD	0.101	CV	1.507
k hat (MLE)	0.649	k star (bias corrected MLE)	0.631
Theta hat (MLE)	0.103	Theta star (bias corrected MLE)	0.106
nu hat (MLE)	90.88	nu star (bias corrected)	88.32
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (88.32, α)	67.65	Adjusted Chi Square Value (88.32, β)	67.27
95% Gamma Approximate UCL	0.0874	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.21	SD (KM)	0.0431
Variance (KM)	0.00186	SE of Mean (KM)	0.00599
k hat (KM)	23.75	k star (KM)	22.74
nu hat (KM)	3325	nu star (KM)	3184

theta hat (KM)	0.00885	theta star (KM)	0.00924
80% gamma percentile (KM)	0.246	90% gamma percentile (KM)	0.268
95% gamma percentile (KM)	0.287	99% gamma percentile (KM)	0.326
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (N/A, α)	3054	Adjusted Chi Square Value (N/A, β)	3051
95% KM Approximate Gamma UCL	0.219	95% KM Adjusted Gamma UCL	0.219
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.131	Mean in Log Scale	-2.207
SD in Original Scale	0.0832	SD in Log Scale	0.584
95% t UCL (assumes normality of ROS data)	0.147	95% Percentile Bootstrap UCL	0.148
95% BCA Bootstrap UCL	0.15	95% Bootstrap t UCL	0.151
95% H-UCL (Log ROS)	0.149		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.574	KM Geo Mean	0.207
KM SD (logged)	0.149	95% Critical H Value (KM-Log)	1.697
KM Standard Error of Mean (logged)	0.0207	95% H-UCL (KM -Log)	0.216
KM SD (logged)	0.149	95% Critical H Value (KM-Log)	1.697
KM Standard Error of Mean (logged)	0.0207		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.132	Mean in Log Scale	-2.102
SD in Original Scale	0.0692	SD in Log Scale	0.35
95% t UCL (Assumes normality)	0.146	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 Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.22		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (boron, hot water soluble_soil)			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	24
Number of Detects	27	Number of Non-Detects	18

	A–E	F	G–K	L
573	Number of Distinct Detects	21	Number of Distinct Non-Detects	3
574	Minimum Detect	0.11	Minimum Non-Detect	0.1
575	Maximum Detect	1.48	Maximum Non-Detect	0.99
576	Variance Detects	0.138	Percent Non-Detects	40%
577	Mean Detects	0.54	SD Detects	0.371
578	Median Detects	0.46	CV Detects	0.687
579	Skewness Detects	0.932	Kurtosis Detects	0.0659
580	Mean of Logged Detects	-0.858	SD of Logged Detects	0.736
581				
582	**Normal GOF Test on Detects Only**			
583	Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**	
584	1% Shapiro Wilk Critical Value	0.894	Detected Data appear Normal at 1% Significance Level	
585	Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
586	1% Lilliefors Critical Value	0.194	Detected Data Not Normal at 1% Significance Level	
587	**Detected Data appear Approximate Normal at 1% Significance Level**			
588				
589	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
590	KM Mean	0.391	KM Standard Error of Mean	0.0546
591	90KM SD	0.349	95% KM (BCA) UCL	0.481
592	95% KM (t) UCL	0.483	95% KM (Percentile Bootstrap) UCL	0.481
593	95% KM (z) UCL	0.481	95% KM Bootstrap t UCL	0.497
594	90% KM Chebyshev UCL	0.555	95% KM Chebyshev UCL	0.629
595	97.5% KM Chebyshev UCL	0.732	99% KM Chebyshev UCL	0.935
596				
597	**Gamma GOF Tests on Detected Observations Only**			
598	A-D Test Statistic	0.367	**Anderson-Darling GOF Test**	
599	5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
600	K-S Test Statistic	0.12	**Kolmogorov-Smirnov GOF**	
601	5% K-S Critical Value	0.17	Detected data appear Gamma Distributed at 5% Significance Level	
602	**Detected data appear Gamma Distributed at 5% Significance Level**			
603				
604	**Gamma Statistics on Detected Data Only**			
605	k hat (MLE)	2.218	k star (bias corrected MLE)	1.996
606	Theta hat (MLE)	0.244	Theta star (bias corrected MLE)	0.271
607	nu hat (MLE)	119.8	nu star (bias corrected)	107.8
608	Mean (detects)	0.54		
609				
610	**Gamma ROS Statistics using Imputed Non-Detects**			
611	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
612	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
613	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
614	This is especially true when the sample size is small.			
615	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
616	Minimum	0.01	Mean	0.365
617	Maximum	1.48	Median	0.25
618	SD	0.37	CV	1.014
619	k hat (MLE)	0.73	k star (bias corrected MLE)	0.697
620	Theta hat (MLE)	0.5	Theta star (bias corrected MLE)	0.524
621	nu hat (MLE)	65.74	nu star (bias corrected)	62.69
622	Adjusted Level of Significance (β)	0.0447		
623	Approximate Chi Square Value (62.69, α)	45.48	Adjusted Chi Square Value (62.69, β)	44.99
624	95% Gamma Approximate UCL	0.503	95% Gamma Adjusted UCL	0.509

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.391	SD (KM)	0.349
Variance (KM)	0.122	SE of Mean (KM)	0.0546
k hat (KM)	1.252	k star (KM)	1.183
nu hat (KM)	112.7	nu star (KM)	106.5
theta hat (KM)	0.312	theta star (KM)	0.33
80% gamma percentile (KM)	0.62	90% gamma percentile (KM)	0.864
95% gamma percentile (KM)	1.104	99% gamma percentile (KM)	1.656

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (106.50, α)	83.68	Adjusted Chi Square Value (106.50, β)	83.01
95% KM Approximate Gamma UCL	0.498	95% KM Adjusted Gamma UCL	0.502

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.935	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.113	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.153	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.381	Mean in Log Scale	-1.383
SD in Original Scale	0.353	SD in Log Scale	0.956
95% t UCL (assumes normality of ROS data)	0.47	95% Percentile Bootstrap UCL	0.469
95% BCA Bootstrap UCL	0.477	95% Bootstrap t UCL	0.486
95% H-UCL (Log ROS)	0.554		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.319	KM Geo Mean	0.267
KM SD (logged)	0.874	95% Critical H Value (KM-Log)	2.236
KM Standard Error of Mean (logged)	0.141	95% H-UCL (KM -Log)	0.526
KM SD (logged)	0.874	95% Critical H Value (KM-Log)	2.236
KM Standard Error of Mean (logged)	0.141		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.401	Mean in Log Scale	-1.385
SD in Original Scale	0.353	SD in Log Scale	1.086
95% t UCL (Assumes normality)	0.489	95% H-Stat UCL	0.677

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 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.483		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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.

677	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
678	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
679				
680	**Result (boron_soil)**			
681				
682	**General Statistics**			
683	Total Number of Observations	70	Number of Distinct Observations	33
684	Number of Detects	36	Number of Non-Detects	34
685	Number of Distinct Detects	30	Number of Distinct Non-Detects	6
686	Minimum Detect	5.6	Minimum Non-Detect	5
687	Maximum Detect	19	Maximum Non-Detect	15.1
688	Variance Detects	11.62	Percent Non-Detects	48.57%
689	Mean Detects	11.76	SD Detects	3.409
690	Median Detects	11.95	CV Detects	0.29
691	Skewness Detects	0.0356	Kurtosis Detects	-0.697
692	Mean of Logged Detects	2.42	SD of Logged Detects	0.312
693				
694	**Normal GOF Test on Detects Only**			
695	Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**	
696	1% Shapiro Wilk Critical Value	0.912	Detected Data appear Normal at 1% Significance Level	
697	Lilliefors Test Statistic	0.0848	**Lilliefors GOF Test**	
698	1% Lilliefors Critical Value	0.17	Detected Data appear Normal at 1% Significance Level	
699	**Detected Data appear Normal at 1% Significance Level**			
700				
701	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
702	KM Mean	8.632	KM Standard Error of Mean	0.502
703	90KM SD	4.075	95% KM (BCA) UCL	9.459
704	95% KM (t) UCL	9.469	95% KM (Percentile Bootstrap) UCL	9.429
705	95% KM (z) UCL	9.457	95% KM Bootstrap t UCL	9.549
706	90% KM Chebyshev UCL	10.14	95% KM Chebyshev UCL	10.82
707	97.5% KM Chebyshev UCL	11.77	99% KM Chebyshev UCL	13.63
708				
709	**Gamma GOF Tests on Detected Observations Only**			
710	A-D Test Statistic	0.502	**Anderson-Darling GOF Test**	
711	5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level	
712	K-S Test Statistic	0.117	**Kolmogorov-Smirnov GOF**	
713	5% K-S Critical Value	0.147	Detected data appear Gamma Distributed at 5% Significance Level	
714	**Detected data appear Gamma Distributed at 5% Significance Level**			
715				
716	**Gamma Statistics on Detected Data Only**			
717	k hat (MLE)	11.35	k star (bias corrected MLE)	10.42
718	Theta hat (MLE)	1.036	Theta star (bias corrected MLE)	1.128
719	nu hat (MLE)	817.2	nu star (bias corrected)	750.4
720	Mean (detects)	11.76		
721				
722	**Gamma ROS Statistics using Imputed Non-Detects**			
723	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
724	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
725	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
726	This is especially true when the sample size is small.			
727	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
728	Minimum	0.981	Mean	8.446

729	Maximum	19	Median	7.423
730	SD	4.386	CV	0.519
731	k hat (MLE)	3.352	k star (bias corrected MLE)	3.218
732	Theta hat (MLE)	2.52	Theta star (bias corrected MLE)	2.625
733	nu hat (MLE)	469.2	nu star (bias corrected)	450.5
734	Adjusted Level of Significance (β)	0.0466		
735	Approximate Chi Square Value (450.46, α)	402.3	Adjusted Chi Square Value (450.46, β)	401.3
736	95% Gamma Approximate UCL	9.459	95% Gamma Adjusted UCL	9.481
737				
738	**Estimates of Gamma Parameters using KM Estimates**			
739	Mean (KM)	8.632	SD (KM)	4.075
740	Variance (KM)	16.61	SE of Mean (KM)	0.502
741	k hat (KM)	4.487	k star (KM)	4.304
742	nu hat (KM)	628.1	nu star (KM)	602.6
743	theta hat (KM)	1.924	theta star (KM)	2.006
744	80% gamma percentile (KM)	11.8	90% gamma percentile (KM)	14.21
745	95% gamma percentile (KM)	16.41	99% gamma percentile (KM)	21.11
746				
747	**Gamma Kaplan-Meier (KM) Statistics**			
748	Approximate Chi Square Value (602.56, α)	546.6	Adjusted Chi Square Value (602.56, β)	545.5
749	95% KM Approximate Gamma UCL	9.515	95% KM Adjusted Gamma UCL	9.535
750				
751	**Lognormal GOF Test on Detected Observations Only**			
752	Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk GOF Test**	
753	10% Shapiro Wilk Critical Value	0.945	Detected Data appear Lognormal at 10% Significance Level	
754	Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**	
755	10% Lilliefors Critical Value	0.134	Detected Data Not Lognormal at 10% Significance Level	
756	**Detected Data appear Approximate Lognormal at 10% Significance Level**			
757				
758	**Lognormal ROS Statistics Using Imputed Non-Detects**			
759	Mean in Original Scale	8.777	Mean in Log Scale	2.071
760	SD in Original Scale	4.019	SD in Log Scale	0.454
761	95% t UCL (assumes normality of ROS data)	9.578	95% Percentile Bootstrap UCL	9.579
762	95% BCA Bootstrap UCL	9.578	95% Bootstrap t UCL	9.626
763	95% H-UCL (Log ROS)	9.721		
764				
765	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
766	KM Mean (logged)	2.051	KM Geo Mean	7.777
767	KM SD (logged)	0.449	95% Critical H Value (KM-Log)	1.838
768	KM Standard Error of Mean (logged)	0.0561	95% H-UCL (KM -Log)	9.5
769	KM SD (logged)	0.449	95% Critical H Value (KM-Log)	1.838
770	KM Standard Error of Mean (logged)	0.0561		
771				
772	**DL/2 Statistics**			
773	**DL/2 Normal**		**DL/2 Log-Transformed**	
774	Mean in Original Scale	7.684	Mean in Log Scale	1.82
775	SD in Original Scale	4.913	SD in Log Scale	0.682
776	95% t UCL (Assumes normality)	8.663	95% H-Stat UCL	9.175
777	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
778				
779	**Nonparametric Distribution Free UCL Statistics**			
780	**Detected Data appear Normal Distributed at 1% Significance Level**			

Suggested UCL to Use

95% KM (t) UCL	9.469

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

Result (cadmium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	67
		Number of Missing Observations	0
Minimum	0.023	Mean	0.426
Maximum	2.09	Median	0.294
SD	0.438	Std. Error of Mean	0.0524
Coefficient of Variation	1.029	Skewness	2.014

Normal GOF Test

Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	5.218E-15	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.513	95% Adjusted-CLT UCL (Chen-1995)	0.526
		95% Modified-t UCL (Johnson-1978)	0.515

Gamma GOF Test

A-D Test Statistic	0.622	**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	0.0923	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.109	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.21	k star (bias corrected MLE)	1.168
Theta hat (MLE)	0.352	Theta star (bias corrected MLE)	0.365
nu hat (MLE)	169.4	nu star (bias corrected)	163.5
MLE Mean (bias corrected)	0.426	MLE Sd (bias corrected)	0.394
		Approximate Chi Square Value (0.05)	134.9
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	134.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.516	95% Adjusted Gamma UCL	0.518

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.57	Data appear Lognormal at 10% Significance Level

Lilliefors Test Statistic	0.0549	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.772	Mean of logged Data	-1.321
Maximum of Logged Data	0.737	SD of logged Data	1.011

Assuming Lognormal Distribution

95% H-UCL	0.586	90% Chebyshev (MVUE) UCL	0.631
95% Chebyshev (MVUE) UCL	0.717	97.5% Chebyshev (MVUE) UCL	0.837
99% Chebyshev (MVUE) UCL	1.072		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.512	95% BCA Bootstrap UCL	0.529
95% Standard Bootstrap UCL	0.511	95% Bootstrap-t UCL	0.534
95% Hall's Bootstrap UCL	0.532	95% Percentile Bootstrap UCL	0.512
90% Chebyshev(Mean, Sd) UCL	0.583	95% Chebyshev(Mean, Sd) UCL	0.654
97.5% Chebyshev(Mean, Sd) UCL	0.753	99% Chebyshev(Mean, Sd) UCL	0.947

Suggested UCL to Use

95% Approximate Gamma UCL	0.516		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (calcium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	65
		Number of Missing Observations	0
Minimum	754	Mean	28813
Maximum	126000	Median	19100
SD	25572	Std. Error of Mean	3056
Coefficient of Variation	0.887	Skewness	1.991

Normal GOF Test

Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	2.642E-14	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	33909	95% Adjusted-CLT UCL (Chen-1995)	34618
		95% Modified-t UCL (Johnson-1978)	34030
Gamma GOF Test			
A-D Test Statistic	1.038	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.768	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.111	**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)	1.616	k star (bias corrected MLE)	1.556
Theta hat (MLE)	17831	Theta star (bias corrected MLE)	18515
nu hat (MLE)	226.2	nu star (bias corrected)	217.9
MLE Mean (bias corrected)	28813	MLE Sd (bias corrected)	23097
		Approximate Chi Square Value (0.05)	184.7
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	184.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	33986	95% Adjusted Gamma UCL	34104
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0404	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0924	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	6.625	Mean of logged Data	9.928
Maximum of Logged Data	11.74	SD of logged Data	0.888
Assuming Lognormal Distribution			
95% H-UCL	38428	90% Chebyshev (MVUE) UCL	41278
95% Chebyshev (MVUE) UCL	46303	97.5% Chebyshev (MVUE) UCL	53278
99% Chebyshev (MVUE) UCL	66978		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	33841	95% BCA Bootstrap UCL	34844
95% Standard Bootstrap UCL	33915	95% Bootstrap-t UCL	35139
95% Hall's Bootstrap UCL	34992	95% Percentile Bootstrap UCL	34113
90% Chebyshev(Mean, Sd) UCL	37982	95% Chebyshev(Mean, Sd) UCL	42136
97.5% Chebyshev(Mean, Sd) UCL	47900	99% Chebyshev(Mean, Sd) UCL	59224
Suggested UCL to Use			
95% H-UCL	38428		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (chromium, hexavalent [cr vi]_soil)

General Statistics

Total Number of Observations	45	Number of Distinct Observations	9
Number of Detects	11	Number of Non-Detects	34
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.11	Minimum Non-Detect	0.1
Maximum Detect	0.25	Maximum Non-Detect	0.4
Variance Detects	0.00181	Percent Non-Detects	75.56%
Mean Detects	0.145	SD Detects	0.0425
Median Detects	0.13	CV Detects	0.294
Skewness Detects	1.81	Kurtosis Detects	3.244
Mean of Logged Detects	-1.967	SD of Logged Detects	0.255

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.783	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

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

KM Mean	0.115	KM Standard Error of Mean	0.0059
90KM SD	0.0318	95% KM (BCA) UCL	0.126
95% KM (t) UCL	0.125	95% KM (Percentile Bootstrap) UCL	0.125
95% KM (z) UCL	0.125	95% KM Bootstrap t UCL	0.132
90% KM Chebyshev UCL	0.133	95% KM Chebyshev UCL	0.141
97.5% KM Chebyshev UCL	0.152	99% KM Chebyshev UCL	0.174

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.784	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.729	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.255	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)	15.58	k star (bias corrected MLE)	11.39
Theta hat (MLE)	0.00928	Theta star (bias corrected MLE)	0.0127
nu hat (MLE)	342.8	nu star (bias corrected)	250.7
Mean (detects)	0.145		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0711
Maximum	0.25	Median	0.0584
SD	0.06	CV	0.844
k hat (MLE)	1.229	k star (bias corrected MLE)	1.161
Theta hat (MLE)	0.0579	Theta star (bias corrected MLE)	0.0612
nu hat (MLE)	110.6	nu star (bias corrected)	104.5
Adjusted Level of Significance (β)	0.0447		
Approximate Chi Square Value (104.53, α)	81.94	Adjusted Chi Square Value (104.53, β)	81.27
95% Gamma Approximate UCL	0.0907	95% Gamma Adjusted UCL	0.0915

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.115	SD (KM)	0.0318
Variance (KM)	0.00101	SE of Mean (KM)	0.0059
k hat (KM)	13.13	k star (KM)	12.27
nu hat (KM)	1182	nu star (KM)	1105
theta hat (KM)	0.00878	theta star (KM)	0.0094
80% gamma percentile (KM)	0.142	90% gamma percentile (KM)	0.159
95% gamma percentile (KM)	0.174	99% gamma percentile (KM)	0.205

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1028	Adjusted Chi Square Value (N/A, β)	1026
95% KM Approximate Gamma UCL	0.124	95% KM Adjusted Gamma UCL	0.124

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.876	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.231	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0893	Mean in Log Scale	-2.54
SD in Original Scale	0.0467	SD in Log Scale	0.505
95% t UCL (assumes normality of ROS data)	0.101	95% Percentile Bootstrap UCL	0.101
95% BCA Bootstrap UCL	0.101	95% Bootstrap t UCL	0.103
95% H-UCL (Log ROS)	0.104		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.187	KM Geo Mean	0.112
KM SD (logged)	0.214	95% Critical H Value (KM-Log)	1.698
KM Standard Error of Mean (logged)	0.0397	95% H-UCL (KM -Log)	0.121
KM SD (logged)	0.214	95% Critical H Value (KM-Log)	1.698
KM Standard Error of Mean (logged)	0.0397		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.116	Mean in Log Scale	-2.344
SD in Original Scale	0.0691	SD in Log Scale	0.642
95% t UCL (Assumes normality)	0.134	95% H-Stat UCL	0.143

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

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.125		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (chromium_soil)			
General Statistics			
Total Number of Observations	70	Number of Distinct Observations	66
		Number of Missing Observations	0
Minimum	1.6	Mean	22.26
Maximum	70.1	Median	21.2
SD	16.3	Std. Error of Mean	1.948
Coefficient of Variation	0.732	Skewness	0.603
Normal GOF Test			
Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	2.4901E-5	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.105	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	25.5	95% Adjusted-CLT UCL (Chen-1995)	25.61
		95% Modified-t UCL (Johnson-1978)	25.53
Gamma GOF Test			
A-D Test Statistic	2.319	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.773	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.12	**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)	1.322	k star (bias corrected MLE)	1.274
Theta hat (MLE)	16.84	Theta star (bias corrected MLE)	17.46
nu hat (MLE)	185	nu star (bias corrected)	178.4
MLE Mean (bias corrected)	22.26	MLE Sd (bias corrected)	19.72
		Approximate Chi Square Value (0.05)	148.5
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	148
Assuming Gamma Distribution			

95% Approximate Gamma UCL	26.74	95% Adjusted Gamma UCL	26.84

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.858	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	6.1820E-9	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.16	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.47	Mean of logged Data	2.679
Maximum of Logged Data	4.25	SD of logged Data	1.085

Assuming Lognormal Distribution

95% H-UCL	35.15	90% Chebyshev (MVUE) UCL	38.14
95% Chebyshev (MVUE) UCL	43.69	97.5% Chebyshev (MVUE) UCL	51.4
99% Chebyshev (MVUE) UCL	66.53		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	25.46	95% BCA Bootstrap UCL	25.35
95% Standard Bootstrap UCL	25.39	95% Bootstrap-t UCL	25.58
95% Hall's Bootstrap UCL	25.58	95% Percentile Bootstrap UCL	25.51
90% Chebyshev(Mean, Sd) UCL	28.1	95% Chebyshev(Mean, Sd) UCL	30.75
97.5% Chebyshev(Mean, Sd) UCL	34.42	99% Chebyshev(Mean, Sd) UCL	41.64

Suggested UCL to Use

95% Student's-t UCL	25.5		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cobalt_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	67
		Number of Missing Observations	0
Minimum	0.38	Mean	5.256
Maximum	14.6	Median	5.335
SD	3.563	Std. Error of Mean	0.426
Coefficient of Variation	0.678	Skewness	0.349

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	9.8100E-4	Data Not Normal at 1% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
1145					Lilliefors Test Statistic	0.0895	Lilliefors GOF Test					
1146					1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level					
1147	Data appear Approximate Normal at 1% Significance Level											
1148												
1149	Assuming Normal Distribution											
1150	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
1151					95% Student's-t UCL	5.966					95% Adjusted-CLT UCL (Chen-1995)	5.976
1152											95% Modified-t UCL (Johnson-1978)	5.969
1153												
1154	Gamma GOF Test											
1155					A-D Test Statistic	2.381	Anderson-Darling Gamma GOF Test					
1156					5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level					
1157					K-S Test Statistic	0.134	Kolmogorov-Smirnov Gamma GOF Test					
1158					5% K-S Critical Value	0.109	Data Not Gamma Distributed at 5% Significance Level					
1159	Data Not Gamma Distributed at 5% Significance Level											
1160												
1161	Gamma Statistics											
1162					k hat (MLE)	1.443					k star (bias corrected MLE)	1.391
1163					Theta hat (MLE)	3.642					Theta star (bias corrected MLE)	3.779
1164					nu hat (MLE)	202					nu star (bias corrected)	194.7
1165					MLE Mean (bias corrected)	5.256					MLE Sd (bias corrected)	4.457
1166											Approximate Chi Square Value (0.05)	163.4
1167					Adjusted Level of Significance	0.0466					Adjusted Chi Square Value	162.8
1168												
1169	Assuming Gamma Distribution											
1170					95% Approximate Gamma UCL	6.262					95% Adjusted Gamma UCL	6.285
1171												
1172	Lognormal GOF Test											
1173					Shapiro Wilk Test Statistic	0.847	Shapiro Wilk Lognormal GOF Test					
1174					10% Shapiro Wilk P Value	9.098E-10	Data Not Lognormal at 10% Significance Level					
1175					Lilliefors Test Statistic	0.177	Lilliefors Lognormal GOF Test					
1176					10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level					
1177	Data Not Lognormal at 10% Significance Level											
1178												
1179	Lognormal Statistics											
1180					Minimum of Logged Data	-0.968					Mean of logged Data	1.275
1181					Maximum of Logged Data	2.681					SD of logged Data	1.048
1182												
1183	Assuming Lognormal Distribution											
1184					95% H-UCL	8.229					90% Chebyshev (MVUE) UCL	8.889
1185					95% Chebyshev (MVUE) UCL	10.14					97.5% Chebyshev (MVUE) UCL	11.88
1186					99% Chebyshev (MVUE) UCL	15.31						
1187												
1188	Nonparametric Distribution Free UCL Statistics											
1189	Data appear to follow a Discernible Distribution											
1190												
1191	Nonparametric Distribution Free UCLs											
1192					95% CLT UCL	5.957					95% BCA Bootstrap UCL	5.916
1193					95% Standard Bootstrap UCL	5.951					95% Bootstrap-t UCL	6.001
1194					95% Hall's Bootstrap UCL	5.987					95% Percentile Bootstrap UCL	5.957
1195					90% Chebyshev(Mean, Sd) UCL	6.534					95% Chebyshev(Mean, Sd) UCL	7.112
1196					97.5% Chebyshev(Mean, Sd) UCL	7.916					99% Chebyshev(Mean, Sd) UCL	9.494

Suggested UCL to Use

95% Student's-t UCL	5.966		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (copper_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	62
		Number of Missing Observations	0
Minimum	1.7	Mean	18.59
Maximum	109	Median	14.85
SD	18	Std. Error of Mean	2.152
Coefficient of Variation	0.968	Skewness	3.775

Normal GOF Test

Shapiro Wilk Test Statistic	0.563	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.296	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	22.18	95% Adjusted-CLT UCL (Chen-1995)	23.16
		95% Modified-t UCL (Johnson-1978)	22.34

Gamma GOF Test

A-D Test Statistic	3.444	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**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)	2.26	k star (bias corrected MLE)	2.172
Theta hat (MLE)	8.226	Theta star (bias corrected MLE)	8.556
nu hat (MLE)	316.4	nu star (bias corrected)	304.1
MLE Mean (bias corrected)	18.59	MLE Sd (bias corrected)	12.61
		Approximate Chi Square Value (0.05)	264.7
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	264

Assuming Gamma Distribution

95% Approximate Gamma UCL	21.35	95% Adjusted Gamma UCL	21.42

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	8.7176E-4	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.136	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.531	Mean of logged Data	2.685
Maximum of Logged Data	4.691	SD of logged Data	0.645

Assuming Lognormal Distribution

95% H-UCL	21.04	90% Chebyshev (MVUE) UCL	22.51
95% Chebyshev (MVUE) UCL	24.55	97.5% Chebyshev (MVUE) UCL	27.39
99% Chebyshev (MVUE) UCL	32.97		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	22.13	95% BCA Bootstrap UCL	23.03
95% Standard Bootstrap UCL	22.09	95% Bootstrap-t UCL	24.24
95% Hall's Bootstrap UCL	25.71	95% Percentile Bootstrap UCL	22.27
90% Chebyshev(Mean, Sd) UCL	25.04	95% Chebyshev(Mean, Sd) UCL	27.97
97.5% Chebyshev(Mean, Sd) UCL	32.02	99% Chebyshev(Mean, Sd) UCL	40

Suggested UCL to Use

95% Student's-t UCL	22.18		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cyanide, free_soil)

General Statistics

Total Number of Observations	45	Number of Distinct Observations	35
Number of Detects	1	Number of Non-Detects	44
Number of Distinct Detects	1	Number of Distinct Non-Detects	34

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 Result (cyanide, free_soil) was not processed!

Result (iron_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	67
		Number of Missing Observations	0

Minimum	819	Mean	10948
Maximum	34600	Median	9775
SD	7999	Std. Error of Mean	956.1
Coefficient of Variation	0.731	Skewness	0.697

Normal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.3875E-4	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.103	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	12542	95% Adjusted-CLT UCL (Chen-1995)	12606
		95% Modified-t UCL (Johnson-1978)	12556

Gamma GOF Test

A-D Test Statistic	1.217	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0976	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.109	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	1.443	k star (bias corrected MLE)	1.39
Theta hat (MLE)	7589	Theta star (bias corrected MLE)	7875
nu hat (MLE)	202	nu star (bias corrected)	194.6
MLE Mean (bias corrected)	10948	MLE Sd (bias corrected)	9285
		Approximate Chi Square Value (0.05)	163.4
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	162.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	13044	95% Adjusted Gamma UCL	13092

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	2.2081E-6	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.138	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.708	Mean of logged Data	8.916
Maximum of Logged Data	10.45	SD of logged Data	1.015

Assuming Lognormal Distribution

95% H-UCL	16423	90% Chebyshev (MVUE) UCL	17691
95% Chebyshev (MVUE) UCL	20118	97.5% Chebyshev (MVUE) UCL	23487
99% Chebyshev (MVUE) UCL	30104		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	12521	95% BCA Bootstrap UCL	12508
95% Standard Bootstrap UCL	12523	95% Bootstrap-t UCL	12581
95% Hall's Bootstrap UCL	12568	95% Percentile Bootstrap UCL	12534
90% Chebyshev(Mean, Sd) UCL	13817	95% Chebyshev(Mean, Sd) UCL	15116
97.5% Chebyshev(Mean, Sd) UCL	16919	99% Chebyshev(Mean, Sd) UCL	20461

Suggested UCL to Use

95% Student's-t UCL	12542		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lead_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	65
		Number of Missing Observations	0
Minimum	1.41	Mean	12.73
Maximum	59.2	Median	9.96
SD	10.1	Std. Error of Mean	1.207
Coefficient of Variation	0.793	Skewness	2.015

Normal GOF Test

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.246E-10	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	14.74	95% Adjusted-CLT UCL (Chen-1995)	15.03
		95% Modified-t UCL (Johnson-1978)	14.79

Gamma GOF Test

A-D Test Statistic	0.32	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.072	**Kolmogorov-Smirnov Gamma GOF Test**
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

k hat (MLE)	1.933	k star (bias corrected MLE)	1.86
Theta hat (MLE)	6.585	Theta star (bias corrected MLE)	6.845

nu hat (MLE)	270.6	nu star (bias corrected)	260.4
MLE Mean (bias corrected)	12.73	MLE Sd (bias corrected)	9.335
		Approximate Chi Square Value (0.05)	224
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	223.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL	14.8	95% Adjusted Gamma UCL	14.84
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.747	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0525	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.344	Mean of logged Data	2.264
Maximum of Logged Data	4.081	SD of logged Data	0.778
Assuming Lognormal Distribution			
95% H-UCL	15.83	90% Chebyshev (MVUE) UCL	17
95% Chebyshev (MVUE) UCL	18.83	97.5% Chebyshev (MVUE) UCL	21.38
99% Chebyshev (MVUE) UCL	26.38		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	14.71	95% BCA Bootstrap UCL	15.11
95% Standard Bootstrap UCL	14.71	95% Bootstrap-t UCL	15.24
95% Hall's Bootstrap UCL	15.33	95% Percentile Bootstrap UCL	14.78
90% Chebyshev(Mean, Sd) UCL	16.35	95% Chebyshev(Mean, Sd) UCL	17.99
97.5% Chebyshev(Mean, Sd) UCL	20.27	99% Chebyshev(Mean, Sd) UCL	24.74
Suggested UCL to Use			
95% Approximate Gamma UCL	14.8		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (lithium_soil)			
General Statistics			
Total Number of Observations	70	Number of Distinct Observations	44
Number of Detects	49	Number of Non-Detects	21
Number of Distinct Detects	40	Number of Distinct Non-Detects	4
Minimum Detect	3.3	Minimum Non-Detect	2
Maximum Detect	36.5	Maximum Non-Detect	6
Variance Detects	61.62	Percent Non-Detects	30%
Mean Detects	13.92	SD Detects	7.85
Median Detects	12.5	CV Detects	0.564

Skewness Detects	0.493	Kurtosis Detects	-0.377
Mean of Logged Detects	2.454	SD of Logged Detects	0.633
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.929	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.168	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.146	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	10.36	KM Standard Error of Mean	1.024
90KM SD	8.481	95% KM (BCA) UCL	12.44
95% KM (t) UCL	12.07	95% KM (Percentile Bootstrap) UCL	12.14
95% KM (z) UCL	12.05	95% KM Bootstrap t UCL	12.12
90% KM Chebyshev UCL	13.43	95% KM Chebyshev UCL	14.83
97.5% KM Chebyshev UCL	16.76	99% KM Chebyshev UCL	20.55
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.442	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.757	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.173	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.128	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	2.941	k star (bias corrected MLE)	2.775
Theta hat (MLE)	4.734	Theta star (bias corrected MLE)	5.018
nu hat (MLE)	288.3	nu star (bias corrected)	271.9
Mean (detects)	13.92		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	10.23
Maximum	36.5	Median	7.15
SD	8.704	CV	0.851
k hat (MLE)	0.715	k star (bias corrected MLE)	0.694
Theta hat (MLE)	14.31	Theta star (bias corrected MLE)	14.75
nu hat (MLE)	100.1	nu star (bias corrected)	97.1
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (97.10, α)	75.37	Adjusted Chi Square Value (97.10, β)	74.97
95% Gamma Approximate UCL	13.18	95% Gamma Adjusted UCL	13.25
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	10.36	SD (KM)	8.481
Variance (KM)	71.94	SE of Mean (KM)	1.024
k hat (KM)	1.492	k star (KM)	1.438
nu hat (KM)	208.9	nu star (KM)	201.3

theta hat (KM)	6.943	theta star (KM)	7.206
80% gamma percentile (KM)	16.1	90% gamma percentile (KM)	21.81
95% gamma percentile (KM)	27.37	99% gamma percentile (KM)	39.97
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (201.28, α)	169.5	Adjusted Chi Square Value (201.28, β)	168.8
95% KM Approximate Gamma UCL	12.31	95% KM Adjusted Gamma UCL	12.35
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.955	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.115	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	10.64	Mean in Log Scale	2.028
SD in Original Scale	8.284	SD in Log Scale	0.866
95% t UCL (assumes normality of ROS data)	12.29	95% Percentile Bootstrap UCL	12.26
95% BCA Bootstrap UCL	12.34	95% Bootstrap t UCL	12.37
95% H-UCL (Log ROS)	13.85		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.93	KM Geo Mean	6.889
KM SD (logged)	0.959	95% Critical H Value (KM-Log)	2.234
KM Standard Error of Mean (logged)	0.116	95% H-UCL (KM -Log)	14.12
KM SD (logged)	0.959	95% Critical H Value (KM-Log)	2.234
KM Standard Error of Mean (logged)	0.116		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10.21	Mean in Log Scale	1.843
SD in Original Scale	8.692	SD in Log Scale	1.083
95% t UCL (Assumes normality)	11.94	95% H-Stat UCL	15.2
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			
Suggested UCL to Use			
95% KM (t) UCL	12.07		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (magnesium_soil)			
General Statistics			
Total Number of Observations	70	Number of Distinct Observations	68
		Number of Missing Observations	0

Minimum	444	Mean	8726
Maximum	35100	Median	5435
SD	8512	Std. Error of Mean	1017
Coefficient of Variation	0.975	Skewness	1.478
Normal GOF Test			
Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.688E-12	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	10422	95% Adjusted-CLT UCL (Chen-1995)	10592
		95% Modified-t UCL (Johnson-1978)	10452
Gamma GOF Test			
A-D Test Statistic	0.696	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.777	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0994	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.109	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.156	k star (bias corrected MLE)	1.116
Theta hat (MLE)	7551	Theta star (bias corrected MLE)	7821
nu hat (MLE)	161.8	nu star (bias corrected)	156.2
MLE Mean (bias corrected)	8726	MLE Sd (bias corrected)	8261
		Approximate Chi Square Value (0.05)	128.3
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	127.8
Assuming Gamma Distribution			
95% Approximate Gamma UCL	10623	95% Adjusted Gamma UCL	10667
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0944	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.086	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	6.096	Mean of logged Data	8.583
Maximum of Logged Data	10.47	SD of logged Data	1.066
Assuming Lognormal Distribution			
95% H-UCL	12578	90% Chebyshev (MVUE) UCL	13616
95% Chebyshev (MVUE) UCL	15567	97.5% Chebyshev (MVUE) UCL	18275
99% Chebyshev (MVUE) UCL	23596		
Nonparametric Distribution Free UCL Statistics			

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	10400	95% BCA Bootstrap UCL	10611
95% Standard Bootstrap UCL	10402	95% Bootstrap-t UCL	10736
95% Hall's Bootstrap UCL	10665	95% Percentile Bootstrap UCL	10467
90% Chebyshev(Mean, Sd) UCL	11778	95% Chebyshev(Mean, Sd) UCL	13161
97.5% Chebyshev(Mean, Sd) UCL	15080	99% Chebyshev(Mean, Sd) UCL	18849

Suggested UCL to Use

95% Approximate Gamma UCL	10623		

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

Result (manganese_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	69
		Number of Missing Observations	0
Minimum	16.2	Mean	325
Maximum	1950	Median	308
SD	292.9	Std. Error of Mean	35.01
Coefficient of Variation	0.901	Skewness	2.781

Normal GOF Test

Shapiro Wilk Test Statistic	0.789	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.155E-13	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	383.4	95% Adjusted-CLT UCL (Chen-1995)	395
		95% Modified-t UCL (Johnson-1978)	385.3

Gamma GOF Test

A-D Test Statistic	0.913	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.772	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.118	**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)	1.344	k star (bias corrected MLE)	1.296
Theta hat (MLE)	241.8	Theta star (bias corrected MLE)	250.7
nu hat (MLE)	188.2	nu star (bias corrected)	181.5
MLE Mean (bias corrected)	325	MLE Sd (bias corrected)	285.5
		Approximate Chi Square Value (0.05)	151.3

Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	150.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	389.8	95% Adjusted Gamma UCL	391.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	8.6203E-5	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.165	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.785	Mean of logged Data	5.368
Maximum of Logged Data	7.576	SD of logged Data	1.048

Assuming Lognormal Distribution

95% H-UCL	493.7	90% Chebyshev (MVUE) UCL	533.4
95% Chebyshev (MVUE) UCL	608.7	97.5% Chebyshev (MVUE) UCL	713.3
99% Chebyshev (MVUE) UCL	918.6		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	382.6	95% BCA Bootstrap UCL	396.2
95% Standard Bootstrap UCL	382.5	95% Bootstrap-t UCL	405.5
95% Hall's Bootstrap UCL	430.8	95% Percentile Bootstrap UCL	384.8
90% Chebyshev(Mean, Sd) UCL	430	95% Chebyshev(Mean, Sd) UCL	477.6
97.5% Chebyshev(Mean, Sd) UCL	543.6	99% Chebyshev(Mean, Sd) UCL	673.3

Suggested UCL to Use

95% Student's-t UCL	383.4		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (mercury_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	64
Number of Detects	68	Number of Non-Detects	2
Number of Distinct Detects	63	Number of Distinct Non-Detects	1
Minimum Detect	0.0066	Minimum Non-Detect	0.005
Maximum Detect	0.321	Maximum Non-Detect	0.005
Variance Detects	0.00546	Percent Non-Detects	2.857%
Mean Detects	0.0837	SD Detects	0.0739
Median Detects	0.0587	CV Detects	0.883
Skewness Detects	0.944	Kurtosis Detects	0.28
Mean of Logged Detects	-2.96	SD of Logged Detects	1.066

1717	**Normal GOF Test on Detects Only**			
1718	Shapiro Wilk Test Statistic	0.866	**Normal GOF Test on Detected Observations Only**	
1719	1% Shapiro Wilk P Value	3.9225E-8	Detected Data Not Normal at 1% Significance Level	
1720	Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**	
1721	1% Lilliefors Critical Value	0.124	Detected Data Not Normal at 1% Significance Level	
1722	**Detected Data Not Normal at 1% Significance Level**			
1723				
1724	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1725	KM Mean	0.0815	KM Standard Error of Mean	0.00885
1726	90KM SD	0.0735	95% KM (BCA) UCL	0.0953
1727	95% KM (t) UCL	0.0962	95% KM (Percentile Bootstrap) UCL	0.0958
1728	95% KM (z) UCL	0.096	95% KM Bootstrap t UCL	0.0972
1729	90% KM Chebyshev UCL	0.108	95% KM Chebyshev UCL	0.12
1730	97.5% KM Chebyshev UCL	0.137	99% KM Chebyshev UCL	0.169
1731				
1732	**Gamma GOF Tests on Detected Observations Only**			
1733	A-D Test Statistic	1.636	**Anderson-Darling GOF Test**	
1734	5% A-D Critical Value	0.776	Detected Data Not Gamma Distributed at 5% Significance Level	
1735	K-S Test Statistic	0.138	**Kolmogorov-Smirnov GOF**	
1736	5% K-S Critical Value	0.111	Detected Data Not Gamma Distributed at 5% Significance Level	
1737	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1738				
1739	**Gamma Statistics on Detected Data Only**			
1740	k hat (MLE)	1.181	k star (bias corrected MLE)	1.139
1741	Theta hat (MLE)	0.0709	Theta star (bias corrected MLE)	0.0735
1742	nu hat (MLE)	160.6	nu star (bias corrected)	154.8
1743	Mean (detects)	0.0837		
1744				
1745	**Gamma ROS Statistics using Imputed Non-Detects**			
1746	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1747	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1748	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1749	This is especially true when the sample size is small.			
1750	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1751	Minimum	0.0066	Mean	0.0816
1752	Maximum	0.321	Median	0.0528
1753	SD	0.0739	CV	0.905
1754	k hat (MLE)	1.135	k star (bias corrected MLE)	1.096
1755	Theta hat (MLE)	0.0719	Theta star (bias corrected MLE)	0.0745
1756	nu hat (MLE)	158.9	nu star (bias corrected)	153.4
1757	Adjusted Level of Significance (β)	0.0466		
1758	Approximate Chi Square Value (153.43, α)	125.8	Adjusted Chi Square Value (153.43, β)	125.3
1759	95% Gamma Approximate UCL	0.0995	95% Gamma Adjusted UCL	0.0999
1760				
1761	**Estimates of Gamma Parameters using KM Estimates**			
1762	Mean (KM)	0.0815	SD (KM)	0.0735
1763	Variance (KM)	0.0054	SE of Mean (KM)	0.00885
1764	k hat (KM)	1.229	k star (KM)	1.186
1765	nu hat (KM)	172	nu star (KM)	166
1766	theta hat (KM)	0.0663	theta star (KM)	0.0687
1767	80% gamma percentile (KM)	0.129	90% gamma percentile (KM)	0.18
1768	95% gamma percentile (KM)	0.23	99% gamma percentile (KM)	0.345

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (165.98, α)	137.2	Adjusted Chi Square Value (165.98, β)	136.6
95% KM Approximate Gamma UCL	0.0985	95% KM Adjusted Gamma UCL	0.0989

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.922	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	2.8003E-4	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.0982	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0814	Mean in Log Scale	-3.035
SD in Original Scale	0.074	SD in Log Scale	1.139
95% t UCL (assumes normality of ROS data)	0.0962	95% Percentile Bootstrap UCL	0.0961
95% BCA Bootstrap UCL	0.0967	95% Bootstrap t UCL	0.0973
95% H-UCL (Log ROS)	0.124		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.027	KM Geo Mean	0.0485
KM SD (logged)	1.113	95% Critical H Value (KM-Log)	2.226
KM Standard Error of Mean (logged)	0.134	95% H-UCL (KM -Log)	0.121
KM SD (logged)	1.113	95% Critical H Value (KM-Log)	2.226
KM Standard Error of Mean (logged)	0.134		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0814	Mean in Log Scale	-3.047
SD in Original Scale	0.0741	SD in Log Scale	1.167
95% t UCL (Assumes normality)	0.0961	95% H-Stat UCL	0.127

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

Suggested UCL to Use

95% KM (t) UCL	0.0962

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (molybdenum_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	47
Number of Detects	65	Number of Non-Detects	5
Number of Distinct Detects	46	Number of Distinct Non-Detects	1
Minimum Detect	0.12	Minimum Non-Detect	0.1
Maximum Detect	5.36	Maximum Non-Detect	0.1
Variance Detects	0.487	Percent Non-Detects	7.143%

Mean Detects	0.555	SD Detects	0.698
Median Detects	0.41	CV Detects	1.258
Skewness Detects	5.569	Kurtosis Detects	36.37
Mean of Logged Detects	-0.872	SD of Logged Detects	0.656
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.465	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.127	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.522	KM Standard Error of Mean	0.0816
90KM SD	0.677	95% KM (BCA) UCL	0.677
95% KM (t) UCL	0.658	95% KM (Percentile Bootstrap) UCL	0.675
95% KM (z) UCL	0.656	95% KM Bootstrap t UCL	0.81
90% KM Chebyshev UCL	0.767	95% KM Chebyshev UCL	0.878
97.5% KM Chebyshev UCL	1.032	99% KM Chebyshev UCL	1.334
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.629	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.764	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.151	**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)	1.918	k star (bias corrected MLE)	1.84
Theta hat (MLE)	0.289	Theta star (bias corrected MLE)	0.301
nu hat (MLE)	249.3	nu star (bias corrected)	239.2
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	0.516
Maximum	5.36	Median	0.395
SD	0.686	CV	1.331
k hat (MLE)	1.188	k star (bias corrected MLE)	1.146
Theta hat (MLE)	0.434	Theta star (bias corrected MLE)	0.45
nu hat (MLE)	166.3	nu star (bias corrected)	160.5
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (160.50, α)	132.2	Adjusted Chi Square Value (160.50, β)	131.7
95% Gamma Approximate UCL	0.626	95% Gamma Adjusted UCL	0.629
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.522	SD (KM)	0.677
Variance (KM)	0.459	SE of Mean (KM)	0.0816

k hat (KM)	0.595	k star (KM)	0.579
nu hat (KM)	83.24	nu star (KM)	81.01
theta hat (KM)	0.878	theta star (KM)	0.902
80% gamma percentile (KM)	0.861	90% gamma percentile (KM)	1.369
95% gamma percentile (KM)	1.904	99% gamma percentile (KM)	3.2
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (81.01, α)	61.27	Adjusted Chi Square Value (81.01, β)	60.91
95% KM Approximate Gamma UCL	0.69	95% KM Adjusted Gamma UCL	0.694
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.945	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0.0112	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0819	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.1	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Approximate Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.522	Mean in Log Scale	-0.98
SD in Original Scale	0.682	SD in Log Scale	0.744
95% t UCL (assumes normality of ROS data)	0.658	95% Percentile Bootstrap UCL	0.666
95% BCA Bootstrap UCL	0.729	95% Bootstrap t UCL	0.822
95% H-UCL (Log ROS)	0.596		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.974	KM Geo Mean	0.377
KM SD (logged)	0.728	95% Critical H Value (KM-Log)	2.042
KM Standard Error of Mean (logged)	0.0877	95% H-UCL (KM -Log)	0.588
KM SD (logged)	0.728	95% Critical H Value (KM-Log)	2.042
KM Standard Error of Mean (logged)	0.0877		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.519	Mean in Log Scale	-1.024
SD in Original Scale	0.684	SD in Log Scale	0.839
95% t UCL (Assumes normality)	0.655	95% H-Stat UCL	0.634
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 10% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.588		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Result (nickel_soil)

General Statistics			
Total Number of Observations	70	Number of Distinct Observations	64
		Number of Missing Observations	0
Minimum	1.89	Mean	13.91
Maximum	40.6	Median	13.55
SD	8.678	Std. Error of Mean	1.037
Coefficient of Variation	0.624	Skewness	0.461
Normal GOF Test			
Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	3.9372E-4	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.64	95% Adjusted-CLT UCL (Chen-1995)	15.68
		95% Modified-t UCL (Johnson-1978)	15.65
Gamma GOF Test			
A-D Test Statistic	1.875	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.132	**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)	2.085	k star (bias corrected MLE)	2.005
Theta hat (MLE)	6.671	Theta star (bias corrected MLE)	6.936
nu hat (MLE)	291.9	nu star (bias corrected)	280.7
MLE Mean (bias corrected)	13.91	MLE Sd (bias corrected)	9.822
		Approximate Chi Square Value (0.05)	242.9
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	242.2
Assuming Gamma Distribution			
95% Approximate Gamma UCL	16.07	95% Adjusted Gamma UCL	16.12
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	3.2421E-6	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.637	Mean of logged Data	2.374
Maximum of Logged Data	3.704	SD of logged Data	0.797

Assuming Lognormal Distribution

95% H-UCL	18.05	90% Chebyshev (MVUE) UCL	19.4
95% Chebyshev (MVUE) UCL	21.54	97.5% Chebyshev (MVUE) UCL	24.51
99% Chebyshev (MVUE) UCL	30.34		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	15.61	95% BCA Bootstrap UCL	15.57
95% Standard Bootstrap UCL	15.58	95% Bootstrap-t UCL	15.69
95% Hall's Bootstrap UCL	15.67	95% Percentile Bootstrap UCL	15.66
90% Chebyshev(Mean, Sd) UCL	17.02	95% Chebyshev(Mean, Sd) UCL	18.43
97.5% Chebyshev(Mean, Sd) UCL	20.39	99% Chebyshev(Mean, Sd) UCL	24.23

Suggested UCL to Use

95% Student's-t UCL	15.64		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (phosphorus_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	64
		Number of Missing Observations	0
Minimum	194	Mean	537.4
Maximum	1250	Median	484.5
SD	191.9	Std. Error of Mean	22.93
Coefficient of Variation	0.357	Skewness	1.436

Normal GOF Test

Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	5.8375E-6	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	575.7	95% Adjusted-CLT UCL (Chen-1995)	579.4
		95% Modified-t UCL (Johnson-1978)	576.3

Gamma GOF Test

A-D Test Statistic	0.663	**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	0.0919	**Kolmogorov-Smirnov Gamma GOF Test**	
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			
k hat (MLE)	9.005	k star (bias corrected MLE)	8.629
Theta hat (MLE)	59.68	Theta star (bias corrected MLE)	62.28
nu hat (MLE)	1261	nu star (bias corrected)	1208
MLE Mean (bias corrected)	537.4	MLE Sd (bias corrected)	183
		Approximate Chi Square Value (0.05)	1128
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	1127
Assuming Gamma Distribution			
95% Approximate Gamma UCL	575.4	95% Adjusted Gamma UCL	576.2
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.981	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.698	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0715	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.0969	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.268	Mean of logged Data	6.23
Maximum of Logged Data	7.131	SD of logged Data	0.337
Assuming Lognormal Distribution			
95% H-UCL	577.6	90% Chebyshev (MVUE) UCL	603.4
95% Chebyshev (MVUE) UCL	633.5	97.5% Chebyshev (MVUE) UCL	675.3
99% Chebyshev (MVUE) UCL	757.3		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	575.1	95% BCA Bootstrap UCL	580.9
95% Standard Bootstrap UCL	574.6	95% Bootstrap-t UCL	580.3
95% Hall's Bootstrap UCL	580.9	95% Percentile Bootstrap UCL	576.6
90% Chebyshev(Mean, Sd) UCL	606.2	95% Chebyshev(Mean, Sd) UCL	637.4
97.5% Chebyshev(Mean, Sd) UCL	680.6	99% Chebyshev(Mean, Sd) UCL	765.6
Suggested UCL to Use			
95% Student's-t UCL	575.7		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (potassium_soil)			

General Statistics

Total Number of Observations	70	Number of Distinct Observations	57
Number of Detects	68	Number of Non-Detects	2
Number of Distinct Detects	57	Number of Distinct Non-Detects	2
Minimum Detect	150	Minimum Non-Detect	150
Maximum Detect	5680	Maximum Non-Detect	300
Variance Detects	1084405	Percent Non-Detects	2.857%
Mean Detects	1309	SD Detects	1041
Median Detects	860	CV Detects	0.795
Skewness Detects	1.366	Kurtosis Detects	3
Mean of Logged Detects	6.843	SD of Logged Detects	0.866

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.861	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	1.7319E-8	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.124	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	1277	KM Standard Error of Mean	124.7
90KM SD	1036	95% KM (BCA) UCL	1494
95% KM (t) UCL	1485	95% KM (Percentile Bootstrap) UCL	1481
95% KM (z) UCL	1482	95% KM Bootstrap t UCL	1517
90% KM Chebyshev UCL	1651	95% KM Chebyshev UCL	1821
97.5% KM Chebyshev UCL	2056	99% KM Chebyshev UCL	2518

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.199	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.767	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**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)	1.645	k star (bias corrected MLE)	1.582
Theta hat (MLE)	796	Theta star (bias corrected MLE)	827.6
nu hat (MLE)	223.7	nu star (bias corrected)	215.1
Mean (detects)	1309		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	1274
Maximum	5680	Median	830
SD	1047	CV	0.822
k hat (MLE)	1.142	k star (bias corrected MLE)	1.103
Theta hat (MLE)	1115	Theta star (bias corrected MLE)	1155

2133	nu hat (MLE)	159.9	nu star (bias corrected)	154.4
2134	Adjusted Level of Significance (β)	0.0466		
2135	Approximate Chi Square Value (154.42, α)	126.7	Adjusted Chi Square Value (154.42, β)	126.2
2136	95% Gamma Approximate UCL	1552	95% Gamma Adjusted UCL	1559
2137				
2138	**Estimates of Gamma Parameters using KM Estimates**			
2139	Mean (KM)	1277	SD (KM)	1036
2140	Variance (KM)	1073164	SE of Mean (KM)	124.7
2141	k hat (KM)	1.519	k star (KM)	1.464
2142	nu hat (KM)	212.7	nu star (KM)	204.9
2143	theta hat (KM)	840.4	theta star (KM)	872.3
2144	80% gamma percentile (KM)	1981	90% gamma percentile (KM)	2677
2145	95% gamma percentile (KM)	3354	99% gamma percentile (KM)	4884
2146				
2147	**Gamma Kaplan-Meier (KM) Statistics**			
2148	Approximate Chi Square Value (204.94, α)	172.8	Adjusted Chi Square Value (204.94, β)	172.2
2149	95% KM Approximate Gamma UCL	1514	95% KM Adjusted Gamma UCL	1520
2150				
2151	**Lognormal GOF Test on Detected Observations Only**			
2152	Shapiro Wilk Approximate Test Statistic	0.946	**Shapiro Wilk GOF Test**	
2153	10% Shapiro Wilk P Value	0.011	Detected Data Not Lognormal at 10% Significance Level	
2154	Lilliefors Test Statistic	0.127	**Lilliefors GOF Test**	
2155	10% Lilliefors Critical Value	0.0982	Detected Data Not Lognormal at 10% Significance Level	
2156	**Detected Data Not Lognormal at 10% Significance Level**			
2157				
2158	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2159	Mean in Original Scale	1276	Mean in Log Scale	6.79
2160	SD in Original Scale	1044	SD in Log Scale	0.911
2161	95% t UCL (assumes normality of ROS data)	1484	95% Percentile Bootstrap UCL	1482
2162	95% BCA Bootstrap UCL	1497	95% Bootstrap t UCL	1509
2163	95% H-UCL (Log ROS)	1716		
2164				
2165	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2166	KM Mean (logged)	6.796	KM Geo Mean	894.1
2167	KM SD (logged)	0.892	95% Critical H Value (KM-Log)	2.19
2168	KM Standard Error of Mean (logged)	0.107	95% H-UCL (KM -Log)	1684
2169	KM SD (logged)	0.892	95% Critical H Value (KM-Log)	2.19
2170	KM Standard Error of Mean (logged)	0.107		
2171				
2172	**DL/2 Statistics**			
2173	**DL/2 Normal**		**DL/2 Log-Transformed**	
2174	Mean in Original Scale	1275	Mean in Log Scale	6.781
2175	SD in Original Scale	1046	SD in Log Scale	0.931
2176	95% t UCL (Assumes normality)	1483	95% H-Stat UCL	1741
2177	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2178				
2179	**Nonparametric Distribution Free UCL Statistics**			
2180	**Data do not follow a Discernible Distribution**			
2181				
2182	**Suggested UCL to Use**			
2183	95% KM (t) UCL	1485		
2184				

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

Result (selenium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	34
Number of Detects	41	Number of Non-Detects	29
Number of Distinct Detects	34	Number of Distinct Non-Detects	1
Minimum Detect	0.2	Minimum Non-Detect	0.2
Maximum Detect	2.14	Maximum Non-Detect	0.2
Variance Detects	0.12	Percent Non-Detects	41.43%
Mean Detects	0.712	SD Detects	0.347
Median Detects	0.71	CV Detects	0.488
Skewness Detects	1.549	Kurtosis Detects	5.894
Mean of Logged Detects	-0.457	SD of Logged Detects	0.51

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.92	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.16	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

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

KM Mean	0.5	KM Standard Error of Mean	0.044
90KM SD	0.364	95% KM (BCA) UCL	0.571
95% KM (t) UCL	0.573	95% KM (Percentile Bootstrap) UCL	0.571
95% KM (z) UCL	0.572	95% KM Bootstrap t UCL	0.587
90% KM Chebyshev UCL	0.632	95% KM Chebyshev UCL	0.692
97.5% KM Chebyshev UCL	0.775	99% KM Chebyshev UCL	0.938

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.636	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.112	**Kolmogorov-Smirnov GOF**
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 on Detected Data Only

k hat (MLE)	4.435	k star (bias corrected MLE)	4.127
Theta hat (MLE)	0.16	Theta star (bias corrected MLE)	0.172
nu hat (MLE)	363.7	nu star (bias corrected)	338.4
Mean (detects)	0.712		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when 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	0.464
Maximum	2.14	Median	0.365
SD	0.402	CV	0.867
k hat (MLE)	0.876	k star (bias corrected MLE)	0.848
Theta hat (MLE)	0.53	Theta star (bias corrected MLE)	0.547
nu hat (MLE)	122.6	nu star (bias corrected)	118.7
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (118.72, α)	94.56	Adjusted Chi Square Value (118.72, β)	94.11
95% Gamma Approximate UCL	0.583	95% Gamma Adjusted UCL	0.585
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.5	SD (KM)	0.364
Variance (KM)	0.132	SE of Mean (KM)	0.044
k hat (KM)	1.887	k star (KM)	1.816
nu hat (KM)	264.2	nu star (KM)	254.2
theta hat (KM)	0.265	theta star (KM)	0.275
80% gamma percentile (KM)	0.757	90% gamma percentile (KM)	0.994
95% gamma percentile (KM)	1.222	99% gamma percentile (KM)	1.731
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (254.20, α)	218.3	Adjusted Chi Square Value (254.20, β)	217.6
95% KM Approximate Gamma UCL	0.582	95% KM Adjusted Gamma UCL	0.584
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.95	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.126	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Approximate Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.501	Mean in Log Scale	-0.956
SD in Original Scale	0.368	SD in Log Scale	0.757
95% t UCL (assumes normality of ROS data)	0.574	95% Percentile Bootstrap UCL	0.574
95% BCA Bootstrap UCL	0.579	95% Bootstrap t UCL	0.584
95% H-UCL (Log ROS)	0.618		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.934	KM Geo Mean	0.393
KM SD (logged)	0.686	95% Critical H Value (KM-Log)	2.008
KM Standard Error of Mean (logged)	0.0831	95% H-UCL (KM -Log)	0.587
KM SD (logged)	0.686	95% Critical H Value (KM-Log)	2.008
KM Standard Error of Mean (logged)	0.0831		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.458	Mean in Log Scale	-1.222
SD in Original Scale	0.402	SD in Log Scale	0.995
95% t UCL (Assumes normality)	0.538	95% H-Stat UCL	0.633
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 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.573		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (silver_soil)			
General Statistics			
Total Number of Observations	70	Number of Distinct Observations	11
Number of Detects	9	Number of Non-Detects	61
Number of Distinct Detects	8	Number of Distinct Non-Detects	3
Minimum Detect	0.11	Minimum Non-Detect	0.1
Maximum Detect	0.5	Maximum Non-Detect	0.3
Variance Detects	0.0148	Percent Non-Detects	87.14%
Mean Detects	0.247	SD Detects	0.122
Median Detects	0.2	CV Detects	0.493
Skewness Detects	1.401	Kurtosis Detects	1.486
Mean of Logged Detects	-1.494	SD of Logged Detects	0.449
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.119	KM Standard Error of Mean	0.00814
90KM SD	0.0641	95% KM (BCA) UCL	0.134
95% KM (t) UCL	0.133	95% KM (Percentile Bootstrap) UCL	0.133
95% KM (z) UCL	0.132	95% KM Bootstrap t UCL	0.142
90% KM Chebyshev UCL	0.143	95% KM Chebyshev UCL	0.155
97.5% KM Chebyshev UCL	0.17	99% KM Chebyshev UCL	0.2
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.487	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.246	**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			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics on Detected Data Only			
k hat (MLE)	5.474	k star (bias corrected MLE)	3.723

Theta hat (MLE)	0.0451	Theta star (bias corrected MLE)	0.0662
nu hat (MLE)	98.53	nu star (bias corrected)	67.02
Mean (detects)	0.247		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.0438
Maximum	0.5	Median	0.01
SD	0.0897	CV	2.048
k hat (MLE)	0.643	k star (bias corrected MLE)	0.625
Theta hat (MLE)	0.0681	Theta star (bias corrected MLE)	0.0701
nu hat (MLE)	90.01	nu star (bias corrected)	87.48
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (87.48, α)	66.92	Adjusted Chi Square Value (87.48, β)	66.54
95% Gamma Approximate UCL	0.0573	95% Gamma Adjusted UCL	0.0576
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.119	SD (KM)	0.0641
Variance (KM)	0.00411	SE of Mean (KM)	0.00814
k hat (KM)	3.45	k star (KM)	3.312
nu hat (KM)	483.1	nu star (KM)	463.7
theta hat (KM)	0.0345	theta star (KM)	0.0359
80% gamma percentile (KM)	0.168	90% gamma percentile (KM)	0.207
95% gamma percentile (KM)	0.243	99% gamma percentile (KM)	0.321
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (463.69, α)	414.8	Adjusted Chi Square Value (463.69, β)	413.8
95% KM Approximate Gamma UCL	0.133	95% KM Adjusted Gamma UCL	0.133
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0661	Mean in Log Scale	-3.274
SD in Original Scale	0.0857	SD in Log Scale	1.055
95% t UCL (assumes normality of ROS data)	0.0832	95% Percentile Bootstrap UCL	0.084
95% BCA Bootstrap UCL	0.087	95% Bootstrap t UCL	0.0905
95% H-UCL (Log ROS)	0.0879		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.197	KM Geo Mean	0.111
KM SD (logged)	0.311	95% Critical H Value (KM-Log)	1.763
KM Standard Error of Mean (logged)	0.0396	95% H-UCL (KM -Log)	0.125

KM SD (logged)	0.311	95% Critical H Value (KM-Log)	1.763
KM Standard Error of Mean (logged)	0.0396		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0842	Mean in Log Scale	-2.665
SD in Original Scale	0.0769	SD in Log Scale	0.524
95% t UCL (Assumes normality)	0.0995	95% H-Stat UCL	0.0899
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.133		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (sodium_soil)			
General Statistics			
Total Number of Observations	70	Number of Distinct Observations	52
Number of Detects	55	Number of Non-Detects	15
Number of Distinct Detects	48	Number of Distinct Non-Detects	5
Minimum Detect	66	Minimum Non-Detect	50
Maximum Detect	354	Maximum Non-Detect	76
Variance Detects	6129	Percent Non-Detects	21.43%
Mean Detects	162.6	SD Detects	78.29
Median Detects	156	CV Detects	0.481
Skewness Detects	0.711	Kurtosis Detects	-0.273
Mean of Logged Detects	4.977	SD of Logged Detects	0.487
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.91	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	3.5942E-4	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.138	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	141.3	KM Standard Error of Mean	9.681
90KM SD	80.04	95% KM (BCA) UCL	157.2
95% KM (t) UCL	157.5	95% KM (Percentile Bootstrap) UCL	157.1
95% KM (z) UCL	157.3	95% KM Bootstrap t UCL	158.4
90% KM Chebyshev UCL	170.4	95% KM Chebyshev UCL	183.5
97.5% KM Chebyshev UCL	201.8	99% KM Chebyshev UCL	237.7
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.785	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.754	Detected Data Not Gamma Distributed at 5% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
2445					K-S Test Statistic	0.132	Kolmogorov-Smirnov GOF					
2446					5% K-S Critical Value	0.12	Detected Data Not Gamma Distributed at 5% Significance Level					
2447	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2448												
2449	**Gamma Statistics on Detected Data Only**											
2450					k hat (MLE)	4.528					k star (bias corrected MLE)	4.293
2451					Theta hat (MLE)	35.91					Theta star (bias corrected MLE)	37.87
2452					nu hat (MLE)	498.1					nu star (bias corrected)	472.2
2453					Mean (detects)	162.6						
2454												
2455	**Gamma ROS Statistics using Imputed Non-Detects**											
2456	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2457	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2458	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2459	This is especially true when the sample size is small.											
2460	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2461					Minimum	3.623					Mean	137.1
2462					Maximum	354					Median	109
2463					SD	85.54					CV	0.624
2464					k hat (MLE)	2.181					k star (bias corrected MLE)	2.097
2465					Theta hat (MLE)	62.87					Theta star (bias corrected MLE)	65.38
2466					nu hat (MLE)	305.3					nu star (bias corrected)	293.6
2467					Adjusted Level of Significance (β)	0.0466						
2468					Approximate Chi Square Value (293.56, α)	254.9					Adjusted Chi Square Value (293.56, β)	254.1
2469					95% Gamma Approximate UCL	157.9					95% Gamma Adjusted UCL	158.4
2470												
2471	**Estimates of Gamma Parameters using KM Estimates**											
2472					Mean (KM)	141.3					SD (KM)	80.04
2473					Variance (KM)	6406					SE of Mean (KM)	9.681
2474					k hat (KM)	3.118					k star (KM)	2.994
2475					nu hat (KM)	436.6					nu star (KM)	419.2
2476					theta hat (KM)	45.32					theta star (KM)	47.2
2477					80% gamma percentile (KM)	201.6					90% gamma percentile (KM)	250.8
2478					95% gamma percentile (KM)	296.8					99% gamma percentile (KM)	396.3
2479												
2480	**Gamma Kaplan-Meier (KM) Statistics**											
2481					Approximate Chi Square Value (419.21, α)	372.7					Adjusted Chi Square Value (419.21, β)	371.8
2482					95% KM Approximate Gamma UCL	159					95% KM Adjusted Gamma UCL	159.3
2483												
2484	**Lognormal GOF Test on Detected Observations Only**											
2485					Shapiro Wilk Approximate Test Statistic	0.938	**Shapiro Wilk GOF Test**					
2486					10% Shapiro Wilk P Value	0.00997	Detected Data Not Lognormal at 10% Significance Level					
2487					Lilliefors Test Statistic	0.115	**Lilliefors GOF Test**					
2488					10% Lilliefors Critical Value	0.109	Detected Data Not Lognormal at 10% Significance Level					
2489	**Detected Data Not Lognormal at 10% Significance Level**											
2490												
2491	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2492					Mean in Original Scale	140.5					Mean in Log Scale	4.78
2493					SD in Original Scale	81.57					SD in Log Scale	0.586
2494					95% t UCL (assumes normality of ROS data)	156.8					95% Percentile Bootstrap UCL	156.7
2495					95% BCA Bootstrap UCL	157.7					95% Bootstrap t UCL	157.5
2496					95% H-UCL (Log ROS)	162						

	A–E	F	G–K	L
2497				
2498	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2499	KM Mean (logged)	4.797	KM Geo Mean	121.1
2500	KM SD (logged)	0.555	95% Critical H Value (KM-Log)	1.907
2501	KM Standard Error of Mean (logged)	0.068	95% H-UCL (KM -Log)	160.5
2502	KM SD (logged)	0.555	95% Critical H Value (KM-Log)	1.907
2503	KM Standard Error of Mean (logged)	0.068		
2504				
2505	**DL/2 Statistics**			
2506	**DL/2 Normal**		**DL/2 Log-Transformed**	
2507	Mean in Original Scale	135.4	Mean in Log Scale	4.674
2508	SD in Original Scale	86.91	SD in Log Scale	0.728
2509	95% t UCL (Assumes normality)	152.7	95% H-Stat UCL	167.1
2510	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2511				
2512	**Nonparametric Distribution Free UCL Statistics**			
2513	**Data do not follow a Discernible Distribution**			
2514				
2515	**Suggested UCL to Use**			
2516	95% KM (t) UCL	157.5		
2517				
2518	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2519	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2520	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2521				
2522	**Result (strontium_soil)**			
2523				
2524	**General Statistics**			
2525	Total Number of Observations	70	Number of Distinct Observations	64
2526			Number of Missing Observations	0
2527	Minimum	4.97	Mean	35.89
2528	Maximum	89.9	Median	32.05
2529	SD	19.09	Std. Error of Mean	2.281
2530	Coefficient of Variation	0.532	Skewness	1.097
2531				
2532	**Normal GOF Test**			
2533	Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**	
2534	1% Shapiro Wilk P Value	1.5360E-5	Data Not Normal at 1% Significance Level	
2535	Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
2536	1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level	
2537	**Data Not Normal at 1% Significance Level**			
2538				
2539	**Assuming Normal Distribution**			
2540	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2541	95% Student's-t UCL	39.7	95% Adjusted-CLT UCL (Chen-1995)	39.96
2542			95% Modified-t UCL (Johnson-1978)	39.75
2543				
2544	**Gamma GOF Test**			
2545	A-D Test Statistic	0.37	**Anderson-Darling Gamma GOF Test**	
2546	5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
2547	K-S Test Statistic	0.107	**Kolmogorov-Smirnov Gamma GOF Test**	
2548	5% K-S Critical Value	0.107	Data Not Gamma Distributed at 5% Significance Level	

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

Gamma Statistics

k hat (MLE)	3.744	k star (bias corrected MLE)	3.593
Theta hat (MLE)	9.587	Theta star (bias corrected MLE)	9.989
nu hat (MLE)	524.2	nu star (bias corrected)	503
MLE Mean (bias corrected)	35.89	MLE Sd (bias corrected)	18.94
		Approximate Chi Square Value (0.05)	452
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	451

Assuming Gamma Distribution

95% Approximate Gamma UCL	39.94	95% Adjusted Gamma UCL	40.03

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.477	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0818	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0969	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.603	Mean of logged Data	3.441
Maximum of Logged Data	4.499	SD of logged Data	0.551

Assuming Lognormal Distribution

95% H-UCL	41.24	90% Chebyshev (MVUE) UCL	43.88
95% Chebyshev (MVUE) UCL	47.33	97.5% Chebyshev (MVUE) UCL	52.12
99% Chebyshev (MVUE) UCL	61.54		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	39.65	95% BCA Bootstrap UCL	39.93
95% Standard Bootstrap UCL	39.67	95% Bootstrap-t UCL	40.26
95% Hall's Bootstrap UCL	40.25	95% Percentile Bootstrap UCL	39.7
90% Chebyshev(Mean, Sd) UCL	42.74	95% Chebyshev(Mean, Sd) UCL	45.84
97.5% Chebyshev(Mean, Sd) UCL	50.14	99% Chebyshev(Mean, Sd) UCL	58.59

Suggested UCL to Use

95% Approximate Gamma UCL	39.94		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (sulfur_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	10
Number of Detects	10	Number of Non-Detects	60
Number of Distinct Detects	7	Number of Distinct Non-Detects	3
Minimum Detect	1100	Minimum Non-Detect	1000
Maximum Detect	2900	Maximum Non-Detect	3000
Variance Detects	284556	Percent Non-Detects	85.71%
Mean Detects	1730	SD Detects	533.4
Median Detects	1700	CV Detects	0.308
Skewness Detects	1.148	Kurtosis Detects	1.559
Mean of Logged Detects	7.417	SD of Logged Detects	0.291

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.781	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.304	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

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

KM Mean	1113	KM Standard Error of Mean	41.52
90KM SD	322.4	95% KM (BCA) UCL	1186
95% KM (t) UCL	1182	95% KM (Percentile Bootstrap) UCL	1180
95% KM (z) UCL	1181	95% KM Bootstrap t UCL	1208
90% KM Chebyshev UCL	1237	95% KM Chebyshev UCL	1294
97.5% KM Chebyshev UCL	1372	99% KM Chebyshev UCL	1526

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.277	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**	
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 on Detected Data Only

k hat (MLE)	12.91	k star (bias corrected MLE)	9.1
Theta hat (MLE)	134.1	Theta star (bias corrected MLE)	190.1
nu hat (MLE)	258.1	nu star (bias corrected)	182
Mean (detects)	1730		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	412.9
Maximum	2900	Median	0.01
SD	644	CV	1.56
k hat (MLE)	0.142	k star (bias corrected MLE)	0.146
Theta hat (MLE)	2899	Theta star (bias corrected MLE)	2831
nu hat (MLE)	19.94	nu star (bias corrected)	20.41
Adjusted Level of Significance (β)	0.0466		

Approximate Chi Square Value (20.41, α)	11.16	Adjusted Chi Square Value (20.41, β)	11.01
95% Gamma Approximate UCL	755.4	95% Gamma Adjusted UCL	765.3
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1113	SD (KM)	322.4
Variance (KM)	103966	SE of Mean (KM)	41.52
k hat (KM)	11.91	k star (KM)	11.41
nu hat (KM)	1667	nu star (KM)	1597
theta hat (KM)	93.44	theta star (KM)	97.54
80% gamma percentile (KM)	1376	90% gamma percentile (KM)	1550
95% gamma percentile (KM)	1704	99% gamma percentile (KM)	2019
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (N/A, α)	1505	Adjusted Chi Square Value (N/A, β)	1503
95% KM Approximate Gamma UCL	1181	95% KM Adjusted Gamma UCL	1182
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.869	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.241	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	706.3	Mean in Log Scale	6.333
SD in Original Scale	523.6	SD in Log Scale	0.675
95% t UCL (assumes normality of ROS data)	810.7	95% Percentile Bootstrap UCL	814.6
95% BCA Bootstrap UCL	830.4	95% Bootstrap t UCL	829.9
95% H-UCL (Log ROS)	831.5		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	6.987	KM Geo Mean	1083
KM SD (logged)	0.209	95% Critical H Value (KM-Log)	1.719
KM Standard Error of Mean (logged)	0.0272	95% H-UCL (KM -Log)	1156
KM SD (logged)	0.209	95% Critical H Value (KM-Log)	1.719
KM Standard Error of Mean (logged)	0.0272		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	757.9	Mean in Log Scale	6.512
SD in Original Scale	469.7	SD in Log Scale	0.44
95% t UCL (Assumes normality)	851.5	95% H-Stat UCL	817.1
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1182		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (thallium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	45
Number of Detects	47	Number of Non-Detects	23
Number of Distinct Detects	42	Number of Distinct Non-Detects	6
Minimum Detect	0.055	Minimum Non-Detect	0.05
Maximum Detect	0.256	Maximum Non-Detect	0.151
Variance Detects	0.00174	Percent Non-Detects	32.86%
Mean Detects	0.119	SD Detects	0.0417
Median Detects	0.12	CV Detects	0.35
Skewness Detects	1.053	Kurtosis Detects	1.983
Mean of Logged Detects	-2.184	SD of Logged Detects	0.341

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.928	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.15	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

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

KM Mean	0.0982	KM Standard Error of Mean	0.00558
90KM SD	0.0457	95% KM (BCA) UCL	0.107
95% KM (t) UCL	0.107	95% KM (Percentile Bootstrap) UCL	0.107
95% KM (z) UCL	0.107	95% KM Bootstrap t UCL	0.108
90% KM Chebyshev UCL	0.115	95% KM Chebyshev UCL	0.122
97.5% KM Chebyshev UCL	0.133	99% KM Chebyshev UCL	0.154

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.521	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.104	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.129	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	8.948	k star (bias corrected MLE)	8.391
Theta hat (MLE)	0.0133	Theta star (bias corrected MLE)	0.0142
nu hat (MLE)	841.1	nu star (bias corrected)	788.8
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	0.0113	Mean	0.0952
Maximum	0.256	Median	0.0885

	A	B	C	D	E	F	G	H	I	J	K	L
2757					SD	0.0494					CV	0.519
2758					k hat (MLE)	3.444					k star (bias corrected MLE)	3.306
2759					Theta hat (MLE)	0.0276					Theta star (bias corrected MLE)	0.0288
2760					nu hat (MLE)	482.2					nu star (bias corrected)	462.8
2761					Adjusted Level of Significance (β)	0.0466						
2762					Approximate Chi Square Value (462.83, α)	413.9					Adjusted Chi Square Value (462.83, β)	413
2763					95% Gamma Approximate UCL	0.106					95% Gamma Adjusted UCL	0.107
2764												
2765	**Estimates of Gamma Parameters using KM Estimates**											
2766					Mean (KM)	0.0982					SD (KM)	0.0457
2767					Variance (KM)	0.00209					SE of Mean (KM)	0.00558
2768					k hat (KM)	4.604					k star (KM)	4.416
2769					nu hat (KM)	644.5					nu star (KM)	618.3
2770					theta hat (KM)	0.0213					theta star (KM)	0.0222
2771					80% gamma percentile (KM)	0.134					90% gamma percentile (KM)	0.161
2772					95% gamma percentile (KM)	0.185					99% gamma percentile (KM)	0.238
2773												
2774	**Gamma Kaplan-Meier (KM) Statistics**											
2775					Approximate Chi Square Value (618.26, α)	561.6					Adjusted Chi Square Value (618.26, β)	560.4
2776					95% KM Approximate Gamma UCL	0.108					95% KM Adjusted Gamma UCL	0.108
2777												
2778	**Lognormal GOF Test on Detected Observations Only**											
2779					Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**					
2780					10% Shapiro Wilk Critical Value	0.954	Detected Data appear Lognormal at 10% Significance Level					
2781					Lilliefors Test Statistic	0.11	**Lilliefors GOF Test**					
2782					10% Lilliefors Critical Value	0.118	Detected Data appear Lognormal at 10% Significance Level					
2783	**Detected Data appear Lognormal at 10% Significance Level**											
2784												
2785	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2786					Mean in Original Scale	0.0985					Mean in Log Scale	-2.419
2787					SD in Original Scale	0.0457					SD in Log Scale	0.454
2788					95% t UCL (assumes normality of ROS data)	0.108					95% Percentile Bootstrap UCL	0.108
2789					95% BCA Bootstrap UCL	0.108					95% Bootstrap t UCL	0.108
2790					95% H-UCL (Log ROS)	0.109						
2791												
2792	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2793					KM Mean (logged)	-2.424					KM Geo Mean	0.0886
2794					KM SD (logged)	0.451					95% Critical H Value (KM-Log)	1.839
2795					KM Standard Error of Mean (logged)	0.0558					95% H-UCL (KM -Log)	0.108
2796					KM SD (logged)	0.451					95% Critical H Value (KM-Log)	1.839
2797					KM Standard Error of Mean (logged)	0.0558						
2798												
2799	**DL/2 Statistics**											
2800	**DL/2 Normal**						**DL/2 Log-Transformed**					
2801					Mean in Original Scale	0.0912					Mean in Log Scale	-2.589
2802					SD in Original Scale	0.053					SD in Log Scale	0.663
2803					95% t UCL (Assumes normality)	0.102					95% H-Stat UCL	0.11
2804	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2805												
2806	**Nonparametric Distribution Free UCL Statistics**											
2807	**Detected Data appear Approximate Normal Distributed at 1% Significance Level**											
2808												

Suggested UCL to Use

95% KM (t) UCL	0.107

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tin_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	5
Number of Detects	1	Number of Non-Detects	69
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 Result (tin_soil) was not processed!

Result (titanium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	70
		Number of Missing Observations	0
Minimum	18.9	Mean	442.4
Maximum	1260	Median	386.5
SD	353.4	Std. Error of Mean	42.24
Coefficient of Variation	0.799	Skewness	0.481

Normal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.0566E-5	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.117	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	512.9	95% Adjusted-CLT UCL (Chen-1995)	514.5
		95% Modified-t UCL (Johnson-1978)	513.3

Gamma GOF Test

A-D Test Statistic	1.768	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.78	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.111	**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)	1.038	k star (bias corrected MLE)	1.003
Theta hat (MLE)	426.1	Theta star (bias corrected MLE)	441
nu hat (MLE)	145.4	nu star (bias corrected)	140.5
MLE Mean (bias corrected)	442.4	MLE Sd (bias corrected)	441.7
		Approximate Chi Square Value (0.05)	114.1
Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	113.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	544.8	95% Adjusted Gamma UCL	547.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	1.5490E-8	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.939	Mean of logged Data	5.539
Maximum of Logged Data	7.139	SD of logged Data	1.274

Assuming Lognormal Distribution

95% H-UCL	786.3	90% Chebyshev (MVUE) UCL	889
95% Chebyshev (MVUE) UCL	1038	97.5% Chebyshev (MVUE) UCL	1244
99% Chebyshev (MVUE) UCL	1649		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	511.9	95% BCA Bootstrap UCL	510.9
95% Standard Bootstrap UCL	511.9	95% Bootstrap-t UCL	517.6
95% Hall's Bootstrap UCL	515.2	95% Percentile Bootstrap UCL	512
90% Chebyshev(Mean, Sd) UCL	569.2	95% Chebyshev(Mean, Sd) UCL	626.6
97.5% Chebyshev(Mean, Sd) UCL	706.2	99% Chebyshev(Mean, Sd) UCL	862.7

Suggested UCL to Use

95% Student's-t UCL	512.9		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tungsten_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	6

Number of Detects	0	Number of Non-Detects	70
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

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 Result (tungsten_soil) was not processed!

Result (uranium_soil)

General Statistics			
Total Number of Observations	70	Number of Distinct Observations	64
Number of Detects	63	Number of Non-Detects	7
Number of Distinct Detects	61	Number of Distinct Non-Detects	3
Minimum Detect	0.083	Minimum Non-Detect	0.073
Maximum Detect	13.5	Maximum Non-Detect	0.151
Variance Detects	3.202	Percent Non-Detects	10%
Mean Detects	0.846	SD Detects	1.79
Median Detects	0.469	CV Detects	2.115
Skewness Detects	6.093	Kurtosis Detects	41.72
Mean of Logged Detects	-0.784	SD of Logged Detects	0.95

Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.373	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.129	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.769	KM Standard Error of Mean	0.205
90KM SD	1.7	95% KM (BCA) UCL	1.163
95% KM (t) UCL	1.11	95% KM (Percentile Bootstrap) UCL	1.141
95% KM (z) UCL	1.106	95% KM Bootstrap t UCL	1.715
90% KM Chebyshev UCL	1.383	95% KM Chebyshev UCL	1.662
97.5% KM Chebyshev UCL	2.048	99% KM Chebyshev UCL	2.807

Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.785	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.782	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.22	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.116	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)	0.943	k star (bias corrected MLE)	0.908
Theta hat (MLE)	0.898	Theta star (bias corrected MLE)	0.931
nu hat (MLE)	118.8	nu star (bias corrected)	114.4
Mean (detects)	0.846		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.762
Maximum	13.5	Median	0.426
SD	1.715	CV	2.25
k hat (MLE)	0.678	k star (bias corrected MLE)	0.659
Theta hat (MLE)	1.124	Theta star (bias corrected MLE)	1.157
nu hat (MLE)	94.97	nu star (bias corrected)	92.24
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (92.24, α)	71.09	Adjusted Chi Square Value (92.24, β)	70.7
95% Gamma Approximate UCL	0.989	95% Gamma Adjusted UCL	0.995

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.769	SD (KM)	1.7
Variance (KM)	2.89	SE of Mean (KM)	0.205
k hat (KM)	0.205	k star (KM)	0.205
nu hat (KM)	28.64	nu star (KM)	28.74
theta hat (KM)	3.759	theta star (KM)	3.745
80% gamma percentile (KM)	1.027	90% gamma percentile (KM)	2.326
95% gamma percentile (KM)	3.934	99% gamma percentile (KM)	8.345

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.74, α)	17.51	Adjusted Chi Square Value (28.74, β)	17.32
95% KM Approximate Gamma UCL	1.262	95% KM Adjusted Gamma UCL	1.276

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.949	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0.024	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.114	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.102	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.767	Mean in Log Scale	-0.992
SD in Original Scale	1.713	SD in Log Scale	1.103
95% t UCL (assumes normality of ROS data)	1.109	95% Percentile Bootstrap UCL	1.134
95% BCA Bootstrap UCL	1.31	95% Bootstrap t UCL	1.66
95% H-UCL (Log ROS)	0.917		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.965	KM Geo Mean	0.381
KM SD (logged)	1.046	95% Critical H Value (KM-Log)	2.254
KM Standard Error of Mean (logged)	0.126	95% H-UCL (KM -Log)	0.875
KM SD (logged)	1.046	95% Critical H Value (KM-Log)	2.254
KM Standard Error of Mean (logged)	0.126		

DL/2 Statistics

DL/2 Normal	**DL/2 Log-Transformed**

Mean in Original Scale	0.766	Mean in Log Scale	-1.025
SD in Original Scale	1.714	SD in Log Scale	1.162
95% t UCL (Assumes normality)	1.107	95% H-Stat UCL	0.956

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

Suggested UCL to Use

95% KM (t) UCL	1.11		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (vanadium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	67
		Number of Missing Observations	0
Minimum	1.38	Mean	20.4
Maximum	61.6	Median	17.75
SD	14.82	Std. Error of Mean	1.772
Coefficient of Variation	0.726	Skewness	0.441

Normal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.1297E-4	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.109	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.122	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	23.36	95% Adjusted-CLT UCL (Chen-1995)	23.42
		95% Modified-t UCL (Johnson-1978)	23.37

Gamma GOF Test

A-D Test Statistic	1.877	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.773	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**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)	1.342	k star (bias corrected MLE)	1.294

	A–E	F	G–K	L
3069	Theta hat (MLE)	15.21	Theta star (bias corrected MLE)	15.77
3070	nu hat (MLE)	187.9	nu star (bias corrected)	181.2
3071	MLE Mean (bias corrected)	20.4	MLE Sd (bias corrected)	17.94
3072			Approximate Chi Square Value (0.05)	151
3073	Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	150.4
3074				
3075	**Assuming Gamma Distribution**			
3076	95% Approximate Gamma UCL	24.48	95% Adjusted Gamma UCL	24.57
3077				
3078	**Lognormal GOF Test**			
3079	Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk Lognormal GOF Test**	
3080	10% Shapiro Wilk P Value	5.1254E-8	Data Not Lognormal at 10% Significance Level	
3081	Lilliefors Test Statistic	0.164	**Lilliefors Lognormal GOF Test**	
3082	10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	
3083	**Data Not Lognormal at 10% Significance Level**			
3084				
3085	**Lognormal Statistics**			
3086	Minimum of Logged Data	0.322	Mean of logged Data	2.599
3087	Maximum of Logged Data	4.121	SD of logged Data	1.07
3088				
3089	**Assuming Lognormal Distribution**			
3090	95% H-UCL	31.83	90% Chebyshev (MVUE) UCL	34.48
3091	95% Chebyshev (MVUE) UCL	39.43	97.5% Chebyshev (MVUE) UCL	46.31
3092	99% Chebyshev (MVUE) UCL	59.82		
3093				
3094	**Nonparametric Distribution Free UCL Statistics**			
3095	**Data appear to follow a Discernible Distribution**			
3096				
3097	**Nonparametric Distribution Free UCLs**			
3098	95% CLT UCL	23.32	95% BCA Bootstrap UCL	23.32
3099	95% Standard Bootstrap UCL	23.32	95% Bootstrap-t UCL	23.45
3100	95% Hall's Bootstrap UCL	23.38	95% Percentile Bootstrap UCL	23.36
3101	90% Chebyshev(Mean, Sd) UCL	25.72	95% Chebyshev(Mean, Sd) UCL	28.13
3102	97.5% Chebyshev(Mean, Sd) UCL	31.47	99% Chebyshev(Mean, Sd) UCL	38.03
3103				
3104	**Suggested UCL to Use**			
3105	95% Student's-t UCL	23.36		
3106				
3107	When a data set follows an approximate distribution passing only one of the GOF tests,			
3108	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
3109				
3110	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3111	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3112	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3113				
3114				
3115	**Result (zinc_soil)**			
3116				
3117	**General Statistics**			
3118	Total Number of Observations	70	Number of Distinct Observations	65
3119			Number of Missing Observations	0
3120	Minimum	9.7	Mean	54.05

	A–E	F	G–K	L
3121	Maximum	436	Median	38.25
3122	SD	66.2	Std. Error of Mean	7.913
3123	Coefficient of Variation	1.225	Skewness	4.18
3124				
3125	**Normal GOF Test**			
3126	Shapiro Wilk Test Statistic	0.528	**Shapiro Wilk GOF Test**	
3127	1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
3128	Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**	
3129	1% Lilliefors Critical Value	0.122	Data Not Normal at 1% Significance Level	
3130	**Data Not Normal at 1% Significance Level**			
3131				
3132	**Assuming Normal Distribution**			
3133	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3134	95% Student's-t UCL	67.24	95% Adjusted-CLT UCL (Chen-1995)	71.29
3135			95% Modified-t UCL (Johnson-1978)	67.9
3136				
3137	**Gamma GOF Test**			
3138	A-D Test Statistic	3.369	**Anderson-Darling Gamma GOF Test**	
3139	5% A-D Critical Value	0.767	Data Not Gamma Distributed at 5% Significance Level	
3140	K-S Test Statistic	0.179	**Kolmogorov-Smirnov Gamma GOF Test**	
3141	5% K-S Critical Value	0.108	Data Not Gamma Distributed at 5% Significance Level	
3142	**Data Not Gamma Distributed at 5% Significance Level**			
3143				
3144	**Gamma Statistics**			
3145	k hat (MLE)	1.677	k star (bias corrected MLE)	1.615
3146	Theta hat (MLE)	32.23	Theta star (bias corrected MLE)	33.47
3147	nu hat (MLE)	234.8	nu star (bias corrected)	226.1
3148	MLE Mean (bias corrected)	54.05	MLE Sd (bias corrected)	42.53
3149			Approximate Chi Square Value (0.05)	192.3
3150	Adjusted Level of Significance	0.0466	Adjusted Chi Square Value	191.6
3151				
3152	**Assuming Gamma Distribution**			
3153	95% Approximate Gamma UCL	63.55	95% Adjusted Gamma UCL	63.77
3154				
3155	**Lognormal GOF Test**			
3156	Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**	
3157	10% Shapiro Wilk P Value	0.00359	Data Not Lognormal at 10% Significance Level	
3158	Lilliefors Test Statistic	0.119	**Lilliefors Lognormal GOF Test**	
3159	10% Lilliefors Critical Value	0.0969	Data Not Lognormal at 10% Significance Level	
3160	**Data Not Lognormal at 10% Significance Level**			
3161				
3162	**Lognormal Statistics**			
3163	Minimum of Logged Data	2.272	Mean of logged Data	3.663
3164	Maximum of Logged Data	6.078	SD of logged Data	0.724
3165				
3166	**Assuming Lognormal Distribution**			
3167	95% H-UCL	60.52	90% Chebyshev (MVUE) UCL	64.92
3168	95% Chebyshev (MVUE) UCL	71.48	97.5% Chebyshev (MVUE) UCL	80.59
3169	99% Chebyshev (MVUE) UCL	98.48		
3170				
3171	**Nonparametric Distribution Free UCL Statistics**			
3172	**Data do not follow a Discernible Distribution**			

Nonparametric Distribution Free UCLs

95% CLT UCL	67.07	95% BCA Bootstrap UCL	70.1
95% Standard Bootstrap UCL	66.67	95% Bootstrap-t UCL	77.15
95% Hall's Bootstrap UCL	119.8	95% Percentile Bootstrap UCL	68.16
90% Chebyshev(Mean, Sd) UCL	77.79	95% Chebyshev(Mean, Sd) UCL	88.54
97.5% Chebyshev(Mean, Sd) UCL	103.5	99% Chebyshev(Mean, Sd) UCL	132.8

Suggested UCL to Use

95% Student's-t UCL	67.24		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (zirconium_soil)

General Statistics

Total Number of Observations	70	Number of Distinct Observations	42
Number of Detects	48	Number of Non-Detects	22
Number of Distinct Detects	41	Number of Distinct Non-Detects	3
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	18.2	Maximum Non-Detect	3
Variance Detects	20.46	Percent Non-Detects	31.43%
Mean Detects	5.654	SD Detects	4.523
Median Detects	4.1	CV Detects	0.8
Skewness Detects	1.031	Kurtosis Detects	0.198
Mean of Logged Detects	1.404	SD of Logged Detects	0.84

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.929	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.148	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	4.236	KM Standard Error of Mean	0.515
90KM SD	4.259	95% KM (BCA) UCL	5.185
95% KM (t) UCL	5.094	95% KM (Percentile Bootstrap) UCL	5.15
95% KM (z) UCL	5.083	95% KM Bootstrap t UCL	5.202
90% KM Chebyshev UCL	5.78	95% KM Chebyshev UCL	6.48
97.5% KM Chebyshev UCL	7.45	99% KM Chebyshev UCL	9.358

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.016	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.766	Detected Data Not Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.125	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.13	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.67	k star (bias corrected MLE)	1.579
Theta hat (MLE)	3.386	Theta star (bias corrected MLE)	3.58
nu hat (MLE)	160.3	nu star (bias corrected)	151.6
Mean (detects)	5.654		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	3.939
Maximum	18.2	Median	1.8
SD	4.525	CV	1.149
k hat (MLE)	0.443	k star (bias corrected MLE)	0.433
Theta hat (MLE)	8.895	Theta star (bias corrected MLE)	9.089
nu hat (MLE)	62	nu star (bias corrected)	60.68
Adjusted Level of Significance (β)	0.0466		
Approximate Chi Square Value (60.68, α)	43.76	Adjusted Chi Square Value (60.68, β)	43.46
95% Gamma Approximate UCL	5.462	95% Gamma Adjusted UCL	5.5
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.236	SD (KM)	4.259
Variance (KM)	18.13	SE of Mean (KM)	0.515
k hat (KM)	0.989	k star (KM)	0.957
nu hat (KM)	138.5	nu star (KM)	133.9
theta hat (KM)	4.281	theta star (KM)	4.428
80% gamma percentile (KM)	6.842	90% gamma percentile (KM)	9.861
95% gamma percentile (KM)	12.89	99% gamma percentile (KM)	19.95
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (133.92, α)	108.2	Adjusted Chi Square Value (133.92, β)	107.7
95% KM Approximate Gamma UCL	5.244	95% KM Adjusted Gamma UCL	5.267
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.954	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.117	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	4.137	Mean in Log Scale	0.859
SD in Original Scale	4.368	SD in Log Scale	1.113
95% t UCL (assumes normality of ROS data)	5.007	95% Percentile Bootstrap UCL	5.025
95% BCA Bootstrap UCL	5.065	95% Bootstrap t UCL	5.109
95% H-UCL (Log ROS)	5.908		

	A–E	F	G–K	L
3277				
3278	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
3279	KM Mean (logged)	1.001	KM Geo Mean	2.72
3280	KM SD (logged)	0.914	95% Critical H Value (KM-Log)	2.207
3281	KM Standard Error of Mean (logged)	0.112	95% H-UCL (KM -Log)	5.269
3282	KM SD (logged)	0.914	95% Critical H Value (KM-Log)	2.207
3283	KM Standard Error of Mean (logged)	0.112		
3284				
3285	**DL/2 Statistics**			
3286	**DL/2 Normal**		**DL/2 Log-Transformed**	
3287	Mean in Original Scale	4.113	Mean in Log Scale	0.865
3288	SD in Original Scale	4.382	SD in Log Scale	1.067
3289	95% t UCL (Assumes normality)	4.986	95% H-Stat UCL	5.601
3290	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
3291				
3292	**Nonparametric Distribution Free UCL Statistics**			
3293	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**			
3294				
3295	**Suggested UCL to Use**			
3296	95% KM Approximate Gamma UCL	5.244	95% GROS Approximate Gamma UCL	5.462
3297				
3298	When a data set follows an approximate distribution passing only one of the GOF tests,			
3299	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
3300				
3301	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3302	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3303	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

B.2.2 Sediment EPC ProUCL Output: North Driftwood Watershed

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.2 3/18/2024 1:54:43 PM								
5	From File			WorkSheet_a.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Result (aluminum (al))											
12												
13	General Statistics											
14	Total Number of Observations					45	Number of Distinct Observations					41
15							Number of Missing Observations					0
16	Minimum					5200	Mean					11198
17	Maximum					24700	Median					10000
18	SD					4333	Std. Error of Mean					645.9
19	Coefficient of Variation					0.387	Skewness					1.642
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.817	Shapiro Wilk GOF Test					
23	1% Shapiro Wilk Critical Value					0.926	Data Not Normal at 1% Significance Level					
24	Lilliefors Test Statistic					0.241	Lilliefors GOF Test					
25	1% Lilliefors Critical Value					0.153	Data Not Normal at 1% Significance Level					
26	Data Not Normal at 1% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					12284	95% Adjusted-CLT UCL (Chen-1995)					12430
31							95% Modified-t UCL (Johnson-1978)					12310
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.782	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.75	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.192	Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value					0.132	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					8.539	k star (bias corrected MLE)					7.985
42	Theta hat (MLE)					1311	Theta star (bias corrected MLE)					1402
43	nu hat (MLE)					768.5	nu star (bias corrected)					718.6
44	MLE Mean (bias corrected)					11198	MLE Sd (bias corrected)					3963
45							Approximate Chi Square Value (0.05)					657.4
46	Adjusted Level of Significance					0.0447	Adjusted Chi Square Value					655.5
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL					12241	95% Adjusted Gamma UCL					12277
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.933	Shapiro Wilk Lognormal GOF Test					

10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.166	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	8.556	Mean of logged Data	9.264
Maximum of Logged Data	10.11	SD of logged Data	0.336
Assuming Lognormal Distribution			
95% H-UCL	12227	90% Chebyshev (MVUE) UCL	12858
95% Chebyshev (MVUE) UCL	13633	97.5% Chebyshev (MVUE) UCL	14710
99% Chebyshev (MVUE) UCL	16823		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	12261	95% BCA Bootstrap UCL	12422
95% Standard Bootstrap UCL	12264	95% Bootstrap-t UCL	12482
95% Hall's Bootstrap UCL	12403	95% Percentile Bootstrap UCL	12340
90% Chebyshev(Mean, Sd) UCL	13136	95% Chebyshev(Mean, Sd) UCL	14014
97.5% Chebyshev(Mean, Sd) UCL	15232	99% Chebyshev(Mean, Sd) UCL	17625
Suggested UCL to Use			
95% Student's-t UCL	12284		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (antimony (sb))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	20
Number of Detects	30	Number of Non-Detects	15
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	0	Minimum Non-Detect	0.1
Maximum Detect	0.66	Maximum Non-Detect	0.1
Variance Detects	0.0291	Percent Non-Detects	33.33%
Mean Detects	0.238	SD Detects	0.171
Median Detects	0.16	CV Detects	0.718
Skewness Detects	1.27	Kurtosis Detects	0.632
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.813	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.9	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.185	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			

KM Mean	0.158	KM Standard Error of Mean	0.0268
90KM SD	0.177	95% KM (BCA) UCL	0.234
95% KM (t) UCL	0.204	95% KM (Percentile Bootstrap) UCL	0.221
95% KM (z) UCL	0.203	95% KM Bootstrap t UCL	0.205
90% KM Chebyshev UCL	0.239	95% KM Chebyshev UCL	0.275
97.5% KM Chebyshev UCL	0.326	99% KM Chebyshev UCL	0.426

Gamma Statistics on Detected Data Only

Dataset Contains Values <= 0 - Cannot Compute Gamma Statistics!

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.158	SD (KM)	0.177
Variance (KM)	0.0313	SE of Mean (KM)	0.0268
k hat (KM)	0.801	k star (KM)	0.763
nu hat (KM)	72.1	nu star (KM)	68.63
theta hat (KM)	0.198	theta star (KM)	0.208
80% gamma percentile (KM)	0.26	90% gamma percentile (KM)	0.39
95% gamma percentile (KM)	0.523	99% gamma percentile (KM)	0.839

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0447
Approximate Chi Square Value (68.63, α)	50.56	Adjusted Chi Square Value (68.63, β)	50.04
95% KM Approximate Gamma UCL	0.215	95% KM Adjusted Gamma UCL	0.217

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	N/A	KM Geo Mean	N/A
KM SD (logged)	N/A	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	N/A	95% H-UCL (KM -Log)	N/A
KM SD (logged)	N/A	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	N/A		

DL/2 Statistics

Mean in Original Scale	0.175	SD in Original Scale	0.165
95% t UCL (Assumes normality)	0.216		

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

Suggested UCL to Use

95% KM (t) UCL	0.204		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (arsenic (as))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	45
		Number of Missing Observations	0

Minimum	1.46	Mean	3.557
Maximum	9.05	Median	2.88
SD	1.788	Std. Error of Mean	0.267
Coefficient of Variation	0.503	Skewness	1.173

Normal GOF Test

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.005	95% Adjusted-CLT UCL (Chen-1995)	4.045
		95% Modified-t UCL (Johnson-1978)	4.012

Gamma GOF Test

A-D Test Statistic	1.024	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.148	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.715	k star (bias corrected MLE)	4.416
Theta hat (MLE)	0.754	Theta star (bias corrected MLE)	0.805
nu hat (MLE)	424.4	nu star (bias corrected)	397.4
MLE Mean (bias corrected)	3.557	MLE Sd (bias corrected)	1.693
		Approximate Chi Square Value (0.05)	352.2
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	350.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.013	95% Adjusted Gamma UCL	4.03

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.378	Mean of logged Data	1.159
Maximum of Logged Data	2.203	SD of logged Data	0.464

Assuming Lognormal Distribution

95% H-UCL	4.048	90% Chebyshev (MVUE) UCL	4.306
95% Chebyshev (MVUE) UCL	4.653	97.5% Chebyshev (MVUE) UCL	5.134
99% Chebyshev (MVUE) UCL	6.08		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	3.995	95% BCA Bootstrap UCL	4.022
95% Standard Bootstrap UCL	3.982	95% Bootstrap-t UCL	4.065
95% Hall's Bootstrap UCL	4.045	95% Percentile Bootstrap UCL	3.986
90% Chebyshev(Mean, Sd) UCL	4.356	95% Chebyshev(Mean, Sd) UCL	4.719
97.5% Chebyshev(Mean, Sd) UCL	5.221	99% Chebyshev(Mean, Sd) UCL	6.209

Suggested UCL to Use

95% H-UCL	4.048		

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

Result (barium (ba))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	43
		Number of Missing Observations	0
Minimum	32.7	Mean	78.93
Maximum	200	Median	63.7
SD	38.14	Std. Error of Mean	5.686
Coefficient of Variation	0.483	Skewness	1.682

Normal GOF Test

Shapiro Wilk Test Statistic	0.792	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	88.48	95% Adjusted-CLT UCL (Chen-1995)	89.81
		95% Modified-t UCL (Johnson-1978)	88.72

Gamma GOF Test

A-D Test Statistic	2.208	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.194	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.746	k star (bias corrected MLE)	5.378
Theta hat (MLE)	13.74	Theta star (bias corrected MLE)	14.68
nu hat (MLE)	517.1	nu star (bias corrected)	484
MLE Mean (bias corrected)	78.93	MLE Sd (bias corrected)	34.04
		Approximate Chi Square Value (0.05)	434

Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	432.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	88.03	95% Adjusted Gamma UCL	88.35
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.487	Mean of logged Data	4.279
Maximum of Logged Data	5.298	SD of logged Data	0.407
Assuming Lognormal Distribution			
95% H-UCL	87.79	90% Chebyshev (MVUE) UCL	92.98
95% Chebyshev (MVUE) UCL	99.64	97.5% Chebyshev (MVUE) UCL	108.9
99% Chebyshev (MVUE) UCL	127.1		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	88.28	95% BCA Bootstrap UCL	89.48
95% Standard Bootstrap UCL	88.25	95% Bootstrap-t UCL	90.57
95% Hall's Bootstrap UCL	89.8	95% Percentile Bootstrap UCL	88.56
90% Chebyshev(Mean, Sd) UCL	95.99	95% Chebyshev(Mean, Sd) UCL	103.7
97.5% Chebyshev(Mean, Sd) UCL	114.4	99% Chebyshev(Mean, Sd) UCL	135.5
Suggested UCL to Use			
95% Student's-t UCL	88.48		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (beryllium (be))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	26
		Number of Missing Observations	0
Minimum	0.16	Mean	0.38
Maximum	0.75	Median	0.36
SD	0.151	Std. Error of Mean	0.0225
Coefficient of Variation	0.398	Skewness	0.991
Normal GOF Test			
Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	

	A–E	F	G–K	L
313	Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
314	1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
315	**Data Not Normal at 1% Significance Level**			
316				
317	**Assuming Normal Distribution**			
318	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
319	95% Student's-t UCL	0.417	95% Adjusted-CLT UCL (Chen-1995)	0.42
320			95% Modified-t UCL (Johnson-1978)	0.418
321				
322	**Gamma GOF Test**			
323	A-D Test Statistic	0.967	**Anderson-Darling Gamma GOF Test**	
324	5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level	
325	K-S Test Statistic	0.151	**Kolmogorov-Smirnov Gamma GOF Test**	
326	5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
327	**Data Not Gamma Distributed at 5% Significance Level**			
328				
329	**Gamma Statistics**			
330	k hat (MLE)	7.106	k star (bias corrected MLE)	6.647
331	Theta hat (MLE)	0.0534	Theta star (bias corrected MLE)	0.0571
332	nu hat (MLE)	639.5	nu star (bias corrected)	598.2
333	MLE Mean (bias corrected)	0.38	MLE Sd (bias corrected)	0.147
334			Approximate Chi Square Value (0.05)	542.5
335	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	540.7
336				
337	**Assuming Gamma Distribution**			
338	95% Approximate Gamma UCL	0.419	95% Adjusted Gamma UCL	0.42
339				
340	**Lognormal GOF Test**			
341	Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**	
342	10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
343	Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**	
344	10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
345	**Data Not Lognormal at 10% Significance Level**			
346				
347	**Lognormal Statistics**			
348	Minimum of Logged Data	-1.833	Mean of logged Data	-1.041
349	Maximum of Logged Data	-0.288	SD of logged Data	0.381
350				
351	**Assuming Lognormal Distribution**			
352	95% H-UCL	0.422	90% Chebyshev (MVUE) UCL	0.446
353	95% Chebyshev (MVUE) UCL	0.476	97.5% Chebyshev (MVUE) UCL	0.518
354	99% Chebyshev (MVUE) UCL	0.6		
355				
356	**Nonparametric Distribution Free UCL Statistics**			
357	**Data do not follow a Discernible Distribution**			
358				
359	**Nonparametric Distribution Free UCLs**			
360	95% CLT UCL	0.417	95% BCA Bootstrap UCL	0.419
361	95% Standard Bootstrap UCL	0.416	95% Bootstrap-t UCL	0.421
362	95% Hall's Bootstrap UCL	0.419	95% Percentile Bootstrap UCL	0.417
363	90% Chebyshev(Mean, Sd) UCL	0.447	95% Chebyshev(Mean, Sd) UCL	0.478
364	97.5% Chebyshev(Mean, Sd) UCL	0.52	99% Chebyshev(Mean, Sd) UCL	0.604

Suggested UCL to Use

95% Student's-t UCL	0.417

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

Result (bismuth (bi))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	13
Number of Detects	14	Number of Non-Detects	31
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.26	Minimum Non-Detect	0.2
Maximum Detect	0.65	Maximum Non-Detect	0.2
Variance Detects	0.00997	Percent Non-Detects	68.89%
Mean Detects	0.355	SD Detects	0.0998
Median Detects	0.325	CV Detects	0.281
Skewness Detects	2.175	Kurtosis Detects	5.777
Mean of Logged Detects	-1.065	SD of Logged Detects	0.239

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.778	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

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

KM Mean	0.248	KM Standard Error of Mean	0.0139
90KM SD	0.0896	95% KM (BCA) UCL	0.272
95% KM (t) UCL	0.272	95% KM (Percentile Bootstrap) UCL	0.271
95% KM (z) UCL	0.271	95% KM Bootstrap t UCL	0.279
90% KM Chebyshev UCL	0.29	95% KM Chebyshev UCL	0.309
97.5% KM Chebyshev UCL	0.335	99% KM Chebyshev UCL	0.386

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.689	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.159	**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)	17.21	k star (bias corrected MLE)	13.57
Theta hat (MLE)	0.0206	Theta star (bias corrected MLE)	0.0262
nu hat (MLE)	481.8	nu star (bias corrected)	379.9
Mean (detects)	0.355		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

417	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
418	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
419	This is especially true when the sample size is small.			
420	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
421	Minimum	0.01	Mean	0.17
422	Maximum	0.65	Median	0.141
423	SD	0.149	CV	0.88
424	k hat (MLE)	0.932	k star (bias corrected MLE)	0.885
425	Theta hat (MLE)	0.182	Theta star (bias corrected MLE)	0.192
426	nu hat (MLE)	83.88	nu star (bias corrected)	79.62
427	Adjusted Level of Significance (β)	0.0447		
428	Approximate Chi Square Value (79.62, α)	60.06	Adjusted Chi Square Value (79.62, β)	59.5
429	95% Gamma Approximate UCL	0.225	95% Gamma Adjusted UCL	0.227
430				
431	**Estimates of Gamma Parameters using KM Estimates**			
432	Mean (KM)	0.248	SD (KM)	0.0896
433	Variance (KM)	0.00803	SE of Mean (KM)	0.0139
434	k hat (KM)	7.675	k star (KM)	7.178
435	nu hat (KM)	690.7	nu star (KM)	646
436	theta hat (KM)	0.0323	theta star (KM)	0.0346
437	80% gamma percentile (KM)	0.321	90% gamma percentile (KM)	0.372
438	95% gamma percentile (KM)	0.418	99% gamma percentile (KM)	0.513
439				
440	**Gamma Kaplan-Meier (KM) Statistics**			
441	Approximate Chi Square Value (646.03, α)	588.1	Adjusted Chi Square Value (646.03, β)	586.2
442	95% KM Approximate Gamma UCL	0.273	95% KM Adjusted Gamma UCL	0.274
443				
444	**Lognormal GOF Test on Detected Observations Only**			
445	Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk GOF Test**	
446	10% Shapiro Wilk Critical Value	0.895	Detected Data Not Lognormal at 10% Significance Level	
447	Lilliefors Test Statistic	0.148	**Lilliefors GOF Test**	
448	10% Lilliefors Critical Value	0.208	Detected Data appear Lognormal at 10% Significance Level	
449	**Detected Data appear Approximate Lognormal at 10% Significance Level**			
450				
451	**Lognormal ROS Statistics Using Imputed Non-Detects**			
452	Mean in Original Scale	0.219	Mean in Log Scale	-1.639
453	SD in Original Scale	0.114	SD in Log Scale	0.497
454	95% t UCL (assumes normality of ROS data)	0.248	95% Percentile Bootstrap UCL	0.248
455	95% BCA Bootstrap UCL	0.25	95% Bootstrap t UCL	0.251
456	95% H-UCL (Log ROS)	0.253		
457				
458	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
459	KM Mean (logged)	-1.44	KM Geo Mean	0.237
460	KM SD (logged)	0.283	95% Critical H Value (KM-Log)	1.757
461	KM Standard Error of Mean (logged)	0.0438	95% H-UCL (KM -Log)	0.266
462	KM SD (logged)	0.283	95% Critical H Value (KM-Log)	1.757
463	KM Standard Error of Mean (logged)	0.0438		
464				
465	**DL/2 Statistics**			
466	**DL/2 Normal**		**DL/2 Log-Transformed**	
467	Mean in Original Scale	0.179	Mean in Log Scale	-1.918
468	SD in Original Scale	0.131	SD in Log Scale	0.594

95% t UCL (Assumes normality)	0.212	95% H-Stat UCL	0.209

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 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.272		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (boron (b))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	27
Number of Detects	31	Number of Non-Detects	14
Number of Distinct Detects	26	Number of Distinct Non-Detects	1
Minimum Detect	5.3	Minimum Non-Detect	5
Maximum Detect	19.8	Maximum Non-Detect	5
Variance Detects	15.42	Percent Non-Detects	31.11%
Mean Detects	9.535	SD Detects	3.927
Median Detects	7.9	CV Detects	0.412
Skewness Detects	1.027	Kurtosis Detects	0.325
Mean of Logged Detects	2.181	SD of Logged Detects	0.383

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.902	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.182	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

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

KM Mean	8.124	KM Standard Error of Mean	0.581
90KM SD	3.833	95% KM (BCA) UCL	9.093
95% KM (t) UCL	9.1	95% KM (Percentile Bootstrap) UCL	9.071
95% KM (z) UCL	9.08	95% KM Bootstrap t UCL	9.226
90% KM Chebyshev UCL	9.867	95% KM Chebyshev UCL	10.66
97.5% KM Chebyshev UCL	11.75	99% KM Chebyshev UCL	13.9

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.012	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.156	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.158	Detected data appear Gamma Distributed at 5% Significance Level

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

521	**Gamma Statistics on Detected Data Only**			
522	k hat (MLE)	6.918	k star (bias corrected MLE)	6.27
523	Theta hat (MLE)	1.378	Theta star (bias corrected MLE)	1.521
524	nu hat (MLE)	428.9	nu star (bias corrected)	388.7
525	Mean (detects)	9.535		
526				
527	**Gamma ROS Statistics using Imputed Non-Detects**			
528	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
529	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
530	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
531	This is especially true when the sample size is small.			
532	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
533	Minimum	0.01	Mean	7.192
534	Maximum	19.8	Median	6.2
535	SD	4.849	CV	0.674
536	k hat (MLE)	1.136	k star (bias corrected MLE)	1.075
537	Theta hat (MLE)	6.334	Theta star (bias corrected MLE)	6.693
538	nu hat (MLE)	102.2	nu star (bias corrected)	96.72
539	Adjusted Level of Significance (β)	0.0447		
540	Approximate Chi Square Value (96.72, α)	75.04	Adjusted Chi Square Value (96.72, β)	74.4
541	95% Gamma Approximate UCL	9.271	95% Gamma Adjusted UCL	9.35
542				
543	**Estimates of Gamma Parameters using KM Estimates**			
544	Mean (KM)	8.124	SD (KM)	3.833
545	Variance (KM)	14.69	SE of Mean (KM)	0.581
546	k hat (KM)	4.494	k star (KM)	4.209
547	nu hat (KM)	404.5	nu star (KM)	378.8
548	theta hat (KM)	1.808	theta star (KM)	1.93
549	80% gamma percentile (KM)	11.14	90% gamma percentile (KM)	13.43
550	95% gamma percentile (KM)	15.54	99% gamma percentile (KM)	20.03
551				
552	**Gamma Kaplan-Meier (KM) Statistics**			
553	Approximate Chi Square Value (378.82, α)	334.7	Adjusted Chi Square Value (378.82, β)	333.3
554	95% KM Approximate Gamma UCL	9.195	95% KM Adjusted Gamma UCL	9.233
555				
556	**Lognormal GOF Test on Detected Observations Only**			
557	Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**	
558	10% Shapiro Wilk Critical Value	0.94	Detected Data Not Lognormal at 10% Significance Level	
559	Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**	
560	10% Lilliefors Critical Value	0.143	Detected Data appear Lognormal at 10% Significance Level	
561	**Detected Data appear Approximate Lognormal at 10% Significance Level**			
562				
563	**Lognormal ROS Statistics Using Imputed Non-Detects**			
564	Mean in Original Scale	7.686	Mean in Log Scale	1.891
565	SD in Original Scale	4.299	SD in Log Scale	0.557
566	95% t UCL (assumes normality of ROS data)	8.762	95% Percentile Bootstrap UCL	8.752
567	95% BCA Bootstrap UCL	8.821	95% Bootstrap t UCL	8.842
568	95% H-UCL (Log ROS)	9.113		
569				
570	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
571	KM Mean (logged)	2.003	KM Geo Mean	7.413
572	KM SD (logged)	0.409	95% Critical H Value (KM-Log)	1.843

KM Standard Error of Mean (logged)	0.062	95% H-UCL (KM -Log)	9.032
KM SD (logged)	0.409	95% Critical H Value (KM-Log)	1.843
KM Standard Error of Mean (logged)	0.062		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.347	Mean in Log Scale	1.788
SD in Original Scale	4.622	SD in Log Scale	0.671
95% t UCL (Assumes normality)	8.504	95% H-Stat UCL	9.205

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 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	9.1		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cadmium (cd))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	43
		Number of Missing Observations	0
Minimum	0.08	Mean	0.739
Maximum	1.9	Median	0.65
SD	0.381	Std. Error of Mean	0.0567
Coefficient of Variation	0.515	Skewness	0.999

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.834	95% Adjusted-CLT UCL (Chen-1995)	0.841
		95% Modified-t UCL (Johnson-1978)	0.835

Gamma GOF Test

A-D Test Statistic	0.671	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	

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

Gamma Statistics

k hat (MLE)	3.669	k star (bias corrected MLE)	3.439
Theta hat (MLE)	0.201	Theta star (bias corrected MLE)	0.215
nu hat (MLE)	330.2	nu star (bias corrected)	309.5
MLE Mean (bias corrected)	0.739	MLE Sd (bias corrected)	0.398
		Approximate Chi Square Value (0.05)	269.7
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	268.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.847	95% Adjusted Gamma UCL	0.851

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.526	Mean of logged Data	-0.445
Maximum of Logged Data	0.642	SD of logged Data	0.583

Assuming Lognormal Distribution

95% H-UCL	0.902	90% Chebyshev (MVUE) UCL	0.966
95% Chebyshev (MVUE) UCL	1.061	97.5% Chebyshev (MVUE) UCL	1.193
99% Chebyshev (MVUE) UCL	1.452		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.832	95% BCA Bootstrap UCL	0.843
95% Standard Bootstrap UCL	0.831	95% Bootstrap-t UCL	0.847
95% Hall's Bootstrap UCL	0.85	95% Percentile Bootstrap UCL	0.833
90% Chebyshev(Mean, Sd) UCL	0.909	95% Chebyshev(Mean, Sd) UCL	0.986
97.5% Chebyshev(Mean, Sd) UCL	1.093	99% Chebyshev(Mean, Sd) UCL	1.303

Suggested UCL to Use

95% Adjusted Gamma UCL	0.851		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (calcium (ca))

	A–E	F	G–K	L
677	**General Statistics**			
678	Total Number of Observations	45	Number of Distinct Observations	43
679			Number of Missing Observations	0
680	Minimum	3770	Mean	13766
681	Maximum	57800	Median	11700
682	SD	9587	Std. Error of Mean	1429
683	Coefficient of Variation	0.696	Skewness	2.583
684				
685	**Normal GOF Test**			
686	Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**	
687	1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
688	Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**	
689	1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
690	**Data Not Normal at 1% Significance Level**			
691				
692	**Assuming Normal Distribution**			
693	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
694	95% Student's-t UCL	16168	95% Adjusted-CLT UCL (Chen-1995)	16705
695			95% Modified-t UCL (Johnson-1978)	16259
696				
697	**Gamma GOF Test**			
698	A-D Test Statistic	0.478	**Anderson-Darling Gamma GOF Test**	
699	5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
700	K-S Test Statistic	0.0823	**Kolmogorov-Smirnov Gamma GOF Test**	
701	5% K-S Critical Value	0.133	Detected data appear Gamma Distributed at 5% Significance Level	
702	**Detected data appear Gamma Distributed at 5% Significance Level**			
703				
704	**Gamma Statistics**			
705	k hat (MLE)	2.978	k star (bias corrected MLE)	2.794
706	Theta hat (MLE)	4623	Theta star (bias corrected MLE)	4926
707	nu hat (MLE)	268	nu star (bias corrected)	251.5
708	MLE Mean (bias corrected)	13766	MLE Sd (bias corrected)	8235
709			Approximate Chi Square Value (0.05)	215.8
710	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	214.7
711				
712	**Assuming Gamma Distribution**			
713	95% Approximate Gamma UCL	16045	95% Adjusted Gamma UCL	16127
714				
715	**Lognormal GOF Test**			
716	Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**	
717	10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level	
718	Lilliefors Test Statistic	0.084	**Lilliefors Lognormal GOF Test**	
719	10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
720	**Data appear Lognormal at 10% Significance Level**			
721				
722	**Lognormal Statistics**			
723	Minimum of Logged Data	8.235	Mean of logged Data	9.353
724	Maximum of Logged Data	10.96	SD of logged Data	0.587
725				
726	**Assuming Lognormal Distribution**			
727	95% H-UCL	16317	90% Chebyshev (MVUE) UCL	17464
728	95% Chebyshev (MVUE) UCL	19195	97.5% Chebyshev (MVUE) UCL	21598

99% Chebyshev (MVUE) UCL	26318		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	16117	95% BCA Bootstrap UCL	17019
95% Standard Bootstrap UCL	16130	95% Bootstrap-t UCL	17143
95% Hall's Bootstrap UCL	18388	95% Percentile Bootstrap UCL	16356
90% Chebyshev(Mean, Sd) UCL	18054	95% Chebyshev(Mean, Sd) UCL	19996
97.5% Chebyshev(Mean, Sd) UCL	22691	99% Chebyshev(Mean, Sd) UCL	27986

Suggested UCL to Use

95% Adjusted Gamma UCL	16127		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (chromium (cr))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	40
		Number of Missing Observations	0
Minimum	16.7	Mean	29.66
Maximum	59.1	Median	26.8
SD	10.74	Std. Error of Mean	1.601
Coefficient of Variation	0.362	Skewness	1.454

Normal GOF Test

Shapiro Wilk Test Statistic	0.803	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	32.35	95% Adjusted-CLT UCL (Chen-1995)	32.66
		95% Modified-t UCL (Johnson-1978)	32.4

Gamma GOF Test

A-D Test Statistic	2.369	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.628	k star (bias corrected MLE)	9.001
Theta hat (MLE)	3.08	Theta star (bias corrected MLE)	3.295

nu hat (MLE)	866.5	nu star (bias corrected)	810.1
MLE Mean (bias corrected)	29.66	MLE Sd (bias corrected)	9.885
		Approximate Chi Square Value (0.05)	745
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	743

Assuming Gamma Distribution

95% Approximate Gamma UCL	32.24	95% Adjusted Gamma UCL	32.33

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.815	Mean of logged Data	3.337
Maximum of Logged Data	4.079	SD of logged Data	0.314

Assuming Lognormal Distribution

95% H-UCL	32.17	90% Chebyshev (MVUE) UCL	33.75
95% Chebyshev (MVUE) UCL	35.67	97.5% Chebyshev (MVUE) UCL	38.33
99% Chebyshev (MVUE) UCL	43.56		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	32.29	95% BCA Bootstrap UCL	32.42
95% Standard Bootstrap UCL	32.27	95% Bootstrap-t UCL	32.8
95% Hall's Bootstrap UCL	32.57	95% Percentile Bootstrap UCL	32.42
90% Chebyshev(Mean, Sd) UCL	34.46	95% Chebyshev(Mean, Sd) UCL	36.63
97.5% Chebyshev(Mean, Sd) UCL	39.65	99% Chebyshev(Mean, Sd) UCL	45.58

Suggested UCL to Use

95% Student's-t UCL	32.35		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cobalt (co))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	44
		Number of Missing Observations	0
Minimum	3.61	Mean	7.626
Maximum	14.3	Median	7.26
SD	2.533	Std. Error of Mean	0.378
Coefficient of Variation	0.332	Skewness	0.786

	A	B	C	D	E	F	G	H	I	J	K	L
833	**Normal GOF Test**											
834					Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**					
835					1% Shapiro Wilk Critical Value	0.926	Data appear Normal at 1% Significance Level					
836					Lilliefors Test Statistic	0.128	**Lilliefors GOF Test**					
837					1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level					
838	**Data appear Normal at 1% Significance Level**											
839												
840	**Assuming Normal Distribution**											
841	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
842					95% Student's-t UCL	8.26					95% Adjusted-CLT UCL (Chen-1995)	8.294
843											95% Modified-t UCL (Johnson-1978)	8.267
844												
845	**Gamma GOF Test**											
846					A-D Test Statistic	0.347	**Anderson-Darling Gamma GOF Test**					
847					5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level					
848					K-S Test Statistic	0.0871	**Kolmogorov-Smirnov Gamma GOF Test**					
849					5% K-S Critical Value	0.132	Detected data appear Gamma Distributed at 5% Significance Level					
850	**Detected data appear Gamma Distributed at 5% Significance Level**											
851												
852	**Gamma Statistics**											
853					k hat (MLE)	9.806					k star (bias corrected MLE)	9.167
854					Theta hat (MLE)	0.778					Theta star (bias corrected MLE)	0.832
855					nu hat (MLE)	882.5					nu star (bias corrected)	825
856					MLE Mean (bias corrected)	7.626					MLE Sd (bias corrected)	2.519
857											Approximate Chi Square Value (0.05)	759.3
858					Adjusted Level of Significance	0.0447					Adjusted Chi Square Value	757.3
859												
860	**Assuming Gamma Distribution**											
861					95% Approximate Gamma UCL	8.285					95% Adjusted Gamma UCL	8.308
862												
863	**Lognormal GOF Test**											
864					Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**					
865					10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level					
866					Lilliefors Test Statistic	0.0707	**Lilliefors Lognormal GOF Test**					
867					10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level					
868	**Data appear Lognormal at 10% Significance Level**											
869												
870	**Lognormal Statistics**											
871					Minimum of Logged Data	1.284					Mean of logged Data	1.98
872					Maximum of Logged Data	2.66					SD of logged Data	0.325
873												
874	**Assuming Lognormal Distribution**											
875					95% H-UCL	8.334					90% Chebyshev (MVUE) UCL	8.754
876					95% Chebyshev (MVUE) UCL	9.267					97.5% Chebyshev (MVUE) UCL	9.978
877					99% Chebyshev (MVUE) UCL	11.37						
878												
879	**Nonparametric Distribution Free UCL Statistics**											
880	**Data appear to follow a Discernible Distribution**											
881												
882	**Nonparametric Distribution Free UCLs**											
883					95% CLT UCL	8.247					95% BCA Bootstrap UCL	8.27
884					95% Standard Bootstrap UCL	8.24					95% Bootstrap-t UCL	8.301

95% Hall's Bootstrap UCL	8.306	95% Percentile Bootstrap UCL	8.267
90% Chebyshev(Mean, Sd) UCL	8.759	95% Chebyshev(Mean, Sd) UCL	9.272
97.5% Chebyshev(Mean, Sd) UCL	9.984	99% Chebyshev(Mean, Sd) UCL	11.38

Suggested UCL to Use

95% Student's-t UCL	8.26		

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

Result (copper (cu))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	44
		Number of Missing Observations	0
Minimum	5.2	Mean	17.28
Maximum	47.6	Median	15.4
SD	9.129	Std. Error of Mean	1.361
Coefficient of Variation	0.528	Skewness	0.964

Normal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0935	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	19.57	95% Adjusted-CLT UCL (Chen-1995)	19.73
		95% Modified-t UCL (Johnson-1978)	19.6

Gamma GOF Test

A-D Test Statistic	0.364	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0916	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.132	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.724	k star (bias corrected MLE)	3.491
Theta hat (MLE)	4.641	Theta star (bias corrected MLE)	4.951
nu hat (MLE)	335.2	nu star (bias corrected)	314.2
MLE Mean (bias corrected)	17.28	MLE Sd (bias corrected)	9.25
		Approximate Chi Square Value (0.05)	274.1
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	272.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	19.81	95% Adjusted Gamma UCL	19.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.111	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.649	Mean of logged Data	2.709
Maximum of Logged Data	3.863	SD of logged Data	0.55

Assuming Lognormal Distribution

95% H-UCL	20.53	90% Chebyshev (MVUE) UCL	21.94
95% Chebyshev (MVUE) UCL	23.99	97.5% Chebyshev (MVUE) UCL	26.84
99% Chebyshev (MVUE) UCL	32.44		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	19.52	95% BCA Bootstrap UCL	19.57
95% Standard Bootstrap UCL	19.46	95% Bootstrap-t UCL	19.84
95% Hall's Bootstrap UCL	19.87	95% Percentile Bootstrap UCL	19.53
90% Chebyshev(Mean, Sd) UCL	21.37	95% Chebyshev(Mean, Sd) UCL	23.21
97.5% Chebyshev(Mean, Sd) UCL	25.78	99% Chebyshev(Mean, Sd) UCL	30.82

Suggested UCL to Use

95% Student's-t UCL	19.57		

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

Result (iron (fe))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	40
		Number of Missing Observations	0
Minimum	6020	Mean	15268
Maximum	38100	Median	12900
SD	7957	Std. Error of Mean	1186
Coefficient of Variation	0.521	Skewness	1.827

Normal GOF Test

Shapiro Wilk Test Statistic	0.768	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	17261	95% Adjusted-CLT UCL (Chen-1995)	17564
		95% Modified-t UCL (Johnson-1978)	17315
Gamma GOF Test			
A-D Test Statistic	1.837	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	5.123	k star (bias corrected MLE)	4.797
Theta hat (MLE)	2980	Theta star (bias corrected MLE)	3183
nu hat (MLE)	461.1	nu star (bias corrected)	431.7
MLE Mean (bias corrected)	15268	MLE Sd (bias corrected)	6971
		Approximate Chi Square Value (0.05)	384.5
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	383.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	17141	95% Adjusted Gamma UCL	17207
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	8.703	Mean of logged Data	9.533
Maximum of Logged Data	10.55	SD of logged Data	0.43
Assuming Lognormal Distribution			
95% H-UCL	17073	90% Chebyshev (MVUE) UCL	18114
95% Chebyshev (MVUE) UCL	19477	97.5% Chebyshev (MVUE) UCL	21368
99% Chebyshev (MVUE) UCL	25084		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	17219	95% BCA Bootstrap UCL	17422
95% Standard Bootstrap UCL	17209	95% Bootstrap-t UCL	17736
95% Hall's Bootstrap UCL	17555	95% Percentile Bootstrap UCL	17333
90% Chebyshev(Mean, Sd) UCL	18827	95% Chebyshev(Mean, Sd) UCL	20438
97.5% Chebyshev(Mean, Sd) UCL	22675	99% Chebyshev(Mean, Sd) UCL	27070
Suggested UCL to Use			
95% Student's-t UCL	17261		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lead (pb))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	41
		Number of Missing Observations	0
Minimum	4.91	Mean	17.95
Maximum	71.7	Median	12
SD	14.55	Std. Error of Mean	2.169
Coefficient of Variation	0.811	Skewness	1.853

Normal GOF Test

Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	21.6	95% Adjusted-CLT UCL (Chen-1995)	22.16
		95% Modified-t UCL (Johnson-1978)	21.7

Gamma GOF Test

A-D Test Statistic	1.831	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.175	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.133	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.205	k star (bias corrected MLE)	2.073
Theta hat (MLE)	8.142	Theta star (bias corrected MLE)	8.662
nu hat (MLE)	198.4	nu star (bias corrected)	186.5
MLE Mean (bias corrected)	17.95	MLE Sd (bias corrected)	12.47
		Approximate Chi Square Value (0.05)	156
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	155

Assuming Gamma Distribution

95% Approximate Gamma UCL	21.48	95% Adjusted Gamma UCL	21.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

1093	Minimum of Logged Data	1.591	Mean of logged Data	2.644
1094	Maximum of Logged Data	4.272	SD of logged Data	0.67
1095				
1096	**Assuming Lognormal Distribution**			
1097	95% H-UCL	21.66	90% Chebyshev (MVUE) UCL	23.21
1098	95% Chebyshev (MVUE) UCL	25.78	97.5% Chebyshev (MVUE) UCL	29.37
1099	99% Chebyshev (MVUE) UCL	36.4		
1100				
1101	**Nonparametric Distribution Free UCL Statistics**			
1102	**Data do not follow a Discernible Distribution**			
1103				
1104	**Nonparametric Distribution Free UCLs**			
1105	95% CLT UCL	21.52	95% BCA Bootstrap UCL	21.96
1106	95% Standard Bootstrap UCL	21.42	95% Bootstrap-t UCL	22.56
1107	95% Hall's Bootstrap UCL	22.4	95% Percentile Bootstrap UCL	21.49
1108	90% Chebyshev(Mean, Sd) UCL	24.46	95% Chebyshev(Mean, Sd) UCL	27.41
1109	97.5% Chebyshev(Mean, Sd) UCL	31.5	99% Chebyshev(Mean, Sd) UCL	39.54
1110				
1111	**Suggested UCL to Use**			
1112	95% Student's-t UCL	21.6		
1113				
1114	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1115	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1116	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1117				
1118				
1119	Result (lithium (li))			
1120				
1121	**General Statistics**			
1122	Total Number of Observations	45	Number of Distinct Observations	40
1123			Number of Missing Observations	0
1124	Minimum	6.7	Mean	15.5
1125	Maximum	34.8	Median	13.8
1126	SD	6.499	Std. Error of Mean	0.969
1127	Coefficient of Variation	0.419	Skewness	1.467
1128				
1129	**Normal GOF Test**			
1130	Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**	
1131	1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
1132	Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**	
1133	1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
1134	**Data Not Normal at 1% Significance Level**			
1135				
1136	**Assuming Normal Distribution**			
1137	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1138	95% Student's-t UCL	17.12	95% Adjusted-CLT UCL (Chen-1995)	17.32
1139			95% Modified-t UCL (Johnson-1978)	17.16
1140				
1141	**Gamma GOF Test**			
1142	A-D Test Statistic	1.199	**Anderson-Darling Gamma GOF Test**	
1143	5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level	
1144	K-S Test Statistic	0.141	**Kolmogorov-Smirnov Gamma GOF Test**	

	A–E	F	G–K	L
1145	5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
1146	**Data Not Gamma Distributed at 5% Significance Level**			
1147				
1148	**Gamma Statistics**			
1149	k hat (MLE)	7.076	k star (bias corrected MLE)	6.619
1150	Theta hat (MLE)	2.19	Theta star (bias corrected MLE)	2.341
1151	nu hat (MLE)	636.9	nu star (bias corrected)	595.7
1152	MLE Mean (bias corrected)	15.5	MLE Sd (bias corrected)	6.023
1153			Approximate Chi Square Value (0.05)	540.1
1154	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	538.4
1155				
1156	**Assuming Gamma Distribution**			
1157	95% Approximate Gamma UCL	17.09	95% Adjusted Gamma UCL	17.15
1158				
1159	**Lognormal GOF Test**			
1160	Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**	
1161	10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level	
1162	Lilliefors Test Statistic	0.114	**Lilliefors Lognormal GOF Test**	
1163	10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
1164	**Data appear Lognormal at 10% Significance Level**			
1165				
1166	**Lognormal Statistics**			
1167	Minimum of Logged Data	1.902	Mean of logged Data	2.668
1168	Maximum of Logged Data	3.55	SD of logged Data	0.373
1169				
1170	**Assuming Lognormal Distribution**			
1171	95% H-UCL	17.12	90% Chebyshev (MVUE) UCL	18.07
1172	95% Chebyshev (MVUE) UCL	19.27	97.5% Chebyshev (MVUE) UCL	20.93
1173	99% Chebyshev (MVUE) UCL	24.19		
1174				
1175	**Nonparametric Distribution Free UCL Statistics**			
1176	**Data appear to follow a Discernible Distribution**			
1177				
1178	**Nonparametric Distribution Free UCLs**			
1179	95% CLT UCL	17.09	95% BCA Bootstrap UCL	17.22
1180	95% Standard Bootstrap UCL	17.08	95% Bootstrap-t UCL	17.48
1181	95% Hall's Bootstrap UCL	17.34	95% Percentile Bootstrap UCL	17.18
1182	90% Chebyshev(Mean, Sd) UCL	18.4	95% Chebyshev(Mean, Sd) UCL	19.72
1183	97.5% Chebyshev(Mean, Sd) UCL	21.55	99% Chebyshev(Mean, Sd) UCL	25.13
1184				
1185	**Suggested UCL to Use**			
1186	95% H-UCL	17.12		
1187				
1188	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1189	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1190	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1191				
1192				
1193	**Result (magnesium (mg))**			
1194				
1195	**General Statistics**			
1196	Total Number of Observations	45	Number of Distinct Observations	43

		Number of Missing Observations	0
Minimum	2340	Mean	6419
Maximum	18200	Median	4770
SD	4066	Std. Error of Mean	606.1
Coefficient of Variation	0.633	Skewness	1.663
Normal GOF Test			
Shapiro Wilk Test Statistic	0.763	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.241	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7438	95% Adjusted-CLT UCL (Chen-1995)	7577
		95% Modified-t UCL (Johnson-1978)	7463
Gamma GOF Test			
A-D Test Statistic	2.061	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.171	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	3.51	k star (bias corrected MLE)	3.291
Theta hat (MLE)	1829	Theta star (bias corrected MLE)	1950
nu hat (MLE)	315.9	nu star (bias corrected)	296.2
MLE Mean (bias corrected)	6419	MLE Sd (bias corrected)	3538
		Approximate Chi Square Value (0.05)	257.3
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	256.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	7389	95% Adjusted Gamma UCL	7423
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	7.758	Mean of logged Data	8.618
Maximum of Logged Data	9.809	SD of logged Data	0.521
Assuming Lognormal Distribution			
95% H-UCL	7365	90% Chebyshev (MVUE) UCL	7861
95% Chebyshev (MVUE) UCL	8562	97.5% Chebyshev (MVUE) UCL	9536
99% Chebyshev (MVUE) UCL	11448		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7416	95% BCA Bootstrap UCL	7584
95% Standard Bootstrap UCL	7419	95% Bootstrap-t UCL	7688
95% Hall's Bootstrap UCL	7564	95% Percentile Bootstrap UCL	7507
90% Chebyshev(Mean, Sd) UCL	8238	95% Chebyshev(Mean, Sd) UCL	9061
97.5% Chebyshev(Mean, Sd) UCL	10204	99% Chebyshev(Mean, Sd) UCL	12450

Suggested UCL to Use

95% Student's-t UCL	7438		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (manganese (mn))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	44
		Number of Missing Observations	0
Minimum	135	Mean	602.1
Maximum	1660	Median	522
SD	383.4	Std. Error of Mean	57.15
Coefficient of Variation	0.637	Skewness	1.179

Normal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	698.1	95% Adjusted-CLT UCL (Chen-1995)	706.8
		95% Modified-t UCL (Johnson-1978)	699.8

Gamma GOF Test

A-D Test Statistic	0.331	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0926	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.133	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.738	k star (bias corrected MLE)	2.57
Theta hat (MLE)	219.9	Theta star (bias corrected MLE)	234.3
nu hat (MLE)	246.4	nu star (bias corrected)	231.3
MLE Mean (bias corrected)	602.1	MLE Sd (bias corrected)	375.6

Row				
1301			Approximate Chi Square Value (0.05)	197.1
1302	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	196.1
1303				
1304	**Assuming Gamma Distribution**			
1305	95% Approximate Gamma UCL	706.6	95% Adjusted Gamma UCL	710.3
1306				
1307	**Lognormal GOF Test**			
1308	Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**	
1309	10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level	
1310	Lilliefors Test Statistic	0.0794	**Lilliefors Lognormal GOF Test**	
1311	10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
1312	**Data appear Lognormal at 10% Significance Level**			
1313				
1314	**Lognormal Statistics**			
1315	Minimum of Logged Data	4.905	Mean of logged Data	6.207
1316	Maximum of Logged Data	7.415	SD of logged Data	0.641
1317				
1318	**Assuming Lognormal Distribution**			
1319	95% H-UCL	740.6	90% Chebyshev (MVUE) UCL	793.5
1320	95% Chebyshev (MVUE) UCL	878.4	97.5% Chebyshev (MVUE) UCL	996.3
1321	99% Chebyshev (MVUE) UCL	1228		
1322				
1323	**Nonparametric Distribution Free UCL Statistics**			
1324	**Data appear to follow a Discernible Distribution**			
1325				
1326	**Nonparametric Distribution Free UCLs**			
1327	95% CLT UCL	696.1	95% BCA Bootstrap UCL	709.2
1328	95% Standard Bootstrap UCL	695.1	95% Bootstrap-t UCL	714.9
1329	95% Hall's Bootstrap UCL	713.9	95% Percentile Bootstrap UCL	695.7
1330	90% Chebyshev(Mean, Sd) UCL	773.5	95% Chebyshev(Mean, Sd) UCL	851.2
1331	97.5% Chebyshev(Mean, Sd) UCL	959	99% Chebyshev(Mean, Sd) UCL	1171
1332				
1333	**Suggested UCL to Use**			
1334	95% Student's-t UCL	698.1		
1335				
1336	When a data set follows an approximate distribution passing only one of the GOF tests,			
1337	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
1338				
1339	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1340	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1341	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1342				
1343				
1344	**Result (mercury (hg))**			
1345				
1346	**General Statistics**			
1347	Total Number of Observations	24	Number of Distinct Observations	22
1348			Number of Missing Observations	0
1349	Minimum	0.0267	Mean	0.0838
1350	Maximum	0.138	Median	0.0886
1351	SD	0.0312	Std. Error of Mean	0.00637
1352	Coefficient of Variation	0.372	Skewness	-0.353

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.884	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.205	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0947	95% Adjusted-CLT UCL (Chen-1995)	0.0938
		95% Modified-t UCL (Johnson-1978)	0.0946

Gamma GOF Test

A-D Test Statistic	0.956	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.178	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.923	k star (bias corrected MLE)	5.21
Theta hat (MLE)	0.0141	Theta star (bias corrected MLE)	0.0161
nu hat (MLE)	284.3	nu star (bias corrected)	250.1
MLE Mean (bias corrected)	0.0838	MLE Sd (bias corrected)	0.0367
		Approximate Chi Square Value (0.05)	214.5
Adjusted Level of Significance	0.0392	Adjusted Chi Square Value	212.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0977	95% Adjusted Gamma UCL	0.0988

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.93	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.175	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.162	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.623	Mean of logged Data	-2.566
Maximum of Logged Data	-1.981	SD of logged Data	0.46

Assuming Lognormal Distribution

95% H-UCL	0.103	90% Chebyshev (MVUE) UCL	0.11
95% Chebyshev (MVUE) UCL	0.121	97.5% Chebyshev (MVUE) UCL	0.137
99% Chebyshev (MVUE) UCL	0.167		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0943	95% BCA Bootstrap UCL	0.0938

	A–E	F	G–K	L
1405	95% Standard Bootstrap UCL	0.0941	95% Bootstrap-t UCL	0.0944
1406	95% Hall's Bootstrap UCL	0.0937	95% Percentile Bootstrap UCL	0.0941
1407	90% Chebyshev(Mean, Sd) UCL	0.103	95% Chebyshev(Mean, Sd) UCL	0.112
1408	97.5% Chebyshev(Mean, Sd) UCL	0.124	99% Chebyshev(Mean, Sd) UCL	0.147
1409				
1410	**Suggested UCL to Use**			
1411	95% Student's-t UCL	0.0947		
1412				
1413	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1414	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1415	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1416				
1417	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**			
1418	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**			
1419				
1420				
1421	**Result (molybdenum (mo))**			
1422				
1423	**General Statistics**			
1424	Total Number of Observations	45	Number of Distinct Observations	35
1425			Number of Missing Observations	0
1426	Minimum	0.16	Mean	0.635
1427	Maximum	2.97	Median	0.39
1428	SD	0.608	Std. Error of Mean	0.0906
1429	Coefficient of Variation	0.957	Skewness	2.246
1430				
1431	**Normal GOF Test**			
1432	Shapiro Wilk Test Statistic	0.702	**Shapiro Wilk GOF Test**	
1433	1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
1434	Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**	
1435	1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
1436	**Data Not Normal at 1% Significance Level**			
1437				
1438	**Assuming Normal Distribution**			
1439	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1440	95% Student's-t UCL	0.788	95% Adjusted-CLT UCL (Chen-1995)	0.817
1441			95% Modified-t UCL (Johnson-1978)	0.793
1442				
1443	**Gamma GOF Test**			
1444	A-D Test Statistic	2.265	**Anderson-Darling Gamma GOF Test**	
1445	5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level	
1446	K-S Test Statistic	0.194	**Kolmogorov-Smirnov Gamma GOF Test**	
1447	5% K-S Critical Value	0.134	Data Not Gamma Distributed at 5% Significance Level	
1448	**Data Not Gamma Distributed at 5% Significance Level**			
1449				
1450	**Gamma Statistics**			
1451	k hat (MLE)	1.824	k star (bias corrected MLE)	1.717
1452	Theta hat (MLE)	0.348	Theta star (bias corrected MLE)	0.37
1453	nu hat (MLE)	164.2	nu star (bias corrected)	154.6
1454	MLE Mean (bias corrected)	0.635	MLE Sd (bias corrected)	0.485
1455			Approximate Chi Square Value (0.05)	126.8
1456	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	126

Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.774	95% Adjusted Gamma UCL	0.779
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.154	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-1.833	Mean of logged Data	-0.752
Maximum of Logged Data	1.089	SD of logged Data	0.721
Assuming Lognormal Distribution			
95% H-UCL	0.768	90% Chebyshev (MVUE) UCL	0.822
95% Chebyshev (MVUE) UCL	0.919	97.5% Chebyshev (MVUE) UCL	1.054
99% Chebyshev (MVUE) UCL	1.32		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.784	95% BCA Bootstrap UCL	0.828
95% Standard Bootstrap UCL	0.78	95% Bootstrap-t UCL	0.84
95% Hall's Bootstrap UCL	0.829	95% Percentile Bootstrap UCL	0.787
90% Chebyshev(Mean, Sd) UCL	0.907	95% Chebyshev(Mean, Sd) UCL	1.03
97.5% Chebyshev(Mean, Sd) UCL	1.201	99% Chebyshev(Mean, Sd) UCL	1.537
Suggested UCL to Use			
95% Student's-t UCL	0.788		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (nickel (ni))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	42
		Number of Missing Observations	0
Minimum	9	Mean	18.16
Maximum	34.9	Median	16.3
SD	7.099	Std. Error of Mean	1.058
Coefficient of Variation	0.391	Skewness	0.971
Normal GOF Test			
Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	

1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	19.94	95% Adjusted-CLT UCL (Chen-1995)	20.07
		95% Modified-t UCL (Johnson-1978)	19.97
Gamma GOF Test			
A-D Test Statistic	0.999	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.132	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	7.514	k star (bias corrected MLE)	7.028
Theta hat (MLE)	2.417	Theta star (bias corrected MLE)	2.584
nu hat (MLE)	676.3	nu star (bias corrected)	632.6
MLE Mean (bias corrected)	18.16	MLE Sd (bias corrected)	6.852
		Approximate Chi Square Value (0.05)	575.2
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	573.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	19.98	95% Adjusted Gamma UCL	20.04
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.107	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.197	Mean of logged Data	2.831
Maximum of Logged Data	3.552	SD of logged Data	0.366
Assuming Lognormal Distribution			
95% H-UCL	20.07	90% Chebyshev (MVUE) UCL	21.17
95% Chebyshev (MVUE) UCL	22.55	97.5% Chebyshev (MVUE) UCL	24.47
99% Chebyshev (MVUE) UCL	28.23		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	19.91	95% BCA Bootstrap UCL	19.94
95% Standard Bootstrap UCL	19.88	95% Bootstrap-t UCL	20.07
95% Hall's Bootstrap UCL	20	95% Percentile Bootstrap UCL	19.93
90% Chebyshev(Mean, Sd) UCL	21.34	95% Chebyshev(Mean, Sd) UCL	22.78
97.5% Chebyshev(Mean, Sd) UCL	24.77	99% Chebyshev(Mean, Sd) UCL	28.69

Suggested UCL to Use			
95% H-UCL	20.07		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (phosphorus (p))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	43
		Number of Missing Observations	0
Minimum	375	Mean	718
Maximum	1570	Median	646
SD	260.6	Std. Error of Mean	38.85
Coefficient of Variation	0.363	Skewness	1.217
Normal GOF Test			
Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	783.2	95% Adjusted-CLT UCL (Chen-1995)	789.4
		95% Modified-t UCL (Johnson-1978)	784.4
Gamma GOF Test			
A-D Test Statistic	0.674	**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	0.138	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	8.865	k star (bias corrected MLE)	8.289
Theta hat (MLE)	80.99	Theta star (bias corrected MLE)	86.62
nu hat (MLE)	797.9	nu star (bias corrected)	746
MLE Mean (bias corrected)	718	MLE Sd (bias corrected)	249.4
		Approximate Chi Square Value (0.05)	683.6
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	681.7
Assuming Gamma Distribution			
95% Approximate Gamma UCL	783.5	95% Adjusted Gamma UCL	785.7
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.117	**Lilliefors Lognormal GOF Test**	

10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.927	Mean of logged Data	6.519
Maximum of Logged Data	7.359	SD of logged Data	0.336
Assuming Lognormal Distribution			
95% H-UCL	785.9	90% Chebyshev (MVUE) UCL	826.5
95% Chebyshev (MVUE) UCL	876.4	97.5% Chebyshev (MVUE) UCL	945.6
99% Chebyshev (MVUE) UCL	1082		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	781.9	95% BCA Bootstrap UCL	789.2
95% Standard Bootstrap UCL	781.2	95% Bootstrap-t UCL	792
95% Hall's Bootstrap UCL	791.5	95% Percentile Bootstrap UCL	783.1
90% Chebyshev(Mean, Sd) UCL	834.5	95% Chebyshev(Mean, Sd) UCL	887.3
97.5% Chebyshev(Mean, Sd) UCL	960.5	99% Chebyshev(Mean, Sd) UCL	1104
Suggested UCL to Use			
95% Adjusted Gamma UCL	785.7		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (potassium (k))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	41
		Number of Missing Observations	0
Minimum	540	Mean	1429
Maximum	3520	Median	1280
SD	708.3	Std. Error of Mean	105.6
Coefficient of Variation	0.496	Skewness	1.572
Normal GOF Test			
Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	

Row	Label	Value	Label	Value
1665	95% Student's-t UCL	1606	95% Adjusted-CLT UCL (Chen-1995)	1629
1666			95% Modified-t UCL (Johnson-1978)	1610
1667				
1668	**Gamma GOF Test**			
1669	A-D Test Statistic	1.322	**Anderson-Darling Gamma GOF Test**	
1670	5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	
1671	K-S Test Statistic	0.159	**Kolmogorov-Smirnov Gamma GOF Test**	
1672	5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
1673	**Data Not Gamma Distributed at 5% Significance Level**			
1674				
1675	**Gamma Statistics**			
1676	k hat (MLE)	5.297	k star (bias corrected MLE)	4.959
1677	Theta hat (MLE)	269.7	Theta star (bias corrected MLE)	288.1
1678	nu hat (MLE)	476.8	nu star (bias corrected)	446.3
1679	MLE Mean (bias corrected)	1429	MLE Sd (bias corrected)	641.7
1680			Approximate Chi Square Value (0.05)	398.3
1681	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	396.8
1682				
1683	**Assuming Gamma Distribution**			
1684	95% Approximate Gamma UCL	1601	95% Adjusted Gamma UCL	1607
1685				
1686	**Lognormal GOF Test**			
1687	Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**	
1688	10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
1689	Lilliefors Test Statistic	0.127	**Lilliefors Lognormal GOF Test**	
1690	10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
1691	**Data Not Lognormal at 10% Significance Level**			
1692				
1693	**Lognormal Statistics**			
1694	Minimum of Logged Data	6.292	Mean of logged Data	7.167
1695	Maximum of Logged Data	8.166	SD of logged Data	0.429
1696				
1697	**Assuming Lognormal Distribution**			
1698	95% H-UCL	1603	90% Chebyshev (MVUE) UCL	1700
1699	95% Chebyshev (MVUE) UCL	1828	97.5% Chebyshev (MVUE) UCL	2005
1700	99% Chebyshev (MVUE) UCL	2354		
1701				
1702	**Nonparametric Distribution Free UCL Statistics**			
1703	**Data do not follow a Discernible Distribution**			
1704				
1705	**Nonparametric Distribution Free UCLs**			
1706	95% CLT UCL	1603	95% BCA Bootstrap UCL	1617
1707	95% Standard Bootstrap UCL	1600	95% Bootstrap-t UCL	1638
1708	95% Hall's Bootstrap UCL	1627	95% Percentile Bootstrap UCL	1611
1709	90% Chebyshev(Mean, Sd) UCL	1746	95% Chebyshev(Mean, Sd) UCL	1889
1710	97.5% Chebyshev(Mean, Sd) UCL	2088	99% Chebyshev(Mean, Sd) UCL	2480
1711				
1712	**Suggested UCL to Use**			
1713	95% Student's-t UCL	1606		
1714				
1715	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1716	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (selenium (se))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	31
Number of Detects	36	Number of Non-Detects	9
Number of Distinct Detects	30	Number of Distinct Non-Detects	1
Minimum Detect	0	Minimum Non-Detect	0.2
Maximum Detect	2.08	Maximum Non-Detect	0.2
Variance Detects	0.26	Percent Non-Detects	20%
Mean Detects	0.701	SD Detects	0.51
Median Detects	0.525	CV Detects	0.727
Skewness Detects	1.278	Kurtosis Detects	0.67

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.827	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.912	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.17	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.561	KM Standard Error of Mean	0.0802
90KM SD	0.53	95% KM (BCA) UCL	0.74
95% KM (t) UCL	0.696	95% KM (Percentile Bootstrap) UCL	0.711
95% KM (z) UCL	0.693	95% KM Bootstrap t UCL	0.707
90% KM Chebyshev UCL	0.802	95% KM Chebyshev UCL	0.91
97.5% KM Chebyshev UCL	1.062	99% KM Chebyshev UCL	1.359

Gamma Statistics on Detected Data Only

Dataset Contains Values <= 0 - Cannot Compute Gamma Statistics!

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.561	SD (KM)	0.53
Variance (KM)	0.281	SE of Mean (KM)	0.0802
k hat (KM)	1.12	k star (KM)	1.06
nu hat (KM)	100.8	nu star (KM)	95.42
theta hat (KM)	0.501	theta star (KM)	0.529
80% gamma percentile (KM)	0.899	90% gamma percentile (KM)	1.273
95% gamma percentile (KM)	1.647	99% gamma percentile (KM)	2.509

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0447
Approximate Chi Square Value (95.42, α)	73.89	Adjusted Chi Square Value (95.42, β)	73.26
95% KM Approximate Gamma UCL	0.725	95% KM Adjusted Gamma UCL	0.731

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	N/A	KM Geo Mean	N/A
KM SD (logged)	N/A	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	N/A	95% H-UCL (KM -Log)	N/A
KM SD (logged)	N/A	95% Critical H Value (KM-Log)	N/A

KM Standard Error of Mean (logged)	N/A		
DL/2 Statistics			
Mean in Original Scale	0.581	SD in Original Scale	0.516
95% t UCL (Assumes normality)	0.71		
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			
Suggested UCL to Use			
95% KM (t) UCL	0.696		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (silver (ag))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	7
Number of Detects	14	Number of Non-Detects	31
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.1
Maximum Detect	0.25	Maximum Non-Detect	0.1
Variance Detects	0.00133	Percent Non-Detects	68.89%
Mean Detects	0.141	SD Detects	0.0365
Median Detects	0.13	CV Detects	0.259
Skewness Detects	2.331	Kurtosis Detects	6.433
Mean of Logged Detects	-1.986	SD of Logged Detects	0.219
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.737	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.825	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.263	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.113	KM Standard Error of Mean	0.00421
90KM SD	0.0272	95% KM (BCA) UCL	0.119
95% KM (t) UCL	0.12	95% KM (Percentile Bootstrap) UCL	0.12
95% KM (z) UCL	0.12	95% KM Bootstrap t UCL	0.123
90% KM Chebyshev UCL	0.125	95% KM Chebyshev UCL	0.131
97.5% KM Chebyshev UCL	0.139	99% KM Chebyshev UCL	0.155
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.083	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.734	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.265	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.228	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)	20.37	k star (bias corrected MLE)	16.05
Theta hat (MLE)	0.00691	Theta star (bias corrected MLE)	0.00877
nu hat (MLE)	570.3	nu star (bias corrected)	449.4
Mean (detects)	0.141		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0732
Maximum	0.25	Median	0.0643
SD	0.0551	CV	0.754
k hat (MLE)	1.49	k star (bias corrected MLE)	1.405
Theta hat (MLE)	0.0491	Theta star (bias corrected MLE)	0.0521
nu hat (MLE)	134.1	nu star (bias corrected)	126.5
Adjusted Level of Significance (β)	0.0447		
Approximate Chi Square Value (126.48, α)	101.5	Adjusted Chi Square Value (126.48, β)	100.8
95% Gamma Approximate UCL	0.0912	95% Gamma Adjusted UCL	0.0919

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.113	SD (KM)	0.0272
Variance (KM)	7.3956E-4	SE of Mean (KM)	0.00421
k hat (KM)	17.16	k star (KM)	16.03
nu hat (KM)	1545	nu star (KM)	1443
theta hat (KM)	0.00656	theta star (KM)	0.00703
80% gamma percentile (KM)	0.135	90% gamma percentile (KM)	0.15
95% gamma percentile (KM)	0.163	99% gamma percentile (KM)	0.188

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1356	Adjusted Chi Square Value (N/A, β)	1353
95% KM Approximate Gamma UCL	0.12	95% KM Adjusted Gamma UCL	0.12

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.895	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.208	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0909	Mean in Log Scale	-2.493
SD in Original Scale	0.0422	SD in Log Scale	0.441
95% t UCL (assumes normality of ROS data)	0.101	95% Percentile Bootstrap UCL	0.101
95% BCA Bootstrap UCL	0.102	95% Bootstrap t UCL	0.103
95% H-UCL (Log ROS)	0.103		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.204	KM Geo Mean	0.11

KM SD (logged)	0.188	95% Critical H Value (KM-Log)	1.686
KM Standard Error of Mean (logged)	0.0291	95% H-UCL (KM -Log)	0.118
KM SD (logged)	0.188	95% Critical H Value (KM-Log)	1.686
KM Standard Error of Mean (logged)	0.0291		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0782	Mean in Log Scale	-2.682
SD in Original Scale	0.0469	SD in Log Scale	0.488
95% t UCL (Assumes normality)	0.09	95% H-Stat UCL	0.0886
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			
Suggested UCL to Use			
95% KM (t) UCL	0.12		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (sodium (Na))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	37
		Number of Missing Observations	0
Minimum	82	Mean	186.6
Maximum	501	Median	147
SD	101	Std. Error of Mean	15.05
Coefficient of Variation	0.541	Skewness	1.38
Normal GOF Test			
Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	211.9	95% Adjusted-CLT UCL (Chen-1995)	214.7
		95% Modified-t UCL (Johnson-1978)	212.4
Gamma GOF Test			
A-D Test Statistic	2.151	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.216	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			

	A–E	F	G–K	L
1925	k hat (MLE)	4.422	k star (bias corrected MLE)	4.142
1926	Theta hat (MLE)	42.2	Theta star (bias corrected MLE)	45.05
1927	nu hat (MLE)	398	nu star (bias corrected)	372.8
1928	MLE Mean (bias corrected)	186.6	MLE Sd (bias corrected)	91.69
1929			Approximate Chi Square Value (0.05)	329.1
1930	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	327.7
1931				
1932	**Assuming Gamma Distribution**			
1933	95% Approximate Gamma UCL	211.4	95% Adjusted Gamma UCL	212.3
1934				
1935	**Lognormal GOF Test**			
1936	Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk Lognormal GOF Test**	
1937	10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
1938	Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**	
1939	10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
1940	**Data Not Lognormal at 10% Significance Level**			
1941				
1942	**Lognormal Statistics**			
1943	Minimum of Logged Data	4.407	Mean of logged Data	5.112
1944	Maximum of Logged Data	6.217	SD of logged Data	0.468
1945				
1946	**Assuming Lognormal Distribution**			
1947	95% H-UCL	211.5	90% Chebyshev (MVUE) UCL	225.1
1948	95% Chebyshev (MVUE) UCL	243.4	97.5% Chebyshev (MVUE) UCL	268.8
1949	99% Chebyshev (MVUE) UCL	318.6		
1950				
1951	**Nonparametric Distribution Free UCL Statistics**			
1952	**Data do not follow a Discernible Distribution**			
1953				
1954	**Nonparametric Distribution Free UCLs**			
1955	95% CLT UCL	211.4	95% BCA Bootstrap UCL	212.1
1956	95% Standard Bootstrap UCL	210.7	95% Bootstrap-t UCL	214.6
1957	95% Hall's Bootstrap UCL	214	95% Percentile Bootstrap UCL	210.6
1958	90% Chebyshev(Mean, Sd) UCL	231.8	95% Chebyshev(Mean, Sd) UCL	252.2
1959	97.5% Chebyshev(Mean, Sd) UCL	280.6	99% Chebyshev(Mean, Sd) UCL	336.4
1960				
1961	**Suggested UCL to Use**			
1962	95% Student's-t UCL	211.9		
1963				
1964	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1965	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1966	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1967				
1968	**Result (strontium (sr))**			
1969				
1970	**General Statistics**			
1971	Total Number of Observations	45	Number of Distinct Observations	42
1972			Number of Missing Observations	0
1973	Minimum	11	Mean	27.59
1974	Maximum	48.1	Median	27.6
1975	SD	9.28	Std. Error of Mean	1.383
1976	Coefficient of Variation	0.336	Skewness	0.333

	A	B	C	D	E	F	G	H	I	J	K	L
1977												
1978	**Normal GOF Test**											
1979					Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**					
1980					1% Shapiro Wilk Critical Value	0.926	Data appear Normal at 1% Significance Level					
1981					Lilliefors Test Statistic	0.079	**Lilliefors GOF Test**					
1982					1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level					
1983	**Data appear Normal at 1% Significance Level**											
1984												
1985	**Assuming Normal Distribution**											
1986	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1987					95% Student's-t UCL	29.92					95% Adjusted-CLT UCL (Chen-1995)	29.94
1988											95% Modified-t UCL (Johnson-1978)	29.93
1989												
1990	**Gamma GOF Test**											
1991					A-D Test Statistic	0.211	**Anderson-Darling Gamma GOF Test**					
1992					5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level					
1993					K-S Test Statistic	0.0784	**Kolmogorov-Smirnov Gamma GOF Test**					
1994					5% K-S Critical Value	0.132	Detected data appear Gamma Distributed at 5% Significance Level					
1995	**Detected data appear Gamma Distributed at 5% Significance Level**											
1996												
1997	**Gamma Statistics**											
1998					k hat (MLE)	8.643					k star (bias corrected MLE)	8.082
1999					Theta hat (MLE)	3.192					Theta star (bias corrected MLE)	3.414
2000					nu hat (MLE)	777.9					nu star (bias corrected)	727.3
2001					MLE Mean (bias corrected)	27.59					MLE Sd (bias corrected)	9.706
2002											Approximate Chi Square Value (0.05)	665.8
2003					Adjusted Level of Significance	0.0447					Adjusted Chi Square Value	663.8
2004												
2005	**Assuming Gamma Distribution**											
2006					95% Approximate Gamma UCL	30.14					95% Adjusted Gamma UCL	30.23
2007												
2008	**Lognormal GOF Test**											
2009					Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**					
2010					10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level					
2011					Lilliefors Test Statistic	0.0932	**Lilliefors Lognormal GOF Test**					
2012					10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level					
2013	**Data appear Lognormal at 10% Significance Level**											
2014												
2015	**Lognormal Statistics**											
2016					Minimum of Logged Data	2.398					Mean of logged Data	3.259
2017					Maximum of Logged Data	3.873					SD of logged Data	0.356
2018												
2019	**Assuming Lognormal Distribution**											
2020					95% H-UCL	30.55					90% Chebyshev (MVUE) UCL	32.19
2021					95% Chebyshev (MVUE) UCL	34.24					97.5% Chebyshev (MVUE) UCL	37.08
2022					99% Chebyshev (MVUE) UCL	42.66						
2023												
2024	**Nonparametric Distribution Free UCL Statistics**											
2025	**Data appear to follow a Discernible Distribution**											
2026												
2027	**Nonparametric Distribution Free UCLs**											
2028					95% CLT UCL	29.87					95% BCA Bootstrap UCL	29.76

95% Standard Bootstrap UCL	29.87	95% Bootstrap-t UCL	30.05
95% Hall's Bootstrap UCL	29.98	95% Percentile Bootstrap UCL	29.91
90% Chebyshev(Mean, Sd) UCL	31.74	95% Chebyshev(Mean, Sd) UCL	33.62
97.5% Chebyshev(Mean, Sd) UCL	36.23	99% Chebyshev(Mean, Sd) UCL	41.36

Suggested UCL to Use

95% Student's-t UCL	29.92		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (sulfur (s))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	19
Number of Detects	28	Number of Non-Detects	17
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	1000	Minimum Non-Detect	1000
Maximum Detect	13200	Maximum Non-Detect	1000
Variance Detects	13996019	Percent Non-Detects	37.78%
Mean Detects	3775	SD Detects	3741
Median Detects	1850	CV Detects	0.991
Skewness Detects	1.475	Kurtosis Detects	0.863
Mean of Logged Detects	7.852	SD of Logged Detects	0.844

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.896	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.296	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.191	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	2727	KM Standard Error of Mean	485
90KM SD	3195	95% KM (BCA) UCL	3571
95% KM (t) UCL	3542	95% KM (Percentile Bootstrap) UCL	3558
95% KM (z) UCL	3524	95% KM Bootstrap t UCL	3789
90% KM Chebyshev UCL	4182	95% KM Chebyshev UCL	4841
97.5% KM Chebyshev UCL	5756	99% KM Chebyshev UCL	7553

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.061	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.764	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.246	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.169	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)	1.444	k star (bias corrected MLE)	1.313
Theta hat (MLE)	2614	Theta star (bias corrected MLE)	2874
nu hat (MLE)	80.88	nu star (bias corrected)	73.54

	A B C D E	F	G H I J K	L
2081	Mean (detects)	3775		
2082				
2083	**Gamma ROS Statistics using Imputed Non-Detects**			
2084	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2085	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2086	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2087	This is especially true when the sample size is small.			
2088	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2089	Minimum	0.01	Mean	2349
2090	Maximum	13200	Median	1200
2091	SD	3466	CV	1.476
2092	k hat (MLE)	0.164	k star (bias corrected MLE)	0.168
2093	Theta hat (MLE)	14297	Theta star (bias corrected MLE)	13969
2094	nu hat (MLE)	14.79	nu star (bias corrected)	15.13
2095	Adjusted Level of Significance (β)	0.0447		
2096	Approximate Chi Square Value (15.13, α)	7.355	Adjusted Chi Square Value (15.13, β)	7.174
2097	95% Gamma Approximate UCL	4833	95% Gamma Adjusted UCL	4955
2098				
2099	**Estimates of Gamma Parameters using KM Estimates**			
2100	Mean (KM)	2727	SD (KM)	3195
2101	Variance (KM)	10207733	SE of Mean (KM)	485
2102	k hat (KM)	0.728	k star (KM)	0.695
2103	nu hat (KM)	65.55	nu star (KM)	62.51
2104	theta hat (KM)	3744	theta star (KM)	3926
2105	80% gamma percentile (KM)	4483	90% gamma percentile (KM)	6857
2106	95% gamma percentile (KM)	9307	99% gamma percentile (KM)	15159
2107				
2108	**Gamma Kaplan-Meier (KM) Statistics**			
2109	Approximate Chi Square Value (62.51, α)	45.33	Adjusted Chi Square Value (62.51, β)	44.84
2110	95% KM Approximate Gamma UCL	3761	95% KM Adjusted Gamma UCL	3801
2111				
2112	**Lognormal GOF Test on Detected Observations Only**			
2113	Shapiro Wilk Test Statistic	0.857	**Shapiro Wilk GOF Test**	
2114	10% Shapiro Wilk Critical Value	0.936	Detected Data Not Lognormal at 10% Significance Level	
2115	Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**	
2116	10% Lilliefors Critical Value	0.151	Detected Data Not Lognormal at 10% Significance Level	
2117	**Detected Data Not Lognormal at 10% Significance Level**			
2118				
2119	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2120	Mean in Original Scale	2488	Mean in Log Scale	7.053
2121	SD in Original Scale	3375	SD in Log Scale	1.29
2122	95% t UCL (assumes normality of ROS data)	3333	95% Percentile Bootstrap UCL	3346
2123	95% BCA Bootstrap UCL	3416	95% Bootstrap t UCL	3575
2124	95% H-UCL (Log ROS)	4510		
2125				
2126	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2127	KM Mean (logged)	7.495	KM Geo Mean	1799
2128	KM SD (logged)	0.798	95% Critical H Value (KM-Log)	2.159
2129	KM Standard Error of Mean (logged)	0.121	95% H-UCL (KM -Log)	3206
2130	KM SD (logged)	0.798	95% Critical H Value (KM-Log)	2.159
2131	KM Standard Error of Mean (logged)	0.121		
2132				

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2538	Mean in Log Scale	7.233
SD in Original Scale	3342	SD in Log Scale	1.04
95% t UCL (Assumes normality)	3375	95% H-Stat UCL	3472

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

Suggested UCL to Use

95% KM (t) UCL	3542		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (thallium (tl))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	37
		Number of Missing Observations	0
Minimum	0	Mean	0.136
Maximum	0.237	Median	0.126
SD	0.0483	Std. Error of Mean	0.0072
Coefficient of Variation	0.355	Skewness	0.181

Normal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.148	95% Adjusted-CLT UCL (Chen-1995)	0.148
		95% Modified-t UCL (Johnson-1978)	0.148

Gamma Statistics Not Available

Lognormal Statistics Not Available

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.148	95% BCA Bootstrap UCL	0.147
95% Standard Bootstrap UCL	0.148	95% Bootstrap-t UCL	0.148
95% Hall's Bootstrap UCL	0.148	95% Percentile Bootstrap UCL	0.148
90% Chebyshev(Mean, Sd) UCL	0.158	95% Chebyshev(Mean, Sd) UCL	0.167
97.5% Chebyshev(Mean, Sd) UCL	0.181	99% Chebyshev(Mean, Sd) UCL	0.208

Suggested UCL to Use

95% Student's-t UCL	0.148

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tin (sn))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	12
Number of Detects	14	Number of Non-Detects	31
Number of Distinct Detects	11	Number of Distinct Non-Detects	2
Minimum Detect	1	Minimum Non-Detect	1
Maximum Detect	5.6	Maximum Non-Detect	2
Variance Detects	2.127	Percent Non-Detects	68.89%
Mean Detects	2.193	SD Detects	1.458
Median Detects	1.35	CV Detects	0.665
Skewness Detects	1.249	Kurtosis Detects	0.631
Mean of Logged Detects	0.608	SD of Logged Detects	0.594

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	1.404	KM Standard Error of Mean	0.149
90KM SD	0.953	95% KM (BCA) UCL	1.668
95% KM (t) UCL	1.654	95% KM (Percentile Bootstrap) UCL	1.662
95% KM (z) UCL	1.648	95% KM Bootstrap t UCL	1.764
90% KM Chebyshev UCL	1.85	95% KM Chebyshev UCL	2.052
97.5% KM Chebyshev UCL	2.333	99% KM Chebyshev UCL	2.884

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.05	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.743	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.27	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.231	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.982	k star (bias corrected MLE)	2.391
Theta hat (MLE)	0.735	Theta star (bias corrected MLE)	0.917
nu hat (MLE)	83.5	nu star (bias corrected)	66.94
Mean (detects)	2.193		

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	0.859
Maximum	5.6	Median	0.0932
SD	1.281	CV	1.491
k hat (MLE)	0.339	k star (bias corrected MLE)	0.331
Theta hat (MLE)	2.534	Theta star (bias corrected MLE)	2.594
nu hat (MLE)	30.52	nu star (bias corrected)	29.81
Adjusted Level of Significance (β)	0.0447		
Approximate Chi Square Value (29.81, α)	18.35	Adjusted Chi Square Value (29.81, β)	18.05
95% Gamma Approximate UCL	1.396	95% Gamma Adjusted UCL	1.419
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.404	SD (KM)	0.953
Variance (KM)	0.908	SE of Mean (KM)	0.149
k hat (KM)	2.171	k star (KM)	2.041
nu hat (KM)	195.4	nu star (KM)	183.7
theta hat (KM)	0.647	theta star (KM)	0.688
80% gamma percentile (KM)	2.097	90% gamma percentile (KM)	2.717
95% gamma percentile (KM)	3.308	99% gamma percentile (KM)	4.618
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (183.66, α)	153.3	Adjusted Chi Square Value (183.66, β)	152.4
95% KM Approximate Gamma UCL	1.682	95% KM Adjusted Gamma UCL	1.692
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.855	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.895	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.208	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.074	Mean in Log Scale	-0.357
SD in Original Scale	1.149	SD in Log Scale	0.929
95% t UCL (assumes normality of ROS data)	1.362	95% Percentile Bootstrap UCL	1.36
95% BCA Bootstrap UCL	1.407	95% Bootstrap t UCL	1.465
95% H-UCL (Log ROS)	1.486		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	0.217	KM Geo Mean	1.242
KM SD (logged)	0.423	95% Critical H Value (KM-Log)	1.852
KM Standard Error of Mean (logged)	0.0675	95% H-UCL (KM -Log)	1.529
KM SD (logged)	0.423	95% Critical H Value (KM-Log)	1.852
KM Standard Error of Mean (logged)	0.0675		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	

Mean in Original Scale	1.204	Mean in Log Scale	-0.0418
SD in Original Scale	1.06	SD in Log Scale	0.62
95% t UCL (Assumes normality)	1.47	95% H-Stat UCL	1.401

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

Suggested UCL to Use

95% KM (t) UCL	1.654		

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

Result (titanium (ti))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	41
		Number of Missing Observations	0
Minimum	224	Mean	484.5
Maximum	1040	Median	482
SD	190.4	Std. Error of Mean	28.39
Coefficient of Variation	0.393	Skewness	1.032

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	532.2	95% Adjusted-CLT UCL (Chen-1995)	535.9
		95% Modified-t UCL (Johnson-1978)	532.9

Gamma GOF Test

A-D Test Statistic	0.238	**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	0.0613	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.132	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.194	k star (bias corrected MLE)	6.729
Theta hat (MLE)	67.35	Theta star (bias corrected MLE)	72
nu hat (MLE)	647.5	nu star (bias corrected)	605.6
MLE Mean (bias corrected)	484.5	MLE Sd (bias corrected)	186.8
		Approximate Chi Square Value (0.05)	549.6
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	547.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	534	95% Adjusted Gamma UCL	535.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0799	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.412	Mean of logged Data	6.112
Maximum of Logged Data	6.947	SD of logged Data	0.38

Assuming Lognormal Distribution

95% H-UCL	538.7	90% Chebyshev (MVUE) UCL	569
95% Chebyshev (MVUE) UCL	607.4	97.5% Chebyshev (MVUE) UCL	660.7
99% Chebyshev (MVUE) UCL	765.4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	531.2	95% BCA Bootstrap UCL	536
95% Standard Bootstrap UCL	530.8	95% Bootstrap-t UCL	537.7
95% Hall's Bootstrap UCL	538.2	95% Percentile Bootstrap UCL	532.9
90% Chebyshev(Mean, Sd) UCL	569.7	95% Chebyshev(Mean, Sd) UCL	608.3
97.5% Chebyshev(Mean, Sd) UCL	661.8	99% Chebyshev(Mean, Sd) UCL	767

Suggested UCL to Use

95% Student's-t UCL	532.2		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tungsten (w))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	3
Number of Detects	0	Number of Non-Detects	45
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 Result (tungsten (w)) was not processed!

	A–E	F	G–K	L
2393				
2394				
2395				
2396	Result (uranium (u))			
2397				
2398	**General Statistics**			
2399	Total Number of Observations	45	Number of Distinct Observations	43
2400			Number of Missing Observations	0
2401	Minimum	0.422	Mean	1.121
2402	Maximum	4.58	Median	0.897
2403	SD	0.868	Std. Error of Mean	0.129
2404	Coefficient of Variation	0.774	Skewness	2.764
2405				
2406	**Normal GOF Test**			
2407	Shapiro Wilk Test Statistic	0.621	**Shapiro Wilk GOF Test**	
2408	1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
2409	Lilliefors Test Statistic	0.317	**Lilliefors GOF Test**	
2410	1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
2411	**Data Not Normal at 1% Significance Level**			
2412				
2413	**Assuming Normal Distribution**			
2414	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2415	95% Student's-t UCL	1.339	95% Adjusted-CLT UCL (Chen-1995)	1.391
2416			95% Modified-t UCL (Johnson-1978)	1.347
2417				
2418	**Gamma GOF Test**			
2419	A-D Test Statistic	3.215	**Anderson-Darling Gamma GOF Test**	
2420	5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level	
2421	K-S Test Statistic	0.238	**Kolmogorov-Smirnov Gamma GOF Test**	
2422	5% K-S Critical Value	0.133	Data Not Gamma Distributed at 5% Significance Level	
2423	**Data Not Gamma Distributed at 5% Significance Level**			
2424				
2425	**Gamma Statistics**			
2426	k hat (MLE)	3.134	k star (bias corrected MLE)	2.94
2427	Theta hat (MLE)	0.358	Theta star (bias corrected MLE)	0.381
2428	nu hat (MLE)	282.1	nu star (bias corrected)	264.6
2429	MLE Mean (bias corrected)	1.121	MLE Sd (bias corrected)	0.654
2430			Approximate Chi Square Value (0.05)	227.9
2431	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	226.8
2432				
2433	**Assuming Gamma Distribution**			
2434	95% Approximate Gamma UCL	1.302	95% Adjusted Gamma UCL	1.308
2435				
2436	**Lognormal GOF Test**			
2437	Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk Lognormal GOF Test**	
2438	10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
2439	Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**	
2440	10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
2441	**Data Not Lognormal at 10% Significance Level**			
2442				
2443	**Lognormal Statistics**			
2444	Minimum of Logged Data	-0.863	Mean of logged Data	-0.0535

Maximum of Logged Data	1.522	SD of logged Data	0.521
Assuming Lognormal Distribution			
95% H-UCL	1.262	90% Chebyshev (MVUE) UCL	1.347
95% Chebyshev (MVUE) UCL	1.468	97.5% Chebyshev (MVUE) UCL	1.635
99% Chebyshev (MVUE) UCL	1.962		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.334	95% BCA Bootstrap UCL	1.416
95% Standard Bootstrap UCL	1.332	95% Bootstrap-t UCL	1.47
95% Hall's Bootstrap UCL	1.379	95% Percentile Bootstrap UCL	1.341
90% Chebyshev(Mean, Sd) UCL	1.509	95% Chebyshev(Mean, Sd) UCL	1.685
97.5% Chebyshev(Mean, Sd) UCL	1.929	99% Chebyshev(Mean, Sd) UCL	2.408
Suggested UCL to Use			
95% Student's-t UCL	1.339		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (vanadium (v))			
General Statistics			
Total Number of Observations	45	Number of Distinct Observations	39
		Number of Missing Observations	0
Minimum	13.4	Mean	25.25
Maximum	52.5	Median	22.7
SD	9.198	Std. Error of Mean	1.371
Coefficient of Variation	0.364	Skewness	1.5
Normal GOF Test			
Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	27.56	95% Adjusted-CLT UCL (Chen-1995)	27.83
		95% Modified-t UCL (Johnson-1978)	27.61
Gamma GOF Test			
A-D Test Statistic	1.69	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.202	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Data Not Gamma Distributed at 5% Significance Level	

	A–E	F	G–K	L
2497	**Data Not Gamma Distributed at 5% Significance Level**			
2498				
2499	**Gamma Statistics**			
2500	k hat (MLE)	9.425	k star (bias corrected MLE)	8.811
2501	Theta hat (MLE)	2.679	Theta star (bias corrected MLE)	2.866
2502	nu hat (MLE)	848.2	nu star (bias corrected)	793
2503	MLE Mean (bias corrected)	25.25	MLE Sd (bias corrected)	8.507
2504			Approximate Chi Square Value (0.05)	728.6
2505	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	726.6
2506				
2507	**Assuming Gamma Distribution**			
2508	95% Approximate Gamma UCL	27.48	95% Adjusted Gamma UCL	27.56
2509				
2510	**Lognormal GOF Test**			
2511	Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**	
2512	10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
2513	Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**	
2514	10% Lilliefors Critical Value	0.12	Data Not Lognormal at 10% Significance Level	
2515	**Data Not Lognormal at 10% Significance Level**			
2516				
2517	**Lognormal Statistics**			
2518	Minimum of Logged Data	2.595	Mean of logged Data	3.175
2519	Maximum of Logged Data	3.961	SD of logged Data	0.32
2520				
2521	**Assuming Lognormal Distribution**			
2522	95% H-UCL	27.45	90% Chebyshev (MVUE) UCL	28.82
2523	95% Chebyshev (MVUE) UCL	30.48	97.5% Chebyshev (MVUE) UCL	32.79
2524	99% Chebyshev (MVUE) UCL	37.33		
2525				
2526	**Nonparametric Distribution Free UCL Statistics**			
2527	**Data do not follow a Discernible Distribution**			
2528				
2529	**Nonparametric Distribution Free UCLs**			
2530	95% CLT UCL	27.51	95% BCA Bootstrap UCL	27.82
2531	95% Standard Bootstrap UCL	27.51	95% Bootstrap-t UCL	27.99
2532	95% Hall's Bootstrap UCL	27.83	95% Percentile Bootstrap UCL	27.63
2533	90% Chebyshev(Mean, Sd) UCL	29.36	95% Chebyshev(Mean, Sd) UCL	31.23
2534	97.5% Chebyshev(Mean, Sd) UCL	33.81	99% Chebyshev(Mean, Sd) UCL	38.89
2535				
2536	**Suggested UCL to Use**			
2537	95% Student's-t UCL	27.56		
2538				
2539	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2540	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2541	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2542				
2543				
2544	**Result (zinc (zn))**			
2545				
2546	**General Statistics**			
2547	Total Number of Observations	45	Number of Distinct Observations	41
2548			Number of Missing Observations	0

Minimum	35.6	Mean	100.8
Maximum	171	Median	94.2
SD	38.75	Std. Error of Mean	5.777
Coefficient of Variation	0.384	Skewness	0.319
Normal GOF Test			
Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0829	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	110.5	95% Adjusted-CLT UCL (Chen-1995)	110.6
		95% Modified-t UCL (Johnson-1978)	110.6
Gamma GOF Test			
A-D Test Statistic	0.334	**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	0.0617	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.132	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	6.517	k star (bias corrected MLE)	6.098
Theta hat (MLE)	15.47	Theta star (bias corrected MLE)	16.53
nu hat (MLE)	586.6	nu star (bias corrected)	548.8
MLE Mean (bias corrected)	100.8	MLE Sd (bias corrected)	40.82
		Approximate Chi Square Value (0.05)	495.5
Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	493.8
Assuming Gamma Distribution			
95% Approximate Gamma UCL	111.6	95% Adjusted Gamma UCL	112
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0878	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.572	Mean of logged Data	4.534
Maximum of Logged Data	5.142	SD of logged Data	0.414
Assuming Lognormal Distribution			
95% H-UCL	113.9	90% Chebyshev (MVUE) UCL	120.7
95% Chebyshev (MVUE) UCL	129.5	97.5% Chebyshev (MVUE) UCL	141.6
99% Chebyshev (MVUE) UCL	165.6		
Nonparametric Distribution Free UCL Statistics			

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	110.3	95% BCA Bootstrap UCL	110.2
95% Standard Bootstrap UCL	110.1	95% Bootstrap-t UCL	110.9
95% Hall's Bootstrap UCL	110.6	95% Percentile Bootstrap UCL	110.1
90% Chebyshev(Mean, Sd) UCL	118.1	95% Chebyshev(Mean, Sd) UCL	126
97.5% Chebyshev(Mean, Sd) UCL	136.9	99% Chebyshev(Mean, Sd) UCL	158.3

Suggested UCL to Use

95% Student's-t UCL	110.5		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (zirconium (zr))

General Statistics

Total Number of Observations	45	Number of Distinct Observations	39
		Number of Missing Observations	0
Minimum	1.6	Mean	5.604
Maximum	13.6	Median	4.9
SD	3.249	Std. Error of Mean	0.484
Coefficient of Variation	0.58	Skewness	0.967

Normal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.926	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.153	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.418	95% Adjusted-CLT UCL (Chen-1995)	6.476
		95% Modified-t UCL (Johnson-1978)	6.43

Gamma GOF Test

A-D Test Statistic	0.355	**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	0.0805	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.133	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.187	k star (bias corrected MLE)	2.989
Theta hat (MLE)	1.759	Theta star (bias corrected MLE)	1.875
nu hat (MLE)	286.8	nu star (bias corrected)	269
MLE Mean (bias corrected)	5.604	MLE Sd (bias corrected)	3.242
		Approximate Chi Square Value (0.05)	232.1

2653	Adjusted Level of Significance	0.0447	Adjusted Chi Square Value	230.9
2654				
2655	**Assuming Gamma Distribution**			
2656	95% Approximate Gamma UCL	6.498	95% Adjusted Gamma UCL	6.53
2657				
2658	**Lognormal GOF Test**			
2659	Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	
2660	10% Shapiro Wilk Critical Value	0.953	Data appear Lognormal at 10% Significance Level	
2661	Lilliefors Test Statistic	0.0829	**Lilliefors Lognormal GOF Test**	
2662	10% Lilliefors Critical Value	0.12	Data appear Lognormal at 10% Significance Level	
2663	**Data appear Lognormal at 10% Significance Level**			
2664				
2665	**Lognormal Statistics**			
2666	Minimum of Logged Data	0.47	Mean of logged Data	1.559
2667	Maximum of Logged Data	2.61	SD of logged Data	0.593
2668				
2669	**Assuming Lognormal Distribution**			
2670	95% H-UCL	6.759	90% Chebyshev (MVUE) UCL	7.236
2671	95% Chebyshev (MVUE) UCL	7.959	97.5% Chebyshev (MVUE) UCL	8.963
2672	99% Chebyshev (MVUE) UCL	10.93		
2673				
2674	**Nonparametric Distribution Free UCL Statistics**			
2675	**Data appear to follow a Discernible Distribution**			
2676				
2677	**Nonparametric Distribution Free UCLs**			
2678	95% CLT UCL	6.401	95% BCA Bootstrap UCL	6.44
2679	95% Standard Bootstrap UCL	6.395	95% Bootstrap-t UCL	6.501
2680	95% Hall's Bootstrap UCL	6.478	95% Percentile Bootstrap UCL	6.438
2681	90% Chebyshev(Mean, Sd) UCL	7.057	95% Chebyshev(Mean, Sd) UCL	7.715
2682	97.5% Chebyshev(Mean, Sd) UCL	8.629	99% Chebyshev(Mean, Sd) UCL	10.42
2683				
2684	**Suggested UCL to Use**			
2685	95% Student's-t UCL	6.418		
2686				
2687	When a data set follows an approximate distribution passing only one of the GOF tests,			
2688	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
2689				
2690	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2691	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2692	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2693				

B.2.3 Sediment EPC ProUCL Output: West Buskegau Watershed

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.2 3/18/2024 3:02:05 PM								
5			From File	WorkSheet.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	Result (aluminum (al))											
12												
13	General Statistics											
14					Total Number of Observations	18					Number of Distinct Observations	18
15											Number of Missing Observations	0
16					Minimum	4270					Mean	10161
17					Maximum	18100					Median	9090
18					SD	4140					Std. Error of Mean	975.7
19					Coefficient of Variation	0.407					Skewness	0.487
20												
21	Normal GOF Test											
22					Shapiro Wilk Test Statistic	0.938	Shapiro Wilk GOF Test					
23					1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level					
24					Lilliefors Test Statistic	0.151	Lilliefors GOF Test					
25					1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level					
26	Data appear Normal at 1% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30					95% Student's-t UCL	11859					95% Adjusted-CLT UCL (Chen-1995)	11886
31											95% Modified-t UCL (Johnson-1978)	11877
32												
33	Gamma GOF Test											
34					A-D Test Statistic	0.367	Anderson-Darling Gamma GOF Test					
35					5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level					
36					K-S Test Statistic	0.161	Kolmogorov-Smirnov Gamma GOF Test					
37					5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level					
38	Detected data appear Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41					k hat (MLE)	6.13					k star (bias corrected MLE)	5.145
42					Theta hat (MLE)	1658					Theta star (bias corrected MLE)	1975
43					nu hat (MLE)	220.7					nu star (bias corrected)	185.2
44					MLE Mean (bias corrected)	10161					MLE Sd (bias corrected)	4479
45											Approximate Chi Square Value (0.05)	154.8
46					Adjusted Level of Significance	0.0357					Adjusted Chi Square Value	152.1
47												
48	Assuming Gamma Distribution											
49					95% Approximate Gamma UCL	12163					95% Adjusted Gamma UCL	12376
50												
51	Lognormal GOF Test											
52					Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Lognormal GOF Test					

10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.189	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data Not Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	8.359	Mean of logged Data	9.143
Maximum of Logged Data	9.804	SD of logged Data	0.433
Assuming Lognormal Distribution			
95% H-UCL	12612	90% Chebyshev (MVUE) UCL	13417
95% Chebyshev (MVUE) UCL	14871	97.5% Chebyshev (MVUE) UCL	16889
99% Chebyshev (MVUE) UCL	20853		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	11766	95% BCA Bootstrap UCL	11723
95% Standard Bootstrap UCL	11725	95% Bootstrap-t UCL	12007
95% Hall's Bootstrap UCL	11933	95% Percentile Bootstrap UCL	11745
90% Chebyshev(Mean, Sd) UCL	13088	95% Chebyshev(Mean, Sd) UCL	14414
97.5% Chebyshev(Mean, Sd) UCL	16255	99% Chebyshev(Mean, Sd) UCL	19870
Suggested UCL to Use			
95% Student's-t UCL	11859		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (antimony (sb))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	5
Number of Detects	11	Number of Non-Detects	7
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.1
Maximum Detect	0.15	Maximum Non-Detect	0.1
Variance Detects	3.6545E-4	Percent Non-Detects	38.89%
Mean Detects	0.124	SD Detects	0.0191
Median Detects	0.12	CV Detects	0.155
Skewness Detects	0.413	Kurtosis Detects	-1.222
Mean of Logged Detects	-2.101	SD of Logged Detects	0.153
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.792	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.114	KM Standard Error of Mean	0.00453
90KM SD	0.0183	95% KM (BCA) UCL	0.122
95% KM (t) UCL	0.122	95% KM (Percentile Bootstrap) UCL	0.122
95% KM (z) UCL	0.122	95% KM Bootstrap t UCL	0.124
90% KM Chebyshev UCL	0.128	95% KM Chebyshev UCL	0.134
97.5% KM Chebyshev UCL	0.143	99% KM Chebyshev UCL	0.16
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.547	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.198	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.255	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)	46.94	k star (bias corrected MLE)	34.2
Theta hat (MLE)	0.00263	Theta star (bias corrected MLE)	0.00361
nu hat (MLE)	1033	nu star (bias corrected)	752.4
Mean (detects)	0.124		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.0584	Mean	0.106
Maximum	0.15	Median	0.105
SD	0.0281	CV	0.265
k hat (MLE)	14.49	k star (bias corrected MLE)	12.11
Theta hat (MLE)	0.00731	Theta star (bias corrected MLE)	0.00874
nu hat (MLE)	521.6	nu star (bias corrected)	436
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (436.04, α)	388.6	Adjusted Chi Square Value (436.04, β)	384.3
95% Gamma Approximate UCL	0.119	95% Gamma Adjusted UCL	0.12
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.114	SD (KM)	0.0183
Variance (KM)	3.3580E-4	SE of Mean (KM)	0.00453
k hat (KM)	39	k star (KM)	32.54
nu hat (KM)	1404	nu star (KM)	1171
theta hat (KM)	0.00293	theta star (KM)	0.00352
80% gamma percentile (KM)	0.131	90% gamma percentile (KM)	0.141
95% gamma percentile (KM)	0.149	99% gamma percentile (KM)	0.166
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (N/A, α)	1093	Adjusted Chi Square Value (N/A, β)	1086
95% KM Approximate Gamma UCL	0.123	95% KM Adjusted Gamma UCL	0.123
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	

10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.108	Mean in Log Scale	-2.255
SD in Original Scale	0.0258	SD in Log Scale	0.241
95% t UCL (assumes normality of ROS data)	0.118	95% Percentile Bootstrap UCL	0.118
95% BCA Bootstrap UCL	0.118	95% Bootstrap t UCL	0.119
95% H-UCL (Log ROS)	0.12		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.179	KM Geo Mean	0.113
KM SD (logged)	0.15	95% Critical H Value (KM-Log)	1.759
KM Standard Error of Mean (logged)	0.0372	95% H-UCL (KM -Log)	0.122
KM SD (logged)	0.15	95% Critical H Value (KM-Log)	1.759
KM Standard Error of Mean (logged)	0.0372		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.095	Mean in Log Scale	-2.449
SD in Original Scale	0.0397	SD in Log Scale	0.464
95% t UCL (Assumes normality)	0.111	95% H-Stat UCL	0.12
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (arsenic (as))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	1.51	Mean	2.587
Maximum	4.02	Median	2.67
SD	0.752	Std. Error of Mean	0.177
Coefficient of Variation	0.291	Skewness	0.377
Normal GOF Test			
Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.108	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.895	95% Adjusted-CLT UCL (Chen-1995)	2.895
		95% Modified-t UCL (Johnson-1978)	2.898
Gamma GOF Test			
A-D Test Statistic	0.252	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.132	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.203	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	12.49	k star (bias corrected MLE)	10.44
Theta hat (MLE)	0.207	Theta star (bias corrected MLE)	0.248
nu hat (MLE)	449.6	nu star (bias corrected)	376
MLE Mean (bias corrected)	2.587	MLE Sd (bias corrected)	0.8
		Approximate Chi Square Value (0.05)	332
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	328.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	2.929	95% Adjusted Gamma UCL	2.964
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.147	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.412	Mean of logged Data	0.91
Maximum of Logged Data	1.391	SD of logged Data	0.295
Assuming Lognormal Distribution			
95% H-UCL	2.962	90% Chebyshev (MVUE) UCL	3.135
95% Chebyshev (MVUE) UCL	3.383	97.5% Chebyshev (MVUE) UCL	3.727
99% Chebyshev (MVUE) UCL	4.402		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2.878	95% BCA Bootstrap UCL	2.873
95% Standard Bootstrap UCL	2.867	95% Bootstrap-t UCL	2.925
95% Hall's Bootstrap UCL	2.901	95% Percentile Bootstrap UCL	2.873
90% Chebyshev(Mean, Sd) UCL	3.119	95% Chebyshev(Mean, Sd) UCL	3.36
97.5% Chebyshev(Mean, Sd) UCL	3.694	99% Chebyshev(Mean, Sd) UCL	4.351
Suggested UCL to Use			

261	95% Student's-t UCL	2.895		
262				
263	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
264	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
265	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
266				
267				
268	**Result (barium (ba))**			
269				
270	**General Statistics**			
271	Total Number of Observations	18	Number of Distinct Observations	18
272			Number of Missing Observations	0
273	Minimum	22.7	Mean	60.66
274	Maximum	89.5	Median	68.3
275	SD	21.58	Std. Error of Mean	5.087
276	Coefficient of Variation	0.356	Skewness	-0.672
277				
278	**Normal GOF Test**			
279	Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**	
280	1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
281	Lilliefors Test Statistic	0.18	**Lilliefors GOF Test**	
282	1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
283	**Data appear Normal at 1% Significance Level**			
284				
285	**Assuming Normal Distribution**			
286	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
287	95% Student's-t UCL	69.51	95% Adjusted-CLT UCL (Chen-1995)	68.17
288			95% Modified-t UCL (Johnson-1978)	69.38
289				
290	**Gamma GOF Test**			
291	A-D Test Statistic	1.137	**Anderson-Darling Gamma GOF Test**	
292	5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level	
293	K-S Test Statistic	0.213	**Kolmogorov-Smirnov Gamma GOF Test**	
294	5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level	
295	**Data Not Gamma Distributed at 5% Significance Level**			
296				
297	**Gamma Statistics**			
298	k hat (MLE)	6.274	k star (bias corrected MLE)	5.266
299	Theta hat (MLE)	9.668	Theta star (bias corrected MLE)	11.52
300	nu hat (MLE)	225.9	nu star (bias corrected)	189.6
301	MLE Mean (bias corrected)	60.66	MLE Sd (bias corrected)	26.44
302			Approximate Chi Square Value (0.05)	158.7
303	Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	156
304				
305	**Assuming Gamma Distribution**			
306	95% Approximate Gamma UCL	72.45	95% Adjusted Gamma UCL	73.71
307				
308	**Lognormal GOF Test**			
309	Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk Lognormal GOF Test**	
310	10% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 10% Significance Level	
311	Lilliefors Test Statistic	0.219	**Lilliefors Lognormal GOF Test**	
312	10% Lilliefors Critical Value	0.185	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.122	Mean of logged Data	4.023
Maximum of Logged Data	4.494	SD of logged Data	0.452

Assuming Lognormal Distribution

95% H-UCL	76.91	90% Chebyshev (MVUE) UCL	81.78
95% Chebyshev (MVUE) UCL	90.94	97.5% Chebyshev (MVUE) UCL	103.7
99% Chebyshev (MVUE) UCL	128.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	69.03	95% BCA Bootstrap UCL	67.57
95% Standard Bootstrap UCL	68.66	95% Bootstrap-t UCL	68.47
95% Hall's Bootstrap UCL	68	95% Percentile Bootstrap UCL	68.36
90% Chebyshev(Mean, Sd) UCL	75.92	95% Chebyshev(Mean, Sd) UCL	82.83
97.5% Chebyshev(Mean, Sd) UCL	92.43	99% Chebyshev(Mean, Sd) UCL	111.3

Suggested UCL to Use

95% Student's-t UCL	69.51		

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 using results from simulation studies.
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.

Result (beryllium (be))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	0.14	Mean	0.335
Maximum	0.72	Median	0.32
SD	0.158	Std. Error of Mean	0.0373
Coefficient of Variation	0.472	Skewness	0.826

Normal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.4	95% Adjusted-CLT UCL (Chen-1995)	0.404

		95% Modified-t UCL (Johnson-1978)	0.401

Gamma GOF Test

A-D Test Statistic	0.249	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.125	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.932	k star (bias corrected MLE)	4.147
Theta hat (MLE)	0.0679	Theta star (bias corrected MLE)	0.0808
nu hat (MLE)	177.5	nu star (bias corrected)	149.3
MLE Mean (bias corrected)	0.335	MLE Sd (bias corrected)	0.165
		Approximate Chi Square Value (0.05)	122
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	119.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.41	95% Adjusted Gamma UCL	0.418

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.105	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.966	Mean of logged Data	-1.198
Maximum of Logged Data	-0.329	SD of logged Data	0.475

Assuming Lognormal Distribution

95% H-UCL	0.425	90% Chebyshev (MVUE) UCL	0.452
95% Chebyshev (MVUE) UCL	0.504	97.5% Chebyshev (MVUE) UCL	0.578
99% Chebyshev (MVUE) UCL	0.721		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.396	95% BCA Bootstrap UCL	0.396
95% Standard Bootstrap UCL	0.395	95% Bootstrap-t UCL	0.412
95% Hall's Bootstrap UCL	0.414	95% Percentile Bootstrap UCL	0.395
90% Chebyshev(Mean, Sd) UCL	0.447	95% Chebyshev(Mean, Sd) UCL	0.497
97.5% Chebyshev(Mean, Sd) UCL	0.568	99% Chebyshev(Mean, Sd) UCL	0.706

Suggested UCL to Use

95% Student's-t UCL	0.4		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (bismuth (bi))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	2
Number of Detects	2	Number of Non-Detects	16
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.2	Minimum Non-Detect	0.2
Maximum Detect	0.24	Maximum Non-Detect	0.2
Variance Detects	8.0000E-4	Percent Non-Detects	88.89%
Mean Detects	0.22	SD Detects	0.0283
Median Detects	0.22	CV Detects	0.129
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.518	SD of Logged Detects	0.129

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	0.202	KM Standard Error of Mean	0.00305
90KM SD	0.00916	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.208	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.207	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.211	95% KM Chebyshev UCL	0.216
97.5% KM Chebyshev UCL	0.221	99% KM Chebyshev UCL	0.233

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	120.7	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00182	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	482.7	nu star (bias corrected)	N/A
Mean (detects)	0.22		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.202	SD (KM)	0.00916
Variance (KM)	8.3951E-5	SE of Mean (KM)	0.00305
k hat (KM)	487.1	k star (KM)	406
nu hat (KM)	17536	nu star (KM)	14615
theta hat (KM)	4.1514E-4	theta star (KM)	4.9812E-4
80% gamma percentile (KM)	0.211	90% gamma percentile (KM)	0.215
95% gamma percentile (KM)	0.219	99% gamma percentile (KM)	0.226

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0357
Approximate Chi Square Value (N/A, α)	14335	Adjusted Chi Square Value (N/A, β)	14308
95% KM Approximate Gamma UCL	0.206	95% KM Adjusted Gamma UCL	0.207

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	0.104	Mean in Log Scale	-2.378
SD in Original Scale	0.0535	SD in Log Scale	0.492
95% t UCL (assumes normality of ROS data)	0.126	95% Percentile Bootstrap UCL	0.125
95% BCA Bootstrap UCL	0.128	95% Bootstrap t UCL	0.132
95% H-UCL (Log ROS)	0.133		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.599	KM Geo Mean	0.202
KM SD (logged)	0.0418	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0139	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0418	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0139		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.113	Mean in Log Scale	-2.215
SD in Original Scale	0.0394	SD in Log Scale	0.256
95% t UCL (Assumes normality)	0.129	95% H-Stat UCL	0.126

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

Suggested UCL to Use

95% KM (t) UCL	0.208		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (boron (b))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	11
Number of Detects	12	Number of Non-Detects	6
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	5.1	Minimum Non-Detect	5
Maximum Detect	9.5	Maximum Non-Detect	5
Variance Detects	2.211	Percent Non-Detects	33.33%
Mean Detects	6.725	SD Detects	1.487
Median Detects	6.4	CV Detects	0.221
Skewness Detects	0.574	Kurtosis Detects	-0.856
Mean of Logged Detects	1.884	SD of Logged Detects	0.216

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level

	A–E	F	G–K	L
521	Lilliefors Test Statistic	0.15	Lilliefors GOF Test	
522	1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level	
523	**Detected Data appear Normal at 1% Significance Level**			
524				
525	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
526	KM Mean	6.15	KM Standard Error of Mean	0.349
527	90KM SD	1.419	95% KM (BCA) UCL	6.783
528	95% KM (t) UCL	6.758	95% KM (Percentile Bootstrap) UCL	6.728
529	95% KM (z) UCL	6.724	95% KM Bootstrap t UCL	6.877
530	90% KM Chebyshev UCL	7.198	95% KM Chebyshev UCL	7.672
531	97.5% KM Chebyshev UCL	8.331	99% KM Chebyshev UCL	9.625
532				
533	**Gamma GOF Tests on Detected Observations Only**			
534	A-D Test Statistic	0.374	**Anderson-Darling GOF Test**	
535	5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level	
536	K-S Test Statistic	0.151	**Kolmogorov-Smirnov GOF**	
537	5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level	
538	**Detected data appear Gamma Distributed at 5% Significance Level**			
539				
540	**Gamma Statistics on Detected Data Only**			
541	k hat (MLE)	23.2	k star (bias corrected MLE)	17.46
542	Theta hat (MLE)	0.29	Theta star (bias corrected MLE)	0.385
543	nu hat (MLE)	556.9	nu star (bias corrected)	419
544	Mean (detects)	6.725		
545				
546	**Gamma ROS Statistics using Imputed Non-Detects**			
547	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
548	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
549	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
550	This is especially true when the sample size is small.			
551	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
552	Minimum	2.103	Mean	5.586
553	Maximum	9.5	Median	5.4
554	SD	2.088	CV	0.374
555	k hat (MLE)	6.904	k star (bias corrected MLE)	5.791
556	Theta hat (MLE)	0.809	Theta star (bias corrected MLE)	0.965
557	nu hat (MLE)	248.6	nu star (bias corrected)	208.5
558	Adjusted Level of Significance (β)	0.0357		
559	Approximate Chi Square Value (208.47, α)	176.1	Adjusted Chi Square Value (208.47, β)	173.2
560	95% Gamma Approximate UCL	6.614	95% Gamma Adjusted UCL	6.723
561				
562	**Estimates of Gamma Parameters using KM Estimates**			
563	Mean (KM)	6.15	SD (KM)	1.419
564	Variance (KM)	2.013	SE of Mean (KM)	0.349
565	k hat (KM)	18.79	k star (KM)	15.7
566	nu hat (KM)	676.6	nu star (KM)	565.1
567	theta hat (KM)	0.327	theta star (KM)	0.392
568	80% gamma percentile (KM)	7.404	90% gamma percentile (KM)	8.204
569	95% gamma percentile (KM)	8.906	99% gamma percentile (KM)	10.32
570				
571	**Gamma Kaplan-Meier (KM) Statistics**			
572	Approximate Chi Square Value (565.15, α)	511	Adjusted Chi Square Value (565.15, β)	506.1

95% KM Approximate Gamma UCL	6.802	95% KM Adjusted Gamma UCL	6.868

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.137	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.754	Mean in Log Scale	1.699
SD in Original Scale	1.875	SD in Log Scale	0.33
95% t UCL (assumes normality of ROS data)	6.522	95% Percentile Bootstrap UCL	6.482
95% BCA Bootstrap UCL	6.53	95% Bootstrap t UCL	6.578
95% H-UCL (Log ROS)	6.711		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.793	KM Geo Mean	6.005
KM SD (logged)	0.213	95% Critical H Value (KM-Log)	1.795
KM Standard Error of Mean (logged)	0.0524	95% H-UCL (KM -Log)	6.739
KM SD (logged)	0.213	95% Critical H Value (KM-Log)	1.795
KM Standard Error of Mean (logged)	0.0524		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	5.317	Mean in Log Scale	1.562
SD in Original Scale	2.373	SD in Log Scale	0.501
95% t UCL (Assumes normality)	6.29	95% H-Stat UCL	6.905

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	6.758		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cadmium (cd))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	0.141	Mean	0.528
Maximum	1.66	Median	0.381
SD	0.454	Std. Error of Mean	0.107
Coefficient of Variation	0.861	Skewness	1.66

Normal GOF Test

625	Shapiro Wilk Test Statistic	0.765	**Shapiro Wilk GOF Test**	
626	1% Shapiro Wilk Critical Value	0.858	Data Not Normal at 1% Significance Level	
627	Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**	
628	1% Lilliefors Critical Value	0.235	Data Not Normal at 1% Significance Level	
629	**Data Not Normal at 1% Significance Level**			
630				
631	**Assuming Normal Distribution**			
632	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
633	95% Student's-t UCL	0.714	95% Adjusted-CLT UCL (Chen-1995)	0.748
634			95% Modified-t UCL (Johnson-1978)	0.721
635				
636	**Gamma GOF Test**			
637	A-D Test Statistic	0.707	**Anderson-Darling Gamma GOF Test**	
638	5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
639	K-S Test Statistic	0.222	**Kolmogorov-Smirnov Gamma GOF Test**	
640	5% K-S Critical Value	0.206	Data Not Gamma Distributed at 5% Significance Level	
641	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**			
642				
643	**Gamma Statistics**			
644	k hat (MLE)	1.93	k star (bias corrected MLE)	1.645
645	Theta hat (MLE)	0.273	Theta star (bias corrected MLE)	0.321
646	nu hat (MLE)	69.47	nu star (bias corrected)	59.23
647	MLE Mean (bias corrected)	0.528	MLE Sd (bias corrected)	0.411
648			Approximate Chi Square Value (0.05)	42.53
649	Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	41.17
650				
651	**Assuming Gamma Distribution**			
652	95% Approximate Gamma UCL	0.735	95% Adjusted Gamma UCL	0.759
653				
654	**Lognormal GOF Test**			
655	Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**	
656	10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
657	Lilliefors Test Statistic	0.169	**Lilliefors Lognormal GOF Test**	
658	10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
659	**Data appear Lognormal at 10% Significance Level**			
660				
661	**Lognormal Statistics**			
662	Minimum of Logged Data	-1.959	Mean of logged Data	-0.921
663	Maximum of Logged Data	0.507	SD of logged Data	0.742
664				
665	**Assuming Lognormal Distribution**			
666	95% H-UCL	0.792	90% Chebyshev (MVUE) UCL	0.804
667	95% Chebyshev (MVUE) UCL	0.935	97.5% Chebyshev (MVUE) UCL	1.117
668	99% Chebyshev (MVUE) UCL	1.474		
669				
670	**Nonparametric Distribution Free UCL Statistics**			
671	**Data appear to follow a Discernible Distribution**			
672				
673	**Nonparametric Distribution Free UCLs**			
674	95% CLT UCL	0.704	95% BCA Bootstrap UCL	0.739
675	95% Standard Bootstrap UCL	0.7	95% Bootstrap-t UCL	0.831
676	95% Hall's Bootstrap UCL	0.794	95% Percentile Bootstrap UCL	0.709

90% Chebyshev(Mean, Sd) UCL	0.849	95% Chebyshev(Mean, Sd) UCL	0.994
97.5% Chebyshev(Mean, Sd) UCL	1.196	99% Chebyshev(Mean, Sd) UCL	1.592

Suggested UCL to Use

95% Adjusted Gamma UCL	0.759		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (calcium (ca))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	2290	Mean	11678
Maximum	37300	Median	9130
SD	8595	Std. Error of Mean	2026
Coefficient of Variation	0.736	Skewness	1.86

Normal GOF Test

Shapiro Wilk Test Statistic	0.801	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15203	95% Adjusted-CLT UCL (Chen-1995)	15960
		95% Modified-t UCL (Johnson-1978)	15351

Gamma GOF Test

A-D Test Statistic	0.64	**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	0.193	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.206	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.377	k star (bias corrected MLE)	2.018
Theta hat (MLE)	4914	Theta star (bias corrected MLE)	5788
nu hat (MLE)	85.56	nu star (bias corrected)	72.63
MLE Mean (bias corrected)	11678	MLE Sd (bias corrected)	8222
		Approximate Chi Square Value (0.05)	54.01
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	52.47

Assuming Gamma Distribution

95% Approximate Gamma UCL	15706	95% Adjusted Gamma UCL	16167
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.233	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data Not Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	7.736	Mean of logged Data	9.141
Maximum of Logged Data	10.53	SD of logged Data	0.704
Assuming Lognormal Distribution			
95% H-UCL	17532	90% Chebyshev (MVUE) UCL	17979
95% Chebyshev (MVUE) UCL	20798	97.5% Chebyshev (MVUE) UCL	24711
99% Chebyshev (MVUE) UCL	32398		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	15011	95% BCA Bootstrap UCL	15946
95% Standard Bootstrap UCL	15013	95% Bootstrap-t UCL	17423
95% Hall's Bootstrap UCL	31372	95% Percentile Bootstrap UCL	15176
90% Chebyshev(Mean, Sd) UCL	17756	95% Chebyshev(Mean, Sd) UCL	20509
97.5% Chebyshev(Mean, Sd) UCL	24330	99% Chebyshev(Mean, Sd) UCL	31836
Suggested UCL to Use			
95% Adjusted Gamma UCL	16167		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (chromium (cr))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	13.8	Mean	26.62
Maximum	47	Median	25.8
SD	9.961	Std. Error of Mean	2.348
Coefficient of Variation	0.374	Skewness	0.472
Normal GOF Test			
Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	30.71	95% Adjusted-CLT UCL (Chen-1995)	30.76
		95% Modified-t UCL (Johnson-1978)	30.75
Gamma GOF Test			
A-D Test Statistic	0.289	**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	0.128	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	7.587	k star (bias corrected MLE)	6.359
Theta hat (MLE)	3.509	Theta star (bias corrected MLE)	4.186
nu hat (MLE)	273.1	nu star (bias corrected)	228.9
MLE Mean (bias corrected)	26.62	MLE Sd (bias corrected)	10.56
		Approximate Chi Square Value (0.05)	194.9
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	191.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL	31.27	95% Adjusted Gamma UCL	31.76
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.11	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.625	Mean of logged Data	3.214
Maximum of Logged Data	3.85	SD of logged Data	0.381
Assuming Lognormal Distribution			
95% H-UCL	31.94	90% Chebyshev (MVUE) UCL	33.97
95% Chebyshev (MVUE) UCL	37.29	97.5% Chebyshev (MVUE) UCL	41.89
99% Chebyshev (MVUE) UCL	50.94		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	30.48	95% BCA Bootstrap UCL	30.37
95% Standard Bootstrap UCL	30.45	95% Bootstrap-t UCL	31.19
95% Hall's Bootstrap UCL	30.66	95% Percentile Bootstrap UCL	30.42
90% Chebyshev(Mean, Sd) UCL	33.67	95% Chebyshev(Mean, Sd) UCL	36.86
97.5% Chebyshev(Mean, Sd) UCL	41.29	99% Chebyshev(Mean, Sd) UCL	49.98
Suggested UCL to Use			
95% Student's-t UCL	30.71		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cobalt (co))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	4.22	Mean	7.852
Maximum	11.1	Median	8.17
SD	2.318	Std. Error of Mean	0.546
Coefficient of Variation	0.295	Skewness	-0.131

Normal GOF Test

Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.803	95% Adjusted-CLT UCL (Chen-1995)	8.733
		95% Modified-t UCL (Johnson-1978)	8.8

Gamma GOF Test

A-D Test Statistic	0.458	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.203	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	11.1	k star (bias corrected MLE)	9.287
Theta hat (MLE)	0.707	Theta star (bias corrected MLE)	0.846
nu hat (MLE)	399.6	nu star (bias corrected)	334.3
MLE Mean (bias corrected)	7.852	MLE Sd (bias corrected)	2.577
		Approximate Chi Square Value (0.05)	293
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	289.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.961	95% Adjusted Gamma UCL	9.076

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.161	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.44	Mean of logged Data	2.015
Maximum of Logged Data	2.407	SD of logged Data	0.32

Assuming Lognormal Distribution

95% H-UCL	9.129	90% Chebyshev (MVUE) UCL	9.682
95% Chebyshev (MVUE) UCL	10.5	97.5% Chebyshev (MVUE) UCL	11.64
99% Chebyshev (MVUE) UCL	13.87		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	8.751	95% BCA Bootstrap UCL	8.634
95% Standard Bootstrap UCL	8.717	95% Bootstrap-t UCL	8.796
95% Hall's Bootstrap UCL	8.719	95% Percentile Bootstrap UCL	8.691
90% Chebyshev(Mean, Sd) UCL	9.491	95% Chebyshev(Mean, Sd) UCL	10.23
97.5% Chebyshev(Mean, Sd) UCL	11.26	99% Chebyshev(Mean, Sd) UCL	13.29

Suggested UCL to Use

95% Student's-t UCL	8.803		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
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.

Result (copper (cu))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	3.48	Mean	10.15
Maximum	17.4	Median	10.3
SD	3.834	Std. Error of Mean	0.904
Coefficient of Variation	0.378	Skewness	-0.0866

Normal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	11.72	95% Adjusted-CLT UCL (Chen-1995)	11.62
		95% Modified-t UCL (Johnson-1978)	11.72

Gamma GOF Test

A-D Test Statistic	0.633	**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	0.216	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.204	Data Not Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	6.094	k star (bias corrected MLE)	5.115
Theta hat (MLE)	1.665	Theta star (bias corrected MLE)	1.984
nu hat (MLE)	219.4	nu star (bias corrected)	184.1
MLE Mean (bias corrected)	10.15	MLE Sd (bias corrected)	4.487
		Approximate Chi Square Value (0.05)	153.8
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	151.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	12.15	95% Adjusted Gamma UCL	12.37

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.185	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.247	Mean of logged Data	2.233
Maximum of Logged Data	2.856	SD of logged Data	0.453

Assuming Lognormal Distribution

95% H-UCL	12.84	90% Chebyshev (MVUE) UCL	13.65
95% Chebyshev (MVUE) UCL	15.18	97.5% Chebyshev (MVUE) UCL	17.31
99% Chebyshev (MVUE) UCL	21.48		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	11.64	95% BCA Bootstrap UCL	11.46
95% Standard Bootstrap UCL	11.57	95% Bootstrap-t UCL	11.7
95% Hall's Bootstrap UCL	11.71	95% Percentile Bootstrap UCL	11.58
90% Chebyshev(Mean, Sd) UCL	12.86	95% Chebyshev(Mean, Sd) UCL	14.09
97.5% Chebyshev(Mean, Sd) UCL	15.79	99% Chebyshev(Mean, Sd) UCL	19.14

Suggested UCL to Use

95% Student's-t UCL	11.72

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 using results from simulation studies.

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.

Result (iron (fe))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	7360	Mean	13102
Maximum	21900	Median	13150
SD	4725	Std. Error of Mean	1114
Coefficient of Variation	0.361	Skewness	0.464

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15039	95% Adjusted-CLT UCL (Chen-1995)	15064
		95% Modified-t UCL (Johnson-1978)	15059

Gamma GOF Test

A-D Test Statistic	0.442	**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	0.15	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.246	k star (bias corrected MLE)	6.909
Theta hat (MLE)	1589	Theta star (bias corrected MLE)	1896
nu hat (MLE)	296.9	nu star (bias corrected)	248.7
MLE Mean (bias corrected)	13102	MLE Sd (bias corrected)	4985
		Approximate Chi Square Value (0.05)	213.2
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	210

Assuming Gamma Distribution

95% Approximate Gamma UCL	15284	95% Adjusted Gamma UCL	15514

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	8.904	Mean of logged Data	9.419
Maximum of Logged Data	9.994	SD of logged Data	0.363
Assuming Lognormal Distribution			
95% H-UCL	15556	90% Chebyshev (MVUE) UCL	16536
95% Chebyshev (MVUE) UCL	18090	97.5% Chebyshev (MVUE) UCL	20247
99% Chebyshev (MVUE) UCL	24483		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	14933	95% BCA Bootstrap UCL	14841
95% Standard Bootstrap UCL	14923	95% Bootstrap-t UCL	15215
95% Hall's Bootstrap UCL	15044	95% Percentile Bootstrap UCL	14879
90% Chebyshev(Mean, Sd) UCL	16443	95% Chebyshev(Mean, Sd) UCL	17956
97.5% Chebyshev(Mean, Sd) UCL	20056	99% Chebyshev(Mean, Sd) UCL	24182
Suggested UCL to Use			
95% Student's-t UCL	15039		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (lead (pb))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	3.17	Mean	11.93
Maximum	33.3	Median	9.175
SD	8.516	Std. Error of Mean	2.007
Coefficient of Variation	0.714	Skewness	1.191
Normal GOF Test			
Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.43	95% Adjusted-CLT UCL (Chen-1995)	15.84
		95% Modified-t UCL (Johnson-1978)	15.52
Gamma GOF Test			
A-D Test Statistic	0.312	**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	0.105	**Kolmogorov-Smirnov Gamma GOF Test**	

	A–E	F	G–K	L
1093	5% K-S Critical Value	0.206	Detected data appear Gamma Distributed at 5% Significance Level	
1094	**Detected data appear Gamma Distributed at 5% Significance Level**			
1095				
1096	**Gamma Statistics**			
1097	k hat (MLE)	2.284	k star (bias corrected MLE)	1.941
1098	Theta hat (MLE)	5.224	Theta star (bias corrected MLE)	6.149
1099	nu hat (MLE)	82.24	nu star (bias corrected)	69.87
1100	MLE Mean (bias corrected)	11.93	MLE Sd (bias corrected)	8.567
1101			Approximate Chi Square Value (0.05)	51.63
1102	Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	50.12
1103				
1104	**Assuming Gamma Distribution**			
1105	95% Approximate Gamma UCL	16.15	95% Adjusted Gamma UCL	16.64
1106				
1107	**Lognormal GOF Test**			
1108	Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**	
1109	10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
1110	Lilliefors Test Statistic	0.11	**Lilliefors Lognormal GOF Test**	
1111	10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
1112	**Data appear Lognormal at 10% Significance Level**			
1113				
1114	**Lognormal Statistics**			
1115	Minimum of Logged Data	1.154	Mean of logged Data	2.245
1116	Maximum of Logged Data	3.506	SD of logged Data	0.714
1117				
1118	**Assuming Lognormal Distribution**			
1119	95% H-UCL	17.99	90% Chebyshev (MVUE) UCL	18.4
1120	95% Chebyshev (MVUE) UCL	21.32	97.5% Chebyshev (MVUE) UCL	25.36
1121	99% Chebyshev (MVUE) UCL	33.31		
1122				
1123	**Nonparametric Distribution Free UCL Statistics**			
1124	**Data appear to follow a Discernible Distribution**			
1125				
1126	**Nonparametric Distribution Free UCLs**			
1127	95% CLT UCL	15.24	95% BCA Bootstrap UCL	15.73
1128	95% Standard Bootstrap UCL	15.17	95% Bootstrap-t UCL	16.51
1129	95% Hall's Bootstrap UCL	16.26	95% Percentile Bootstrap UCL	15.39
1130	90% Chebyshev(Mean, Sd) UCL	17.96	95% Chebyshev(Mean, Sd) UCL	20.68
1131	97.5% Chebyshev(Mean, Sd) UCL	24.47	99% Chebyshev(Mean, Sd) UCL	31.91
1132				
1133	**Suggested UCL to Use**			
1134	95% Student's-t UCL	15.43		
1135				
1136	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1137	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1138	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1139				
1140				
1141	**Result (lithium (li))**			
1142				
1143	**General Statistics**			
1144	Total Number of Observations	18	Number of Distinct Observations	16

1145			Number of Missing Observations	0
1146	Minimum	6.5	Mean	13.71
1147	Maximum	24.5	Median	12.9
1148	SD	5.77	Std. Error of Mean	1.36
1149	Coefficient of Variation	0.421	Skewness	0.502
1150				
1151	**Normal GOF Test**			
1152	Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**	
1153	1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
1154	Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**	
1155	1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
1156	**Data appear Normal at 1% Significance Level**			
1157				
1158	**Assuming Normal Distribution**			
1159	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1160	95% Student's-t UCL	16.08	95% Adjusted-CLT UCL (Chen-1995)	16.12
1161			95% Modified-t UCL (Johnson-1978)	16.1
1162				
1163	**Gamma GOF Test**			
1164	A-D Test Statistic	0.302	**Anderson-Darling Gamma GOF Test**	
1165	5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level	
1166	K-S Test Statistic	0.138	**Kolmogorov-Smirnov Gamma GOF Test**	
1167	5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	
1168	**Detected data appear Gamma Distributed at 5% Significance Level**			
1169				
1170	**Gamma Statistics**			
1171	k hat (MLE)	5.982	k star (bias corrected MLE)	5.022
1172	Theta hat (MLE)	2.292	Theta star (bias corrected MLE)	2.73
1173	nu hat (MLE)	215.4	nu star (bias corrected)	180.8
1174	MLE Mean (bias corrected)	13.71	MLE Sd (bias corrected)	6.118
1175			Approximate Chi Square Value (0.05)	150.7
1176	Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	148.1
1177				
1178	**Assuming Gamma Distribution**			
1179	95% Approximate Gamma UCL	16.45	95% Adjusted Gamma UCL	16.74
1180				
1181	**Lognormal GOF Test**			
1182	Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**	
1183	10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
1184	Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**	
1185	10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
1186	**Data appear Lognormal at 10% Significance Level**			
1187				
1188	**Lognormal Statistics**			
1189	Minimum of Logged Data	1.872	Mean of logged Data	2.532
1190	Maximum of Logged Data	3.199	SD of logged Data	0.431
1191				
1192	**Assuming Lognormal Distribution**			
1193	95% H-UCL	16.95	90% Chebyshev (MVUE) UCL	18.03
1194	95% Chebyshev (MVUE) UCL	19.98	97.5% Chebyshev (MVUE) UCL	22.68
1195	99% Chebyshev (MVUE) UCL	27.99		
1196				

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	15.95	95% BCA Bootstrap UCL	15.92
95% Standard Bootstrap UCL	15.93	95% Bootstrap-t UCL	16.39
95% Hall's Bootstrap UCL	16.12	95% Percentile Bootstrap UCL	15.98
90% Chebyshev(Mean, Sd) UCL	17.79	95% Chebyshev(Mean, Sd) UCL	19.64
97.5% Chebyshev(Mean, Sd) UCL	22.2	99% Chebyshev(Mean, Sd) UCL	27.24

Suggested UCL to Use

95% Student's-t UCL	16.08

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (magnesium (mg))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	2310	Mean	5400
Maximum	12000	Median	5195
SD	2853	Std. Error of Mean	672.4
Coefficient of Variation	0.528	Skewness	0.81

Normal GOF Test

Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6570	95% Adjusted-CLT UCL (Chen-1995)	6643
		95% Modified-t UCL (Johnson-1978)	6591

Gamma GOF Test

A-D Test Statistic	0.541	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.202	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.205	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.967	k star (bias corrected MLE)	3.343
Theta hat (MLE)	1361	Theta star (bias corrected MLE)	1615
nu hat (MLE)	142.8	nu star (bias corrected)	120.3
MLE Mean (bias corrected)	5400	MLE Sd (bias corrected)	2954

		Approximate Chi Square Value (0.05)	96
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	93.92
Assuming Gamma Distribution			
95% Approximate Gamma UCL	6769	95% Adjusted Gamma UCL	6919
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data Not Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	7.745	Mean of logged Data	8.463
Maximum of Logged Data	9.393	SD of logged Data	0.53
Assuming Lognormal Distribution			
95% H-UCL	7095	90% Chebyshev (MVUE) UCL	7506
95% Chebyshev (MVUE) UCL	8459	97.5% Chebyshev (MVUE) UCL	9781
99% Chebyshev (MVUE) UCL	12379		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	6506	95% BCA Bootstrap UCL	6562
95% Standard Bootstrap UCL	6518	95% Bootstrap-t UCL	6806
95% Hall's Bootstrap UCL	6717	95% Percentile Bootstrap UCL	6554
90% Chebyshev(Mean, Sd) UCL	7417	95% Chebyshev(Mean, Sd) UCL	8331
97.5% Chebyshev(Mean, Sd) UCL	9599	99% Chebyshev(Mean, Sd) UCL	12090
Suggested UCL to Use			
95% Student's-t UCL	6570		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (manganese (mn))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	333	Mean	741.9
Maximum	2050	Median	622
SD	434.2	Std. Error of Mean	102.3
Coefficient of Variation	0.585	Skewness	1.681
Normal GOF Test			
Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**	

1% Shapiro Wilk Critical Value	0.858	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	919.9	95% Adjusted-CLT UCL (Chen-1995)	953.5
		95% Modified-t UCL (Johnson-1978)	926.7
Gamma GOF Test			
A-D Test Statistic	0.633	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.743	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	0.205	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	3.845	k star (bias corrected MLE)	3.241
Theta hat (MLE)	193	Theta star (bias corrected MLE)	228.9
nu hat (MLE)	138.4	nu star (bias corrected)	116.7
MLE Mean (bias corrected)	741.9	MLE Sd (bias corrected)	412.1
		Approximate Chi Square Value (0.05)	92.74
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	90.69
Assuming Gamma Distribution			
95% Approximate Gamma UCL	933.4	95% Adjusted Gamma UCL	954.5
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.808	Mean of logged Data	6.474
Maximum of Logged Data	7.626	SD of logged Data	0.521
Assuming Lognormal Distribution			
95% H-UCL	960.4	90% Chebyshev (MVUE) UCL	1017
95% Chebyshev (MVUE) UCL	1144	97.5% Chebyshev (MVUE) UCL	1321
99% Chebyshev (MVUE) UCL	1668		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	910.2	95% BCA Bootstrap UCL	939
95% Standard Bootstrap UCL	903.8	95% Bootstrap-t UCL	984.5
95% Hall's Bootstrap UCL	1063	95% Percentile Bootstrap UCL	916.5
90% Chebyshev(Mean, Sd) UCL	1049	95% Chebyshev(Mean, Sd) UCL	1188

97.5% Chebyshev(Mean, Sd) UCL	1381	99% Chebyshev(Mean, Sd) UCL	1760

Suggested UCL to Use

95% Student's-t UCL	919.9		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (mercury (hg))

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	0.0129	Mean	0.0481
Maximum	0.133	Median	0.0271
SD	0.0458	Std. Error of Mean	0.0132
Coefficient of Variation	0.951	Skewness	1.243

Normal GOF Test

Shapiro Wilk Test Statistic	0.729	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.281	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0719	95% Adjusted-CLT UCL (Chen-1995)	0.0749
		95% Modified-t UCL (Johnson-1978)	0.0727

Gamma GOF Test

A-D Test Statistic	0.94	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.25	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	1.506	k star (bias corrected MLE)	1.185
Theta hat (MLE)	0.032	Theta star (bias corrected MLE)	0.0406
nu hat (MLE)	36.15	nu star (bias corrected)	28.45
MLE Mean (bias corrected)	0.0481	MLE Sd (bias corrected)	0.0442
		Approximate Chi Square Value (0.05)	17.28
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	15.96

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0793	95% Adjusted Gamma UCL	0.0858

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.883	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.223	Data appear Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.351	Mean of logged Data	-3.401
Maximum of Logged Data	-2.017	SD of logged Data	0.861

Assuming Lognormal Distribution

95% H-UCL	0.0966	90% Chebyshev (MVUE) UCL	0.083
95% Chebyshev (MVUE) UCL	0.0996	97.5% Chebyshev (MVUE) UCL	0.123
99% Chebyshev (MVUE) UCL	0.168		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0699	95% BCA Bootstrap UCL	0.0738
95% Standard Bootstrap UCL	0.069	95% Bootstrap-t UCL	0.0792
95% Hall's Bootstrap UCL	0.0651	95% Percentile Bootstrap UCL	0.071
90% Chebyshev(Mean, Sd) UCL	0.0878	95% Chebyshev(Mean, Sd) UCL	0.106
97.5% Chebyshev(Mean, Sd) UCL	0.131	99% Chebyshev(Mean, Sd) UCL	0.18

Suggested UCL to Use

95% Adjusted Gamma UCL	0.0858		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (molybdenum (mo))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	15
Number of Detects	14	Number of Non-Detects	4
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	0.16	Minimum Non-Detect	0.1
Maximum Detect	0.93	Maximum Non-Detect	0.1
Variance Detects	0.079	Percent Non-Detects	22.22%
Mean Detects	0.454	SD Detects	0.281
Median Detects	0.33	CV Detects	0.619
Skewness Detects	0.626	Kurtosis Detects	-1.218
Mean of Logged Detects	-0.974	SD of Logged Detects	0.637

Normal GOF Test on Detects Only

	A–E	F	G–K	L
1457	Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**	
1458	1% Shapiro Wilk Critical Value	0.825	Detected Data appear Normal at 1% Significance Level	
1459	Lilliefors Test Statistic	0.208	**Lilliefors GOF Test**	
1460	1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level	
1461	**Detected Data appear Normal at 1% Significance Level**			
1462				
1463	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1464	KM Mean	0.376	KM Standard Error of Mean	0.0686
1465	90KM SD	0.281	95% KM (BCA) UCL	0.491
1466	95% KM (t) UCL	0.495	95% KM (Percentile Bootstrap) UCL	0.483
1467	95% KM (z) UCL	0.488	95% KM Bootstrap t UCL	0.51
1468	90% KM Chebyshev UCL	0.582	95% KM Chebyshev UCL	0.675
1469	97.5% KM Chebyshev UCL	0.804	99% KM Chebyshev UCL	1.059
1470				
1471	**Gamma GOF Tests on Detected Observations Only**			
1472	A-D Test Statistic	0.575	**Anderson-Darling GOF Test**	
1473	5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
1474	K-S Test Statistic	0.174	**Kolmogorov-Smirnov GOF**	
1475	5% K-S Critical Value	0.231	Detected data appear Gamma Distributed at 5% Significance Level	
1476	**Detected data appear Gamma Distributed at 5% Significance Level**			
1477				
1478	**Gamma Statistics on Detected Data Only**			
1479	k hat (MLE)	2.858	k star (bias corrected MLE)	2.293
1480	Theta hat (MLE)	0.159	Theta star (bias corrected MLE)	0.198
1481	nu hat (MLE)	80.02	nu star (bias corrected)	64.21
1482	Mean (detects)	0.454		
1483				
1484	**Gamma ROS Statistics using Imputed Non-Detects**			
1485	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1486	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1487	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1488	This is especially true when the sample size is small.			
1489	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1490	Minimum	0.01	Mean	0.357
1491	Maximum	0.93	Median	0.255
1492	SD	0.309	CV	0.864
1493	k hat (MLE)	0.872	k star (bias corrected MLE)	0.764
1494	Theta hat (MLE)	0.41	Theta star (bias corrected MLE)	0.468
1495	nu hat (MLE)	31.39	nu star (bias corrected)	27.49
1496	Adjusted Level of Significance (β)	0.0357		
1497	Approximate Chi Square Value (27.49, α)	16.54	Adjusted Chi Square Value (27.49, β)	15.72
1498	95% Gamma Approximate UCL	0.594	95% Gamma Adjusted UCL	0.625
1499				
1500	**Estimates of Gamma Parameters using KM Estimates**			
1501	Mean (KM)	0.376	SD (KM)	0.281
1502	Variance (KM)	0.0788	SE of Mean (KM)	0.0686
1503	k hat (KM)	1.791	k star (KM)	1.529
1504	nu hat (KM)	64.46	nu star (KM)	55.05
1505	theta hat (KM)	0.21	theta star (KM)	0.246
1506	80% gamma percentile (KM)	0.58	90% gamma percentile (KM)	0.779
1507	95% gamma percentile (KM)	0.972	99% gamma percentile (KM)	1.407
1508				

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (55.05, α)	39	Adjusted Chi Square Value (55.05, β)	37.7
95% KM Approximate Gamma UCL	0.53	95% KM Adjusted Gamma UCL	0.548

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.895	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.208	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.372	Mean in Log Scale	-1.312
SD in Original Scale	0.292	SD in Log Scale	0.866
95% t UCL (assumes normality of ROS data)	0.492	95% Percentile Bootstrap UCL	0.484
95% BCA Bootstrap UCL	0.497	95% Bootstrap t UCL	0.51
95% H-UCL (Log ROS)	0.656		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.269	KM Geo Mean	0.281
KM SD (logged)	0.773	95% Critical H Value (KM-Log)	2.328
KM Standard Error of Mean (logged)	0.189	95% H-UCL (KM -Log)	0.587
KM SD (logged)	0.773	95% Critical H Value (KM-Log)	2.328
KM Standard Error of Mean (logged)	0.189		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.364	Mean in Log Scale	-1.423
SD in Original Scale	0.301	SD in Log Scale	1.029
95% t UCL (Assumes normality)	0.488	95% H-Stat UCL	0.798

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.495

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (nickel (ni))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	7.7	Mean	14.5
Maximum	24.4	Median	14.45
SD	5.252	Std. Error of Mean	1.238
Coefficient of Variation	0.362	Skewness	0.392

Normal GOF Test			
Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	16.66	95% Adjusted-CLT UCL (Chen-1995)	16.66
		95% Modified-t UCL (Johnson-1978)	16.67
Gamma GOF Test			
A-D Test Statistic	0.304	**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	0.106	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	8.014	k star (bias corrected MLE)	6.715
Theta hat (MLE)	1.81	Theta star (bias corrected MLE)	2.16
nu hat (MLE)	288.5	nu star (bias corrected)	241.7
MLE Mean (bias corrected)	14.5	MLE Sd (bias corrected)	5.596
		Approximate Chi Square Value (0.05)	206.8
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	203.6
Assuming Gamma Distribution			
95% Approximate Gamma UCL	16.96	95% Adjusted Gamma UCL	17.22
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.11	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.041	Mean of logged Data	2.611
Maximum of Logged Data	3.195	SD of logged Data	0.371
Assuming Lognormal Distribution			
95% H-UCL	17.3	90% Chebyshev (MVUE) UCL	18.4
95% Chebyshev (MVUE) UCL	20.16	97.5% Chebyshev (MVUE) UCL	22.6
99% Chebyshev (MVUE) UCL	27.39		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	16.54	95% BCA Bootstrap UCL	16.48

95% Standard Bootstrap UCL	16.53	95% Bootstrap-t UCL	16.96
95% Hall's Bootstrap UCL	16.64	95% Percentile Bootstrap UCL	16.54
90% Chebyshev(Mean, Sd) UCL	18.22	95% Chebyshev(Mean, Sd) UCL	19.9
97.5% Chebyshev(Mean, Sd) UCL	22.23	99% Chebyshev(Mean, Sd) UCL	26.82
Suggested UCL to Use			
95% Student's-t UCL	16.66		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (phosphorus (p))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	255	Mean	556.1
Maximum	1110	Median	555.5
SD	210.2	Std. Error of Mean	49.55
Coefficient of Variation	0.378	Skewness	0.958
Normal GOF Test			
Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	642.3	95% Adjusted-CLT UCL (Chen-1995)	649.6
		95% Modified-t UCL (Johnson-1978)	644.2
Gamma GOF Test			
A-D Test Statistic	0.275	**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	0.127	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	7.753	k star (bias corrected MLE)	6.498
Theta hat (MLE)	71.73	Theta star (bias corrected MLE)	85.59
nu hat (MLE)	279.1	nu star (bias corrected)	233.9
MLE Mean (bias corrected)	556.1	MLE Sd (bias corrected)	218.2
		Approximate Chi Square Value (0.05)	199.5
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	196.5
Assuming Gamma Distribution			
95% Approximate Gamma UCL	652	95% Adjusted Gamma UCL	662.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.541	Mean of logged Data	6.255
Maximum of Logged Data	7.012	SD of logged Data	0.376

Assuming Lognormal Distribution

95% H-UCL	665.3	90% Chebyshev (MVUE) UCL	707.5
95% Chebyshev (MVUE) UCL	775.9	97.5% Chebyshev (MVUE) UCL	870.9
99% Chebyshev (MVUE) UCL	1057		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	637.6	95% BCA Bootstrap UCL	642.4
95% Standard Bootstrap UCL	634.9	95% Bootstrap-t UCL	656.8
95% Hall's Bootstrap UCL	674.7	95% Percentile Bootstrap UCL	636.8
90% Chebyshev(Mean, Sd) UCL	704.8	95% Chebyshev(Mean, Sd) UCL	772.1
97.5% Chebyshev(Mean, Sd) UCL	865.6	99% Chebyshev(Mean, Sd) UCL	1049

Suggested UCL to Use

95% Student's-t UCL	642.3		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (potassium (k))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	430	Mean	1277
Maximum	2410	Median	1220
SD	558.3	Std. Error of Mean	131.6
Coefficient of Variation	0.437	Skewness	0.297

Normal GOF Test

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.096	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1506	95% Adjusted-CLT UCL (Chen-1995)	1503
		95% Modified-t UCL (Johnson-1978)	1507
Gamma GOF Test			
A-D Test Statistic	0.264	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.109	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	4.926	k star (bias corrected MLE)	4.142
Theta hat (MLE)	259.1	Theta star (bias corrected MLE)	308.2
nu hat (MLE)	177.4	nu star (bias corrected)	149.1
MLE Mean (bias corrected)	1277	MLE Sd (bias corrected)	627.3
		Approximate Chi Square Value (0.05)	121.9
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	119.5
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1562	95% Adjusted Gamma UCL	1593
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	6.064	Mean of logged Data	7.047
Maximum of Logged Data	7.787	SD of logged Data	0.496
Assuming Lognormal Distribution			
95% H-UCL	1657	90% Chebyshev (MVUE) UCL	1758
95% Chebyshev (MVUE) UCL	1970	97.5% Chebyshev (MVUE) UCL	2265
99% Chebyshev (MVUE) UCL	2843		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1493	95% BCA Bootstrap UCL	1479
95% Standard Bootstrap UCL	1488	95% Bootstrap-t UCL	1515
95% Hall's Bootstrap UCL	1506	95% Percentile Bootstrap UCL	1487
90% Chebyshev(Mean, Sd) UCL	1671	95% Chebyshev(Mean, Sd) UCL	1850
97.5% Chebyshev(Mean, Sd) UCL	2098	99% Chebyshev(Mean, Sd) UCL	2586
Suggested UCL to Use			
95% Student's-t UCL	1506		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (selenium (se))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	9
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.24	Minimum Non-Detect	0.2
Maximum Detect	0.78	Maximum Non-Detect	0.2
Variance Detects	0.0281	Percent Non-Detects	50%
Mean Detects	0.491	SD Detects	0.168
Median Detects	0.49	CV Detects	0.341
Skewness Detects	0.145	Kurtosis Detects	-0.21
Mean of Logged Detects	-0.768	SD of Logged Detects	0.37

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.989	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0953	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.346	KM Standard Error of Mean	0.0459
90KM SD	0.183	95% KM (BCA) UCL	0.421
95% KM (t) UCL	0.425	95% KM (Percentile Bootstrap) UCL	0.418
95% KM (z) UCL	0.421	95% KM Bootstrap t UCL	0.437
90% KM Chebyshev UCL	0.483	95% KM Chebyshev UCL	0.545
97.5% KM Chebyshev UCL	0.632	99% KM Chebyshev UCL	0.802

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.166	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.116	**Kolmogorov-Smirnov GOF**
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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	8.922	k star (bias corrected MLE)	6.022
Theta hat (MLE)	0.055	Theta star (bias corrected MLE)	0.0816
nu hat (MLE)	160.6	nu star (bias corrected)	108.4
Mean (detects)	0.491		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

1821	This is especially true when the sample size is small.			
1822	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1823	Minimum	0.01	Mean	0.295
1824	Maximum	0.78	Median	0.234
1825	SD	0.239	CV	0.811
1826	k hat (MLE)	0.961	k star (bias corrected MLE)	0.838
1827	Theta hat (MLE)	0.307	Theta star (bias corrected MLE)	0.352
1828	nu hat (MLE)	34.6	nu star (bias corrected)	30.17
1829	Adjusted Level of Significance (β)	0.0357		
1830	Approximate Chi Square Value (30.17, α)	18.63	Adjusted Chi Square Value (30.17, β)	17.76
1831	95% Gamma Approximate UCL	0.478	95% Gamma Adjusted UCL	0.501
1832				
1833	**Estimates of Gamma Parameters using KM Estimates**			
1834	Mean (KM)	0.346	SD (KM)	0.183
1835	Variance (KM)	0.0337	SE of Mean (KM)	0.0459
1836	k hat (KM)	3.548	k star (KM)	2.993
1837	nu hat (KM)	127.7	nu star (KM)	107.8
1838	theta hat (KM)	0.0974	theta star (KM)	0.115
1839	80% gamma percentile (KM)	0.493	90% gamma percentile (KM)	0.613
1840	95% gamma percentile (KM)	0.726	99% gamma percentile (KM)	0.969
1841				
1842	**Gamma Kaplan-Meier (KM) Statistics**			
1843	Approximate Chi Square Value (107.76, α)	84.81	Adjusted Chi Square Value (107.76, β)	82.85
1844	95% KM Approximate Gamma UCL	0.439	95% KM Adjusted Gamma UCL	0.449
1845				
1846	**Lognormal GOF Test on Detected Observations Only**			
1847	Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk GOF Test**	
1848	10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level	
1849	Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**	
1850	10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level	
1851	**Detected Data appear Lognormal at 10% Significance Level**			
1852	**Note GOF tests may be unreliable for small sample sizes**			
1853				
1854	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1855	Mean in Original Scale	0.331	Mean in Log Scale	-1.293
1856	SD in Original Scale	0.204	SD in Log Scale	0.643
1857	95% t UCL (assumes normality of ROS data)	0.415	95% Percentile Bootstrap UCL	0.41
1858	95% BCA Bootstrap UCL	0.416	95% Bootstrap t UCL	0.426
1859	95% H-UCL (Log ROS)	0.473		
1860				
1861	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1862	KM Mean (logged)	-1.189	KM Geo Mean	0.305
1863	KM SD (logged)	0.488	95% Critical H Value (KM-Log)	2.009
1864	KM Standard Error of Mean (logged)	0.122	95% H-UCL (KM -Log)	0.435
1865	KM SD (logged)	0.488	95% Critical H Value (KM-Log)	2.009
1866	KM Standard Error of Mean (logged)	0.122		
1867				
1868	**DL/2 Statistics**			
1869	**DL/2 Normal**		**DL/2 Log-Transformed**	
1870	Mean in Original Scale	0.296	Mean in Log Scale	-1.535
1871	SD in Original Scale	0.232	SD in Log Scale	0.829
1872	95% t UCL (Assumes normality)	0.391	95% H-Stat UCL	0.492

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.425		

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

Result (silver (ag))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	18
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 Result (silver (ag)) was not processed!

Result (sodium (na))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	54	Mean	134.5
Maximum	248	Median	131
SD	52.32	Std. Error of Mean	12.33
Coefficient of Variation	0.389	Skewness	0.462

Normal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	156	95% Adjusted-CLT UCL (Chen-1995)	156.2
		95% Modified-t UCL (Johnson-1978)	156.2

Gamma GOF Test

A-D Test Statistic	0.269	**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	0.121	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level

Row				
1925	**Detected data appear Gamma Distributed at 5% Significance Level**			
1926				
1927	**Gamma Statistics**			
1928	k hat (MLE)	6.578	k star (bias corrected MLE)	5.519
1929	Theta hat (MLE)	20.45	Theta star (bias corrected MLE)	24.37
1930	nu hat (MLE)	236.8	nu star (bias corrected)	198.7
1931	MLE Mean (bias corrected)	134.5	MLE Sd (bias corrected)	57.25
1932			Approximate Chi Square Value (0.05)	167.1
1933	Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	164.3
1934				
1935	**Assuming Gamma Distribution**			
1936	95% Approximate Gamma UCL	160	95% Adjusted Gamma UCL	162.7
1937				
1938	**Lognormal GOF Test**			
1939	Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**	
1940	10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
1941	Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**	
1942	10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
1943	**Data appear Lognormal at 10% Significance Level**			
1944				
1945	**Lognormal Statistics**			
1946	Minimum of Logged Data	3.989	Mean of logged Data	4.824
1947	Maximum of Logged Data	5.513	SD of logged Data	0.421
1948				
1949	**Assuming Lognormal Distribution**			
1950	95% H-UCL	165.9	90% Chebyshev (MVUE) UCL	176.5
1951	95% Chebyshev (MVUE) UCL	195.1	97.5% Chebyshev (MVUE) UCL	221.1
1952	99% Chebyshev (MVUE) UCL	272		
1953				
1954	**Nonparametric Distribution Free UCL Statistics**			
1955	**Data appear to follow a Discernible Distribution**			
1956				
1957	**Nonparametric Distribution Free UCLs**			
1958	95% CLT UCL	154.8	95% BCA Bootstrap UCL	155.7
1959	95% Standard Bootstrap UCL	154.5	95% Bootstrap-t UCL	157.9
1960	95% Hall's Bootstrap UCL	157.9	95% Percentile Bootstrap UCL	155.3
1961	90% Chebyshev(Mean, Sd) UCL	171.5	95% Chebyshev(Mean, Sd) UCL	188.3
1962	97.5% Chebyshev(Mean, Sd) UCL	211.5	99% Chebyshev(Mean, Sd) UCL	257.2
1963				
1964	**Suggested UCL to Use**			
1965	95% Student's-t UCL	156		
1966				
1967	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1968	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1969	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1970				
1971				
1972	**Result (strontium (sr))**			
1973				
1974	**General Statistics**			
1975	Total Number of Observations	18	Number of Distinct Observations	18
1976			Number of Missing Observations	0

	A–E	F	G–K	L
1977	Minimum	9.34	Mean	25.71
1978	Maximum	53.3	Median	26.05
1979	SD	11.5	Std. Error of Mean	2.71
1980	Coefficient of Variation	0.447	Skewness	0.526
1981				
1982	**Normal GOF Test**			
1983	Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk GOF Test**	
1984	1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
1985	Lilliefors Test Statistic	0.113	**Lilliefors GOF Test**	
1986	1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
1987	**Data appear Normal at 1% Significance Level**			
1988				
1989	**Assuming Normal Distribution**			
1990	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1991	95% Student's-t UCL	30.42	95% Adjusted-CLT UCL (Chen-1995)	30.53
1992			95% Modified-t UCL (Johnson-1978)	30.48
1993				
1994	**Gamma GOF Test**			
1995	A-D Test Statistic	0.375	**Anderson-Darling Gamma GOF Test**	
1996	5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
1997	K-S Test Statistic	0.132	**Kolmogorov-Smirnov Gamma GOF Test**	
1998	5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level	
1999	**Detected data appear Gamma Distributed at 5% Significance Level**			
2000				
2001	**Gamma Statistics**			
2002	k hat (MLE)	4.86	k star (bias corrected MLE)	4.087
2003	Theta hat (MLE)	5.29	Theta star (bias corrected MLE)	6.291
2004	nu hat (MLE)	175	nu star (bias corrected)	147.1
2005	MLE Mean (bias corrected)	25.71	MLE Sd (bias corrected)	12.72
2006			Approximate Chi Square Value (0.05)	120.1
2007	Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	117.8
2008				
2009	**Assuming Gamma Distribution**			
2010	95% Approximate Gamma UCL	31.5	95% Adjusted Gamma UCL	32.12
2011				
2012	**Lognormal GOF Test**			
2013	Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**	
2014	10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
2015	Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**	
2016	10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
2017	**Data appear Lognormal at 10% Significance Level**			
2018				
2019	**Lognormal Statistics**			
2020	Minimum of Logged Data	2.234	Mean of logged Data	3.14
2021	Maximum of Logged Data	3.976	SD of logged Data	0.497
2022				
2023	**Assuming Lognormal Distribution**			
2024	95% H-UCL	33.36	90% Chebyshev (MVUE) UCL	35.4
2025	95% Chebyshev (MVUE) UCL	39.67	97.5% Chebyshev (MVUE) UCL	45.6
2026	99% Chebyshev (MVUE) UCL	57.26		
2027				
2028	**Nonparametric Distribution Free UCL Statistics**			

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	30.17	95% BCA Bootstrap UCL	30.52
95% Standard Bootstrap UCL	30.02	95% Bootstrap-t UCL	30.9
95% Hall's Bootstrap UCL	31.24	95% Percentile Bootstrap UCL	30.26
90% Chebyshev(Mean, Sd) UCL	33.84	95% Chebyshev(Mean, Sd) UCL	37.52
97.5% Chebyshev(Mean, Sd) UCL	42.64	99% Chebyshev(Mean, Sd) UCL	52.68

Suggested UCL to Use

95% Student's-t UCL	30.42		

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

Result (sulfur (s))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	13
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	1400	Minimum Non-Detect	1000
Maximum Detect	2100	Maximum Non-Detect	1000
Variance Detects	82000	Percent Non-Detects	72.22%
Mean Detects	1780	SD Detects	286.4
Median Detects	1800	CV Detects	0.161
Skewness Detects	-0.307	Kurtosis Detects	-1.544
Mean of Logged Detects	7.474	SD of Logged Detects	0.165

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	1217	KM Standard Error of Mean	98.7
90KM SD	374.5	95% KM (BCA) UCL	1372
95% KM (t) UCL	1388	95% KM (Percentile Bootstrap) UCL	1372
95% KM (z) UCL	1379	95% KM Bootstrap t UCL	1307
90% KM Chebyshev UCL	1513	95% KM Chebyshev UCL	1647
97.5% KM Chebyshev UCL	1833	99% KM Chebyshev UCL	2199

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.236	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.678	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.205	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	46.7	k star (bias corrected MLE)	18.81
Theta hat (MLE)	38.11	Theta star (bias corrected MLE)	94.61
nu hat (MLE)	467	nu star (bias corrected)	188.1
Mean (detects)	1780		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	1011
Maximum	2100	Median	964.3
SD	606	CV	0.599
k hat (MLE)	0.8	k star (bias corrected MLE)	0.704
Theta hat (MLE)	1264	Theta star (bias corrected MLE)	1437
nu hat (MLE)	28.8	nu star (bias corrected)	25.33
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (25.33, α)	14.87	Adjusted Chi Square Value (25.33, β)	14.1
95% Gamma Approximate UCL	1723	95% Gamma Adjusted UCL	1817

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1217	SD (KM)	374.5
Variance (KM)	140278	SE of Mean (KM)	98.7
k hat (KM)	10.55	k star (KM)	8.831
nu hat (KM)	379.9	nu star (KM)	317.9
theta hat (KM)	115.3	theta star (KM)	137.8
80% gamma percentile (KM)	1541	90% gamma percentile (KM)	1762
95% gamma percentile (KM)	1959	99% gamma percentile (KM)	2365

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (317.91, α)	277.6	Adjusted Chi Square Value (317.91, β)	274
95% KM Approximate Gamma UCL	1393	95% KM Adjusted Gamma UCL	1412

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1170	Mean in Log Scale	6.994
SD in Original Scale	458.2	SD in Log Scale	0.387
95% t UCL (assumes normality of ROS data)	1358	95% Percentile Bootstrap UCL	1345
95% BCA Bootstrap UCL	1367	95% Bootstrap t UCL	1384
95% H-UCL (Log ROS)	1407		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	7.065	KM Geo Mean	1170
KM SD (logged)	0.265	95% Critical H Value (KM-Log)	1.829
KM Standard Error of Mean (logged)	0.0699	95% H-UCL (KM -Log)	1363
KM SD (logged)	0.265	95% Critical H Value (KM-Log)	1.829
KM Standard Error of Mean (logged)	0.0699		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	855.6	Mean in Log Scale	6.564
SD in Original Scale	606.1	SD in Log Scale	0.586
95% t UCL (Assumes normality)	1104	95% H-Stat UCL	1136
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1388		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (thallium (tl))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	16
Number of Detects	15	Number of Non-Detects	3
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	0.06	Minimum Non-Detect	0.05
Maximum Detect	0.179	Maximum Non-Detect	0.05
Variance Detects	0.00128	Percent Non-Detects	16.67%
Mean Detects	0.128	SD Detects	0.0358
Median Detects	0.129	CV Detects	0.279
Skewness Detects	-0.3	Kurtosis Detects	-0.909
Mean of Logged Detects	-2.094	SD of Logged Detects	0.311
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.835	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.255	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.115	KM Standard Error of Mean	0.0105
90KM SD	0.043	95% KM (BCA) UCL	0.133
95% KM (t) UCL	0.134	95% KM (Percentile Bootstrap) UCL	0.132
95% KM (z) UCL	0.133	95% KM Bootstrap t UCL	0.133
90% KM Chebyshev UCL	0.147	95% KM Chebyshev UCL	0.161
97.5% KM Chebyshev UCL	0.181	99% KM Chebyshev UCL	0.22

2185				
2186	**Gamma GOF Tests on Detected Observations Only**			
2187	A-D Test Statistic	0.372	**Anderson-Darling GOF Test**	
2188	5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level	
2189	K-S Test Statistic	0.158	**Kolmogorov-Smirnov GOF**	
2190	5% K-S Critical Value	0.221	Detected data appear Gamma Distributed at 5% Significance Level	
2191	**Detected data appear Gamma Distributed at 5% Significance Level**			
2192				
2193	**Gamma Statistics on Detected Data Only**			
2194	k hat (MLE)	12.15	k star (bias corrected MLE)	9.765
2195	Theta hat (MLE)	0.0106	Theta star (bias corrected MLE)	0.0131
2196	nu hat (MLE)	364.5	nu star (bias corrected)	293
2197	Mean (detects)	0.128		
2198				
2199	**Gamma ROS Statistics using Imputed Non-Detects**			
2200	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2201	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2202	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2203	This is especially true when the sample size is small.			
2204	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2205	Minimum	0.0484	Mean	0.117
2206	Maximum	0.179	Median	0.114
2207	SD	0.0422	CV	0.362
2208	k hat (MLE)	7.097	k star (bias corrected MLE)	5.951
2209	Theta hat (MLE)	0.0165	Theta star (bias corrected MLE)	0.0196
2210	nu hat (MLE)	255.5	nu star (bias corrected)	214.2
2211	Adjusted Level of Significance (β)	0.0357		
2212	Approximate Chi Square Value (214.23, α)	181.4	Adjusted Chi Square Value (214.23, β)	178.5
2213	95% Gamma Approximate UCL	0.138	95% Gamma Adjusted UCL	0.14
2214				
2215	**Estimates of Gamma Parameters using KM Estimates**			
2216	Mean (KM)	0.115	SD (KM)	0.043
2217	Variance (KM)	0.00185	SE of Mean (KM)	0.0105
2218	k hat (KM)	7.185	k star (KM)	6.025
2219	nu hat (KM)	258.7	nu star (KM)	216.9
2220	theta hat (KM)	0.0161	theta star (KM)	0.0191
2221	80% gamma percentile (KM)	0.152	90% gamma percentile (KM)	0.178
2222	95% gamma percentile (KM)	0.202	99% gamma percentile (KM)	0.252
2223				
2224	**Gamma Kaplan-Meier (KM) Statistics**			
2225	Approximate Chi Square Value (216.88, α)	183.8	Adjusted Chi Square Value (216.88, β)	180.9
2226	95% KM Approximate Gamma UCL	0.136	95% KM Adjusted Gamma UCL	0.138
2227				
2228	**Lognormal GOF Test on Detected Observations Only**			
2229	Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**	
2230	10% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 10% Significance Level	
2231	Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**	
2232	10% Lilliefors Critical Value	0.202	Detected Data appear Lognormal at 10% Significance Level	
2233	**Detected Data appear Lognormal at 10% Significance Level**			
2234				
2235	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2236	Mean in Original Scale	0.117	Mean in Log Scale	-2.211

SD in Original Scale	0.0415	SD in Log Scale	0.391
95% t UCL (assumes normality of ROS data)	0.134	95% Percentile Bootstrap UCL	0.133
95% BCA Bootstrap UCL	0.133	95% Bootstrap t UCL	0.134
95% H-UCL (Log ROS)	0.142		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.245	KM Geo Mean	0.106
KM SD (logged)	0.434	95% Critical H Value (KM-Log)	1.96
KM Standard Error of Mean (logged)	0.106	95% H-UCL (KM -Log)	0.143
KM SD (logged)	0.434	95% Critical H Value (KM-Log)	1.96
KM Standard Error of Mean (logged)	0.106		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.111	Mean in Log Scale	-2.36
SD in Original Scale	0.0513	SD in Log Scale	0.674
95% t UCL (Assumes normality)	0.132	95% H-Stat UCL	0.17

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.134		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tin (sn))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Result (tin (sn)) was not processed!

Result (titanium (ti))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	125	Mean	464.4
Maximum	953	Median	481.5
SD	220.7	Std. Error of Mean	52.01
Coefficient of Variation	0.475	Skewness	0.372

Normal GOF Test			
Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	554.9	95% Adjusted-CLT UCL (Chen-1995)	554.9
		95% Modified-t UCL (Johnson-1978)	555.7
Gamma GOF Test			
A-D Test Statistic	0.305	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.146	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.205	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	4.182	k star (bias corrected MLE)	3.522
Theta hat (MLE)	111	Theta star (bias corrected MLE)	131.9
nu hat (MLE)	150.6	nu star (bias corrected)	126.8
MLE Mean (bias corrected)	464.4	MLE Sd (bias corrected)	247.5
		Approximate Chi Square Value (0.05)	101.8
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	99.65
Assuming Gamma Distribution			
95% Approximate Gamma UCL	578.5	95% Adjusted Gamma UCL	591
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.828	Mean of logged Data	6.017
Maximum of Logged Data	6.86	SD of logged Data	0.541
Assuming Lognormal Distribution			
95% H-UCL	622.6	90% Chebyshev (MVUE) UCL	657.9
95% Chebyshev (MVUE) UCL	742.8	97.5% Chebyshev (MVUE) UCL	860.5
99% Chebyshev (MVUE) UCL	1092		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	550	95% BCA Bootstrap UCL	547.9

95% Standard Bootstrap UCL	549.5	95% Bootstrap-t UCL	559.3
95% Hall's Bootstrap UCL	558.7	95% Percentile Bootstrap UCL	549.4
90% Chebyshev(Mean, Sd) UCL	620.5	95% Chebyshev(Mean, Sd) UCL	691.2
97.5% Chebyshev(Mean, Sd) UCL	789.2	99% Chebyshev(Mean, Sd) UCL	981.9
Suggested UCL to Use			
95% Student's-t UCL	554.9		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (tungsten (w))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	18
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 Result (tungsten (w)) was not processed!			
Result (uranium (u))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	0.268	Mean	0.846
Maximum	2.1	Median	0.705
SD	0.517	Std. Error of Mean	0.122
Coefficient of Variation	0.611	Skewness	1.279
Normal GOF Test			
Shapiro Wilk Test Statistic	0.856	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.058	95% Adjusted-CLT UCL (Chen-1995)	1.086
		95% Modified-t UCL (Johnson-1978)	1.064
Gamma GOF Test			
A-D Test Statistic	0.458	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level	

A	B	C	D	E	F	G	H	I	J	K	L
				K-S Test Statistic	0.172	**Kolmogorov-Smirnov Gamma GOF Test**					
				5% K-S Critical Value	0.205	Detected data appear Gamma Distributed at 5% Significance Level					
Detected data appear Gamma Distributed at 5% Significance Level											
Gamma Statistics											
				k hat (MLE)	3.28					k star (bias corrected MLE)	2.77
				Theta hat (MLE)	0.258					Theta star (bias corrected MLE)	0.305
				nu hat (MLE)	118.1					nu star (bias corrected)	99.73
				MLE Mean (bias corrected)	0.846					MLE Sd (bias corrected)	0.508
										Approximate Chi Square Value (0.05)	77.69
				Adjusted Level of Significance	0.0357					Adjusted Chi Square Value	75.83
Assuming Gamma Distribution											
				95% Approximate Gamma UCL	1.086					95% Adjusted Gamma UCL	1.113
Lognormal GOF Test											
				Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**					
				10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level					
				Lilliefors Test Statistic	0.134	**Lilliefors Lognormal GOF Test**					
				10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level					
Data appear Lognormal at 10% Significance Level											
Lognormal Statistics											
				Minimum of Logged Data	-1.317					Mean of logged Data	-0.327
				Maximum of Logged Data	0.742					SD of logged Data	0.58
Assuming Lognormal Distribution											
				95% H-UCL	1.146					90% Chebyshev (MVUE) UCL	1.205
				95% Chebyshev (MVUE) UCL	1.369					97.5% Chebyshev (MVUE) UCL	1.596
				99% Chebyshev (MVUE) UCL	2.042						
Nonparametric Distribution Free UCL Statistics											
Data appear to follow a Discernible Distribution											
Nonparametric Distribution Free UCLs											
				95% CLT UCL	1.046					95% BCA Bootstrap UCL	1.074
				95% Standard Bootstrap UCL	1.038					95% Bootstrap-t UCL	1.113
				95% Hall's Bootstrap UCL	1.091					95% Percentile Bootstrap UCL	1.045
				90% Chebyshev(Mean, Sd) UCL	1.211					95% Chebyshev(Mean, Sd) UCL	1.377
				97.5% Chebyshev(Mean, Sd) UCL	1.606					99% Chebyshev(Mean, Sd) UCL	2.058
Suggested UCL to Use											
				95% Adjusted Gamma UCL	1.113						
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
Result (vanadium (v))											
General Statistics											

	A	B	C	D	E	F	G	H	I	J	K	L
2445					Total Number of Observations	18					Number of Distinct Observations	17
2446											Number of Missing Observations	0
2447					Minimum	12.4					Mean	23.66
2448					Maximum	37.6					Median	23.9
2449					SD	7.648					Std. Error of Mean	1.803
2450					Coefficient of Variation	0.323					Skewness	0.211
2451												
2452	**Normal GOF Test**											
2453					Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**					
2454					1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level					
2455					Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**					
2456					1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level					
2457	**Data appear Normal at 1% Significance Level**											
2458												
2459	**Assuming Normal Distribution**											
2460	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
2461					95% Student's-t UCL	26.8					95% Adjusted-CLT UCL (Chen-1995)	26.72
2462											95% Modified-t UCL (Johnson-1978)	26.81
2463												
2464	**Gamma GOF Test**											
2465					A-D Test Statistic	0.273	**Anderson-Darling Gamma GOF Test**					
2466					5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level					
2467					K-S Test Statistic	0.12	**Kolmogorov-Smirnov Gamma GOF Test**					
2468					5% K-S Critical Value	0.203	Detected data appear Gamma Distributed at 5% Significance Level					
2469	**Detected data appear Gamma Distributed at 5% Significance Level**											
2470												
2471	**Gamma Statistics**											
2472					k hat (MLE)	9.727					k star (bias corrected MLE)	8.143
2473					Theta hat (MLE)	2.432					Theta star (bias corrected MLE)	2.906
2474					nu hat (MLE)	350.2					nu star (bias corrected)	293.1
2475					MLE Mean (bias corrected)	23.66					MLE Sd (bias corrected)	8.292
2476											Approximate Chi Square Value (0.05)	254.5
2477					Adjusted Level of Significance	0.0357					Adjusted Chi Square Value	251
2478												
2479	**Assuming Gamma Distribution**											
2480					95% Approximate Gamma UCL	27.26					95% Adjusted Gamma UCL	27.63
2481												
2482	**Lognormal GOF Test**											
2483					Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**					
2484					10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level					
2485					Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**					
2486					10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level					
2487	**Data appear Lognormal at 10% Significance Level**											
2488												
2489	**Lognormal Statistics**											
2490					Minimum of Logged Data	2.518					Mean of logged Data	3.112
2491					Maximum of Logged Data	3.627					SD of logged Data	0.339
2492												
2493	**Assuming Lognormal Distribution**											
2494					95% H-UCL	27.76					90% Chebyshev (MVUE) UCL	29.48
2495					95% Chebyshev (MVUE) UCL	32.09					97.5% Chebyshev (MVUE) UCL	35.72
2496					99% Chebyshev (MVUE) UCL	42.85						

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	26.63	95% BCA Bootstrap UCL	26.4
95% Standard Bootstrap UCL	26.6	95% Bootstrap-t UCL	26.94
95% Hall's Bootstrap UCL	26.69	95% Percentile Bootstrap UCL	26.58
90% Chebyshev(Mean, Sd) UCL	29.07	95% Chebyshev(Mean, Sd) UCL	31.52
97.5% Chebyshev(Mean, Sd) UCL	34.92	99% Chebyshev(Mean, Sd) UCL	41.6

Suggested UCL to Use

95% Student's-t UCL	26.8		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (zinc (zn))

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	30.9	Mean	67.79
Maximum	134	Median	64.45
SD	30.74	Std. Error of Mean	7.244
Coefficient of Variation	0.453	Skewness	1.008

Normal GOF Test

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	80.39	95% Adjusted-CLT UCL (Chen-1995)	81.54
		95% Modified-t UCL (Johnson-1978)	80.68

Gamma GOF Test

A-D Test Statistic	0.336	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.129	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.588	k star (bias corrected MLE)	4.694
Theta hat (MLE)	12.13	Theta star (bias corrected MLE)	14.44
nu hat (MLE)	201.2	nu star (bias corrected)	169

MLE Mean (bias corrected)	67.79	MLE Sd (bias corrected)	31.29
		Approximate Chi Square Value (0.05)	139.9
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	137.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	81.87	95% Adjusted Gamma UCL	83.38
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.431	Mean of logged Data	4.124
Maximum of Logged Data	4.898	SD of logged Data	0.441
Assuming Lognormal Distribution			
95% H-UCL	84.12	90% Chebyshev (MVUE) UCL	89.47
95% Chebyshev (MVUE) UCL	99.31	97.5% Chebyshev (MVUE) UCL	113
99% Chebyshev (MVUE) UCL	139.8		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	79.7	95% BCA Bootstrap UCL	80.44
95% Standard Bootstrap UCL	79.28	95% Bootstrap-t UCL	83.85
95% Hall's Bootstrap UCL	86.05	95% Percentile Bootstrap UCL	79.94
90% Chebyshev(Mean, Sd) UCL	89.52	95% Chebyshev(Mean, Sd) UCL	99.37
97.5% Chebyshev(Mean, Sd) UCL	113	99% Chebyshev(Mean, Sd) UCL	139.9
Suggested UCL to Use			
95% Student's-t UCL	80.39		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (zirconium (zr))			
General Statistics			
Total Number of Observations	18	Number of Distinct Observations	17
Number of Detects	17	Number of Non-Detects	1
Number of Distinct Detects	16	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	1
Maximum Detect	7.9	Maximum Non-Detect	1
Variance Detects	4.812	Percent Non-Detects	5.556%
Mean Detects	3.888	SD Detects	2.194
Median Detects	3.5	CV Detects	0.564
Skewness Detects	0.475	Kurtosis Detects	-1.146

Mean of Logged Detects	1.191	SD of Logged Detects	0.615
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.851	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.241	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	3.728	KM Standard Error of Mean	0.528
90KM SD	2.171	95% KM (BCA) UCL	4.672
95% KM (t) UCL	4.646	95% KM (Percentile Bootstrap) UCL	4.589
95% KM (z) UCL	4.596	95% KM Bootstrap t UCL	4.774
90% KM Chebyshev UCL	5.311	95% KM Chebyshev UCL	6.027
97.5% KM Chebyshev UCL	7.022	99% KM Chebyshev UCL	8.977
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.38	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.152	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.211	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)	3.16	k star (bias corrected MLE)	2.642
Theta hat (MLE)	1.23	Theta star (bias corrected MLE)	1.472
nu hat (MLE)	107.4	nu star (bias corrected)	89.81
Mean (detects)	3.888		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.225	Mean	3.685
Maximum	7.9	Median	3.25
SD	2.297	CV	0.623
k hat (MLE)	2.062	k star (bias corrected MLE)	1.755
Theta hat (MLE)	1.787	Theta star (bias corrected MLE)	2.099
nu hat (MLE)	74.23	nu star (bias corrected)	63.19
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (63.19, α)	45.9	Adjusted Chi Square Value (63.19, β)	44.49
95% Gamma Approximate UCL	5.072	95% Gamma Adjusted UCL	5.234
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	3.728	SD (KM)	2.171
Variance (KM)	4.715	SE of Mean (KM)	0.528
k hat (KM)	2.947	k star (KM)	2.493
nu hat (KM)	106.1	nu star (KM)	89.74
theta hat (KM)	1.265	theta star (KM)	1.495

	A	B	C	D	E	F	G	H	I	J	K	L
2653					80% gamma percentile (KM)	5.436					90% gamma percentile (KM)	6.891
2654					95% gamma percentile (KM)	8.261					99% gamma percentile (KM)	11.26
2655												
2656	Gamma Kaplan-Meier (KM) Statistics											
2657					Approximate Chi Square Value (89.74, α)	68.9					Adjusted Chi Square Value (89.74, β)	67.15
2658					95% KM Approximate Gamma UCL	4.855					95% KM Adjusted Gamma UCL	4.982
2659												
2660	Lognormal GOF Test on Detected Observations Only											
2661					Shapiro Wilk Test Statistic	0.939	Shapiro Wilk GOF Test					
2662					10% Shapiro Wilk Critical Value	0.91	Detected Data appear Lognormal at 10% Significance Level					
2663					Lilliefors Test Statistic	0.151	Lilliefors GOF Test					
2664					10% Lilliefors Critical Value	0.19	Detected Data appear Lognormal at 10% Significance Level					
2665	Detected Data appear Lognormal at 10% Significance Level											
2666												
2667	Lognormal ROS Statistics Using Imputed Non-Detects											
2668					Mean in Original Scale	3.713					Mean in Log Scale	1.108
2669					SD in Original Scale	2.255					SD in Log Scale	0.694
2670					95% t UCL (assumes normality of ROS data)	4.637					95% Percentile Bootstrap UCL	4.579
2671					95% BCA Bootstrap UCL	4.622					95% Bootstrap t UCL	4.707
2672					95% H-UCL (Log ROS)	5.609						
2673												
2674	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
2675					KM Mean (logged)	1.125					KM Geo Mean	3.081
2676					KM SD (logged)	0.641					95% Critical H Value (KM-Log)	2.169
2677					KM Standard Error of Mean (logged)	0.156					95% H-UCL (KM -Log)	5.299
2678					KM SD (logged)	0.641					95% Critical H Value (KM-Log)	2.169
2679					KM Standard Error of Mean (logged)	0.156						
2680												
2681	DL/2 Statistics											
2682	DL/2 Normal						DL/2 Log-Transformed					
2683					Mean in Original Scale	3.7					Mean in Log Scale	1.087
2684					SD in Original Scale	2.273					SD in Log Scale	0.744
2685					95% t UCL (Assumes normality)	4.632					95% H-Stat UCL	5.909
2686	DL/2 is not a recommended method, provided for comparisons and historical reasons											
2687												
2688	Nonparametric Distribution Free UCL Statistics											
2689	Detected Data appear Normal Distributed at 1% Significance Level											
2690												
2691	Suggested UCL to Use											
2692					95% KM (t) UCL	4.646						
2693												
2694	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2695	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2696	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2697												

B.2.4 Terrestrial Vegetation EPC ProUCL Output: Berries

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 3/14/2024 1:29:13 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (aluminum)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
Number of Detects	10	Number of Non-Detects	1
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.42	Minimum Non-Detect	0.4
Maximum Detect	21.5	Maximum Non-Detect	0.4
Variance Detects	42.03	Percent Non-Detects	9.091%
Mean Detects	3.104	SD Detects	6.483
Median Detects	1.28	CV Detects	2.089
Skewness Detects	3.127	Kurtosis Detects	9.839
Mean of Logged Detects	0.239	SD of Logged Detects	1.133

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.437	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.472	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.304	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	2.858	KM Standard Error of Mean	1.88
90KM SD	5.915	95% KM (BCA) UCL	6.657
95% KM (t) UCL	6.266	95% KM (Percentile Bootstrap) UCL	6.546
95% KM (z) UCL	5.95	95% KM Bootstrap t UCL	30.7
90% KM Chebyshev UCL	8.498	95% KM Chebyshev UCL	11.05
97.5% KM Chebyshev UCL	14.6	99% KM Chebyshev UCL	21.56

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.597	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.763	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.379	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.277	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)	0.679	k star (bias corrected MLE)	0.542
Theta hat (MLE)	4.571	Theta star (bias corrected MLE)	5.727
nu hat (MLE)	13.58	nu star (bias corrected)	10.84
Mean (detects)	3.104		

Gamma ROS Statistics using Imputed Non-Detects

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
56	This is especially true when the sample size is small.			
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
58	Minimum	0.01	Mean	2.823
59	Maximum	21.5	Median	1.2
60	SD	6.22	CV	2.204
61	k hat (MLE)	0.511	k star (bias corrected MLE)	0.432
62	Theta hat (MLE)	5.525	Theta star (bias corrected MLE)	6.532
63	nu hat (MLE)	11.24	nu star (bias corrected)	9.507
64	Adjusted Level of Significance (β)	0.0278		
65	Approximate Chi Square Value (9.51, α)	3.636	Adjusted Chi Square Value (9.51, β)	3.068
66	95% Gamma Approximate UCL	7.38	95% Gamma Adjusted UCL	8.747
67				
68	**Estimates of Gamma Parameters using KM Estimates**			
69	Mean (KM)	2.858	SD (KM)	5.915
70	Variance (KM)	34.99	SE of Mean (KM)	1.88
71	k hat (KM)	0.233	k star (KM)	0.23
72	nu hat (KM)	5.136	nu star (KM)	5.069
73	theta hat (KM)	12.24	theta star (KM)	12.41
74	80% gamma percentile (KM)	4.023	90% gamma percentile (KM)	8.62
75	95% gamma percentile (KM)	14.17	99% gamma percentile (KM)	29.11
76				
77	**Gamma Kaplan-Meier (KM) Statistics**			
78	Approximate Chi Square Value (5.07, α)	1.184	Adjusted Chi Square Value (5.07, β)	0.91
79	95% KM Approximate Gamma UCL	12.23	95% KM Adjusted Gamma UCL	15.93
80				
81	**Lognormal GOF Test on Detected Observations Only**			
82	Shapiro Wilk Test Statistic	0.794	**Shapiro Wilk GOF Test**	
83	10% Shapiro Wilk Critical Value	0.869	Detected Data Not Lognormal at 10% Significance Level	
84	Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**	
85	10% Lilliefors Critical Value	0.241	Detected Data Not Lognormal at 10% Significance Level	
86	**Detected Data Not Lognormal at 10% Significance Level**			
87				
88	**Lognormal ROS Statistics Using Imputed Non-Detects**			
89	Mean in Original Scale	2.831	Mean in Log Scale	0.0103
90	SD in Original Scale	6.216	SD in Log Scale	1.315
91	95% t UCL (assumes normality of ROS data)	6.228	95% Percentile Bootstrap UCL	6.503
92	95% BCA Bootstrap UCL	8.456	95% Bootstrap t UCL	28.51
93	95% H-UCL (Log ROS)	10.89		
94				
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
96	KM Mean (logged)	0.134	KM Geo Mean	1.143
97	KM SD (logged)	1.078	95% Critical H Value (KM-Log)	3.149
98	KM Standard Error of Mean (logged)	0.342	95% H-UCL (KM -Log)	5.974
99	KM SD (logged)	1.078	95% Critical H Value (KM-Log)	3.149
100	KM Standard Error of Mean (logged)	0.342		
101				
102	**DL/2 Statistics**			
103	**DL/2 Normal**		**DL/2 Log-Transformed**	
104	Mean in Original Scale	2.84	Mean in Log Scale	0.0708

SD in Original Scale	6.212	SD in Log Scale	1.211
95% t UCL (Assumes normality)	6.235	95% H-Stat UCL	8.275

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

Suggested UCL to Use

95% KM (t) UCL	6.266		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (antimony)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (antimony) was not processed!

Result (arsenic)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	6
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.0046	Minimum Non-Detect	0.004
Maximum Detect	0.0086	Maximum Non-Detect	0.004
Variance Detects	3.0170E-6	Percent Non-Detects	54.55%
Mean Detects	0.00652	SD Detects	0.00174
Median Detects	0.0058	CV Detects	0.266
Skewness Detects	0.352	Kurtosis Detects	-2.522
Mean of Logged Detects	-5.061	SD of Logged Detects	0.266

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.00515	KM Standard Error of Mean	5.5099E-4
90KM SD	0.00163	95% KM (BCA) UCL	0.00608
95% KM (t) UCL	0.00614	95% KM (Percentile Bootstrap) UCL	0.00603
95% KM (z) UCL	0.00605	95% KM Bootstrap t UCL	0.00613
90% KM Chebyshev UCL	0.0068	95% KM Chebyshev UCL	0.00755
97.5% KM Chebyshev UCL	0.00859	99% KM Chebyshev UCL	0.0106

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.378	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.257	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	17.76	k star (bias corrected MLE)	7.237
Theta hat (MLE)	3.6711E-4	Theta star (bias corrected MLE)	9.0087E-4
nu hat (MLE)	177.6	nu star (bias corrected)	72.37
Mean (detects)	0.00652		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.00842
Maximum	0.01	Median	0.01
SD	0.00212	CV	0.252
k hat (MLE)	14.39	k star (bias corrected MLE)	10.53
Theta hat (MLE)	5.8485E-4	Theta star (bias corrected MLE)	7.9954E-4
nu hat (MLE)	316.7	nu star (bias corrected)	231.6
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (231.63, α)	197.4	Adjusted Chi Square Value (231.63, β)	192.3
95% Gamma Approximate UCL	0.00988	95% Gamma Adjusted UCL	0.0101

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00515	SD (KM)	0.00163
Variance (KM)	2.6716E-6	SE of Mean (KM)	5.5099E-4
k hat (KM)	9.91	k star (KM)	7.268
nu hat (KM)	218	nu star (KM)	159.9
theta hat (KM)	5.1921E-4	theta star (KM)	7.0796E-4
80% gamma percentile (KM)	0.00665	90% gamma percentile (KM)	0.00769
95% gamma percentile (KM)	0.00863	99% gamma percentile (KM)	0.0106

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (159.90, α)	131.7	Adjusted Chi Square Value (159.90, β)	127.5

95% KM Approximate Gamma UCL	0.00625	95% KM Adjusted Gamma UCL	0.00645
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00448	Mean in Log Scale	-5.528
SD in Original Scale	0.0023	SD in Log Scale	0.519
95% t UCL (assumes normality of ROS data)	0.00574	95% Percentile Bootstrap UCL	0.00566
95% BCA Bootstrap UCL	0.00575	95% Bootstrap t UCL	0.00596
95% H-UCL (Log ROS)	0.00652		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.312	KM Geo Mean	0.00493
KM SD (logged)	0.28	95% Critical H Value (KM-Log)	1.93
KM Standard Error of Mean (logged)	0.0943	95% H-UCL (KM -Log)	0.00608
KM SD (logged)	0.28	95% Critical H Value (KM-Log)	1.93
KM Standard Error of Mean (logged)	0.0943		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00405	Mean in Log Scale	-5.69
SD in Original Scale	0.0026	SD in Log Scale	0.625
95% t UCL (Assumes normality)	0.00548	95% H-Stat UCL	0.00654
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00614		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (barium)			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.126	Mean	1.545
Maximum	3.59	Median	1.15
SD	1.248	Std. Error of Mean	0.376
Coefficient of Variation	0.807	Skewness	0.645

Normal GOF Test			
Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.227	95% Adjusted-CLT UCL (Chen-1995)	2.242
		95% Modified-t UCL (Johnson-1978)	2.239
Gamma GOF Test			
A-D Test Statistic	0.237	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.14	**Kolmogorov-Smirnov Gamma GOF Test**	
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			
k hat (MLE)	1.353	k star (bias corrected MLE)	1.045
Theta hat (MLE)	1.142	Theta star (bias corrected MLE)	1.479
nu hat (MLE)	29.76	nu star (bias corrected)	22.98
MLE Mean (bias corrected)	1.545	MLE Sd (bias corrected)	1.512
		Approximate Chi Square Value (0.05)	13.08
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	11.87
Assuming Gamma Distribution			
95% Approximate Gamma UCL	2.716	95% Adjusted Gamma UCL	2.991
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.071	Mean of logged Data	0.0222
Maximum of Logged Data	1.278	SD of logged Data	1.072
Assuming Lognormal Distribution			
95% H-UCL	5.257	90% Chebyshev (MVUE) UCL	3.429
95% Chebyshev (MVUE) UCL	4.217	97.5% Chebyshev (MVUE) UCL	5.312
99% Chebyshev (MVUE) UCL	7.462		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2.164	95% BCA Bootstrap UCL	2.207
95% Standard Bootstrap UCL	2.134	95% Bootstrap-t UCL	2.372

95% Hall's Bootstrap UCL	2.287	95% Percentile Bootstrap UCL	2.142
90% Chebyshev(Mean, Sd) UCL	2.674	95% Chebyshev(Mean, Sd) UCL	3.185
97.5% Chebyshev(Mean, Sd) UCL	3.894	99% Chebyshev(Mean, Sd) UCL	5.288

Suggested UCL to Use

95% Student's-t UCL	2.227		

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

Result (beryllium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (beryllium) was not processed!

Result (bismuth)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (bismuth) was not processed!

Result (boron)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.7	Mean	2.429
Maximum	6.18	Median	1.67
SD	1.741	Std. Error of Mean	0.525
Coefficient of Variation	0.717	Skewness	1.148

Normal GOF Test

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**	

1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.38	95% Adjusted-CLT UCL (Chen-1995)	3.487
		95% Modified-t UCL (Johnson-1978)	3.411
Gamma GOF Test			
A-D Test Statistic	0.307	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.17	**Kolmogorov-Smirnov Gamma GOF Test**	
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			
k hat (MLE)	2.364	k star (bias corrected MLE)	1.78
Theta hat (MLE)	1.027	Theta star (bias corrected MLE)	1.365
nu hat (MLE)	52.02	nu star (bias corrected)	39.16
MLE Mean (bias corrected)	2.429	MLE Sd (bias corrected)	1.821
		Approximate Chi Square Value (0.05)	25.83
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	24.07
Assuming Gamma Distribution			
95% Approximate Gamma UCL	3.683	95% Adjusted Gamma UCL	3.951
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.139	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.357	Mean of logged Data	0.661
Maximum of Logged Data	1.821	SD of logged Data	0.708
Assuming Lognormal Distribution			
95% H-UCL	4.333	90% Chebyshev (MVUE) UCL	4.031
95% Chebyshev (MVUE) UCL	4.76	97.5% Chebyshev (MVUE) UCL	5.771
99% Chebyshev (MVUE) UCL	7.758		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3.292	95% BCA Bootstrap UCL	3.374
95% Standard Bootstrap UCL	3.254	95% Bootstrap-t UCL	3.824
95% Hall's Bootstrap UCL	3.643	95% Percentile Bootstrap UCL	3.301
90% Chebyshev(Mean, Sd) UCL	4.004	95% Chebyshev(Mean, Sd) UCL	4.717

97.5% Chebyshev(Mean, Sd) UCL	5.707	99% Chebyshev(Mean, Sd) UCL	7.652

Suggested UCL to Use

95% Student's-t UCL	3.38		

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

Result (cadmium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	4
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.0017	Minimum Non-Detect	0.001
Maximum Detect	0.0226	Maximum Non-Detect	0.001
Variance Detects	6.7226E-5	Percent Non-Detects	36.36%
Mean Detects	0.00846	SD Detects	0.0082
Median Detects	0.0032	CV Detects	0.969
Skewness Detects	1.061	Kurtosis Detects	-0.344
Mean of Logged Detects	-5.206	SD of Logged Detects	1.013

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.00575	KM Standard Error of Mean	0.00229
90KM SD	0.00704	95% KM (BCA) UCL	0.0096
95% KM (t) UCL	0.0099	95% KM (Percentile Bootstrap) UCL	0.00952
95% KM (z) UCL	0.00952	95% KM Bootstrap t UCL	0.0148
90% KM Chebyshev UCL	0.0126	95% KM Chebyshev UCL	0.0157
97.5% KM Chebyshev UCL	0.0201	99% KM Chebyshev UCL	0.0286

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.548	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.31	**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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.296	k star (bias corrected MLE)	0.836
Theta hat (MLE)	0.00652	Theta star (bias corrected MLE)	0.0101
nu hat (MLE)	18.15	nu star (bias corrected)	11.7
Mean (detects)	0.00846		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.00902
Maximum	0.0226	Median	0.01
SD	0.0064	CV	0.71
k hat (MLE)	1.943	k star (bias corrected MLE)	1.474
Theta hat (MLE)	0.00464	Theta star (bias corrected MLE)	0.00612
nu hat (MLE)	42.75	nu star (bias corrected)	32.43
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (32.43, α)	20.41	Adjusted Chi Square Value (32.43, β)	18.87
95% Gamma Approximate UCL	0.0143	95% Gamma Adjusted UCL	0.0155

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00575	SD (KM)	0.00704
Variance (KM)	4.9537E-5	SE of Mean (KM)	0.00229
k hat (KM)	0.666	k star (KM)	0.545
nu hat (KM)	14.66	nu star (KM)	12
theta hat (KM)	0.00862	theta star (KM)	0.0105
80% gamma percentile (KM)	0.00946	90% gamma percentile (KM)	0.0153
95% gamma percentile (KM)	0.0214	99% gamma percentile (KM)	0.0364

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.00, α)	5.224	Adjusted Chi Square Value (12.00, β)	4.517
95% KM Approximate Gamma UCL	0.0132	95% KM Adjusted Gamma UCL	0.0153

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00554	Mean in Log Scale	-6.186
SD in Original Scale	0.00753	SD in Log Scale	1.617
95% t UCL (assumes normality of ROS data)	0.00966	95% Percentile Bootstrap UCL	0.00941
95% BCA Bootstrap UCL	0.0103	95% Bootstrap t UCL	0.0143
95% H-UCL (Log ROS)	0.0682		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.825	KM Geo Mean	0.00295
KM SD (logged)	1.109	95% Critical H Value (KM-Log)	3.212
KM Standard Error of Mean (logged)	0.361	95% H-UCL (KM -Log)	0.0169
KM SD (logged)	1.109	95% Critical H Value (KM-Log)	3.212
KM Standard Error of Mean (logged)	0.361		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00556	Mean in Log Scale	-6.077
SD in Original Scale	0.00751	SD in Log Scale	1.441
95% t UCL (Assumes normality)	0.00967	95% H-Stat UCL	0.0384

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0099

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (calcium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	115	Mean	584.5
Maximum	2460	Median	343
SD	677.2	Std. Error of Mean	204.2
Coefficient of Variation	1.159	Skewness	2.504

Normal GOF Test

Shapiro Wilk Test Statistic	0.674	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.792	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.279	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level	

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	954.6	95% Adjusted-CLT UCL (Chen-1995)	1085
		95% Modified-t UCL (Johnson-1978)	980.3

Gamma GOF Test

A-D Test Statistic	0.529	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.745	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	0.26	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.357	k star (bias corrected MLE)	1.048
Theta hat (MLE)	430.7	Theta star (bias corrected MLE)	557.9
nu hat (MLE)	29.86	nu star (bias corrected)	23.05
MLE Mean (bias corrected)	584.5	MLE Sd (bias corrected)	571.1

		Approximate Chi Square Value (0.05)	13.13
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	11.92

Assuming Gamma Distribution

95% Approximate Gamma UCL	1026	95% Adjusted Gamma UCL	1130

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.138	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.745	Mean of logged Data	5.959
Maximum of Logged Data	7.808	SD of logged Data	0.892

Assuming Lognormal Distribution

95% H-UCL	1268	90% Chebyshev (MVUE) UCL	1018
95% Chebyshev (MVUE) UCL	1229	97.5% Chebyshev (MVUE) UCL	1523
99% Chebyshev (MVUE) UCL	2100		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	920.4	95% BCA Bootstrap UCL	1105
95% Standard Bootstrap UCL	908	95% Bootstrap-t UCL	1617
95% Hall's Bootstrap UCL	2314	95% Percentile Bootstrap UCL	947.2
90% Chebyshev(Mean, Sd) UCL	1197	95% Chebyshev(Mean, Sd) UCL	1475
97.5% Chebyshev(Mean, Sd) UCL	1860	99% Chebyshev(Mean, Sd) UCL	2616

Suggested UCL to Use

95% Student's-t UCL	954.6		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cesium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	4

	A–E	F	G–K	L
625	Number of Distinct Detects	7	Number of Distinct Non-Detects	1
626	Minimum Detect	0.0042	Minimum Non-Detect	0.001
627	Maximum Detect	0.0443	Maximum Non-Detect	0.001
628	Variance Detects	1.7021E-4	Percent Non-Detects	36.36%
629	Mean Detects	0.0179	SD Detects	0.013
630	Median Detects	0.0136	CV Detects	0.728
631	Skewness Detects	1.632	Kurtosis Detects	3.033
632	Mean of Logged Detects	-4.234	SD of Logged Detects	0.721
633				
634	**Normal GOF Test on Detects Only**			
635	Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk GOF Test**	
636	1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	
637	Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**	
638	1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level	
639	**Detected Data appear Normal at 1% Significance Level**			
640	**Note GOF tests may be unreliable for small sample sizes**			
641				
642	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
643	KM Mean	0.0118	KM Standard Error of Mean	0.00411
644	90KM SD	0.0126	95% KM (BCA) UCL	0.0192
645	95% KM (t) UCL	0.0192	95% KM (Percentile Bootstrap) UCL	0.0185
646	95% KM (z) UCL	0.0185	95% KM Bootstrap t UCL	0.0231
647	90% KM Chebyshev UCL	0.0241	95% KM Chebyshev UCL	0.0297
648	97.5% KM Chebyshev UCL	0.0374	99% KM Chebyshev UCL	0.0527
649				
650	**Gamma GOF Tests on Detected Observations Only**			
651	A-D Test Statistic	0.409	**Anderson-Darling GOF Test**	
652	5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level	
653	K-S Test Statistic	0.254	**Kolmogorov-Smirnov GOF**	
654	5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level	
655	**Detected data appear Gamma Distributed at 5% Significance Level**			
656	**Note GOF tests may be unreliable for small sample sizes**			
657				
658	**Gamma Statistics on Detected Data Only**			
659	k hat (MLE)	2.503	k star (bias corrected MLE)	1.525
660	Theta hat (MLE)	0.00716	Theta star (bias corrected MLE)	0.0118
661	nu hat (MLE)	35.04	nu star (bias corrected)	21.36
662	Mean (detects)	0.0179		
663				
664	**Gamma ROS Statistics using Imputed Non-Detects**			
665	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
666	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
667	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
668	This is especially true when the sample size is small.			
669	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
670	Minimum	0.0042	Mean	0.015
671	Maximum	0.0443	Median	0.0121
672	SD	0.0109	CV	0.722
673	k hat (MLE)	3.056	k star (bias corrected MLE)	2.283
674	Theta hat (MLE)	0.00492	Theta star (bias corrected MLE)	0.00659
675	nu hat (MLE)	67.23	nu star (bias corrected)	50.23
676	Adjusted Level of Significance (β)	0.0278		

	A	B	C	D	E	F	G	H	I	J	K	L
677	Approximate Chi Square Value (50.23, α)					34.95	Adjusted Chi Square Value (50.23, β)					32.89
678	95% Gamma Approximate UCL					0.0216	95% Gamma Adjusted UCL					0.023
679												
680	Estimates of Gamma Parameters using KM Estimates											
681	Mean (KM)					0.0118	SD (KM)					0.0126
682	Variance (KM)					1.5916E-4	SE of Mean (KM)					0.00411
683	k hat (KM)					0.871	k star (KM)					0.694
684	nu hat (KM)					19.16	nu star (KM)					15.27
685	theta hat (KM)					0.0135	theta star (KM)					0.017
686	80% gamma percentile (KM)					0.0194	90% gamma percentile (KM)					0.0296
687	95% gamma percentile (KM)					0.0402	99% gamma percentile (KM)					0.0655
688												
689	Gamma Kaplan-Meier (KM) Statistics											
690	Approximate Chi Square Value (15.27, α)					7.447	Adjusted Chi Square Value (15.27, β)					6.576
691	95% KM Approximate Gamma UCL					0.0241	95% KM Adjusted Gamma UCL					0.0273
692												
693	Lognormal GOF Test on Detected Observations Only											
694	Shapiro Wilk Test Statistic					0.933	Shapiro Wilk GOF Test					
695	10% Shapiro Wilk Critical Value					0.838	Detected Data appear Lognormal at 10% Significance Level					
696	Lilliefors Test Statistic					0.258	Lilliefors GOF Test					
697	10% Lilliefors Critical Value					0.28	Detected Data appear Lognormal at 10% Significance Level					
698	Detected Data appear Lognormal at 10% Significance Level											
699	Note GOF tests may be unreliable for small sample sizes											
700												
701	Lognormal ROS Statistics Using Imputed Non-Detects											
702	Mean in Original Scale					0.0123	Mean in Log Scale					-4.907
703	SD in Original Scale					0.0128	SD in Log Scale					1.119
704	95% t UCL (assumes normality of ROS data)					0.0193	95% Percentile Bootstrap UCL					0.0188
705	95% BCA Bootstrap UCL					0.0211	95% Bootstrap t UCL					0.0237
706	95% H-UCL (Log ROS)					0.0434						
707												
708	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
709	KM Mean (logged)					-5.206	KM Geo Mean					0.00548
710	KM SD (logged)					1.392	95% Critical H Value (KM-Log)					3.799
711	KM Standard Error of Mean (logged)					0.453	95% H-UCL (KM -Log)					0.0769
712	KM SD (logged)					1.392	95% Critical H Value (KM-Log)					3.799
713	KM Standard Error of Mean (logged)					0.453						
714												
715	DL/2 Statistics											
716	DL/2 Normal						DL/2 Log-Transformed					
717	Mean in Original Scale					0.0116	Mean in Log Scale					-5.458
718	SD in Original Scale					0.0134	SD in Log Scale					1.788
719	95% t UCL (Assumes normality)					0.0189	95% H-Stat UCL					0.296
720	DL/2 is not a recommended method, provided for comparisons and historical reasons											
721												
722	Nonparametric Distribution Free UCL Statistics											
723	Detected Data appear Normal Distributed at 1% Significance Level											
724												
725	Suggested UCL to Use											
726	95% KM (t) UCL					0.0192						
727												
728	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (chromium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	8
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.019	Minimum Non-Detect	0.01
Maximum Detect	0.06	Maximum Non-Detect	0.01
Variance Detects	4.9033E-4	Percent Non-Detects	72.73%
Mean Detects	0.0347	SD Detects	0.0221
Median Detects	0.025	CV Detects	0.639
Skewness Detects	1.59	Kurtosis Detects	N/A
Mean of Logged Detects	-3.489	SD of Logged Detects	0.601

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	0.857	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.335	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.0167	KM Standard Error of Mean	0.00535
90KM SD	0.0145	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0264	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0255	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0328	95% KM Chebyshev UCL	0.04
97.5% KM Chebyshev UCL	0.0501	99% KM Chebyshev UCL	0.07

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.394	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.344	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.434	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.11	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00843	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	24.66	nu star (bias corrected)	N/A
Mean (detects)	0.0347		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.0167
Maximum	0.06	Median	0.01
SD	0.0152	CV	0.908
k hat (MLE)	2.536	k star (bias corrected MLE)	1.905
Theta hat (MLE)	0.0066	Theta star (bias corrected MLE)	0.00878
nu hat (MLE)	55.79	nu star (bias corrected)	41.91
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (41.91, α)	28.07	Adjusted Chi Square Value (41.91, β)	26.24
95% Gamma Approximate UCL	0.025	95% Gamma Adjusted UCL	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0167	SD (KM)	0.0145
Variance (KM)	2.0983E-4	SE of Mean (KM)	0.00535
k hat (KM)	1.333	k star (KM)	1.03
nu hat (KM)	29.34	nu star (KM)	22.67
theta hat (KM)	0.0125	theta star (KM)	0.0162
80% gamma percentile (KM)	0.0269	90% gamma percentile (KM)	0.0382
95% gamma percentile (KM)	0.0496	99% gamma percentile (KM)	0.0759
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (22.67, α)	12.84	Adjusted Chi Square Value (22.67, β)	11.65
95% KM Approximate Gamma UCL	0.0295	95% KM Adjusted Gamma UCL	0.0325
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0116	Mean in Log Scale	-5.478
SD in Original Scale	0.0179	SD in Log Scale	1.578
95% t UCL (assumes normality of ROS data)	0.0214	95% Percentile Bootstrap UCL	0.0211
95% BCA Bootstrap UCL	0.0253	95% Bootstrap t UCL	0.0347
95% H-UCL (Log ROS)	0.118		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.301	KM Geo Mean	0.0136
KM SD (logged)	0.559	95% Critical H Value (KM-Log)	2.256
KM Standard Error of Mean (logged)	0.207	95% H-UCL (KM -Log)	0.0236
KM SD (logged)	0.559	95% Critical H Value (KM-Log)	2.256
KM Standard Error of Mean (logged)	0.207		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0131	Mean in Log Scale	-4.805

SD in Original Scale	0.017	SD in Log Scale	0.887
95% t UCL (Assumes normality)	0.0224	95% H-Stat UCL	0.0265

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0264		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cobalt)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.0056	Minimum Non-Detect	0.004
Maximum Detect	0.0186	Maximum Non-Detect	0.004
Variance Detects	8.4500E-5	Percent Non-Detects	81.82%
Mean Detects	0.0121	SD Detects	0.00919
Median Detects	0.0121	CV Detects	0.76
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-4.585	SD of Logged Detects	0.849

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	0.00547	KM Standard Error of Mean	0.00178
90KM SD	0.00418	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0087	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0084	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0108	95% KM Chebyshev UCL	0.0132
97.5% KM Chebyshev UCL	0.0166	99% KM Chebyshev UCL	0.0232

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.094	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00391	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	12.37	nu star (bias corrected)	N/A
Mean (detects)	0.0121		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00547	SD (KM)	0.00418
Variance (KM)	1.7442E-5	SE of Mean (KM)	0.00178
k hat (KM)	1.717	k star (KM)	1.309
nu hat (KM)	37.78	nu star (KM)	28.81
theta hat (KM)	0.00319	theta star (KM)	0.00418
80% gamma percentile (KM)	0.00859	90% gamma percentile (KM)	0.0118
95% gamma percentile (KM)	0.0149	99% gamma percentile (KM)	0.0221

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (28.81, α)	17.56	Adjusted Chi Square Value (28.81, β)	16.14
95% KM Approximate Gamma UCL	0.00898	95% KM Adjusted Gamma UCL	0.00977

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	0.00238	Mean in Log Scale	-8.821
SD in Original Scale	0.00562	SD in Log Scale	2.817
95% t UCL (assumes normality of ROS data)	0.00546	95% Percentile Bootstrap UCL	0.0055
95% BCA Bootstrap UCL	0.00743	95% Bootstrap t UCL	0.0404
95% H-UCL (Log ROS)	4.191		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.351	KM Geo Mean	0.00474
KM SD (logged)	0.443	95% Critical H Value (KM-Log)	2.104
KM Standard Error of Mean (logged)	0.189	95% H-UCL (KM -Log)	0.00702
KM SD (logged)	0.443	95% Critical H Value (KM-Log)	2.104
KM Standard Error of Mean (logged)	0.189		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00384	Mean in Log Scale	-5.918
SD in Original Scale	0.00501	SD in Log Scale	0.712
95% t UCL (Assumes normality)	0.00658	95% H-Stat UCL	0.00606

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

Suggested UCL to Use

95% KM (t) UCL	0.0087

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (copper)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.39	Mean	0.842
Maximum	1.5	Median	0.712
SD	0.39	Std. Error of Mean	0.118
Coefficient of Variation	0.464	Skewness	0.667
Normal GOF Test			
Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.055	95% Adjusted-CLT UCL (Chen-1995)	1.061
		95% Modified-t UCL (Johnson-1978)	1.059
Gamma GOF Test			
A-D Test Statistic	0.445	**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	0.209	**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)	5.351	k star (bias corrected MLE)	3.952
Theta hat (MLE)	0.157	Theta star (bias corrected MLE)	0.213
nu hat (MLE)	117.7	nu star (bias corrected)	86.95
MLE Mean (bias corrected)	0.842	MLE Sd (bias corrected)	0.424
		Approximate Chi Square Value (0.05)	66.45
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	63.54
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.102	95% Adjusted Gamma UCL	1.152
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.19	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.942	Mean of logged Data	-0.268
Maximum of Logged Data	0.405	SD of logged Data	0.46
Assuming Lognormal Distribution			
95% H-UCL	1.157	90% Chebyshev (MVUE) UCL	1.197
95% Chebyshev (MVUE) UCL	1.358	97.5% Chebyshev (MVUE) UCL	1.582
99% Chebyshev (MVUE) UCL	2.022		

	A-E	F	G-K	L
989				
990	Nonparametric Distribution Free UCL Statistics			
991	Data appear to follow a Discernible Distribution			
992				
993	Nonparametric Distribution Free UCLs			
994	95% CLT UCL	1.036	95% BCA Bootstrap UCL	1.036
995	95% Standard Bootstrap UCL	1.025	95% Bootstrap-t UCL	1.091
996	95% Hall's Bootstrap UCL	1.056	95% Percentile Bootstrap UCL	1.026
997	90% Chebyshev(Mean, Sd) UCL	1.195	95% Chebyshev(Mean, Sd) UCL	1.355
998	97.5% Chebyshev(Mean, Sd) UCL	1.577	99% Chebyshev(Mean, Sd) UCL	2.013
999				
1000	Suggested UCL to Use			
1001	95% Student's-t UCL	1.055		
1002				
1003	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1004	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1005	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1006				
1007				
1008	Result (iron)			
1009				
1010	General Statistics			
1011	Total Number of Observations	11	Number of Distinct Observations	11
1012			Number of Missing Observations	0
1013	Minimum	1.42	Mean	5.805
1014	Maximum	30.3	Median	3.41
1015	SD	8.219	Std. Error of Mean	2.478
1016	Coefficient of Variation	1.416	Skewness	3.178
1017				
1018	Normal GOF Test			
1019	Shapiro Wilk Test Statistic	0.49	Shapiro Wilk GOF Test	
1020	1% Shapiro Wilk Critical Value	0.792	Data Not Normal at 1% Significance Level	
1021	Lilliefors Test Statistic	0.425	Lilliefors GOF Test	
1022	1% Lilliefors Critical Value	0.291	Data Not Normal at 1% Significance Level	
1023	Data Not Normal at 1% Significance Level			
1024				
1025	Assuming Normal Distribution			
1026	95% Normal UCL		95% UCLs (Adjusted for Skewness)	
1027	95% Student's-t UCL	10.3	95% Adjusted-CLT UCL (Chen-1995)	12.42
1028			95% Modified-t UCL (Johnson-1978)	10.69
1029				
1030	Gamma GOF Test			
1031	A-D Test Statistic	1.343	Anderson-Darling Gamma GOF Test	
1032	5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level	
1033	K-S Test Statistic	0.32	Kolmogorov-Smirnov Gamma GOF Test	
1034	5% K-S Critical Value	0.261	Data Not Gamma Distributed at 5% Significance Level	
1035	Data Not Gamma Distributed at 5% Significance Level			
1036				
1037	Gamma Statistics			
1038	k hat (MLE)	1.332	k star (bias corrected MLE)	1.029
1039	Theta hat (MLE)	4.36	Theta star (bias corrected MLE)	5.642
1040	nu hat (MLE)	29.29	nu star (bias corrected)	22.64

MLE Mean (bias corrected)	5.805	MLE Sd (bias corrected)	5.723
		Approximate Chi Square Value (0.05)	12.82
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	11.63
Assuming Gamma Distribution			
95% Approximate Gamma UCL	10.25	95% Adjusted Gamma UCL	11.3
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.835	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.236	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.351	Mean of logged Data	1.338
Maximum of Logged Data	3.411	SD of logged Data	0.804
Assuming Lognormal Distribution			
95% H-UCL	10.31	90% Chebyshev (MVUE) UCL	8.944
95% Chebyshev (MVUE) UCL	10.69	97.5% Chebyshev (MVUE) UCL	13.12
99% Chebyshev (MVUE) UCL	17.89		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9.881	95% BCA Bootstrap UCL	13.01
95% Standard Bootstrap UCL	9.759	95% Bootstrap-t UCL	27.11
95% Hall's Bootstrap UCL	28.76	95% Percentile Bootstrap UCL	10.63
90% Chebyshev(Mean, Sd) UCL	13.24	95% Chebyshev(Mean, Sd) UCL	16.61
97.5% Chebyshev(Mean, Sd) UCL	21.28	99% Chebyshev(Mean, Sd) UCL	30.46
Suggested UCL to Use			
95% Student's-t UCL	10.3		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (lead)			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	8
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.005	Minimum Non-Detect	0.004

	A–E	F	G–K	L
1093	Maximum Detect	0.0113	Maximum Non-Detect	0.004
1094	Variance Detects	1.0623E-5	Percent Non-Detects	72.73%
1095	Mean Detects	0.00767	SD Detects	0.00326
1096	Median Detects	0.0067	CV Detects	0.425
1097	Skewness Detects	1.217	Kurtosis Detects	N/A
1098	Mean of Logged Detects	-4.929	SD of Logged Detects	0.413
1099				
1100	Warning: Data set has only 3 Detected Values.			
1101	This is not enough to compute meaningful or reliable statistics and estimates.			
1102				
1103				
1104	**Normal GOF Test on Detects Only**			
1105	Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
1106	1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level	
1107	Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**	
1108	1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level	
1109	Detected Data appear Normal at 1% Significance Level			
1110	Note GOF tests may be unreliable for small sample sizes			
1111				
1112	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1113	KM Mean	0.005	KM Standard Error of Mean	7.9185E-4
1114	90KM SD	0.00214	95% KM (BCA) UCL	N/A
1115	95% KM (t) UCL	0.00644	95% KM (Percentile Bootstrap) UCL	N/A
1116	95% KM (z) UCL	0.0063	95% KM Bootstrap t UCL	N/A
1117	90% KM Chebyshev UCL	0.00738	95% KM Chebyshev UCL	0.00845
1118	97.5% KM Chebyshev UCL	0.00995	99% KM Chebyshev UCL	0.0129
1119				
1120	**Gamma GOF Tests on Detected Observations Only**			
1121	A-D Test Statistic	0.299	**Anderson-Darling GOF Test**	
1122	5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level	
1123	K-S Test Statistic	0.275	**Kolmogorov-Smirnov GOF**	
1124	5% K-S Critical Value	0.433	Detected data appear Gamma Distributed at 5% Significance Level	
1125	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1126				
1127	**Gamma Statistics on Detected Data Only**			
1128	k hat (MLE)	8.769	k star (bias corrected MLE)	N/A
1129	Theta hat (MLE)	8.7426E-4	Theta star (bias corrected MLE)	N/A
1130	nu hat (MLE)	52.62	nu star (bias corrected)	N/A
1131	Mean (detects)	0.00767		
1132				
1133	**Gamma ROS Statistics using Imputed Non-Detects**			
1134	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1135	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1136	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1137	This is especially true when the sample size is small.			
1138	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1139	Minimum	0.005	Mean	0.00936
1140	Maximum	0.0113	Median	0.01
1141	SD	0.00182	CV	0.194
1142	k hat (MLE)	22.33	k star (bias corrected MLE)	16.3
1143	Theta hat (MLE)	4.1933E-4	Theta star (bias corrected MLE)	5.7443E-4
1144	nu hat (MLE)	491.3	nu star (bias corrected)	358.6

	A–E	F	G–K	L
1145	Adjusted Level of Significance (β)	0.0278		
1146	Approximate Chi Square Value (358.62, α)	315.7	Adjusted Chi Square Value (358.62, β)	309.2
1147	95% Gamma Approximate UCL	0.0106	95% Gamma Adjusted UCL	N/A
1148				
1149	**Estimates of Gamma Parameters using KM Estimates**			
1150	Mean (KM)	0.005	SD (KM)	0.00214
1151	Variance (KM)	4.5982E-6	SE of Mean (KM)	7.9185E-4
1152	k hat (KM)	5.437	k star (KM)	4.015
1153	nu hat (KM)	119.6	nu star (KM)	88.32
1154	theta hat (KM)	9.1964E-4	theta star (KM)	0.00125
1155	80% gamma percentile (KM)	0.00689	90% gamma percentile (KM)	0.00834
1156	95% gamma percentile (KM)	0.00968	99% gamma percentile (KM)	0.0125
1157				
1158	**Gamma Kaplan-Meier (KM) Statistics**			
1159	Approximate Chi Square Value (88.32, α)	67.66	Adjusted Chi Square Value (88.32, β)	64.71
1160	95% KM Approximate Gamma UCL	0.00653	95% KM Adjusted Gamma UCL	0.00682
1161				
1162	**Lognormal GOF Test on Detected Observations Only**			
1163	Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk GOF Test**	
1164	10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
1165	Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**	
1166	10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	
1167	**Detected Data appear Lognormal at 10% Significance Level**			
1168	**Note GOF tests may be unreliable for small sample sizes**			
1169				
1170	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1171	Mean in Original Scale	0.00306	Mean in Log Scale	-6.32
1172	SD in Original Scale	0.00338	SD in Log Scale	1.102
1173	95% t UCL (assumes normality of ROS data)	0.0049	95% Percentile Bootstrap UCL	0.00475
1174	95% BCA Bootstrap UCL	0.00533	95% Bootstrap t UCL	0.00634
1175	95% H-UCL (Log ROS)	0.0101		
1176				
1177	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1178	KM Mean (logged)	-5.36	KM Geo Mean	0.0047
1179	KM SD (logged)	0.317	95% Critical H Value (KM-Log)	1.966
1180	KM Standard Error of Mean (logged)	0.117	95% H-UCL (KM -Log)	0.00602
1181	KM SD (logged)	0.317	95% Critical H Value (KM-Log)	1.966
1182	KM Standard Error of Mean (logged)	0.117		
1183				
1184	**DL/2 Statistics**			
1185	**DL/2 Normal**		**DL/2 Log-Transformed**	
1186	Mean in Original Scale	0.00355	Mean in Log Scale	-5.864
1187	SD in Original Scale	0.00302	SD in Log Scale	0.628
1188	95% t UCL (Assumes normality)	0.0052	95% H-Stat UCL	0.00552
1189	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1190				
1191	**Nonparametric Distribution Free UCL Statistics**			
1192	**Detected Data appear Normal Distributed at 1% Significance Level**			
1193				
1194	**Suggested UCL to Use**			
1195	95% KM (t) UCL	0.00644		
1196				

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lithium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (lithium) was not processed!

Result (magnesium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	67.9	Mean	214.5
Maximum	492	Median	161
SD	153.6	Std. Error of Mean	46.32
Coefficient of Variation	0.716	Skewness	0.976

Normal GOF Test

Shapiro Wilk Test Statistic	0.831	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	298.5	95% Adjusted-CLT UCL (Chen-1995)	305.3
		95% Modified-t UCL (Johnson-1978)	300.8

Gamma GOF Test

A-D Test Statistic	0.494	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.194	**Kolmogorov-Smirnov Gamma GOF Test**
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

k hat (MLE)	2.361	k star (bias corrected MLE)	1.778
Theta hat (MLE)	90.85	Theta star (bias corrected MLE)	120.7
nu hat (MLE)	51.95	nu star (bias corrected)	39.12

MLE Mean (bias corrected)	214.5	MLE Sd (bias corrected)	160.9
		Approximate Chi Square Value (0.05)	25.79
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	24.04

Assuming Gamma Distribution

95% Approximate Gamma UCL	325.4	95% Adjusted Gamma UCL	349.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.152	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.218	Mean of logged Data	5.142
Maximum of Logged Data	6.198	SD of logged Data	0.704

Assuming Lognormal Distribution

95% H-UCL	379.7	90% Chebyshev (MVUE) UCL	354.2
95% Chebyshev (MVUE) UCL	418	97.5% Chebyshev (MVUE) UCL	506.5
99% Chebyshev (MVUE) UCL	680.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	290.7	95% BCA Bootstrap UCL	299.2
95% Standard Bootstrap UCL	287	95% Bootstrap-t UCL	319
95% Hall's Bootstrap UCL	286.3	95% Percentile Bootstrap UCL	292.2
90% Chebyshev(Mean, Sd) UCL	353.5	95% Chebyshev(Mean, Sd) UCL	416.4
97.5% Chebyshev(Mean, Sd) UCL	503.8	99% Chebyshev(Mean, Sd) UCL	675.4

Suggested UCL to Use

95% Student's-t UCL	298.5		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (manganese)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.631	Mean	20.18
Maximum	75.4	Median	11.4
SD	23.88	Std. Error of Mean	7.2
Coefficient of Variation	1.183	Skewness	1.415

Normal GOF Test

	A	B	C	D	E	F	G	H	I	J	K	L
1301					Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**					
1302					1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level					
1303					Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**					
1304					1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level					
1305	**Data appear Normal at 1% Significance Level**											
1306												
1307	**Assuming Normal Distribution**											
1308	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1309					95% Student's-t UCL	33.23					95% Adjusted-CLT UCL (Chen-1995)	35.31
1310											95% Modified-t UCL (Johnson-1978)	33.75
1311												
1312	**Gamma GOF Test**											
1313					A-D Test Statistic	0.272	**Anderson-Darling Gamma GOF Test**					
1314					5% A-D Critical Value	0.768	Detected data appear Gamma Distributed at 5% Significance Level					
1315					K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**					
1316					5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level					
1317	**Detected data appear Gamma Distributed at 5% Significance Level**											
1318												
1319	**Gamma Statistics**											
1320					k hat (MLE)	0.671					k star (bias corrected MLE)	0.549
1321					Theta hat (MLE)	30.09					Theta star (bias corrected MLE)	36.8
1322					nu hat (MLE)	14.76					nu star (bias corrected)	12.07
1323					MLE Mean (bias corrected)	20.18					MLE Sd (bias corrected)	27.25
1324											Approximate Chi Square Value (0.05)	5.272
1325					Adjusted Level of Significance	0.0278					Adjusted Chi Square Value	4.561
1326												
1327	**Assuming Gamma Distribution**											
1328					95% Approximate Gamma UCL	46.21					95% Adjusted Gamma UCL	53.41
1329												
1330	**Lognormal GOF Test**											
1331					Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**					
1332					10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level					
1333					Lilliefors Test Statistic	0.151	**Lilliefors Lognormal GOF Test**					
1334					10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level					
1335	**Data appear Lognormal at 10% Significance Level**											
1336												
1337	**Lognormal Statistics**											
1338					Minimum of Logged Data	-0.46					Mean of logged Data	2.099
1339					Maximum of Logged Data	4.323					SD of logged Data	1.62
1340												
1341	**Assuming Lognormal Distribution**											
1342					95% H-UCL	274					90% Chebyshev (MVUE) UCL	62.84
1343					95% Chebyshev (MVUE) UCL	80.26					97.5% Chebyshev (MVUE) UCL	104.4
1344					99% Chebyshev (MVUE) UCL	151.9						
1345												
1346	**Nonparametric Distribution Free UCL Statistics**											
1347	**Data appear to follow a Discernible Distribution**											
1348												
1349	**Nonparametric Distribution Free UCLs**											
1350					95% CLT UCL	32.03					95% BCA Bootstrap UCL	35.15
1351					95% Standard Bootstrap UCL	31.55					95% Bootstrap-t UCL	41.4
1352					95% Hall's Bootstrap UCL	36.43					95% Percentile Bootstrap UCL	32.3

90% Chebyshev(Mean, Sd) UCL	41.78	95% Chebyshev(Mean, Sd) UCL	51.57
97.5% Chebyshev(Mean, Sd) UCL	65.15	99% Chebyshev(Mean, Sd) UCL	91.82

Suggested UCL to Use

95% Student's-t UCL	33.23		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

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

Result (mercury)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	3	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Result (mercury) was not processed!

Result (molybdenum)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.0117	Mean	0.147
Maximum	0.632	Median	0.036
SD	0.19	Std. Error of Mean	0.0573
Coefficient of Variation	1.293	Skewness	1.903

Normal GOF Test

Shapiro Wilk Test Statistic	0.717	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.305	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.251	95% Adjusted-CLT UCL (Chen-1995)	0.276
		95% Modified-t UCL (Johnson-1978)	0.256

Gamma GOF Test

A-D Test Statistic	0.796	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.76	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.278	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.264	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.8	k star (bias corrected MLE)	0.642
Theta hat (MLE)	0.184	Theta star (bias corrected MLE)	0.229
nu hat (MLE)	17.59	nu star (bias corrected)	14.13
MLE Mean (bias corrected)	0.147	MLE Sd (bias corrected)	0.183
		Approximate Chi Square Value (0.05)	6.658
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	5.842
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.312	95% Adjusted Gamma UCL	0.355
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.242	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.231	Data Not Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-4.448	Mean of logged Data	-2.66
Maximum of Logged Data	-0.459	SD of logged Data	1.288
Assuming Lognormal Distribution			
95% H-UCL	0.688	90% Chebyshev (MVUE) UCL	0.321
95% Chebyshev (MVUE) UCL	0.402	97.5% Chebyshev (MVUE) UCL	0.514
99% Chebyshev (MVUE) UCL	0.734		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.241	95% BCA Bootstrap UCL	0.276
95% Standard Bootstrap UCL	0.238	95% Bootstrap-t UCL	0.314
95% Hall's Bootstrap UCL	0.314	95% Percentile Bootstrap UCL	0.242
90% Chebyshev(Mean, Sd) UCL	0.319	95% Chebyshev(Mean, Sd) UCL	0.397
97.5% Chebyshev(Mean, Sd) UCL	0.505	99% Chebyshev(Mean, Sd) UCL	0.717
Suggested UCL to Use			
95% H-UCL	0.688		
Recommended UCL exceeds the maximum observation			
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (nickel)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	2
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.052	Minimum Non-Detect	0.04
Maximum Detect	0.167	Maximum Non-Detect	0.04
Variance Detects	0.00153	Percent Non-Detects	18.18%
Mean Detects	0.092	SD Detects	0.0391
Median Detects	0.077	CV Detects	0.425
Skewness Detects	1.041	Kurtosis Detects	0.199
Mean of Logged Detects	-2.459	SD of Logged Detects	0.399

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.0825	KM Standard Error of Mean	0.0124
90KM SD	0.0389	95% KM (BCA) UCL	0.103
95% KM (t) UCL	0.105	95% KM (Percentile Bootstrap) UCL	0.103
95% KM (z) UCL	0.103	95% KM Bootstrap t UCL	0.116
90% KM Chebyshev UCL	0.12	95% KM Chebyshev UCL	0.137
97.5% KM Chebyshev UCL	0.16	99% KM Chebyshev UCL	0.206

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.314	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.184	**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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	6.971	k star (bias corrected MLE)	4.721
Theta hat (MLE)	0.0132	Theta star (bias corrected MLE)	0.0195
nu hat (MLE)	125.5	nu star (bias corrected)	84.98
Mean (detects)	0.092		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0781
Maximum	0.167	Median	0.071
SD	0.0467	CV	0.598
k hat (MLE)	2.309	k star (bias corrected MLE)	1.74
Theta hat (MLE)	0.0338	Theta star (bias corrected MLE)	0.0449
nu hat (MLE)	50.81	nu star (bias corrected)	38.28
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (38.28, α)	25.11	Adjusted Chi Square Value (38.28, β)	23.39
95% Gamma Approximate UCL	0.119	95% Gamma Adjusted UCL	0.128
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0825	SD (KM)	0.0389
Variance (KM)	0.00151	SE of Mean (KM)	0.0124
k hat (KM)	4.506	k star (KM)	3.338
nu hat (KM)	99.14	nu star (KM)	73.43
theta hat (KM)	0.0183	theta star (KM)	0.0247
80% gamma percentile (KM)	0.116	90% gamma percentile (KM)	0.143
95% gamma percentile (KM)	0.168	99% gamma percentile (KM)	0.222
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (73.43, α)	54.7	Adjusted Chi Square Value (73.43, β)	52.07
95% KM Approximate Gamma UCL	0.111	95% KM Adjusted Gamma UCL	0.116
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0811	Mean in Log Scale	-2.638
SD in Original Scale	0.0425	SD in Log Scale	0.537
95% t UCL (assumes normality of ROS data)	0.104	95% Percentile Bootstrap UCL	0.103
95% BCA Bootstrap UCL	0.105	95% Bootstrap t UCL	0.11
95% H-UCL (Log ROS)	0.12		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.597	KM Geo Mean	0.0745
KM SD (logged)	0.449	95% Critical H Value (KM-Log)	2.112
KM Standard Error of Mean (logged)	0.144	95% H-UCL (KM -Log)	0.111
KM SD (logged)	0.449	95% Critical H Value (KM-Log)	2.112
KM Standard Error of Mean (logged)	0.144		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0789	Mean in Log Scale	-2.724
SD in Original Scale	0.0455	SD in Log Scale	0.687
95% t UCL (Assumes normality)	0.104	95% H-Stat UCL	0.141

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.105

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (phosphorus)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	117	Mean	302.2
Maximum	706	Median	236
SD	177.9	Std. Error of Mean	53.63
Coefficient of Variation	0.589	Skewness	1.19

Normal GOF Test

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	399.4	95% Adjusted-CLT UCL (Chen-1995)	411
		95% Modified-t UCL (Johnson-1978)	402.6

Gamma GOF Test

A-D Test Statistic	0.226	**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	0.149	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.257	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.515	k star (bias corrected MLE)	2.617
Theta hat (MLE)	85.96	Theta star (bias corrected MLE)	115.5
nu hat (MLE)	77.34	nu star (bias corrected)	57.58
MLE Mean (bias corrected)	302.2	MLE Sd (bias corrected)	186.8
		Approximate Chi Square Value (0.05)	41.14
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	38.88

Assuming Gamma Distribution

95% Approximate Gamma UCL	423	95% Adjusted Gamma UCL	447.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.114	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.762	Mean of logged Data	5.562
Maximum of Logged Data	6.56	SD of logged Data	0.572

Assuming Lognormal Distribution

95% H-UCL	462.4	90% Chebyshev (MVUE) UCL	461.6
95% Chebyshev (MVUE) UCL	534.1	97.5% Chebyshev (MVUE) UCL	634.7
99% Chebyshev (MVUE) UCL	832.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	390.4	95% BCA Bootstrap UCL	402.6
95% Standard Bootstrap UCL	385.8	95% Bootstrap-t UCL	431.5
95% Hall's Bootstrap UCL	435.2	95% Percentile Bootstrap UCL	394
90% Chebyshev(Mean, Sd) UCL	463.1	95% Chebyshev(Mean, Sd) UCL	535.9
97.5% Chebyshev(Mean, Sd) UCL	637.1	99% Chebyshev(Mean, Sd) UCL	835.8

Suggested UCL to Use

95% Student's-t UCL	399.4		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (potassium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	826	Mean	2019
Maximum	4500	Median	1180
SD	1426	Std. Error of Mean	429.9
Coefficient of Variation	0.706	Skewness	0.941

Normal GOF Test

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

	A–E	F	G–K	L
1665	Assuming Normal Distribution			
1666	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1667	95% Student's-t UCL	2798	95% Adjusted-CLT UCL (Chen-1995)	2856
1668			95% Modified-t UCL (Johnson-1978)	2818
1669				
1670	Gamma GOF Test			
1671	A-D Test Statistic	0.88	**Anderson-Darling Gamma GOF Test**	
1672	5% A-D Critical Value	0.736	Data Not Gamma Distributed at 5% Significance Level	
1673	K-S Test Statistic	0.257	**Kolmogorov-Smirnov Gamma GOF Test**	
1674	5% K-S Critical Value	0.258	Detected data appear Gamma Distributed at 5% Significance Level	
1675	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**			
1676				
1677	Gamma Statistics			
1678	k hat (MLE)	2.49	k star (bias corrected MLE)	1.872
1679	Theta hat (MLE)	810.8	Theta star (bias corrected MLE)	1079
1680	nu hat (MLE)	54.78	nu star (bias corrected)	41.18
1681	MLE Mean (bias corrected)	2019	MLE Sd (bias corrected)	1476
1682			Approximate Chi Square Value (0.05)	27.47
1683	Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	25.66
1684				
1685	Assuming Gamma Distribution			
1686	95% Approximate Gamma UCL	3026	95% Adjusted Gamma UCL	3240
1687				
1688	Lognormal GOF Test			
1689	Shapiro Wilk Test Statistic	0.835	**Shapiro Wilk Lognormal GOF Test**	
1690	10% Shapiro Wilk Critical Value	0.876	Data Not Lognormal at 10% Significance Level	
1691	Lilliefors Test Statistic	0.237	**Lilliefors Lognormal GOF Test**	
1692	10% Lilliefors Critical Value	0.231	Data Not Lognormal at 10% Significance Level	
1693	**Data Not Lognormal at 10% Significance Level**			
1694				
1695	Lognormal Statistics			
1696	Minimum of Logged Data	6.717	Mean of logged Data	7.396
1697	Maximum of Logged Data	8.412	SD of logged Data	0.672
1698				
1699	Assuming Lognormal Distribution			
1700	95% H-UCL	3420	90% Chebyshev (MVUE) UCL	3250
1701	95% Chebyshev (MVUE) UCL	3819	97.5% Chebyshev (MVUE) UCL	4608
1702	99% Chebyshev (MVUE) UCL	6158		
1703				
1704	Nonparametric Distribution Free UCL Statistics			
1705	Data appear to follow a Discernible Distribution			
1706				
1707	Nonparametric Distribution Free UCLs			
1708	95% CLT UCL	2726	95% BCA Bootstrap UCL	2780
1709	95% Standard Bootstrap UCL	2697	95% Bootstrap-t UCL	3054
1710	95% Hall's Bootstrap UCL	2707	95% Percentile Bootstrap UCL	2741
1711	90% Chebyshev(Mean, Sd) UCL	3309	95% Chebyshev(Mean, Sd) UCL	3893
1712	97.5% Chebyshev(Mean, Sd) UCL	4703	99% Chebyshev(Mean, Sd) UCL	6296
1713				
1714	Suggested UCL to Use			
1715	95% Student's-t UCL	2798		
1716				

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

Result (rubidium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	1.71	Mean	3.511
Maximum	7.88	Median	2.97
SD	1.719	Std. Error of Mean	0.518
Coefficient of Variation	0.49	Skewness	1.894

Normal GOF Test

Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.45	95% Adjusted-CLT UCL (Chen-1995)	4.68
		95% Modified-t UCL (Johnson-1978)	4.5

Gamma GOF Test

A-D Test Statistic	0.543	**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	0.256	**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)	5.948	k star (bias corrected MLE)	4.386
Theta hat (MLE)	0.59	Theta star (bias corrected MLE)	0.8
nu hat (MLE)	130.8	nu star (bias corrected)	96.49
MLE Mean (bias corrected)	3.511	MLE Sd (bias corrected)	1.676
		Approximate Chi Square Value (0.05)	74.84
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	71.73

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.527	95% Adjusted Gamma UCL	4.723

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics			
Minimum of Logged Data	0.536	Mean of logged Data	1.169
Maximum of Logged Data	2.064	SD of logged Data	0.417
Assuming Lognormal Distribution			
95% H-UCL	4.616	90% Chebyshev (MVUE) UCL	4.816
95% Chebyshev (MVUE) UCL	5.42	97.5% Chebyshev (MVUE) UCL	6.258
99% Chebyshev (MVUE) UCL	7.905		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	4.364	95% BCA Bootstrap UCL	4.628
95% Standard Bootstrap UCL	4.325	95% Bootstrap-t UCL	5.513
95% Hall's Bootstrap UCL	9.455	95% Percentile Bootstrap UCL	4.4
90% Chebyshev(Mean, Sd) UCL	5.066	95% Chebyshev(Mean, Sd) UCL	5.77
97.5% Chebyshev(Mean, Sd) UCL	6.748	99% Chebyshev(Mean, Sd) UCL	8.669
Suggested UCL to Use			
95% Student's-t UCL	4.45		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (selenium)			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (selenium) was not processed!			
Result (sodium)			
General Statistics			
Total Number of Observations	11	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	4
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	4.4	Minimum Non-Detect	4
Maximum Detect	24.5	Maximum Non-Detect	4
Variance Detects	49.85	Percent Non-Detects	36.36%

Mean Detects	9.843	SD Detects	7.061
Median Detects	8.2	CV Detects	0.717
Skewness Detects	1.847	Kurtosis Detects	3.631
Mean of Logged Detects	2.111	SD of Logged Detects	0.609
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.786	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	7.718	KM Standard Error of Mean	1.929
90KM SD	5.924	95% KM (BCA) UCL	11.03
95% KM (t) UCL	11.21	95% KM (Percentile Bootstrap) UCL	10.99
95% KM (z) UCL	10.89	95% KM Bootstrap t UCL	15.32
90% KM Chebyshev UCL	13.51	95% KM Chebyshev UCL	16.13
97.5% KM Chebyshev UCL	19.77	99% KM Chebyshev UCL	26.91
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.428	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.712	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.216	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics on Detected Data Only			
k hat (MLE)	3.007	k star (bias corrected MLE)	1.813
Theta hat (MLE)	3.273	Theta star (bias corrected MLE)	5.428
nu hat (MLE)	42.1	nu star (bias corrected)	25.39
Mean (detects)	9.843		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	6.267
Maximum	24.5	Median	5
SD	7.384	CV	1.178
k hat (MLE)	0.316	k star (bias corrected MLE)	0.29
Theta hat (MLE)	19.85	Theta star (bias corrected MLE)	21.6
nu hat (MLE)	6.945	nu star (bias corrected)	6.384
Adjusted Level of Significance (β)	0.0278		
Approximate Chi Square Value (6.38, α)	1.839	Adjusted Chi Square Value (6.38, β)	1.47
95% Gamma Approximate UCL	21.75	95% Gamma Adjusted UCL	27.22
Estimates of Gamma Parameters using KM Estimates			

Mean (KM)	7.718	SD (KM)	5.924
Variance (KM)	35.09	SE of Mean (KM)	1.929
k hat (KM)	1.698	k star (KM)	1.295
nu hat (KM)	37.35	nu star (KM)	28.49
theta hat (KM)	4.547	theta star (KM)	5.959
80% gamma percentile (KM)	12.13	90% gamma percentile (KM)	16.67
95% gamma percentile (KM)	21.13	99% gamma percentile (KM)	31.29

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.49, α)	17.31	Adjusted Chi Square Value (28.49, β)	15.91
95% KM Approximate Gamma UCL	12.7	95% KM Adjusted Gamma UCL	13.83

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.882	Mean in Log Scale	1.513
SD in Original Scale	6.85	SD in Log Scale	0.983
95% t UCL (assumes normality of ROS data)	10.63	95% Percentile Bootstrap UCL	10.31
95% BCA Bootstrap UCL	11.53	95% Bootstrap t UCL	13.41
95% H-UCL (Log ROS)	18.51		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.848	KM Geo Mean	6.345
KM SD (logged)	0.569	95% Critical H Value (KM-Log)	2.269
KM Standard Error of Mean (logged)	0.185	95% H-UCL (KM -Log)	11.22
KM SD (logged)	0.569	95% Critical H Value (KM-Log)	2.269
KM Standard Error of Mean (logged)	0.185		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.991	Mean in Log Scale	1.596
SD in Original Scale	6.75	SD in Log Scale	0.857
95% t UCL (Assumes normality)	10.68	95% H-Stat UCL	14.92

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	11.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (strontium)

General Statistics			
Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.163	Mean	0.727
Maximum	3.96	Median	0.378
SD	1.108	Std. Error of Mean	0.334
Coefficient of Variation	1.524	Skewness	2.964
Normal GOF Test			
Shapiro Wilk Test Statistic	0.549	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.792	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.333	95% Adjusted-CLT UCL (Chen-1995)	1.596
		95% Modified-t UCL (Johnson-1978)	1.382
Gamma GOF Test			
A-D Test Statistic	1.016	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.276	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.262	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.018	k star (bias corrected MLE)	0.801
Theta hat (MLE)	0.714	Theta star (bias corrected MLE)	0.908
nu hat (MLE)	22.4	nu star (bias corrected)	17.62
MLE Mean (bias corrected)	0.727	MLE Sd (bias corrected)	0.812
		Approximate Chi Square Value (0.05)	9.12
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	8.14
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.405	95% Adjusted Gamma UCL	1.574
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.201	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-1.814	Mean of logged Data	-0.884
Maximum of Logged Data	1.376	SD of logged Data	0.973
Assuming Lognormal Distribution			

95% H-UCL	1.64	90% Chebyshev (MVUE) UCL	1.208
95% Chebyshev (MVUE) UCL	1.472	97.5% Chebyshev (MVUE) UCL	1.838
99% Chebyshev (MVUE) UCL	2.558		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.277	95% BCA Bootstrap UCL	1.664
95% Standard Bootstrap UCL	1.258	95% Bootstrap-t UCL	3.287
95% Hall's Bootstrap UCL	3.24	95% Percentile Bootstrap UCL	1.354
90% Chebyshev(Mean, Sd) UCL	1.729	95% Chebyshev(Mean, Sd) UCL	2.183
97.5% Chebyshev(Mean, Sd) UCL	2.813	99% Chebyshev(Mean, Sd) UCL	4.051

Suggested UCL to Use

95% H-UCL	1.64		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tellurium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (tellurium) was not processed!

Result (thallium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	11
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 Result (thallium) was not processed!

Result (tin)

General Statistics			
Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.531	Mean	1.562
Maximum	8.76	Median	0.821
SD	2.401	Std. Error of Mean	0.724
Coefficient of Variation	1.537	Skewness	3.247
Normal GOF Test			
Shapiro Wilk Test Statistic	0.442	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.792	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.471	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.291	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.874	95% Adjusted-CLT UCL (Chen-1995)	3.51
		95% Modified-t UCL (Johnson-1978)	2.992
Gamma GOF Test			
A-D Test Statistic	1.861	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.403	**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)	1.255	k star (bias corrected MLE)	0.973
Theta hat (MLE)	1.245	Theta star (bias corrected MLE)	1.605
nu hat (MLE)	27.61	nu star (bias corrected)	21.41
MLE Mean (bias corrected)	1.562	MLE Sd (bias corrected)	1.583
		Approximate Chi Square Value (0.05)	11.9
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	10.76
Assuming Gamma Distribution			
95% Approximate Gamma UCL	2.811	95% Adjusted Gamma UCL	3.109
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.71	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.32	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.231	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.633	Mean of logged Data	-0.00256

Maximum of Logged Data	2.17	SD of logged Data	0.786

Assuming Lognormal Distribution

95% H-UCL	2.597	90% Chebyshev (MVUE) UCL	2.287
95% Chebyshev (MVUE) UCL	2.728	97.5% Chebyshev (MVUE) UCL	3.34
99% Chebyshev (MVUE) UCL	4.543		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.753	95% BCA Bootstrap UCL	3.706
95% Standard Bootstrap UCL	2.708	95% Bootstrap-t UCL	9.684
95% Hall's Bootstrap UCL	8.741	95% Percentile Bootstrap UCL	2.993
90% Chebyshev(Mean, Sd) UCL	3.734	95% Chebyshev(Mean, Sd) UCL	4.718
97.5% Chebyshev(Mean, Sd) UCL	6.083	99% Chebyshev(Mean, Sd) UCL	8.765

Suggested UCL to Use

95% Student's-t UCL	2.874		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (uranium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Result (uranium) was not processed!

Result (vanadium)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	10
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Result (vanadium) was not processed!

Result (zinc)

General Statistics

Total Number of Observations	11	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	1.2	Mean	2.006
Maximum	3.91	Median	1.74
SD	0.842	Std. Error of Mean	0.254
Coefficient of Variation	0.42	Skewness	1.432

Normal GOF Test

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.467	95% Adjusted-CLT UCL (Chen-1995)	2.541
		95% Modified-t UCL (Johnson-1978)	2.485

Gamma GOF Test

A-D Test Statistic	0.486	**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	0.227	**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)	7.532	k star (bias corrected MLE)	5.538
Theta hat (MLE)	0.266	Theta star (bias corrected MLE)	0.362
nu hat (MLE)	165.7	nu star (bias corrected)	121.8
MLE Mean (bias corrected)	2.006	MLE Sd (bias corrected)	0.853
		Approximate Chi Square Value (0.05)	97.35
Adjusted Level of Significance	0.0278	Adjusted Chi Square Value	93.79

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.511	95% Adjusted Gamma UCL	2.607

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.876	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.231	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

	A	B	C	D	E	F	G	H	I	J	K	L
2185					Minimum of Logged Data	0.182					Mean of logged Data	0.628
2186					Maximum of Logged Data	1.364					SD of logged Data	0.372
2187												
2188						Assuming Lognormal Distribution						
2189					95% H-UCL	2.549					90% Chebyshev (MVUE) UCL	2.676
2190					95% Chebyshev (MVUE) UCL	2.984					97.5% Chebyshev (MVUE) UCL	3.411
2191					99% Chebyshev (MVUE) UCL	4.251						
2192												
2193						Nonparametric Distribution Free UCL Statistics						
2194						Data appear to follow a Discernible Distribution						
2195												
2196						Nonparametric Distribution Free UCLs						
2197					95% CLT UCL	2.424					95% BCA Bootstrap UCL	2.515
2198					95% Standard Bootstrap UCL	2.406					95% Bootstrap-t UCL	2.788
2199					95% Hall's Bootstrap UCL	3.324					95% Percentile Bootstrap UCL	2.434
2200					90% Chebyshev(Mean, Sd) UCL	2.768					95% Chebyshev(Mean, Sd) UCL	3.113
2201					97.5% Chebyshev(Mean, Sd) UCL	3.592					99% Chebyshev(Mean, Sd) UCL	4.533
2202												
2203						Suggested UCL to Use						
2204					95% Student's-t UCL	2.467						
2205												
2206	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2207	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2208	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2209												
2210	Result (zirconium)											
2211												
2212						General Statistics						
2213					Total Number of Observations	11					Number of Distinct Observations	2
2214					Number of Detects	1					Number of Non-Detects	10
2215					Number of Distinct Detects	1					Number of Distinct Non-Detects	1
2216												
2217	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
2218	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
2219												
2220	The data set for variable Result (zirconium) was not processed!											
2221												
2222												

B.2.5 Terrestrial Vegetation EPC ProUCL Output: Other

UCL Statistics for Data Sets with Non-Detects			
User Selected Options			
Date/Time of Computation	ProUCL 5.2 4/1/2024 3:58:23 PM		
From File	WorkSheet.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Result (aluminum)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	51
Number of Detects	52	Number of Non-Detects	1
Number of Distinct Detects	50	Number of Distinct Non-Detects	1
Minimum Detect	0.44	Minimum Non-Detect	0.4
Maximum Detect	518	Maximum Non-Detect	0.4
Variance Detects	15203	Percent Non-Detects	1.887%
Mean Detects	58.41	SD Detects	123.3
Median Detects	8.66	CV Detects	2.111
Skewness Detects	2.642	Kurtosis Detects	6.278
Mean of Logged Detects	2.225	SD of Logged Detects	1.963
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.526	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.378	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.141	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	57.32	KM Standard Error of Mean	16.81
90KM SD	121.2	95% KM (BCA) UCL	89.82
95% KM (t) UCL	85.47	95% KM (Percentile Bootstrap) UCL	87.34
95% KM (z) UCL	84.97	95% KM Bootstrap t UCL	99.1
90% KM Chebyshev UCL	107.8	95% KM Chebyshev UCL	130.6
97.5% KM Chebyshev UCL	162.3	99% KM Chebyshev UCL	224.6
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	3.392	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.848	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.248	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.133	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)	0.363	k star (bias corrected MLE)	0.355
Theta hat (MLE)	161	Theta star (bias corrected MLE)	164.7
nu hat (MLE)	37.73	nu star (bias corrected)	36.89
Mean (detects)	58.41		
Gamma ROS Statistics using Imputed Non-Detects			

	A–E	F	G–K	L
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
56	This is especially true when the sample size is small.			
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
58	Minimum	0.01	Mean	57.31
59	Maximum	518	Median	8.22
60	SD	122.4	CV	2.135
61	k hat (MLE)	0.345	k star (bias corrected MLE)	0.338
62	Theta hat (MLE)	166	Theta star (bias corrected MLE)	169.5
63	nu hat (MLE)	36.59	nu star (bias corrected)	35.85
64	Adjusted Level of Significance (β)	0.0455		
65	Approximate Chi Square Value (35.85, α)	23.15	Adjusted Chi Square Value (35.85, β)	22.86
66	95% Gamma Approximate UCL	88.76	95% Gamma Adjusted UCL	89.87
67				
68	**Estimates of Gamma Parameters using KM Estimates**			
69	Mean (KM)	57.32	SD (KM)	121.2
70	Variance (KM)	14691	SE of Mean (KM)	16.81
71	k hat (KM)	0.224	k star (KM)	0.224
72	nu hat (KM)	23.71	nu star (KM)	23.7
73	theta hat (KM)	256.3	theta star (KM)	256.4
74	80% gamma percentile (KM)	79.66	90% gamma percentile (KM)	173.1
75	95% gamma percentile (KM)	286.6	99% gamma percentile (KM)	593.6
76				
77	**Gamma Kaplan-Meier (KM) Statistics**			
78	Approximate Chi Square Value (23.70, α)	13.62	Adjusted Chi Square Value (23.70, β)	13.4
79	95% KM Approximate Gamma UCL	99.74	95% KM Adjusted Gamma UCL	101.3
80				
81	**Lognormal GOF Test on Detected Observations Only**			
82	Shapiro Wilk Approximate Test Statistic	0.934	**Shapiro Wilk GOF Test**	
83	10% Shapiro Wilk P Value	0.00906	Detected Data Not Lognormal at 10% Significance Level	
84	Lilliefors Test Statistic	0.11	**Lilliefors GOF Test**	
85	10% Lilliefors Critical Value	0.112	Detected Data appear Lognormal at 10% Significance Level	
86	**Detected Data appear Approximate Lognormal at 10% Significance Level**			
87				
88	**Lognormal ROS Statistics Using Imputed Non-Detects**			
89	Mean in Original Scale	57.31	Mean in Log Scale	2.129
90	SD in Original Scale	122.4	SD in Log Scale	2.066
91	95% t UCL (assumes normality of ROS data)	85.46	95% Percentile Bootstrap UCL	85.76
92	95% BCA Bootstrap UCL	90.13	95% Bootstrap t UCL	97.48
93	95% H-UCL (Log ROS)	205.3		
94				
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
96	KM Mean (logged)	2.166	KM Geo Mean	8.72
97	KM SD (logged)	1.972	95% Critical H Value (KM-Log)	3.574
98	KM Standard Error of Mean (logged)	0.274	95% H-UCL (KM -Log)	162
99	KM SD (logged)	1.972	95% Critical H Value (KM-Log)	3.574
100	KM Standard Error of Mean (logged)	0.274		
101				
102	**DL/2 Statistics**			
103	**DL/2 Normal**		**DL/2 Log-Transformed**	
104	Mean in Original Scale	57.32	Mean in Log Scale	2.153

	A	B	C	D	E	F	G	H	I	J	K	L
105					SD in Original Scale	122.4					SD in Log Scale	2.014
106					95% t UCL (Assumes normality)	85.47					95% H-Stat UCL	180.3
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Approximate Lognormal Distributed at 10% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					KM H-UCL	162						
114												
115	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
116	**Please verify the data were collected from random locations.**											
117	**If the data were collected using judgmental or other non-random methods,**											
118	**then contact a statistician to correctly calculate UCLs.**											
119												
120	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
121	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
122	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
123												
124	**Result (antimony)**											
125												
126	**General Statistics**											
127					Total Number of Observations	53					Number of Distinct Observations	10
128					Number of Detects	12					Number of Non-Detects	41
129					Number of Distinct Detects	10					Number of Distinct Non-Detects	1
130					Minimum Detect	0.002					Minimum Non-Detect	0.002
131					Maximum Detect	0.0085					Maximum Non-Detect	0.002
132					Variance Detects	3.9297E-6					Percent Non-Detects	77.36%
133					Mean Detects	0.00423					SD Detects	0.00198
134					Median Detects	0.00325					CV Detects	0.468
135					Skewness Detects	1.198					Kurtosis Detects	0.413
136					Mean of Logged Detects	-5.553					SD of Logged Detects	0.426
137												
138	**Normal GOF Test on Detects Only**											
139					Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk GOF Test**					
140					1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level					
141					Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**					
142					1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level					
143	**Detected Data appear Normal at 1% Significance Level**											
144												
145	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
146					KM Mean	0.00251					KM Standard Error of Mean	1.8647E-4
147					90KM SD	0.0013					95% KM (BCA) UCL	0.00285
148					95% KM (t) UCL	0.00282					95% KM (Percentile Bootstrap) UCL	0.00283
149					95% KM (z) UCL	0.00281					95% KM Bootstrap t UCL	0.00301
150					90% KM Chebyshev UCL	0.00307					95% KM Chebyshev UCL	0.00332
151					97.5% KM Chebyshev UCL	0.00367					99% KM Chebyshev UCL	0.00436
152												
153	**Gamma GOF Tests on Detected Observations Only**											
154					A-D Test Statistic	0.802	**Anderson-Darling GOF Test**					
155					5% A-D Critical Value	0.732	Detected Data Not Gamma Distributed at 5% Significance Level					
156					K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**					

5% K-S Critical Value	0.246	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)	5.842	k star (bias corrected MLE)	4.437
Theta hat (MLE)	7.2465E-4	Theta star (bias corrected MLE)	9.5411E-4
nu hat (MLE)	140.2	nu star (bias corrected)	106.5
Mean (detects)	0.00423		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.00869
Maximum	0.01	Median	0.01
SD	0.0026	CV	0.299
k hat (MLE)	6.861	k star (bias corrected MLE)	6.485
Theta hat (MLE)	0.00127	Theta star (bias corrected MLE)	0.00134
nu hat (MLE)	727.3	nu star (bias corrected)	687.4
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (687.43, α)	627.6	Adjusted Chi Square Value (687.43, β)	626
95% Gamma Approximate UCL	0.00952	95% Gamma Adjusted UCL	0.00955

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00251	SD (KM)	0.0013
Variance (KM)	1.6892E-6	SE of Mean (KM)	1.8647E-4
k hat (KM)	3.717	k star (KM)	3.519
nu hat (KM)	394	nu star (KM)	373
theta hat (KM)	6.7416E-4	theta star (KM)	7.1205E-4
80% gamma percentile (KM)	0.00351	90% gamma percentile (KM)	0.0043
95% gamma percentile (KM)	0.00503	99% gamma percentile (KM)	0.0066

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (373.01, α)	329.2	Adjusted Chi Square Value (373.01, β)	328.1
95% KM Approximate Gamma UCL	0.00284	95% KM Adjusted Gamma UCL	0.00285

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.21	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00164	Mean in Log Scale	-6.876
SD in Original Scale	0.00175	SD in Log Scale	0.981
95% t UCL (assumes normality of ROS data)	0.00204	95% Percentile Bootstrap UCL	0.00204
95% BCA Bootstrap UCL	0.00209	95% Bootstrap t UCL	0.00215
95% H-UCL (Log ROS)	0.00229		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.065	KM Geo Mean	0.00232
KM SD (logged)	0.338	95% Critical H Value (KM-Log)	1.736
KM Standard Error of Mean (logged)	0.0485	95% H-UCL (KM -Log)	0.00267
KM SD (logged)	0.338	95% Critical H Value (KM-Log)	1.736
KM Standard Error of Mean (logged)	0.0485		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00173	Mean in Log Scale	-6.601
SD in Original Scale	0.00164	SD in Log Scale	0.605
95% t UCL (Assumes normality)	0.00211	95% H-Stat UCL	0.00192

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00282

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (arsenic)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	41
Number of Detects	42	Number of Non-Detects	11
Number of Distinct Detects	41	Number of Distinct Non-Detects	1
Minimum Detect	0.004	Minimum Non-Detect	0.004
Maximum Detect	0.131	Maximum Non-Detect	0.004
Variance Detects	0.001	Percent Non-Detects	20.75%
Mean Detects	0.0273	SD Detects	0.0317
Median Detects	0.0135	CV Detects	1.158
Skewness Detects	1.854	Kurtosis Detects	2.849
Mean of Logged Detects	-4.126	SD of Logged Detects	1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.7	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.922	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.157	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.0225	KM Standard Error of Mean	0.00409
90KM SD	0.0294	95% KM (BCA) UCL	0.0301
95% KM (t) UCL	0.0293	95% KM (Percentile Bootstrap) UCL	0.0295
95% KM (z) UCL	0.0292	95% KM Bootstrap t UCL	0.0311
90% KM Chebyshev UCL	0.0348	95% KM Chebyshev UCL	0.0403
97.5% KM Chebyshev UCL	0.048	99% KM Chebyshev UCL	0.0632

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.842	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.776	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.193	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.14	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)	1.087	k star (bias corrected MLE)	1.025
Theta hat (MLE)	0.0251	Theta star (bias corrected MLE)	0.0267
nu hat (MLE)	91.33	nu star (bias corrected)	86.14
Mean (detects)	0.0273		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0237
Maximum	0.131	Median	0.01
SD	0.029	CV	1.222
k hat (MLE)	1.171	k star (bias corrected MLE)	1.117
Theta hat (MLE)	0.0203	Theta star (bias corrected MLE)	0.0212
nu hat (MLE)	124.1	nu star (bias corrected)	118.4
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (118.44, α)	94.31	Adjusted Chi Square Value (118.44, β)	93.71
95% Gamma Approximate UCL	0.0298	95% Gamma Adjusted UCL	0.03

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0225	SD (KM)	0.0294
Variance (KM)	8.6497E-4	SE of Mean (KM)	0.00409
k hat (KM)	0.585	k star (KM)	0.564
nu hat (KM)	61.98	nu star (KM)	59.8
theta hat (KM)	0.0385	theta star (KM)	0.0399
80% gamma percentile (KM)	0.0371	90% gamma percentile (KM)	0.0593
95% gamma percentile (KM)	0.0827	99% gamma percentile (KM)	0.14

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (59.80, α)	43.02	Adjusted Chi Square Value (59.80, β)	42.62
95% KM Approximate Gamma UCL	0.0313	95% KM Adjusted Gamma UCL	0.0316

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.951	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.124	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.022	Mean in Log Scale	-4.609

SD in Original Scale	0.03	SD in Log Scale	1.325
95% t UCL (assumes normality of ROS data)	0.0289	95% Percentile Bootstrap UCL	0.0289
95% BCA Bootstrap UCL	0.0296	95% Bootstrap t UCL	0.0309
95% H-UCL (Log ROS)	0.0396		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.415	KM Geo Mean	0.0121
KM SD (logged)	1.046	95% Critical H Value (KM-Log)	2.37
KM Standard Error of Mean (logged)	0.145	95% H-UCL (KM -Log)	0.0295
KM SD (logged)	1.046	95% Critical H Value (KM-Log)	2.37
KM Standard Error of Mean (logged)	0.145		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0221	Mean in Log Scale	-4.559
SD in Original Scale	0.03	SD in Log Scale	1.233
95% t UCL (Assumes normality)	0.029	95% H-Stat UCL	0.035
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			
Suggested UCL to Use			
95% KM (t) UCL	0.0293		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (barium)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	51
		Number of Missing Observations	0
Minimum	0.196	Mean	4.908
Maximum	37.1	Median	1.43
SD	8.459	Std. Error of Mean	1.162
Coefficient of Variation	1.723	Skewness	2.701
Normal GOF Test			
Shapiro Wilk Test Statistic	0.579	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.289	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			

365	**Assuming Normal Distribution**			
366	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
367	95% Student's-t UCL	6.854	95% Adjusted-CLT UCL (Chen-1995)	7.28
368			95% Modified-t UCL (Johnson-1978)	6.926
369				
370	**Gamma GOF Test**			
371	A-D Test Statistic	2.136	**Anderson-Darling Gamma GOF Test**	
372	5% A-D Critical Value	0.809	Data Not Gamma Distributed at 5% Significance Level	
373	K-S Test Statistic	0.144	**Kolmogorov-Smirnov Gamma GOF Test**	
374	5% K-S Critical Value	0.129	Data Not Gamma Distributed at 5% Significance Level	
375	**Data Not Gamma Distributed at 5% Significance Level**			
376				
377	**Gamma Statistics**			
378	k hat (MLE)	0.571	k star (bias corrected MLE)	0.552
379	Theta hat (MLE)	8.589	Theta star (bias corrected MLE)	8.896
380	nu hat (MLE)	60.58	nu star (bias corrected)	58.48
381	MLE Mean (bias corrected)	4.908	MLE Sd (bias corrected)	6.608
382			Approximate Chi Square Value (0.05)	41.9
383	Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	41.51
384				
385	**Assuming Gamma Distribution**			
386	95% Approximate Gamma UCL	6.851	95% Adjusted Gamma UCL	6.916
387				
388	**Lognormal GOF Test**			
389	Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk Lognormal GOF Test**	
390	10% Shapiro Wilk P Value	0.00354	Data Not Lognormal at 10% Significance Level	
391	Lilliefors Test Statistic	0.108	**Lilliefors Lognormal GOF Test**	
392	10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
393	**Data appear Approximate Lognormal at 10% Significance Level**			
394				
395	**Lognormal Statistics**			
396	Minimum of Logged Data	-1.63	Mean of logged Data	0.502
397	Maximum of Logged Data	3.614	SD of logged Data	1.495
398				
399	**Assuming Lognormal Distribution**			
400	95% H-UCL	9.304	90% Chebyshev (MVUE) UCL	8.819
401	95% Chebyshev (MVUE) UCL	10.62	97.5% Chebyshev (MVUE) UCL	13.12
402	99% Chebyshev (MVUE) UCL	18.03		
403				
404	**Nonparametric Distribution Free UCL Statistics**			
405	**Data appear to follow a Discernible Distribution**			
406				
407	**Nonparametric Distribution Free UCLs**			
408	95% CLT UCL	6.82	95% BCA Bootstrap UCL	7.313
409	95% Standard Bootstrap UCL	6.794	95% Bootstrap-t UCL	7.854
410	95% Hall's Bootstrap UCL	7.148	95% Percentile Bootstrap UCL	6.806
411	90% Chebyshev(Mean, Sd) UCL	8.394	95% Chebyshev(Mean, Sd) UCL	9.973
412	97.5% Chebyshev(Mean, Sd) UCL	12.16	99% Chebyshev(Mean, Sd) UCL	16.47
413				
414	**Suggested UCL to Use**			
415	95% H-UCL	9.304		
416				

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (beryllium)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	44
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.0024	Minimum Non-Detect	0.002
Maximum Detect	0.0176	Maximum Non-Detect	0.002
Variance Detects	3.2792E-5	Percent Non-Detects	83.02%
Mean Detects	0.00932	SD Detects	0.00573
Median Detects	0.0083	CV Detects	0.614
Skewness Detects	0.283	Kurtosis Detects	-1.585
Mean of Logged Detects	-4.883	SD of Logged Detects	0.724

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.00324	KM Standard Error of Mean	5.1527E-4
90KM SD	0.00354	95% KM (BCA) UCL	0.00418
95% KM (t) UCL	0.00411	95% KM (Percentile Bootstrap) UCL	0.00412
95% KM (z) UCL	0.00409	95% KM Bootstrap t UCL	0.00444
90% KM Chebyshev UCL	0.00479	95% KM Chebyshev UCL	0.00549
97.5% KM Chebyshev UCL	0.00646	99% KM Chebyshev UCL	0.00837

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.32	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.568	k star (bias corrected MLE)	1.786
Theta hat (MLE)	0.00363	Theta star (bias corrected MLE)	0.00522
nu hat (MLE)	46.22	nu star (bias corrected)	32.15
Mean (detects)	0.00932		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.00988
Maximum	0.0176	Median	0.01
SD	0.00226	CV	0.229
k hat (MLE)	14.24	k star (bias corrected MLE)	13.45
Theta hat (MLE)	6.9413E-4	Theta star (bias corrected MLE)	7.3509E-4
nu hat (MLE)	1510	nu star (bias corrected)	1425
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (N/A, α)	1339	Adjusted Chi Square Value (N/A, β)	1336
95% Gamma Approximate UCL	0.0105	95% Gamma Adjusted UCL	0.0105

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00324	SD (KM)	0.00354
Variance (KM)	1.2508E-5	SE of Mean (KM)	5.1527E-4
k hat (KM)	0.841	k star (KM)	0.806
nu hat (KM)	89.15	nu star (KM)	85.44
theta hat (KM)	0.00386	theta star (KM)	0.00402
80% gamma percentile (KM)	0.0053	90% gamma percentile (KM)	0.00787
95% gamma percentile (KM)	0.0105	99% gamma percentile (KM)	0.0167

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.44, α)	65.13	Adjusted Chi Square Value (85.44, β)	64.63
95% KM Approximate Gamma UCL	0.00425	95% KM Adjusted Gamma UCL	0.00429

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0021	Mean in Log Scale	-7.557
SD in Original Scale	0.00404	SD in Log Scale	1.776
95% t UCL (assumes normality of ROS data)	0.00303	95% Percentile Bootstrap UCL	0.00306
95% BCA Bootstrap UCL	0.00317	95% Bootstrap t UCL	0.00347
95% H-UCL (Log ROS)	0.00571		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.988	KM Geo Mean	0.00251
KM SD (logged)	0.574	95% Critical H Value (KM-Log)	1.93
KM Standard Error of Mean (logged)	0.0836	95% H-UCL (KM -Log)	0.00345
KM SD (logged)	0.574	95% Critical H Value (KM-Log)	1.93
KM Standard Error of Mean (logged)	0.0836		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00241	Mean in Log Scale	-6.564
SD in Original Scale	0.00387	SD in Log Scale	0.818
95% t UCL (Assumes normality)	0.0033	95% H-Stat UCL	0.00251

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00411		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (bismuth)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	7
Number of Detects	7	Number of Non-Detects	46
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.002	Minimum Non-Detect	0.002
Maximum Detect	0.0047	Maximum Non-Detect	0.002
Variance Detects	1.0333E-6	Percent Non-Detects	86.79%
Mean Detects	0.0033	SD Detects	0.00102
Median Detects	0.0033	CV Detects	0.308
Skewness Detects	0.117	Kurtosis Detects	-1.189
Mean of Logged Detects	-5.757	SD of Logged Detects	0.322

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.00217	KM Standard Error of Mean	8.2701E-5
90KM SD	5.5741E-4	95% KM (BCA) UCL	0.00232
95% KM (t) UCL	0.00231	95% KM (Percentile Bootstrap) UCL	0.00232
95% KM (z) UCL	0.00231	95% KM Bootstrap t UCL	0.00234
90% KM Chebyshev UCL	0.00242	95% KM Chebyshev UCL	0.00253
97.5% KM Chebyshev UCL	0.00269	99% KM Chebyshev UCL	0.00299

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.261	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.171	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics on Detected Data Only			
k hat (MLE)	11.78	k star (bias corrected MLE)	6.825
Theta hat (MLE)	2.8020E-4	Theta star (bias corrected MLE)	4.8351E-4
nu hat (MLE)	164.9	nu star (bias corrected)	95.55
Mean (detects)	0.0033		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.00912
Maximum	0.01	Median	0.01
SD	0.00232	CV	0.254
k hat (MLE)	8.572	k star (bias corrected MLE)	8.1
Theta hat (MLE)	0.00106	Theta star (bias corrected MLE)	0.00113
nu hat (MLE)	908.7	nu star (bias corrected)	858.6
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (858.56, α)	791.6	Adjusted Chi Square Value (858.56, β)	789.8
95% Gamma Approximate UCL	0.00989	95% Gamma Adjusted UCL	0.00991
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00217	SD (KM)	5.5741E-4
Variance (KM)	3.1071E-7	SE of Mean (KM)	8.2701E-5
k hat (KM)	15.18	k star (KM)	14.33
nu hat (KM)	1609	nu star (KM)	1519
theta hat (KM)	1.4307E-4	theta star (KM)	1.5152E-4
80% gamma percentile (KM)	0.00263	90% gamma percentile (KM)	0.00293
95% gamma percentile (KM)	0.00319	99% gamma percentile (KM)	0.00372
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (N/A, α)	1430	Adjusted Chi Square Value (N/A, β)	1427
95% KM Approximate Gamma UCL	0.00231	95% KM Adjusted Gamma UCL	0.00231
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00109	Mean in Log Scale	-7.202
SD in Original Scale	0.00104	SD in Log Scale	0.883
95% t UCL (assumes normality of ROS data)	0.00132	95% Percentile Bootstrap UCL	0.00132
95% BCA Bootstrap UCL	0.00135	95% Bootstrap t UCL	0.00138
95% H-UCL (Log ROS)	0.00144		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.154	KM Geo Mean	0.00212
KM SD (logged)	0.189	95% Critical H Value (KM-Log)	1.718
KM Standard Error of Mean (logged)	0.0281	95% H-UCL (KM -Log)	0.00226
KM SD (logged)	0.189	95% Critical H Value (KM-Log)	1.718
KM Standard Error of Mean (logged)	0.0281		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0013	Mean in Log Scale	-6.756
SD in Original Scale	8.5866E-4	SD in Log Scale	0.408
95% t UCL (Assumes normality)	0.0015	95% H-Stat UCL	0.0014

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00231

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (boron)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	52
		Number of Missing Observations	0
Minimum	0.76	Mean	4.908
Maximum	15.6	Median	4.16
SD	3.372	Std. Error of Mean	0.463
Coefficient of Variation	0.687	Skewness	1.172

Normal GOF Test

Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.4426E-4	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5.684	95% Adjusted-CLT UCL (Chen-1995)	5.75
		95% Modified-t UCL (Johnson-1978)	5.696

Gamma GOF Test

A-D Test Statistic	0.224	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.762	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.053	**Kolmogorov-Smirnov Gamma GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
677					5% K-S Critical Value	0.124	Detected data appear Gamma Distributed at 5% Significance Level					
678	**Detected data appear Gamma Distributed at 5% Significance Level**											
679												
680	**Gamma Statistics**											
681					k hat (MLE)	2.165					k star (bias corrected MLE)	2.055
682					Theta hat (MLE)	2.267					Theta star (bias corrected MLE)	2.388
683					nu hat (MLE)	229.5					nu star (bias corrected)	217.8
684					MLE Mean (bias corrected)	4.908					MLE Sd (bias corrected)	3.424
685											Approximate Chi Square Value (0.05)	184.7
686					Adjusted Level of Significance	0.0455					Adjusted Chi Square Value	183.8
687												
688	**Assuming Gamma Distribution**											
689					95% Approximate Gamma UCL	5.789					95% Adjusted Gamma UCL	5.816
690												
691	**Lognormal GOF Test**											
692					Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**					
693					10% Shapiro Wilk P Value	0.0865	Data Not Lognormal at 10% Significance Level					
694					Lilliefors Test Statistic	0.0785	**Lilliefors Lognormal GOF Test**					
695					10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level					
696	**Data appear Approximate Lognormal at 10% Significance Level**											
697												
698	**Lognormal Statistics**											
699					Minimum of Logged Data	-0.274					Mean of logged Data	1.342
700					Maximum of Logged Data	2.747					SD of logged Data	0.756
701												
702	**Assuming Lognormal Distribution**											
703					95% H-UCL	6.337					90% Chebyshev (MVUE) UCL	6.812
704					95% Chebyshev (MVUE) UCL	7.605					97.5% Chebyshev (MVUE) UCL	8.705
705					99% Chebyshev (MVUE) UCL	10.87						
706												
707	**Nonparametric Distribution Free UCL Statistics**											
708	**Data appear to follow a Discernible Distribution**											
709												
710	**Nonparametric Distribution Free UCLs**											
711					95% CLT UCL	5.67					95% BCA Bootstrap UCL	5.749
712					95% Standard Bootstrap UCL	5.671					95% Bootstrap-t UCL	5.787
713					95% Hall's Bootstrap UCL	5.764					95% Percentile Bootstrap UCL	5.675
714					90% Chebyshev(Mean, Sd) UCL	6.298					95% Chebyshev(Mean, Sd) UCL	6.927
715					97.5% Chebyshev(Mean, Sd) UCL	7.801					99% Chebyshev(Mean, Sd) UCL	9.517
716												
717	**Suggested UCL to Use**											
718					95% Student's-t UCL	5.684						
719												
720	When a data set follows an approximate distribution passing only one of the GOF tests,											
721	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
722												
723	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
724	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
725	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
726												
727	**Result (cadmium)**											
728												

General Statistics

Total Number of Observations	53	Number of Distinct Observations	44
Number of Detects	44	Number of Non-Detects	9
Number of Distinct Detects	43	Number of Distinct Non-Detects	1
Minimum Detect	0.0016	Minimum Non-Detect	0.001
Maximum Detect	0.2	Maximum Non-Detect	0.001
Variance Detects	0.00169	Percent Non-Detects	16.98%
Mean Detects	0.0378	SD Detects	0.0411
Median Detects	0.0215	CV Detects	1.086
Skewness Detects	1.962	Kurtosis Detects	4.601
Mean of Logged Detects	-3.822	SD of Logged Detects	1.123

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.154	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.0316	KM Standard Error of Mean	0.00549
90KM SD	0.0395	95% KM (BCA) UCL	0.041
95% KM (t) UCL	0.0408	95% KM (Percentile Bootstrap) UCL	0.0406
95% KM (z) UCL	0.0406	95% KM Bootstrap t UCL	0.0432
90% KM Chebyshev UCL	0.0481	95% KM Chebyshev UCL	0.0555
97.5% KM Chebyshev UCL	0.0659	99% KM Chebyshev UCL	0.0862

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.586	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.776	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.123	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.137	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)	1.047	k star (bias corrected MLE)	0.991
Theta hat (MLE)	0.0361	Theta star (bias corrected MLE)	0.0382
nu hat (MLE)	92.16	nu star (bias corrected)	87.21
Mean (detects)	0.0378		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0331
Maximum	0.2	Median	0.0178
SD	0.0388	CV	1.172
k hat (MLE)	1.048	k star (bias corrected MLE)	1.001
Theta hat (MLE)	0.0316	Theta star (bias corrected MLE)	0.0331
nu hat (MLE)	111.1	nu star (bias corrected)	106.2

Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (106.16, α)	83.38	Adjusted Chi Square Value (106.16, β)	82.82
95% Gamma Approximate UCL	0.0422	95% Gamma Adjusted UCL	0.0425
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0316	SD (KM)	0.0395
Variance (KM)	0.00156	SE of Mean (KM)	0.00549
k hat (KM)	0.639	k star (KM)	0.616
nu hat (KM)	67.77	nu star (KM)	65.27
theta hat (KM)	0.0494	theta star (KM)	0.0513
80% gamma percentile (KM)	0.0521	90% gamma percentile (KM)	0.0817
95% gamma percentile (KM)	0.113	99% gamma percentile (KM)	0.187
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (65.27, α)	47.68	Adjusted Chi Square Value (65.27, β)	47.26
95% KM Approximate Gamma UCL	0.0432	95% KM Adjusted Gamma UCL	0.0436
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.952	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0676	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.122	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0317	Mean in Log Scale	-4.255
SD in Original Scale	0.0398	SD in Log Scale	1.421
95% t UCL (assumes normality of ROS data)	0.0409	95% Percentile Bootstrap UCL	0.0407
95% BCA Bootstrap UCL	0.042	95% Bootstrap t UCL	0.0433
95% H-UCL (Log ROS)	0.0684		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.346	KM Geo Mean	0.013
KM SD (logged)	1.538	95% Critical H Value (KM-Log)	2.998
KM Standard Error of Mean (logged)	0.214	95% H-UCL (KM -Log)	0.0801
KM SD (logged)	1.538	95% Critical H Value (KM-Log)	2.998
KM Standard Error of Mean (logged)	0.214		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0315	Mean in Log Scale	-4.464
SD in Original Scale	0.0399	SD in Log Scale	1.759
95% t UCL (Assumes normality)	0.0407	95% H-Stat UCL	0.121
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	0.0432		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (calcium)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	51
		Number of Missing Observations	0
Minimum	299	Mean	2399
Maximum	10700	Median	2020
SD	1978	Std. Error of Mean	271.7
Coefficient of Variation	0.824	Skewness	1.775

Normal GOF Test

Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	8.0632E-7	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2854	95% Adjusted-CLT UCL (Chen-1995)	2917
		95% Modified-t UCL (Johnson-1978)	2865

Gamma GOF Test

A-D Test Statistic	0.357	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.767	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0753	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.124	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.607	k star (bias corrected MLE)	1.529
Theta hat (MLE)	1492	Theta star (bias corrected MLE)	1569
nu hat (MLE)	170.4	nu star (bias corrected)	162.1
MLE Mean (bias corrected)	2399	MLE Sd (bias corrected)	1940
		Approximate Chi Square Value (0.05)	133.6
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	132.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	2909	95% Adjusted Gamma UCL	2925

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.0678	Data Not Lognormal at 10% Significance Level

Lilliefors Test Statistic	0.11	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.7	Mean of logged Data	7.441
Maximum of Logged Data	9.278	SD of logged Data	0.891
Assuming Lognormal Distribution			
95% H-UCL	3325	90% Chebyshev (MVUE) UCL	3562
95% Chebyshev (MVUE) UCL	4040	97.5% Chebyshev (MVUE) UCL	4703
99% Chebyshev (MVUE) UCL	6006		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2846	95% BCA Bootstrap UCL	2941
95% Standard Bootstrap UCL	2846	95% Bootstrap-t UCL	2957
95% Hall's Bootstrap UCL	3001	95% Percentile Bootstrap UCL	2867
90% Chebyshev(Mean, Sd) UCL	3214	95% Chebyshev(Mean, Sd) UCL	3583
97.5% Chebyshev(Mean, Sd) UCL	4095	99% Chebyshev(Mean, Sd) UCL	5102
Suggested UCL to Use			
95% Approximate Gamma UCL	2909		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (chromium)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	41
Number of Detects	45	Number of Non-Detects	8
Number of Distinct Detects	41	Number of Distinct Non-Detects	1
Minimum Detect	0.01	Minimum Non-Detect	0.01
Maximum Detect	1.82	Maximum Non-Detect	0.01
Variance Detects	0.132	Percent Non-Detects	15.09%
Mean Detects	0.216	SD Detects	0.364
Median Detects	0.067	CV Detects	1.684
Skewness Detects	2.748	Kurtosis Detects	8.547
Mean of Logged Detects	-2.567	SD of Logged Detects	1.417
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.613	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.926	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.334	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.153	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			

KM Mean	0.185	KM Standard Error of Mean	0.0472
90KM SD	0.34	95% KM (BCA) UCL	0.275
95% KM (t) UCL	0.264	95% KM (Percentile Bootstrap) UCL	0.269
95% KM (z) UCL	0.263	95% KM Bootstrap t UCL	0.31
90% KM Chebyshev UCL	0.327	95% KM Chebyshev UCL	0.391
97.5% KM Chebyshev UCL	0.48	99% KM Chebyshev UCL	0.654

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.408	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.804	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.236	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.138	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)	0.597	k star (bias corrected MLE)	0.572
Theta hat (MLE)	0.362	Theta star (bias corrected MLE)	0.378
nu hat (MLE)	53.75	nu star (bias corrected)	51.5
Mean (detects)	0.216		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.185
Maximum	1.82	Median	0.047
SD	0.343	CV	1.854
k hat (MLE)	0.53	k star (bias corrected MLE)	0.513
Theta hat (MLE)	0.349	Theta star (bias corrected MLE)	0.361
nu hat (MLE)	56.19	nu star (bias corrected)	54.35
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (54.35, α)	38.41	Adjusted Chi Square Value (54.35, β)	38.03
95% Gamma Approximate UCL	0.262	95% Gamma Adjusted UCL	0.264

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.185	SD (KM)	0.34
Variance (KM)	0.115	SE of Mean (KM)	0.0472
k hat (KM)	0.297	k star (KM)	0.292
nu hat (KM)	31.43	nu star (KM)	30.98
theta hat (KM)	0.624	theta star (KM)	0.633
80% gamma percentile (KM)	0.282	90% gamma percentile (KM)	0.547
95% gamma percentile (KM)	0.853	99% gamma percentile (KM)	1.651

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (30.98, α)	19.27	Adjusted Chi Square Value (30.98, β)	19.01
95% KM Approximate Gamma UCL	0.297	95% KM Adjusted Gamma UCL	0.301

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.953	Detected Data Not Lognormal at 10% Significance Level	

	A–E	F	G–K	L
989	Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
990	10% Lilliefors Critical Value	0.12	Detected Data Not Lognormal at 10% Significance Level	
991	**Detected Data Not Lognormal at 10% Significance Level**			
992				
993	**Lognormal ROS Statistics Using Imputed Non-Detects**			
994	Mean in Original Scale	0.184	Mean in Log Scale	-3.06
995	SD in Original Scale	0.343	SD in Log Scale	1.774
996	95% t UCL (assumes normality of ROS data)	0.263	95% Percentile Bootstrap UCL	0.264
997	95% BCA Bootstrap UCL	0.277	95% Bootstrap t UCL	0.301
998	95% H-UCL (Log ROS)	0.51		
999				
1000	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1001	KM Mean (logged)	-2.875	KM Geo Mean	0.0564
1002	KM SD (logged)	1.483	95% Critical H Value (KM-Log)	2.929
1003	KM Standard Error of Mean (logged)	0.206	95% H-UCL (KM -Log)	0.31
1004	KM SD (logged)	1.483	95% Critical H Value (KM-Log)	2.929
1005	KM Standard Error of Mean (logged)	0.206		
1006				
1007	**DL/2 Statistics**			
1008	**DL/2 Normal**		**DL/2 Log-Transformed**	
1009	Mean in Original Scale	0.184	Mean in Log Scale	-2.98
1010	SD in Original Scale	0.343	SD in Log Scale	1.635
1011	95% t UCL (Assumes normality)	0.263	95% H-Stat UCL	0.393
1012	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1013				
1014	**Nonparametric Distribution Free UCL Statistics**			
1015	**Data do not follow a Discernible Distribution**			
1016				
1017	**Suggested UCL to Use**			
1018	95% KM (t) UCL	0.264		
1019				
1020	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**			
1021	**Please verify the data were collected from random locations.**			
1022	**If the data were collected using judgmental or other non-random methods,**			
1023	**then contact a statistician to correctly calculate UCLs.**			
1024				
1025	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1026	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1027	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1028				
1029	**Result (cobalt)**			
1030				
1031	**General Statistics**			
1032	Total Number of Observations	53	Number of Distinct Observations	46
1033	Number of Detects	47	Number of Non-Detects	6
1034	Number of Distinct Detects	45	Number of Distinct Non-Detects	1
1035	Minimum Detect	0.0041	Minimum Non-Detect	0.004
1036	Maximum Detect	0.49	Maximum Non-Detect	0.004
1037	Variance Detects	0.0103	Percent Non-Detects	11.32%
1038	Mean Detects	0.0628	SD Detects	0.101
1039	Median Detects	0.0163	CV Detects	1.614
1040	Skewness Detects	2.582	Kurtosis Detects	7.217

	A–E	F	G–K	L
1041	Mean of Logged Detects	-3.715	SD of Logged Detects	1.328
1042				
1043	**Normal GOF Test on Detects Only**			
1044	Shapiro Wilk Test Statistic	0.625	**Shapiro Wilk GOF Test**	
1045	1% Shapiro Wilk Critical Value	0.928	Detected Data Not Normal at 1% Significance Level	
1046	Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**	
1047	1% Lilliefors Critical Value	0.15	Detected Data Not Normal at 1% Significance Level	
1048	**Detected Data Not Normal at 1% Significance Level**			
1049				
1050	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1051	KM Mean	0.0562	KM Standard Error of Mean	0.0134
1052	90KM SD	0.0963	95% KM (BCA) UCL	0.0803
1053	95% KM (t) UCL	0.0786	95% KM (Percentile Bootstrap) UCL	0.0796
1054	95% KM (z) UCL	0.0782	95% KM Bootstrap t UCL	0.0896
1055	90% KM Chebyshev UCL	0.0963	95% KM Chebyshev UCL	0.114
1056	97.5% KM Chebyshev UCL	0.14	99% KM Chebyshev UCL	0.189
1057				
1058	**Gamma GOF Tests on Detected Observations Only**			
1059	A-D Test Statistic	3.073	**Anderson-Darling GOF Test**	
1060	5% A-D Critical Value	0.801	Detected Data Not Gamma Distributed at 5% Significance Level	
1061	K-S Test Statistic	0.253	**Kolmogorov-Smirnov GOF**	
1062	5% K-S Critical Value	0.135	Detected Data Not Gamma Distributed at 5% Significance Level	
1063	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1064				
1065	**Gamma Statistics on Detected Data Only**			
1066	k hat (MLE)	0.645	k star (bias corrected MLE)	0.618
1067	Theta hat (MLE)	0.0974	Theta star (bias corrected MLE)	0.102
1068	nu hat (MLE)	60.64	nu star (bias corrected)	58.1
1069	Mean (detects)	0.0628		
1070				
1071	**Gamma ROS Statistics using Imputed Non-Detects**			
1072	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1073	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1074	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1075	This is especially true when the sample size is small.			
1076	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1077	Minimum	0.0041	Mean	0.0569
1078	Maximum	0.49	Median	0.0142
1079	SD	0.0969	CV	1.704
1080	k hat (MLE)	0.645	k star (bias corrected MLE)	0.621
1081	Theta hat (MLE)	0.0882	Theta star (bias corrected MLE)	0.0916
1082	nu hat (MLE)	68.34	nu star (bias corrected)	65.8
1083	Adjusted Level of Significance (β)	0.0455		
1084	Approximate Chi Square Value (65.80, α)	48.13	Adjusted Chi Square Value (65.80, β)	47.71
1085	95% Gamma Approximate UCL	0.0777	95% Gamma Adjusted UCL	0.0784
1086				
1087	**Estimates of Gamma Parameters using KM Estimates**			
1088	Mean (KM)	0.0562	SD (KM)	0.0963
1089	Variance (KM)	0.00928	SE of Mean (KM)	0.0134
1090	k hat (KM)	0.34	k star (KM)	0.333
1091	nu hat (KM)	36.05	nu star (KM)	35.34
1092	theta hat (KM)	0.165	theta star (KM)	0.169

80% gamma percentile (KM)	0.0882	90% gamma percentile (KM)	0.163
95% gamma percentile (KM)	0.248	99% gamma percentile (KM)	0.466

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (35.34, α)	22.74	Adjusted Chi Square Value (35.34, β)	22.45
95% KM Approximate Gamma UCL	0.0873	95% KM Adjusted Gamma UCL	0.0884

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.954	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.118	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0559	Mean in Log Scale	-4.058
SD in Original Scale	0.0974	SD in Log Scale	1.589
95% t UCL (assumes normality of ROS data)	0.0783	95% Percentile Bootstrap UCL	0.0784
95% BCA Bootstrap UCL	0.082	95% Bootstrap t UCL	0.0875
95% H-UCL (Log ROS)	0.12		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.919	KM Geo Mean	0.0199
KM SD (logged)	1.363	95% Critical H Value (KM-Log)	2.782
KM Standard Error of Mean (logged)	0.189	95% H-UCL (KM -Log)	0.085
KM SD (logged)	1.363	95% Critical H Value (KM-Log)	2.782
KM Standard Error of Mean (logged)	0.189		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.056	Mean in Log Scale	-3.998
SD in Original Scale	0.0974	SD in Log Scale	1.483
95% t UCL (Assumes normality)	0.0784	95% H-Stat UCL	0.101

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

Suggested UCL to Use

95% KM (t) UCL	0.0786		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (copper)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	50
		Number of Missing Observations	0
Minimum	0.54	Mean	1.507
Maximum	4.26	Median	1.16
SD	0.887	Std. Error of Mean	0.122
Coefficient of Variation	0.589	Skewness	1.379

Normal GOF Test

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.6268E-7	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.711	95% Adjusted-CLT UCL (Chen-1995)	1.732
		95% Modified-t UCL (Johnson-1978)	1.715

Gamma GOF Test

A-D Test Statistic	1.458	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.123	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.62	k star (bias corrected MLE)	3.428
Theta hat (MLE)	0.416	Theta star (bias corrected MLE)	0.44
nu hat (MLE)	383.8	nu star (bias corrected)	363.4
MLE Mean (bias corrected)	1.507	MLE Sd (bias corrected)	0.814
		Approximate Chi Square Value (0.05)	320.2
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	319.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.71	95% Adjusted Gamma UCL	1.716

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.0206	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.111	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.616	Mean of logged Data	0.266
Maximum of Logged Data	1.449	SD of logged Data	0.527

Assuming Lognormal Distribution

95% H-UCL	1.722	90% Chebyshev (MVUE) UCL	1.837

95% Chebyshev (MVUE) UCL	1.992	97.5% Chebyshev (MVUE) UCL	2.208
99% Chebyshev (MVUE) UCL	2.631		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.708	95% BCA Bootstrap UCL	1.747
95% Standard Bootstrap UCL	1.71	95% Bootstrap-t UCL	1.759
95% Hall's Bootstrap UCL	1.748	95% Percentile Bootstrap UCL	1.714
90% Chebyshev(Mean, Sd) UCL	1.873	95% Chebyshev(Mean, Sd) UCL	2.038
97.5% Chebyshev(Mean, Sd) UCL	2.268	99% Chebyshev(Mean, Sd) UCL	2.719

Suggested UCL to Use

95% Student's-t UCL	1.711		

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

Result (iron)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	52
		Number of Missing Observations	0
Minimum	4.2	Mean	87.19
Maximum	756	Median	16.6
SD	173.1	Std. Error of Mean	23.77
Coefficient of Variation	1.985	Skewness	2.778

Normal GOF Test

Shapiro Wilk Test Statistic	0.531	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	127	95% Adjusted-CLT UCL (Chen-1995)	136
		95% Modified-t UCL (Johnson-1978)	128.5

Gamma GOF Test

A-D Test Statistic	4.826	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.815	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.285	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.129	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.498	k star (bias corrected MLE)	0.483

Theta hat (MLE)	174.9	Theta star (bias corrected MLE)	180.6
nu hat (MLE)	52.83	nu star (bias corrected)	51.17
MLE Mean (bias corrected)	87.19	MLE Sd (bias corrected)	125.5
		Approximate Chi Square Value (0.05)	35.74
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	35.38
Assuming Gamma Distribution			
95% Approximate Gamma UCL	124.8	95% Adjusted Gamma UCL	126.1
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	7.3572E-6	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.111	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.435	Mean of logged Data	3.193
Maximum of Logged Data	6.628	SD of logged Data	1.472
Assuming Lognormal Distribution			
95% H-UCL	130.5	90% Chebyshev (MVUE) UCL	124.7
95% Chebyshev (MVUE) UCL	149.8	97.5% Chebyshev (MVUE) UCL	184.8
99% Chebyshev (MVUE) UCL	253.4		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	126.3	95% BCA Bootstrap UCL	135.9
95% Standard Bootstrap UCL	126.2	95% Bootstrap-t UCL	147.3
95% Hall's Bootstrap UCL	132.1	95% Percentile Bootstrap UCL	128.1
90% Chebyshev(Mean, Sd) UCL	158.5	95% Chebyshev(Mean, Sd) UCL	190.8
97.5% Chebyshev(Mean, Sd) UCL	235.7	99% Chebyshev(Mean, Sd) UCL	323.7
Suggested UCL to Use			
95% Student's-t UCL	127		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (lead)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	34
Number of Detects	34	Number of Non-Detects	19

1301	Number of Distinct Detects	33	Number of Distinct Non-Detects	1
1302	Minimum Detect	0.0056	Minimum Non-Detect	0.004
1303	Maximum Detect	0.771	Maximum Non-Detect	0.004
1304	Variance Detects	0.0361	Percent Non-Detects	35.85%
1305	Mean Detects	0.107	SD Detects	0.19
1306	Median Detects	0.0189	CV Detects	1.78
1307	Skewness Detects	2.5	Kurtosis Detects	5.982
1308	Mean of Logged Detects	-3.399	SD of Logged Detects	1.455
1309				
1310	**Normal GOF Test on Detects Only**			
1311	Shapiro Wilk Test Statistic	0.584	**Shapiro Wilk GOF Test**	
1312	1% Shapiro Wilk Critical Value	0.908	Detected Data Not Normal at 1% Significance Level	
1313	Lilliefors Test Statistic	0.321	**Lilliefors GOF Test**	
1314	1% Lilliefors Critical Value	0.175	Detected Data Not Normal at 1% Significance Level	
1315	**Detected Data Not Normal at 1% Significance Level**			
1316				
1317	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1318	KM Mean	0.0699	KM Standard Error of Mean	0.022
1319	90KM SD	0.158	95% KM (BCA) UCL	0.112
1320	95% KM (t) UCL	0.107	95% KM (Percentile Bootstrap) UCL	0.109
1321	95% KM (z) UCL	0.106	95% KM Bootstrap t UCL	0.127
1322	90% KM Chebyshev UCL	0.136	95% KM Chebyshev UCL	0.166
1323	97.5% KM Chebyshev UCL	0.207	99% KM Chebyshev UCL	0.289
1324				
1325	**Gamma GOF Tests on Detected Observations Only**			
1326	A-D Test Statistic	2.908	**Anderson-Darling GOF Test**	
1327	5% A-D Critical Value	0.808	Detected Data Not Gamma Distributed at 5% Significance Level	
1328	K-S Test Statistic	0.231	**Kolmogorov-Smirnov GOF**	
1329	5% K-S Critical Value	0.159	Detected Data Not Gamma Distributed at 5% Significance Level	
1330	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1331				
1332	**Gamma Statistics on Detected Data Only**			
1333	k hat (MLE)	0.54	k star (bias corrected MLE)	0.512
1334	Theta hat (MLE)	0.198	Theta star (bias corrected MLE)	0.208
1335	nu hat (MLE)	36.74	nu star (bias corrected)	34.83
1336	Mean (detects)	0.107		
1337				
1338	**Gamma ROS Statistics using Imputed Non-Detects**			
1339	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1340	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1341	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1342	This is especially true when the sample size is small.			
1343	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1344	Minimum	0.0056	Mean	0.0721
1345	Maximum	0.771	Median	0.0108
1346	SD	0.158	CV	2.198
1347	k hat (MLE)	0.525	k star (bias corrected MLE)	0.508
1348	Theta hat (MLE)	0.137	Theta star (bias corrected MLE)	0.142
1349	nu hat (MLE)	55.64	nu star (bias corrected)	53.82
1350	Adjusted Level of Significance (β)	0.0455		
1351	Approximate Chi Square Value (53.82, α)	37.97	Adjusted Chi Square Value (53.82, β)	37.59
1352	95% Gamma Approximate UCL	0.102	95% Gamma Adjusted UCL	0.103

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0699	SD (KM)	0.158
Variance (KM)	0.0249	SE of Mean (KM)	0.022
k hat (KM)	0.196	k star (KM)	0.198
nu hat (KM)	20.81	nu star (KM)	20.97
theta hat (KM)	0.356	theta star (KM)	0.353
80% gamma percentile (KM)	0.0916	90% gamma percentile (KM)	0.211
95% gamma percentile (KM)	0.361	99% gamma percentile (KM)	0.774

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.97, α)	11.57	Adjusted Chi Square Value (20.97, β)	11.37
95% KM Approximate Gamma UCL	0.127	95% KM Adjusted Gamma UCL	0.129

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.943	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.137	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.069	Mean in Log Scale	-4.689
SD in Original Scale	0.16	SD in Log Scale	2.188
95% t UCL (assumes normality of ROS data)	0.106	95% Percentile Bootstrap UCL	0.107
95% BCA Bootstrap UCL	0.117	95% Bootstrap t UCL	0.128
95% H-UCL (Log ROS)	0.328		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.16	KM Geo Mean	0.0156
KM SD (logged)	1.535	95% Critical H Value (KM-Log)	2.993
KM Standard Error of Mean (logged)	0.214	95% H-UCL (KM -Log)	0.0958
KM SD (logged)	1.535	95% Critical H Value (KM-Log)	2.993
KM Standard Error of Mean (logged)	0.214		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0692	Mean in Log Scale	-4.408
SD in Original Scale	0.16	SD in Log Scale	1.789
95% t UCL (Assumes normality)	0.106	95% H-Stat UCL	0.138

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

Suggested UCL to Use

95% KM (t) UCL	0.107		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lithium)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	10
Number of Detects	10	Number of Non-Detects	43
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.1
Maximum Detect	1.38	Maximum Non-Detect	0.1
Variance Detects	0.168	Percent Non-Detects	81.13%
Mean Detects	0.491	SD Detects	0.41
Median Detects	0.305	CV Detects	0.835
Skewness Detects	1.259	Kurtosis Detects	1.083
Mean of Logged Detects	-1.024	SD of Logged Detects	0.845

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.857	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.781	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.304	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.174	KM Standard Error of Mean	0.033
90KM SD	0.228	95% KM (BCA) UCL	0.236
95% KM (t) UCL	0.229	95% KM (Percentile Bootstrap) UCL	0.231
95% KM (z) UCL	0.228	95% KM Bootstrap t UCL	0.275
90% KM Chebyshev UCL	0.273	95% KM Chebyshev UCL	0.318
97.5% KM Chebyshev UCL	0.38	99% KM Chebyshev UCL	0.502

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.325	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	**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)	1.747	k star (bias corrected MLE)	1.29
Theta hat (MLE)	0.281	Theta star (bias corrected MLE)	0.381
nu hat (MLE)	34.94	nu star (bias corrected)	25.79
Mean (detects)	0.491		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.101
Maximum	1.38	Median	0.01
SD	0.255	CV	2.535
k hat (MLE)	0.402	k star (bias corrected MLE)	0.392
Theta hat (MLE)	0.25	Theta star (bias corrected MLE)	0.257
nu hat (MLE)	42.64	nu star (bias corrected)	41.56
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (41.56, α)	27.78	Adjusted Chi Square Value (41.56, β)	27.47
95% Gamma Approximate UCL	0.151	95% Gamma Adjusted UCL	0.152
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.174	SD (KM)	0.228
Variance (KM)	0.052	SE of Mean (KM)	0.033
k hat (KM)	0.581	k star (KM)	0.561
nu hat (KM)	61.59	nu star (KM)	59.43
theta hat (KM)	0.299	theta star (KM)	0.31
80% gamma percentile (KM)	0.286	90% gamma percentile (KM)	0.459
95% gamma percentile (KM)	0.641	99% gamma percentile (KM)	1.083
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (59.43, α)	42.71	Adjusted Chi Square Value (59.43, β)	42.31
95% KM Approximate Gamma UCL	0.242	95% KM Adjusted Gamma UCL	0.244
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.869	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.241	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.11	Mean in Log Scale	-4.07
SD in Original Scale	0.253	SD in Log Scale	2.099
95% t UCL (assumes normality of ROS data)	0.168	95% Percentile Bootstrap UCL	0.17
95% BCA Bootstrap UCL	0.187	95% Bootstrap t UCL	0.212
95% H-UCL (Log ROS)	0.461		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.061	KM Geo Mean	0.127
KM SD (logged)	0.609	95% Critical H Value (KM-Log)	1.957
KM Standard Error of Mean (logged)	0.0882	95% H-UCL (KM -Log)	0.181
KM SD (logged)	0.609	95% Critical H Value (KM-Log)	1.957
KM Standard Error of Mean (logged)	0.0882		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.133	Mean in Log Scale	-2.624
SD in Original Scale	0.244	SD in Log Scale	0.854
95% t UCL (Assumes normality)	0.189	95% H-Stat UCL	0.135
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.229		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (magnesium)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	53
		Number of Missing Observations	0
Minimum	188	Mean	523.1
Maximum	1760	Median	472
SD	328.9	Std. Error of Mean	45.18
Coefficient of Variation	0.629	Skewness	2.164

Normal GOF Test

Shapiro Wilk Test Statistic	0.766	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	9.101E-11	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	598.8	95% Adjusted-CLT UCL (Chen-1995)	611.8
		95% Modified-t UCL (Johnson-1978)	601

Gamma GOF Test

A-D Test Statistic	1.303	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0996	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.123	Detected data appear Gamma Distributed at 5% Significance Level

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

Gamma Statistics

k hat (MLE)	3.671	k star (bias corrected MLE)	3.476
Theta hat (MLE)	142.5	Theta star (bias corrected MLE)	150.5
nu hat (MLE)	389.1	nu star (bias corrected)	368.4
MLE Mean (bias corrected)	523.1	MLE Sd (bias corrected)	280.6
		Approximate Chi Square Value (0.05)	324.9
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	323.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	593.1	95% Adjusted Gamma UCL	595.2

Lognormal GOF Test

	A–E	F	G–K	L
1561	Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**	
1562	10% Shapiro Wilk P Value	0.0216	Data Not Lognormal at 10% Significance Level	
1563	Lilliefors Test Statistic	0.0906	**Lilliefors Lognormal GOF Test**	
1564	10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
1565	**Data appear Approximate Lognormal at 10% Significance Level**			
1566				
1567	**Lognormal Statistics**			
1568	Minimum of Logged Data	5.236	Mean of logged Data	6.117
1569	Maximum of Logged Data	7.473	SD of logged Data	0.512
1570				
1571	**Assuming Lognormal Distribution**			
1572	95% H-UCL	591.2	90% Chebyshev (MVUE) UCL	630.2
1573	95% Chebyshev (MVUE) UCL	682.1	97.5% Chebyshev (MVUE) UCL	754
1574	99% Chebyshev (MVUE) UCL	895.4		
1575				
1576	**Nonparametric Distribution Free UCL Statistics**			
1577	**Data appear to follow a Discernible Distribution**			
1578				
1579	**Nonparametric Distribution Free UCLs**			
1580	95% CLT UCL	597.4	95% BCA Bootstrap UCL	618
1581	95% Standard Bootstrap UCL	597.9	95% Bootstrap-t UCL	622.5
1582	95% Hall's Bootstrap UCL	623.1	95% Percentile Bootstrap UCL	602.1
1583	90% Chebyshev(Mean, Sd) UCL	658.6	95% Chebyshev(Mean, Sd) UCL	720
1584	97.5% Chebyshev(Mean, Sd) UCL	805.2	99% Chebyshev(Mean, Sd) UCL	972.6
1585				
1586	**Suggested UCL to Use**			
1587	95% Approximate Gamma UCL	593.1		
1588				
1589	When a data set follows an approximate distribution passing only one of the GOF tests,			
1590	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
1591				
1592	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1593	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1594	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1595				
1596				
1597	**Result (manganese)**			
1598				
1599	**General Statistics**			
1600	Total Number of Observations	53	Number of Distinct Observations	53
1601			Number of Missing Observations	0
1602	Minimum	2.55	Mean	29.04
1603	Maximum	172	Median	11
1604	SD	42.06	Std. Error of Mean	5.778
1605	Coefficient of Variation	1.448	Skewness	2.13
1606				
1607	**Normal GOF Test**			
1608	Shapiro Wilk Test Statistic	0.635	**Shapiro Wilk GOF Test**	
1609	1% Shapiro Wilk P Value	6.661E-16	Data Not Normal at 1% Significance Level	
1610	Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**	
1611	1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level	
1612	**Data Not Normal at 1% Significance Level**			

Row	A–E	F	G–K	L
1613				
1614	**Assuming Normal Distribution**			
1615	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1616	95% Student's-t UCL	38.72	95% Adjusted-CLT UCL (Chen-1995)	40.35
1617			95% Modified-t UCL (Johnson-1978)	39
1618				
1619	**Gamma GOF Test**			
1620	A-D Test Statistic	3.37	**Anderson-Darling Gamma GOF Test**	
1621	5% A-D Critical Value	0.791	Data Not Gamma Distributed at 5% Significance Level	
1622	K-S Test Statistic	0.179	**Kolmogorov-Smirnov Gamma GOF Test**	
1623	5% K-S Critical Value	0.127	Data Not Gamma Distributed at 5% Significance Level	
1624	**Data Not Gamma Distributed at 5% Significance Level**			
1625				
1626	**Gamma Statistics**			
1627	k hat (MLE)	0.795	k star (bias corrected MLE)	0.762
1628	Theta hat (MLE)	36.55	Theta star (bias corrected MLE)	38.1
1629	nu hat (MLE)	84.24	nu star (bias corrected)	80.8
1630	MLE Mean (bias corrected)	29.04	MLE Sd (bias corrected)	33.27
1631			Approximate Chi Square Value (0.05)	61.09
1632	Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	60.61
1633				
1634	**Assuming Gamma Distribution**			
1635	95% Approximate Gamma UCL	38.42	95% Adjusted Gamma UCL	38.72
1636				
1637	**Lognormal GOF Test**			
1638	Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk Lognormal GOF Test**	
1639	10% Shapiro Wilk P Value	2.0714E-4	Data Not Lognormal at 10% Significance Level	
1640	Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**	
1641	10% Lilliefors Critical Value	0.111	Data Not Lognormal at 10% Significance Level	
1642	**Data Not Lognormal at 10% Significance Level**			
1643				
1644	**Lognormal Statistics**			
1645	Minimum of Logged Data	0.936	Mean of logged Data	2.621
1646	Maximum of Logged Data	5.147	SD of logged Data	1.157
1647				
1648	**Assuming Lognormal Distribution**			
1649	95% H-UCL	40.2	90% Chebyshev (MVUE) UCL	41.73
1650	95% Chebyshev (MVUE) UCL	48.71	97.5% Chebyshev (MVUE) UCL	58.4
1651	99% Chebyshev (MVUE) UCL	77.42		
1652				
1653	**Nonparametric Distribution Free UCL Statistics**			
1654	**Data do not follow a Discernible Distribution**			
1655				
1656	**Nonparametric Distribution Free UCLs**			
1657	95% CLT UCL	38.55	95% BCA Bootstrap UCL	40.61
1658	95% Standard Bootstrap UCL	38.32	95% Bootstrap-t UCL	41.15
1659	95% Hall's Bootstrap UCL	39.68	95% Percentile Bootstrap UCL	38.78
1660	90% Chebyshev(Mean, Sd) UCL	46.38	95% Chebyshev(Mean, Sd) UCL	54.23
1661	97.5% Chebyshev(Mean, Sd) UCL	65.13	99% Chebyshev(Mean, Sd) UCL	86.53
1662				
1663	**Suggested UCL to Use**			
1664	95% Student's-t UCL	38.72		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (mercury)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	19
Number of Detects	32	Number of Non-Detects	21
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	0.001	Minimum Non-Detect	0.001
Maximum Detect	0.0046	Maximum Non-Detect	0.001
Variance Detects	7.5128E-7	Percent Non-Detects	39.62%
Mean Detects	0.0023	SD Detects	8.6676E-4
Median Detects	0.0023	CV Detects	0.377
Skewness Detects	0.794	Kurtosis Detects	0.727
Mean of Logged Detects	-6.145	SD of Logged Detects	0.382

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.904	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.18	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.00178	KM Standard Error of Mean	1.2804E-4
90KM SD	9.1749E-4	95% KM (BCA) UCL	0.002
95% KM (t) UCL	0.002	95% KM (Percentile Bootstrap) UCL	0.00199
95% KM (z) UCL	0.00199	95% KM Bootstrap t UCL	0.00202
90% KM Chebyshev UCL	0.00217	95% KM Chebyshev UCL	0.00234
97.5% KM Chebyshev UCL	0.00258	99% KM Chebyshev UCL	0.00306

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.576	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.159	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.156	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)	7.424	k star (bias corrected MLE)	6.749
Theta hat (MLE)	3.0938E-4	Theta star (bias corrected MLE)	3.4033E-4
nu hat (MLE)	475.1	nu star (bias corrected)	431.9
Mean (detects)	0.0023		

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.001	Mean	0.00535
Maximum	0.01	Median	0.003
SD	0.00386	CV	0.722
k hat (MLE)	1.793	k star (bias corrected MLE)	1.704
Theta hat (MLE)	0.00298	Theta star (bias corrected MLE)	0.00314
nu hat (MLE)	190.1	nu star (bias corrected)	180.6
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (180.63, α)	150.5	Adjusted Chi Square Value (180.63, β)	149.8
95% Gamma Approximate UCL	0.00642	95% Gamma Adjusted UCL	0.00645
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00178	SD (KM)	9.1749E-4
Variance (KM)	8.4179E-7	SE of Mean (KM)	1.2804E-4
k hat (KM)	3.777	k star (KM)	3.575
nu hat (KM)	400.3	nu star (KM)	379
theta hat (KM)	4.7211E-4	theta star (KM)	4.9868E-4
80% gamma percentile (KM)	0.00249	90% gamma percentile (KM)	0.00305
95% gamma percentile (KM)	0.00356	99% gamma percentile (KM)	0.00467
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (379.00, α)	334.9	Adjusted Chi Square Value (379.00, β)	333.7
95% KM Approximate Gamma UCL	0.00202	95% KM Adjusted Gamma UCL	0.00202
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.941	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.142	Detected Data Not Lognormal at 10% Significance Level	
Detected Data appear Approximate Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00173	Mean in Log Scale	-6.518
SD in Original Scale	9.8244E-4	SD in Log Scale	0.581
95% t UCL (assumes normality of ROS data)	0.00196	95% Percentile Bootstrap UCL	0.00196
95% BCA Bootstrap UCL	0.00196	95% Bootstrap t UCL	0.00199
95% H-UCL (Log ROS)	0.00204		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.447	KM Geo Mean	0.00158
KM SD (logged)	0.474	95% Critical H Value (KM-Log)	1.866
KM Standard Error of Mean (logged)	0.0661	95% H-UCL (KM -Log)	0.002
KM SD (logged)	0.474	95% Critical H Value (KM-Log)	1.866
KM Standard Error of Mean (logged)	0.0661		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	

Mean in Original Scale	0.00158	Mean in Log Scale	-6.722
SD in Original Scale	0.00111	SD in Log Scale	0.777
95% t UCL (Assumes normality)	0.00184	95% H-Stat UCL	0.00204
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.002		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (molybdenum)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	52
		Number of Missing Observations	0
Minimum	0.0147	Mean	0.414
Maximum	3.01	Median	0.22
SD	0.527	Std. Error of Mean	0.0724
Coefficient of Variation	1.272	Skewness	2.999
Normal GOF Test			
Shapiro Wilk Test Statistic	0.674	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.765E-14	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.536	95% Adjusted-CLT UCL (Chen-1995)	0.565
		95% Modified-t UCL (Johnson-1978)	0.54
Gamma GOF Test			
A-D Test Statistic	0.903	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.78	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.126	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.987	k star (bias corrected MLE)	0.943
Theta hat (MLE)	0.42	Theta star (bias corrected MLE)	0.439
nu hat (MLE)	104.6	nu star (bias corrected)	100
MLE Mean (bias corrected)	0.414	MLE Sd (bias corrected)	0.426
		Approximate Chi Square Value (0.05)	77.94
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	77.39

Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.532	95% Adjusted Gamma UCL	0.535
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.49	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0909	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-4.22	Mean of logged Data	-1.467
Maximum of Logged Data	1.102	SD of logged Data	1.143
Assuming Lognormal Distribution			
95% H-UCL	0.657	90% Chebyshev (MVUE) UCL	0.684
95% Chebyshev (MVUE) UCL	0.797	97.5% Chebyshev (MVUE) UCL	0.954
99% Chebyshev (MVUE) UCL	1.263		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.533	95% BCA Bootstrap UCL	0.571
95% Standard Bootstrap UCL	0.533	95% Bootstrap-t UCL	0.59
95% Hall's Bootstrap UCL	0.624	95% Percentile Bootstrap UCL	0.544
90% Chebyshev(Mean, Sd) UCL	0.631	95% Chebyshev(Mean, Sd) UCL	0.73
97.5% Chebyshev(Mean, Sd) UCL	0.866	99% Chebyshev(Mean, Sd) UCL	1.135
Suggested UCL to Use			
95% H-UCL	0.657		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

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

Result (nickel)

General Statistics			
Total Number of Observations	53	Number of Distinct Observations	44
Number of Detects	50	Number of Non-Detects	3
Number of Distinct Detects	43	Number of Distinct Non-Detects	1
Minimum Detect	0.041	Minimum Non-Detect	0.04
Maximum Detect	1.25	Maximum Non-Detect	0.04
Variance Detects	0.0466	Percent Non-Detects	5.66%
Mean Detects	0.203	SD Detects	0.216

1873	Median Detects	0.119	CV Detects	1.064
1874	Skewness Detects	2.808	Kurtosis Detects	10.6
1875	Mean of Logged Detects	-1.968	SD of Logged Detects	0.822
1876				
1877	**Normal GOF Test on Detects Only**			
1878	Shapiro Wilk Test Statistic	0.698	**Shapiro Wilk GOF Test**	
1879	1% Shapiro Wilk Critical Value	0.93	Detected Data Not Normal at 1% Significance Level	
1880	Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**	
1881	1% Lilliefors Critical Value	0.146	Detected Data Not Normal at 1% Significance Level	
1882	**Detected Data Not Normal at 1% Significance Level**			
1883				
1884	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1885	KM Mean	0.194	KM Standard Error of Mean	0.0293
1886	90KM SD	0.211	95% KM (BCA) UCL	0.249
1887	95% KM (t) UCL	0.243	95% KM (Percentile Bootstrap) UCL	0.247
1888	95% KM (z) UCL	0.242	95% KM Bootstrap t UCL	0.269
1889	90% KM Chebyshev UCL	0.281	95% KM Chebyshev UCL	0.321
1890	97.5% KM Chebyshev UCL	0.376	99% KM Chebyshev UCL	0.485
1891				
1892	**Gamma GOF Tests on Detected Observations Only**			
1893	A-D Test Statistic	1.959	**Anderson-Darling GOF Test**	
1894	5% A-D Critical Value	0.768	Detected Data Not Gamma Distributed at 5% Significance Level	
1895	K-S Test Statistic	0.175	**Kolmogorov-Smirnov GOF**	
1896	5% K-S Critical Value	0.128	Detected Data Not Gamma Distributed at 5% Significance Level	
1897	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1898				
1899	**Gamma Statistics on Detected Data Only**			
1900	k hat (MLE)	1.486	k star (bias corrected MLE)	1.411
1901	Theta hat (MLE)	0.136	Theta star (bias corrected MLE)	0.144
1902	nu hat (MLE)	148.6	nu star (bias corrected)	141.1
1903	Mean (detects)	0.203		
1904				
1905	**Gamma ROS Statistics using Imputed Non-Detects**			
1906	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1907	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1908	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1909	This is especially true when the sample size is small.			
1910	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1911	Minimum	0.01	Mean	0.192
1912	Maximum	1.25	Median	0.112
1913	SD	0.214	CV	1.117
1914	k hat (MLE)	1.211	k star (bias corrected MLE)	1.155
1915	Theta hat (MLE)	0.158	Theta star (bias corrected MLE)	0.166
1916	nu hat (MLE)	128.4	nu star (bias corrected)	122.4
1917	Adjusted Level of Significance (β)	0.0455		
1918	Approximate Chi Square Value (122.44, α)	97.89	Adjusted Chi Square Value (122.44, β)	97.28
1919	95% Gamma Approximate UCL	0.24	95% Gamma Adjusted UCL	0.241
1920				
1921	**Estimates of Gamma Parameters using KM Estimates**			
1922	Mean (KM)	0.194	SD (KM)	0.211
1923	Variance (KM)	0.0445	SE of Mean (KM)	0.0293
1924	k hat (KM)	0.842	k star (KM)	0.807

nu hat (KM)	89.28	nu star (KM)	85.56
theta hat (KM)	0.23	theta star (KM)	0.24
80% gamma percentile (KM)	0.316	90% gamma percentile (KM)	0.47
95% gamma percentile (KM)	0.626	99% gamma percentile (KM)	0.994
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (85.56, α)	65.24	Adjusted Chi Square Value (85.56, β)	64.74
95% KM Approximate Gamma UCL	0.254	95% KM Adjusted Gamma UCL	0.256
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.955	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.114	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.192	Mean in Log Scale	-2.079
SD in Original Scale	0.214	SD in Log Scale	0.92
95% t UCL (assumes normality of ROS data)	0.242	95% Percentile Bootstrap UCL	0.243
95% BCA Bootstrap UCL	0.25	95% Bootstrap t UCL	0.262
95% H-UCL (Log ROS)	0.254		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.039	KM Geo Mean	0.13
KM SD (logged)	0.842	95% Critical H Value (KM-Log)	2.156
KM Standard Error of Mean (logged)	0.117	95% H-UCL (KM -Log)	0.239
KM SD (logged)	0.842	95% Critical H Value (KM-Log)	2.156
KM Standard Error of Mean (logged)	0.117		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.192	Mean in Log Scale	-2.078
SD in Original Scale	0.214	SD in Log Scale	0.918
95% t UCL (Assumes normality)	0.242	95% H-Stat UCL	0.253
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			
Suggested UCL to Use			
95% KM (t) UCL	0.243		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Result (phosphorus)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	52
		Number of Missing Observations	0
Minimum	105	Mean	469.7
Maximum	1230	Median	434
SD	233.7	Std. Error of Mean	32.11
Coefficient of Variation	0.498	Skewness	1.238

Normal GOF Test

Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	6.1822E-4	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.112	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	523.4	95% Adjusted-CLT UCL (Chen-1995)	528.3
		95% Modified-t UCL (Johnson-1978)	524.4

Gamma GOF Test

A-D Test Statistic	0.247	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0796	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.122	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.398	k star (bias corrected MLE)	4.161
Theta hat (MLE)	106.8	Theta star (bias corrected MLE)	112.9
nu hat (MLE)	466.1	nu star (bias corrected)	441.1
MLE Mean (bias corrected)	469.7	MLE Sd (bias corrected)	230.2
		Approximate Chi Square Value (0.05)	393.4
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	392.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	526.6	95% Adjusted Gamma UCL	528.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.846	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.082	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.654	Mean of logged Data	6.034
Maximum of Logged Data	7.115	SD of logged Data	0.501

	A	B	C	D	E	F	G	H	I	J	K	L
2029	Assuming Lognormal Distribution											
2030					95% H-UCL	539.3					90% Chebyshev (MVUE) UCL	574.4
2031					95% Chebyshev (MVUE) UCL	620.8					97.5% Chebyshev (MVUE) UCL	685.2
2032					99% Chebyshev (MVUE) UCL	811.7						
2033												
2034	Nonparametric Distribution Free UCL Statistics											
2035	Data appear to follow a Discernible Distribution											
2036												
2037	Nonparametric Distribution Free UCLs											
2038					95% CLT UCL	522.5					95% BCA Bootstrap UCL	529.1
2039					95% Standard Bootstrap UCL	521.9					95% Bootstrap-t UCL	534.8
2040					95% Hall's Bootstrap UCL	535.7					95% Percentile Bootstrap UCL	523.5
2041					90% Chebyshev(Mean, Sd) UCL	566					95% Chebyshev(Mean, Sd) UCL	609.6
2042					97.5% Chebyshev(Mean, Sd) UCL	670.2					99% Chebyshev(Mean, Sd) UCL	789.1
2043												
2044	Suggested UCL to Use											
2045					95% Student's-t UCL	523.4						
2046												
2047	When a data set follows an approximate distribution passing only one of the GOF tests,											
2048	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL											
2049												
2050	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2051	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2052	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2053												
2054												
2055	Result (potassium)											
2056												
2057	General Statistics											
2058					Total Number of Observations	53					Number of Distinct Observations	51
2059											Number of Missing Observations	0
2060					Minimum	1260					Mean	3190
2061					Maximum	6410					Median	3000
2062					SD	1497					Std. Error of Mean	205.6
2063					Coefficient of Variation	0.469					Skewness	0.62
2064												
2065	Normal GOF Test											
2066					Shapiro Wilk Test Statistic	0.911	Shapiro Wilk GOF Test					
2067					1% Shapiro Wilk P Value	5.4730E-4	Data Not Normal at 1% Significance Level					
2068					Lilliefors Test Statistic	0.123	Lilliefors GOF Test					
2069					1% Lilliefors Critical Value	0.14	Data appear Normal at 1% Significance Level					
2070	Data appear Approximate Normal at 1% Significance Level											
2071												
2072	Assuming Normal Distribution											
2073	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
2074					95% Student's-t UCL	3535					95% Adjusted-CLT UCL (Chen-1995)	3547
2075											95% Modified-t UCL (Johnson-1978)	3538
2076												
2077	Gamma GOF Test											
2078					A-D Test Statistic	0.639	Anderson-Darling Gamma GOF Test					
2079					5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level					
2080					K-S Test Statistic	0.0821	Kolmogorov-Smirnov Gamma GOF Test					

5% K-S Critical Value	0.122	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	4.722	k star (bias corrected MLE)	4.467
Theta hat (MLE)	675.7	Theta star (bias corrected MLE)	714.2
nu hat (MLE)	500.5	nu star (bias corrected)	473.5
MLE Mean (bias corrected)	3190	MLE Sd (bias corrected)	1510
		Approximate Chi Square Value (0.05)	424
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	422.7
Assuming Gamma Distribution			
95% Approximate Gamma UCL	3562	95% Adjusted Gamma UCL	3573
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0217	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.079	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	7.139	Mean of logged Data	7.958
Maximum of Logged Data	8.766	SD of logged Data	0.478
Assuming Lognormal Distribution			
95% H-UCL	3626	90% Chebyshev (MVUE) UCL	3855
95% Chebyshev (MVUE) UCL	4153	97.5% Chebyshev (MVUE) UCL	4567
99% Chebyshev (MVUE) UCL	5380		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3529	95% BCA Bootstrap UCL	3544
95% Standard Bootstrap UCL	3521	95% Bootstrap-t UCL	3545
95% Hall's Bootstrap UCL	3538	95% Percentile Bootstrap UCL	3529
90% Chebyshev(Mean, Sd) UCL	3807	95% Chebyshev(Mean, Sd) UCL	4087
97.5% Chebyshev(Mean, Sd) UCL	4475	99% Chebyshev(Mean, Sd) UCL	5236
Suggested UCL to Use			
95% Student's-t UCL	3535		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (selenium)			

2133	**General Statistics**			
2134	Total Number of Observations	53	Number of Distinct Observations	6
2135	Number of Detects	6	Number of Non-Detects	47
2136	Number of Distinct Detects	5	Number of Distinct Non-Detects	1
2137	Minimum Detect	0.011	Minimum Non-Detect	0.01
2138	Maximum Detect	0.027	Maximum Non-Detect	0.01
2139	Variance Detects	3.5867E-5	Percent Non-Detects	88.68%
2140	Mean Detects	0.0187	SD Detects	0.00599
2141	Median Detects	0.018	CV Detects	0.321
2142	Skewness Detects	0.173	Kurtosis Detects	-1.341
2143	Mean of Logged Detects	-4.026	SD of Logged Detects	0.334
2144				
2145	**Normal GOF Test on Detects Only**			
2146	Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
2147	1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
2148	Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**	
2149	1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	
2150	**Detected Data appear Normal at 1% Significance Level**			
2151	**Note GOF tests may be unreliable for small sample sizes**			
2152				
2153	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2154	KM Mean	0.011	KM Standard Error of Mean	4.9733E-4
2155	90KM SD	0.00331	95% KM (BCA) UCL	0.0118
2156	95% KM (t) UCL	0.0118	95% KM (Percentile Bootstrap) UCL	0.0118
2157	95% KM (z) UCL	0.0118	95% KM Bootstrap t UCL	0.0118
2158	90% KM Chebyshev UCL	0.0125	95% KM Chebyshev UCL	0.0131
2159	97.5% KM Chebyshev UCL	0.0141	99% KM Chebyshev UCL	0.0159
2160				
2161	**Gamma GOF Tests on Detected Observations Only**			
2162	A-D Test Statistic	0.283	**Anderson-Darling GOF Test**	
2163	5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level	
2164	K-S Test Statistic	0.228	**Kolmogorov-Smirnov GOF**	
2165	5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level	
2166	**Detected data appear Gamma Distributed at 5% Significance Level**			
2167	**Note GOF tests may be unreliable for small sample sizes**			
2168				
2169	**Gamma Statistics on Detected Data Only**			
2170	k hat (MLE)	11.25	k star (bias corrected MLE)	5.737
2171	Theta hat (MLE)	0.00166	Theta star (bias corrected MLE)	0.00325
2172	nu hat (MLE)	135	nu star (bias corrected)	68.84
2173	Mean (detects)	0.0187		
2174				
2175	**Gamma ROS Statistics using Imputed Non-Detects**			
2176	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2177	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2178	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2179	This is especially true when the sample size is small.			
2180	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2181	Minimum	0.01	Mean	0.011
2182	Maximum	0.027	Median	0.01
2183	SD	0.00334	CV	0.304
2184	k hat (MLE)	18	k star (bias corrected MLE)	16.99

Row		F		L
2185	Theta hat (MLE)	6.1017E-4	Theta star (bias corrected MLE)	6.4630E-4
2186	nu hat (MLE)	1908	nu star (bias corrected)	1801
2187	Adjusted Level of Significance (β)	0.0455		
2188	Approximate Chi Square Value (N/A, α)	1703	Adjusted Chi Square Value (N/A, β)	1701
2189	95% Gamma Approximate UCL	0.0116	95% Gamma Adjusted UCL	0.0116
2190				
2191	**Estimates of Gamma Parameters using KM Estimates**			
2192	Mean (KM)	0.011	SD (KM)	0.00331
2193	Variance (KM)	1.0924E-5	SE of Mean (KM)	4.9733E-4
2194	k hat (KM)	11.04	k star (KM)	10.43
2195	nu hat (KM)	1170	nu star (KM)	1105
2196	theta hat (KM)	9.9481E-4	theta star (KM)	0.00105
2197	80% gamma percentile (KM)	0.0137	90% gamma percentile (KM)	0.0155
2198	95% gamma percentile (KM)	0.0171	99% gamma percentile (KM)	0.0204
2199				
2200	**Gamma Kaplan-Meier (KM) Statistics**			
2201	Approximate Chi Square Value (N/A, α)	1029	Adjusted Chi Square Value (N/A, β)	1027
2202	95% KM Approximate Gamma UCL	0.0118	95% KM Adjusted Gamma UCL	0.0118
2203				
2204	**Lognormal GOF Test on Detected Observations Only**			
2205	Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**	
2206	10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level	
2207	Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**	
2208	10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level	
2209	**Detected Data appear Lognormal at 10% Significance Level**			
2210	**Note GOF tests may be unreliable for small sample sizes**			
2211				
2212	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2213	Mean in Original Scale	0.00532	Mean in Log Scale	-5.693
2214	SD in Original Scale	0.00571	SD in Log Scale	0.974
2215	95% t UCL (assumes normality of ROS data)	0.00663	95% Percentile Bootstrap UCL	0.00662
2216	95% BCA Bootstrap UCL	0.00679	95% Bootstrap t UCL	0.00699
2217	95% H-UCL (Log ROS)	0.00737		
2218				
2219	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2220	KM Mean (logged)	-4.54	KM Geo Mean	0.0107
2221	KM SD (logged)	0.21	95% Critical H Value (KM-Log)	1.72
2222	KM Standard Error of Mean (logged)	0.0316	95% H-UCL (KM -Log)	0.0115
2223	KM SD (logged)	0.21	95% Critical H Value (KM-Log)	1.72
2224	KM Standard Error of Mean (logged)	0.0316		
2225				
2226	**DL/2 Statistics**			
2227	**DL/2 Normal**		**DL/2 Log-Transformed**	
2228	Mean in Original Scale	0.00655	Mean in Log Scale	-5.154
2229	SD in Original Scale	0.00475	SD in Log Scale	0.42
2230	95% t UCL (Assumes normality)	0.00764	95% H-Stat UCL	0.00702
2231	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2232				
2233	**Nonparametric Distribution Free UCL Statistics**			
2234	**Detected Data appear Normal Distributed at 1% Significance Level**			
2235				
2236	**Suggested UCL to Use**			

	A	B	C	D	E	F	G	H	I	J	K	L
2237					95% KM (t) UCL	0.0118						
2238												
2239	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2240	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2241	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2242												
2243	Result											
2244												
2245	**General Statistics**											
2246					Total Number of Observations	53					Number of Distinct Observations	26
2247					Number of Detects	29					Number of Non-Detects	24
2248					Number of Distinct Detects	25					Number of Distinct Non-Detects	1
2249					Minimum Detect	4.2					Minimum Non-Detect	4
2250					Maximum Detect	51.6					Maximum Non-Detect	4
2251					Variance Detects	168.8					Percent Non-Detects	45.28%
2252					Mean Detects	13.68					SD Detects	12.99
2253					Median Detects	7					CV Detects	0.95
2254					Skewness Detects	1.535					Kurtosis Detects	1.438
2255					Mean of Logged Detects	2.269					SD of Logged Detects	0.795
2256												
2257	**Normal GOF Test on Detects Only**											
2258					Shapiro Wilk Test Statistic	0.729	**Shapiro Wilk GOF Test**					
2259					1% Shapiro Wilk Critical Value	0.898	Detected Data Not Normal at 1% Significance Level					
2260					Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**					
2261					1% Lilliefors Critical Value	0.189	Detected Data Not Normal at 1% Significance Level					
2262	**Detected Data Not Normal at 1% Significance Level**											
2263												
2264	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2265					KM Mean	9.294					KM Standard Error of Mean	1.482
2266					90KM SD	10.6					95% KM (BCA) UCL	11.98
2267					95% KM (t) UCL	11.78					95% KM (Percentile Bootstrap) UCL	11.77
2268					95% KM (z) UCL	11.73					95% KM Bootstrap t UCL	12.59
2269					90% KM Chebyshev UCL	13.74					95% KM Chebyshev UCL	15.75
2270					97.5% KM Chebyshev UCL	18.55					99% KM Chebyshev UCL	24.04
2271												
2272	**Gamma GOF Tests on Detected Observations Only**											
2273					A-D Test Statistic	2.492	**Anderson-Darling GOF Test**					
2274					5% A-D Critical Value	0.762	Detected Data Not Gamma Distributed at 5% Significance Level					
2275					K-S Test Statistic	0.295	**Kolmogorov-Smirnov GOF**					
2276					5% K-S Critical Value	0.165	Detected Data Not Gamma Distributed at 5% Significance Level					
2277	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2278												
2279	**Gamma Statistics on Detected Data Only**											
2280					k hat (MLE)	1.59					k star (bias corrected MLE)	1.448
2281					Theta hat (MLE)	8.602					Theta star (bias corrected MLE)	9.442
2282					nu hat (MLE)	92.22					nu star (bias corrected)	84.01
2283					Mean (detects)	13.68						
2284												
2285	**Gamma ROS Statistics using Imputed Non-Detects**											
2286	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2287	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2288	For such situations, GROS method may yield incorrect values of UCLs and BTVs											

This is especially true when 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	7.488
Maximum	51.6	Median	4.5
SD	11.75	CV	1.569
k hat (MLE)	0.249	k star (bias corrected MLE)	0.247
Theta hat (MLE)	30.09	Theta star (bias corrected MLE)	30.28
nu hat (MLE)	26.37	nu star (bias corrected)	26.21
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (26.21, α)	15.54	Adjusted Chi Square Value (26.21, β)	15.31
95% Gamma Approximate UCL	12.63	95% Gamma Adjusted UCL	12.82

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.294	SD (KM)	10.6
Variance (KM)	112.4	SE of Mean (KM)	1.482
k hat (KM)	0.769	k star (KM)	0.738
nu hat (KM)	81.48	nu star (KM)	78.2
theta hat (KM)	12.09	theta star (KM)	12.6
80% gamma percentile (KM)	15.25	90% gamma percentile (KM)	23.04
95% gamma percentile (KM)	31.04	99% gamma percentile (KM)	50.06

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (78.20, α)	58.83	Adjusted Chi Square Value (78.20, β)	58.36
95% KM Approximate Gamma UCL	12.35	95% KM Adjusted Gamma UCL	12.45

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.937	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.148	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	8.151	Mean in Log Scale	1.327
SD in Original Scale	11.35	SD in Log Scale	1.286
95% t UCL (assumes normality of ROS data)	10.76	95% Percentile Bootstrap UCL	10.71
95% BCA Bootstrap UCL	10.99	95% Bootstrap t UCL	11.56
95% H-UCL (Log ROS)	13.91		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.869	KM Geo Mean	6.485
KM SD (logged)	0.726	95% Critical H Value (KM-Log)	2.051
KM Standard Error of Mean (logged)	0.101	95% H-UCL (KM -Log)	10.38
KM SD (logged)	0.726	95% Critical H Value (KM-Log)	2.051
KM Standard Error of Mean (logged)	0.101		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.389	Mean in Log Scale	1.556
SD in Original Scale	11.19	SD in Log Scale	0.984
95% t UCL (Assumes normality)	10.96	95% H-Stat UCL	10.52

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

Suggested UCL to Use

95% KM (t) UCL	11.78

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (strontium)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	51
		Number of Missing Observations	0
Minimum	0.41	Mean	2.821
Maximum	10.4	Median	2.18
SD	2.288	Std. Error of Mean	0.314
Coefficient of Variation	0.811	Skewness	1.661

Normal GOF Test

Shapiro Wilk Test Statistic	0.824	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	3.4437E-8	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.347	95% Adjusted-CLT UCL (Chen-1995)	3.414
		95% Modified-t UCL (Johnson-1978)	3.359

Gamma GOF Test

A-D Test Statistic	0.439	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0947	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.124	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.866	k star (bias corrected MLE)	1.773
Theta hat (MLE)	1.511	Theta star (bias corrected MLE)	1.591
nu hat (MLE)	197.8	nu star (bias corrected)	188
MLE Mean (bias corrected)	2.821	MLE Sd (bias corrected)	2.118
		Approximate Chi Square Value (0.05)	157.3
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	156.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.372	95% Adjusted Gamma UCL	3.389

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.567	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0584	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.892	Mean of logged Data	0.746
Maximum of Logged Data	2.342	SD of logged Data	0.786
Assuming Lognormal Distribution			
95% H-UCL	3.609	90% Chebyshev (MVUE) UCL	3.879
95% Chebyshev (MVUE) UCL	4.346	97.5% Chebyshev (MVUE) UCL	4.994
99% Chebyshev (MVUE) UCL	6.267		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	3.338	95% BCA Bootstrap UCL	3.433
95% Standard Bootstrap UCL	3.336	95% Bootstrap-t UCL	3.45
95% Hall's Bootstrap UCL	3.436	95% Percentile Bootstrap UCL	3.373
90% Chebyshev(Mean, Sd) UCL	3.764	95% Chebyshev(Mean, Sd) UCL	4.191
97.5% Chebyshev(Mean, Sd) UCL	4.784	99% Chebyshev(Mean, Sd) UCL	5.948
Suggested UCL to Use			
95% Approximate Gamma UCL	3.372		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (thallium)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	30
Number of Detects	29	Number of Non-Detects	24
Number of Distinct Detects	29	Number of Distinct Non-Detects	1
Minimum Detect	5.0000E-4	Minimum Non-Detect	4.0000E-4
Maximum Detect	0.0301	Maximum Non-Detect	4.0000E-4
Variance Detects	3.2740E-5	Percent Non-Detects	45.28%
Mean Detects	0.00353	SD Detects	0.00572
Median Detects	0.00164	CV Detects	1.622
Skewness Detects	3.913	Kurtosis Detects	17.42
Mean of Logged Detects	-6.234	SD of Logged Detects	0.979
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.514	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.898	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.189	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			

	A–E	F	G–K	L
2445				
2446	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2447	KM Mean	0.00211	KM Standard Error of Mean	6.2081E-4
2448	90KM SD	0.00444	95% KM (BCA) UCL	0.00336
2449	95% KM (t) UCL	0.00315	95% KM (Percentile Bootstrap) UCL	0.00331
2450	95% KM (z) UCL	0.00313	95% KM Bootstrap t UCL	0.00447
2451	90% KM Chebyshev UCL	0.00397	95% KM Chebyshev UCL	0.00482
2452	97.5% KM Chebyshev UCL	0.00599	99% KM Chebyshev UCL	0.00829
2453				
2454	**Gamma GOF Tests on Detected Observations Only**			
2455	A-D Test Statistic	1.662	**Anderson-Darling GOF Test**	
2456	5% A-D Critical Value	0.775	Detected Data Not Gamma Distributed at 5% Significance Level	
2457	K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**	
2458	5% K-S Critical Value	0.168	Detected Data Not Gamma Distributed at 5% Significance Level	
2459	**Detected Data Not Gamma Distributed at 5% Significance Level**			
2460				
2461	**Gamma Statistics on Detected Data Only**			
2462	k hat (MLE)	0.985	k star (bias corrected MLE)	0.906
2463	Theta hat (MLE)	0.00358	Theta star (bias corrected MLE)	0.0039
2464	nu hat (MLE)	57.1	nu star (bias corrected)	52.53
2465	Mean (detects)	0.00353		
2466				
2467	**Gamma ROS Statistics using Imputed Non-Detects**			
2468	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2469	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2470	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2471	This is especially true when the sample size is small.			
2472	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2473	Minimum	5.0000E-4	Mean	0.00646
2474	Maximum	0.0301	Median	0.00816
2475	SD	0.00531	CV	0.822
2476	k hat (MLE)	1.241	k star (bias corrected MLE)	1.183
2477	Theta hat (MLE)	0.00521	Theta star (bias corrected MLE)	0.00546
2478	nu hat (MLE)	131.5	nu star (bias corrected)	125.4
2479	Adjusted Level of Significance (β)	0.0455		
2480	Approximate Chi Square Value (125.42, α)	100.6	Adjusted Chi Square Value (125.42, β)	99.93
2481	95% Gamma Approximate UCL	0.00806	95% Gamma Adjusted UCL	0.00811
2482				
2483	**Estimates of Gamma Parameters using KM Estimates**			
2484	Mean (KM)	0.00211	SD (KM)	0.00444
2485	Variance (KM)	1.9722E-5	SE of Mean (KM)	6.2081E-4
2486	k hat (KM)	0.226	k star (KM)	0.226
2487	nu hat (KM)	23.97	nu star (KM)	23.95
2488	theta hat (KM)	0.00934	theta star (KM)	0.00935
2489	80% gamma percentile (KM)	0.00295	90% gamma percentile (KM)	0.00637
2490	95% gamma percentile (KM)	0.0105	99% gamma percentile (KM)	0.0217
2491				
2492	**Gamma Kaplan-Meier (KM) Statistics**			
2493	Approximate Chi Square Value (23.95, α)	13.81	Adjusted Chi Square Value (23.95, β)	13.59
2494	95% KM Approximate Gamma UCL	0.00366	95% KM Adjusted Gamma UCL	0.00372
2495				
2496	**Lognormal GOF Test on Detected Observations Only**			

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.937	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.148	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00202	Mean in Log Scale	-7.42
SD in Original Scale	0.00452	SD in Log Scale	1.611
95% t UCL (assumes normality of ROS data)	0.00306	95% Percentile Bootstrap UCL	0.00317
95% BCA Bootstrap UCL	0.00355	95% Bootstrap t UCL	0.00431
95% H-UCL (Log ROS)	0.00438		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.954	KM Geo Mean	9.5469E-4
KM SD (logged)	1.064	95% Critical H Value (KM-Log)	2.392
KM Standard Error of Mean (logged)	0.149	95% H-UCL (KM -Log)	0.00239
KM SD (logged)	1.064	95% Critical H Value (KM-Log)	2.392
KM Standard Error of Mean (logged)	0.149		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00202	Mean in Log Scale	-7.268
SD in Original Scale	0.00452	SD in Log Scale	1.354
95% t UCL (Assumes normality)	0.00306	95% H-Stat UCL	0.00293
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 10% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.00239		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (tin)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	35
Number of Detects	36	Number of Non-Detects	17
Number of Distinct Detects	34	Number of Distinct Non-Detects	1
Minimum Detect	0.022	Minimum Non-Detect	0.02
Maximum Detect	1.3	Maximum Non-Detect	0.02
Variance Detects	0.0748	Percent Non-Detects	32.08%
Mean Detects	0.22	SD Detects	0.274

	A–E	F	G–K	L
2549	Median Detects	0.0995	CV Detects	1.243
2550	Skewness Detects	2.548	Kurtosis Detects	7.077
2551	Mean of Logged Detects	-2.053	SD of Logged Detects	1.03
2552				
2553	**Normal GOF Test on Detects Only**			
2554	Shapiro Wilk Test Statistic	0.683	**Shapiro Wilk GOF Test**	
2555	1% Shapiro Wilk Critical Value	0.912	Detected Data Not Normal at 1% Significance Level	
2556	Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
2557	1% Lilliefors Critical Value	0.17	Detected Data Not Normal at 1% Significance Level	
2558	**Detected Data Not Normal at 1% Significance Level**			
2559				
2560	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2561	KM Mean	0.156	KM Standard Error of Mean	0.0336
2562	90KM SD	0.241	95% KM (BCA) UCL	0.215
2563	95% KM (t) UCL	0.212	95% KM (Percentile Bootstrap) UCL	0.215
2564	95% KM (z) UCL	0.211	95% KM Bootstrap t UCL	0.235
2565	90% KM Chebyshev UCL	0.257	95% KM Chebyshev UCL	0.302
2566	97.5% KM Chebyshev UCL	0.366	99% KM Chebyshev UCL	0.49
2567				
2568	**Gamma GOF Tests on Detected Observations Only**			
2569	A-D Test Statistic	0.949	**Anderson-Darling GOF Test**	
2570	5% A-D Critical Value	0.775	Detected Data Not Gamma Distributed at 5% Significance Level	
2571	K-S Test Statistic	0.172	**Kolmogorov-Smirnov GOF**	
2572	5% K-S Critical Value	0.151	Detected Data Not Gamma Distributed at 5% Significance Level	
2573	**Detected Data Not Gamma Distributed at 5% Significance Level**			
2574				
2575	**Gamma Statistics on Detected Data Only**			
2576	k hat (MLE)	1.063	k star (bias corrected MLE)	0.993
2577	Theta hat (MLE)	0.207	Theta star (bias corrected MLE)	0.222
2578	nu hat (MLE)	76.56	nu star (bias corrected)	71.52
2579	Mean (detects)	0.22		
2580				
2581	**Gamma ROS Statistics using Imputed Non-Detects**			
2582	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2583	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2584	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2585	This is especially true when the sample size is small.			
2586	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2587	Minimum	0.01	Mean	0.153
2588	Maximum	1.3	Median	0.078
2589	SD	0.245	CV	1.606
2590	k hat (MLE)	0.62	k star (bias corrected MLE)	0.597
2591	Theta hat (MLE)	0.246	Theta star (bias corrected MLE)	0.256
2592	nu hat (MLE)	65.7	nu star (bias corrected)	63.31
2593	Adjusted Level of Significance (β)	0.0455		
2594	Approximate Chi Square Value (63.31, α)	46.01	Adjusted Chi Square Value (63.31, β)	45.6
2595	95% Gamma Approximate UCL	0.21	95% Gamma Adjusted UCL	0.212
2596				
2597	**Estimates of Gamma Parameters using KM Estimates**			
2598	Mean (KM)	0.156	SD (KM)	0.241
2599	Variance (KM)	0.0581	SE of Mean (KM)	0.0336
2600	k hat (KM)	0.418	k star (KM)	0.407

nu hat (KM)	44.33	nu star (KM)	43.15
theta hat (KM)	0.373	theta star (KM)	0.383
80% gamma percentile (KM)	0.252	90% gamma percentile (KM)	0.439
95% gamma percentile (KM)	0.644	99% gamma percentile (KM)	1.158

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (43.15, α)	29.09	Adjusted Chi Square Value (43.15, β)	28.77
95% KM Approximate Gamma UCL	0.231	95% KM Adjusted Gamma UCL	0.234

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.945	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.134	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.154	Mean in Log Scale	-2.861
SD in Original Scale	0.245	SD in Log Scale	1.511
95% t UCL (assumes normality of ROS data)	0.21	95% Percentile Bootstrap UCL	0.211
95% BCA Bootstrap UCL	0.222	95% Bootstrap t UCL	0.239
95% H-UCL (Log ROS)	0.333		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.649	KM Geo Mean	0.0707
KM SD (logged)	1.206	95% Critical H Value (KM-Log)	2.577
KM Standard Error of Mean (logged)	0.168	95% H-UCL (KM -Log)	0.225
KM SD (logged)	1.206	95% Critical H Value (KM-Log)	2.577
KM Standard Error of Mean (logged)	0.168		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.153	Mean in Log Scale	-2.871
SD in Original Scale	0.245	SD in Log Scale	1.47
95% t UCL (Assumes normality)	0.209	95% H-Stat UCL	0.302

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

KM H-UCL	0.225

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2653	**Result (uranium)**			
2654				
2655	**General Statistics**			
2656	Total Number of Observations	53	Number of Distinct Observations	24
2657	Number of Detects	23	Number of Non-Detects	30
2658	Number of Distinct Detects	23	Number of Distinct Non-Detects	1
2659	Minimum Detect	4.3000E-4	Minimum Non-Detect	4.0000E-4
2660	Maximum Detect	0.0306	Maximum Non-Detect	4.0000E-4
2661	Variance Detects	9.9135E-5	Percent Non-Detects	56.6%
2662	Mean Detects	0.00786	SD Detects	0.00996
2663	Median Detects	0.00176	CV Detects	1.267
2664	Skewness Detects	1.231	Kurtosis Detects	0.0321
2665	Mean of Logged Detects	-5.772	SD of Logged Detects	1.453
2666				
2667	**Normal GOF Test on Detects Only**			
2668	Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk GOF Test**	
2669	1% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 1% Significance Level	
2670	Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**	
2671	1% Lilliefors Critical Value	0.209	Detected Data Not Normal at 1% Significance Level	
2672	**Detected Data Not Normal at 1% Significance Level**			
2673				
2674	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2675	KM Mean	0.00364	KM Standard Error of Mean	0.00104
2676	90KM SD	0.0074	95% KM (BCA) UCL	0.00554
2677	95% KM (t) UCL	0.00538	95% KM (Percentile Bootstrap) UCL	0.00539
2678	95% KM (z) UCL	0.00535	95% KM Bootstrap t UCL	0.0061
2679	90% KM Chebyshev UCL	0.00676	95% KM Chebyshev UCL	0.00817
2680	97.5% KM Chebyshev UCL	0.0101	99% KM Chebyshev UCL	0.014
2681				
2682	**Gamma GOF Tests on Detected Observations Only**			
2683	A-D Test Statistic	1.255	**Anderson-Darling GOF Test**	
2684	5% A-D Critical Value	0.791	Detected Data Not Gamma Distributed at 5% Significance Level	
2685	K-S Test Statistic	0.225	**Kolmogorov-Smirnov GOF**	
2686	5% K-S Critical Value	0.19	Detected Data Not Gamma Distributed at 5% Significance Level	
2687	**Detected Data Not Gamma Distributed at 5% Significance Level**			
2688				
2689	**Gamma Statistics on Detected Data Only**			
2690	k hat (MLE)	0.658	k star (bias corrected MLE)	0.601
2691	Theta hat (MLE)	0.0119	Theta star (bias corrected MLE)	0.0131
2692	nu hat (MLE)	30.28	nu star (bias corrected)	27.66
2693	Mean (detects)	0.00786		
2694				
2695	**Gamma ROS Statistics using Imputed Non-Detects**			
2696	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2697	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2698	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2699	This is especially true when the sample size is small.			
2700	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2701	Minimum	4.3000E-4	Mean	0.00907
2702	Maximum	0.0306	Median	0.01
2703	SD	0.00656	CV	0.724
2704	k hat (MLE)	1.365	k star (bias corrected MLE)	1.301

2705	Theta hat (MLE)	0.00664	Theta star (bias corrected MLE)	0.00697
2706	nu hat (MLE)	144.7	nu star (bias corrected)	137.9
2707	Adjusted Level of Significance (β)	0.0455		
2708	Approximate Chi Square Value (137.86, α)	111.7	Adjusted Chi Square Value (137.86, β)	111.1
2709	95% Gamma Approximate UCL	0.0112	95% Gamma Adjusted UCL	0.0113
2710				
2711	**Estimates of Gamma Parameters using KM Estimates**			
2712	Mean (KM)	0.00364	SD (KM)	0.0074
2713	Variance (KM)	5.4814E-5	SE of Mean (KM)	0.00104
2714	k hat (KM)	0.241	k star (KM)	0.24
2715	nu hat (KM)	25.57	nu star (KM)	25.46
2716	theta hat (KM)	0.0151	theta star (KM)	0.0151
2717	80% gamma percentile (KM)	0.0052	90% gamma percentile (KM)	0.0109
2718	95% gamma percentile (KM)	0.0178	99% gamma percentile (KM)	0.0362
2719				
2720	**Gamma Kaplan-Meier (KM) Statistics**			
2721	Approximate Chi Square Value (25.46, α)	14.96	Adjusted Chi Square Value (25.46, β)	14.74
2722	95% KM Approximate Gamma UCL	0.00619	95% KM Adjusted Gamma UCL	0.00628
2723				
2724	**Lognormal GOF Test on Detected Observations Only**			
2725	Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
2726	10% Shapiro Wilk Critical Value	0.928	Detected Data Not Lognormal at 10% Significance Level	
2727	Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**	
2728	10% Lilliefors Critical Value	0.165	Detected Data Not Lognormal at 10% Significance Level	
2729	**Detected Data Not Lognormal at 10% Significance Level**			
2730				
2731	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2732	Mean in Original Scale	0.00347	Mean in Log Scale	-8.172
2733	SD in Original Scale	0.00755	SD in Log Scale	2.609
2734	95% t UCL (assumes normality of ROS data)	0.00521	95% Percentile Bootstrap UCL	0.00518
2735	95% BCA Bootstrap UCL	0.00551	95% Bootstrap t UCL	0.00586
2736	95% H-UCL (Log ROS)	0.044		
2737				
2738	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2739	KM Mean (logged)	-6.934	KM Geo Mean	9.7440E-4
2740	KM SD (logged)	1.382	95% Critical H Value (KM-Log)	2.806
2741	KM Standard Error of Mean (logged)	0.194	95% H-UCL (KM -Log)	0.00434
2742	KM SD (logged)	1.382	95% Critical H Value (KM-Log)	2.806
2743	KM Standard Error of Mean (logged)	0.194		
2744				
2745	**DL/2 Statistics**			
2746	**DL/2 Normal**		**DL/2 Log-Transformed**	
2747	Mean in Original Scale	0.00352	Mean in Log Scale	-7.326
2748	SD in Original Scale	0.00752	SD in Log Scale	1.667
2749	95% t UCL (Assumes normality)	0.00525	95% H-Stat UCL	0.00549
2750	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2751				
2752	**Nonparametric Distribution Free UCL Statistics**			
2753	**Data do not follow a Discernible Distribution**			
2754				
2755	**Suggested UCL to Use**			
2756	95% KM (t) UCL	0.00538		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (vanadium)

General Statistics

Total Number of Observations	53	Number of Distinct Observations	22
Number of Detects	24	Number of Non-Detects	29
Number of Distinct Detects	22	Number of Distinct Non-Detects	1
Minimum Detect	0.02	Minimum Non-Detect	0.02
Maximum Detect	1.63	Maximum Non-Detect	0.02
Variance Detects	0.217	Percent Non-Detects	54.72%
Mean Detects	0.346	SD Detects	0.465
Median Detects	0.081	CV Detects	1.347
Skewness Detects	1.615	Kurtosis Detects	1.676
Mean of Logged Detects	-1.999	SD of Logged Detects	1.434

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.727	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.884	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.252	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.205	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.167	KM Standard Error of Mean	0.0487
90KM SD	0.347	95% KM (BCA) UCL	0.261
95% KM (t) UCL	0.249	95% KM (Percentile Bootstrap) UCL	0.252
95% KM (z) UCL	0.247	95% KM Bootstrap t UCL	0.293
90% KM Chebyshev UCL	0.313	95% KM Chebyshev UCL	0.38
97.5% KM Chebyshev UCL	0.471	99% KM Chebyshev UCL	0.652

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.419	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.792	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.186	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.652	k star (bias corrected MLE)	0.598
Theta hat (MLE)	0.53	Theta star (bias corrected MLE)	0.578
nu hat (MLE)	31.3	nu star (bias corrected)	28.72
Mean (detects)	0.346		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.162
Maximum	1.63	Median	0.01
SD	0.352	CV	2.176
k hat (MLE)	0.409	k star (bias corrected MLE)	0.398
Theta hat (MLE)	0.396	Theta star (bias corrected MLE)	0.407
nu hat (MLE)	43.32	nu star (bias corrected)	42.21
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (42.21, α)	28.31	Adjusted Chi Square Value (42.21, β)	27.99
95% Gamma Approximate UCL	0.241	95% Gamma Adjusted UCL	0.244

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.167	SD (KM)	0.347
Variance (KM)	0.12	SE of Mean (KM)	0.0487
k hat (KM)	0.233	k star (KM)	0.233
nu hat (KM)	24.72	nu star (KM)	24.65
theta hat (KM)	0.718	theta star (KM)	0.72
80% gamma percentile (KM)	0.237	90% gamma percentile (KM)	0.505
95% gamma percentile (KM)	0.828	99% gamma percentile (KM)	1.697

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (24.65, α)	14.34	Adjusted Chi Square Value (24.65, β)	14.12
95% KM Approximate Gamma UCL	0.288	95% KM Adjusted Gamma UCL	0.292

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.93	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.162	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.159	Mean in Log Scale	-4.248
SD in Original Scale	0.354	SD in Log Scale	2.534
95% t UCL (assumes normality of ROS data)	0.24	95% Percentile Bootstrap UCL	0.241
95% BCA Bootstrap UCL	0.257	95% Bootstrap t UCL	0.277
95% H-UCL (Log ROS)	1.683		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.046	KM Geo Mean	0.0476
KM SD (logged)	1.341	95% Critical H Value (KM-Log)	2.755
KM Standard Error of Mean (logged)	0.188	95% H-UCL (KM -Log)	0.195
KM SD (logged)	1.341	95% Critical H Value (KM-Log)	2.755
KM Standard Error of Mean (logged)	0.188		

DL/2 Statistics

DL/2 Normal	**DL/2 Log-Transformed**

	A–E	F	G–K	L
2861	Mean in Original Scale	0.162	Mean in Log Scale	-3.425
2862	SD in Original Scale	0.352	SD in Log Scale	1.62
2863	95% t UCL (Assumes normality)	0.243	95% H-Stat UCL	0.243
2864	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2865				
2866	**Nonparametric Distribution Free UCL Statistics**			
2867	**Data do not follow a Discernible Distribution**			
2868				
2869	**Suggested UCL to Use**			
2870	95% KM (t) UCL	0.249		
2871				
2872	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**			
2873	**Please verify the data were collected from random locations.**			
2874	**If the data were collected using judgmental or other non-random methods,**			
2875	**then contact a statistician to correctly calculate UCLs.**			
2876				
2877	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2878	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2879	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2880				
2881				
2882	Result (zinc)			
2883				
2884	**General Statistics**			
2885	Total Number of Observations	53	Number of Distinct Observations	53
2886			Number of Missing Observations	0
2887	Minimum	1.85	Mean	8.288
2888	Maximum	35.3	Median	6.1
2889	SD	6.597	Std. Error of Mean	0.906
2890	Coefficient of Variation	0.796	Skewness	2.281
2891				
2892	**Normal GOF Test**			
2893	Shapiro Wilk Test Statistic	0.757	**Shapiro Wilk GOF Test**	
2894	1% Shapiro Wilk P Value	3.938E-11	Data Not Normal at 1% Significance Level	
2895	Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
2896	1% Lilliefors Critical Value	0.14	Data Not Normal at 1% Significance Level	
2897	**Data Not Normal at 1% Significance Level**			
2898				
2899	**Assuming Normal Distribution**			
2900	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2901	95% Student's-t UCL	9.806	95% Adjusted-CLT UCL (Chen-1995)	10.08
2902			95% Modified-t UCL (Johnson-1978)	9.853
2903				
2904	**Gamma GOF Test**			
2905	A-D Test Statistic	1.095	**Anderson-Darling Gamma GOF Test**	
2906	5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level	
2907	K-S Test Statistic	0.126	**Kolmogorov-Smirnov Gamma GOF Test**	
2908	5% K-S Critical Value	0.123	Data Not Gamma Distributed at 5% Significance Level	
2909	**Data Not Gamma Distributed at 5% Significance Level**			
2910				
2911	**Gamma Statistics**			
2912	k hat (MLE)	2.38	k star (bias corrected MLE)	2.258

Theta hat (MLE)	3.482	Theta star (bias corrected MLE)	3.671
nu hat (MLE)	252.3	nu star (bias corrected)	239.3
MLE Mean (bias corrected)	8.288	MLE Sd (bias corrected)	5.516
		Approximate Chi Square Value (0.05)	204.5
Adjusted Level of Significance	0.0455	Adjusted Chi Square Value	203.6
Assuming Gamma Distribution			
95% Approximate Gamma UCL	9.699	95% Adjusted Gamma UCL	9.742
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.438	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0831	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.111	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.615	Mean of logged Data	1.89
Maximum of Logged Data	3.564	SD of logged Data	0.648
Assuming Lognormal Distribution			
95% H-UCL	9.762	90% Chebyshev (MVUE) UCL	10.48
95% Chebyshev (MVUE) UCL	11.54	97.5% Chebyshev (MVUE) UCL	13.02
99% Chebyshev (MVUE) UCL	15.92		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9.779	95% BCA Bootstrap UCL	9.952
95% Standard Bootstrap UCL	9.775	95% Bootstrap-t UCL	10.3
95% Hall's Bootstrap UCL	10.31	95% Percentile Bootstrap UCL	9.785
90% Chebyshev(Mean, Sd) UCL	11.01	95% Chebyshev(Mean, Sd) UCL	12.24
97.5% Chebyshev(Mean, Sd) UCL	13.95	99% Chebyshev(Mean, Sd) UCL	17.3
Suggested UCL to Use			
95% H-UCL	9.762		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (zirconium)			
General Statistics			
Total Number of Observations	53	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	41
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.041	Minimum Non-Detect	0.04
Maximum Detect	0.598	Maximum Non-Detect	0.04
Variance Detects	0.033	Percent Non-Detects	77.36%
Mean Detects	0.223	SD Detects	0.182

Median Detects	0.169	CV Detects	0.814
Skewness Detects	1.031	Kurtosis Detects	0.0104
Mean of Logged Detects	-1.832	SD of Logged Detects	0.89
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0815	KM Standard Error of Mean	0.0162
90KM SD	0.113	95% KM (BCA) UCL	0.113
95% KM (t) UCL	0.109	95% KM (Percentile Bootstrap) UCL	0.109
95% KM (z) UCL	0.108	95% KM Bootstrap t UCL	0.123
90% KM Chebyshev UCL	0.13	95% KM Chebyshev UCL	0.152
97.5% KM Chebyshev UCL	0.183	99% KM Chebyshev UCL	0.243
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.241	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.131	**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)	1.652	k star (bias corrected MLE)	1.295
Theta hat (MLE)	0.135	Theta star (bias corrected MLE)	0.172
nu hat (MLE)	39.65	nu star (bias corrected)	31.07
Mean (detects)	0.223		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.0583
Maximum	0.598	Median	0.01
SD	0.123	CV	2.109
k hat (MLE)	0.552	k star (bias corrected MLE)	0.533
Theta hat (MLE)	0.106	Theta star (bias corrected MLE)	0.109
nu hat (MLE)	58.46	nu star (bias corrected)	56.48
Adjusted Level of Significance (β)	0.0455		
Approximate Chi Square Value (56.48, α)	40.21	Adjusted Chi Square Value (56.48, β)	39.83
95% Gamma Approximate UCL	0.0818	95% Gamma Adjusted UCL	0.0826
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0815	SD (KM)	0.113
Variance (KM)	0.0127	SE of Mean (KM)	0.0162
k hat (KM)	0.522	k star (KM)	0.505

	A–E	F	G–K	L
3017	nu hat (KM)	55.29	nu star (KM)	53.49
3018	theta hat (KM)	0.156	theta star (KM)	0.161
3019	80% gamma percentile (KM)	0.134	90% gamma percentile (KM)	0.22
3020	95% gamma percentile (KM)	0.312	99% gamma percentile (KM)	0.538
3021				
3022	**Gamma Kaplan-Meier (KM) Statistics**			
3023	Approximate Chi Square Value (53.49, α)	37.69	Adjusted Chi Square Value (53.49, β)	37.32
3024	95% KM Approximate Gamma UCL	0.116	95% KM Adjusted Gamma UCL	0.117
3025				
3026	**Lognormal GOF Test on Detected Observations Only**			
3027	Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**	
3028	10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level	
3029	Lilliefors Test Statistic	0.115	**Lilliefors GOF Test**	
3030	10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level	
3031	**Detected Data appear Lognormal at 10% Significance Level**			
3032				
3033	**Lognormal ROS Statistics Using Imputed Non-Detects**			
3034	Mean in Original Scale	0.0586	Mean in Log Scale	-4.573
3035	SD in Original Scale	0.123	SD in Log Scale	2.034
3036	95% t UCL (assumes normality of ROS data)	0.0869	95% Percentile Bootstrap UCL	0.0876
3037	95% BCA Bootstrap UCL	0.0931	95% Bootstrap t UCL	0.102
3038	95% H-UCL (Log ROS)	0.23		
3039				
3040	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
3041	KM Mean (logged)	-2.905	KM Geo Mean	0.0548
3042	KM SD (logged)	0.708	95% Critical H Value (KM-Log)	2.036
3043	KM Standard Error of Mean (logged)	0.102	95% H-UCL (KM -Log)	0.0859
3044	KM SD (logged)	0.708	95% Critical H Value (KM-Log)	2.036
3045	KM Standard Error of Mean (logged)	0.102		
3046				
3047	**DL/2 Statistics**			
3048	**DL/2 Normal**		**DL/2 Log-Transformed**	
3049	Mean in Original Scale	0.066	Mean in Log Scale	-3.441
3050	SD in Original Scale	0.12	SD in Log Scale	0.969
3051	95% t UCL (Assumes normality)	0.0936	95% H-Stat UCL	0.0697
3052	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
3053				
3054	**Nonparametric Distribution Free UCL Statistics**			
3055	**Detected Data appear Normal Distributed at 1% Significance Level**			
3056				
3057	**Suggested UCL to Use**			
3058	95% KM (t) UCL	0.109		
3059				
3060	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3061	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3062	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3063				

B.2.6 Terrestrial Vegetation EPC ProUCL Output : Berries & Other

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 4/1/2024 4:18:03 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (aluminum)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	59
Number of Detects	62	Number of Non-Detects	2
Number of Distinct Detects	58	Number of Distinct Non-Detects	1
Minimum Detect	0.42	Minimum Non-Detect	0.4
Maximum Detect	518	Maximum Non-Detect	0.4
Variance Detects	13137	Percent Non-Detects	3.125%
Mean Detects	49.49	SD Detects	114.6
Median Detects	5.295	CV Detects	2.316
Skewness Detects	2.954	Kurtosis Detects	8.191
Mean of Logged Detects	1.905	SD of Logged Detects	1.988

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.485	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.13	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	47.96	KM Standard Error of Mean	14.14
90KM SD	112.2	95% KM (BCA) UCL	73.66
95% KM (t) UCL	71.57	95% KM (Percentile Bootstrap) UCL	72.41
95% KM (z) UCL	71.22	95% KM Bootstrap t UCL	81.19
90% KM Chebyshev UCL	90.39	95% KM Chebyshev UCL	109.6
97.5% KM Chebyshev UCL	136.3	99% KM Chebyshev UCL	188.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.655	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.855	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**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)	0.339	k star (bias corrected MLE)	0.333
Theta hat (MLE)	146.2	Theta star (bias corrected MLE)	148.7
nu hat (MLE)	41.98	nu star (bias corrected)	41.28
Mean (detects)	49.49		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	47.95
Maximum	518	Median	4.805
SD	113.1	CV	2.359
k hat (MLE)	0.315	k star (bias corrected MLE)	0.311
Theta hat (MLE)	152	Theta star (bias corrected MLE)	154.2
nu hat (MLE)	40.36	nu star (bias corrected)	39.81
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (39.81, α)	26.35	Adjusted Chi Square Value (39.81, β)	26.1
95% Gamma Approximate UCL	72.43	95% Gamma Adjusted UCL	73.13
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	47.96	SD (KM)	112.2
Variance (KM)	12595	SE of Mean (KM)	14.14
k hat (KM)	0.183	k star (KM)	0.184
nu hat (KM)	23.38	nu star (KM)	23.61
theta hat (KM)	262.6	theta star (KM)	260
80% gamma percentile (KM)	60.4	90% gamma percentile (KM)	144.8
95% gamma percentile (KM)	252.2	99% gamma percentile (KM)	552
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (23.61, α)	13.56	Adjusted Chi Square Value (23.61, β)	13.38
95% KM Approximate Gamma UCL	83.55	95% KM Adjusted Gamma UCL	84.65
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.919	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	3.8224E-4	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.103	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	47.95	Mean in Log Scale	1.751
SD in Original Scale	113.1	SD in Log Scale	2.137
95% t UCL (assumes normality of ROS data)	71.55	95% Percentile Bootstrap UCL	71.83
95% BCA Bootstrap UCL	75.56	95% Bootstrap t UCL	81.66
95% H-UCL (Log ROS)	132.8		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.816	KM Geo Mean	6.15
KM SD (logged)	2.002	95% Critical H Value (KM-Log)	3.058
KM Standard Error of Mean (logged)	0.252	95% H-UCL (KM -Log)	98.66
KM SD (logged)	2.002	95% Critical H Value (KM-Log)	3.058
KM Standard Error of Mean (logged)	0.252		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	47.95	Mean in Log Scale	1.795

SD in Original Scale	113.1	SD in Log Scale	2.051
95% t UCL (Assumes normality)	71.56	95% H-Stat UCL	109.9

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	71.57		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (antimony)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	10
Number of Detects	12	Number of Non-Detects	52
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.002	Minimum Non-Detect	0.002
Maximum Detect	0.0085	Maximum Non-Detect	0.002
Variance Detects	3.9297E-6	Percent Non-Detects	81.25%
Mean Detects	0.00423	SD Detects	0.00198
Median Detects	0.00325	CV Detects	0.468
Skewness Detects	1.198	Kurtosis Detects	0.413
Mean of Logged Detects	-5.553	SD of Logged Detects	0.426

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.00242	KM Standard Error of Mean	1.5641E-4
90KM SD	0.0012	95% KM (BCA) UCL	0.00268
95% KM (t) UCL	0.00268	95% KM (Percentile Bootstrap) UCL	0.00268
95% KM (z) UCL	0.00268	95% KM Bootstrap t UCL	0.00285
90% KM Chebyshev UCL	0.00289	95% KM Chebyshev UCL	0.0031
97.5% KM Chebyshev UCL	0.0034	99% KM Chebyshev UCL	0.00398

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.802	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.732	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**

5% K-S Critical Value	0.246	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)	5.842	k star (bias corrected MLE)	4.437
Theta hat (MLE)	7.2465E-4	Theta star (bias corrected MLE)	9.5411E-4
nu hat (MLE)	140.2	nu star (bias corrected)	106.5
Mean (detects)	0.00423		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.00892
Maximum	0.01	Median	0.01
SD	0.00242	CV	0.271
k hat (MLE)	8.068	k star (bias corrected MLE)	7.7
Theta hat (MLE)	0.00111	Theta star (bias corrected MLE)	0.00116
nu hat (MLE)	1033	nu star (bias corrected)	985.7
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (985.66, α)	913.8	Adjusted Chi Square Value (985.66, β)	912.2
95% Gamma Approximate UCL	0.00962	95% Gamma Adjusted UCL	0.00964
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00242	SD (KM)	0.0012
Variance (KM)	1.4353E-6	SE of Mean (KM)	1.5641E-4
k hat (KM)	4.076	k star (KM)	3.895
nu hat (KM)	521.7	nu star (KM)	498.6
theta hat (KM)	5.9339E-4	theta star (KM)	6.2091E-4
80% gamma percentile (KM)	0.00335	90% gamma percentile (KM)	0.00406
95% gamma percentile (KM)	0.00472	99% gamma percentile (KM)	0.00613
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (498.62, α)	447.8	Adjusted Chi Square Value (498.62, β)	446.7
95% KM Approximate Gamma UCL	0.00269	95% KM Adjusted Gamma UCL	0.0027
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.21	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00144	Mean in Log Scale	-7.052
SD in Original Scale	0.00166	SD in Log Scale	1.032
95% t UCL (assumes normality of ROS data)	0.00179	95% Percentile Bootstrap UCL	0.00179
95% BCA Bootstrap UCL	0.00183	95% Bootstrap t UCL	0.0019
95% H-UCL (Log ROS)	0.00198		

	A–E	F	G–K	L
209	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
210	KM Mean (logged)	-6.091	KM Geo Mean	0.00226
211	KM SD (logged)	0.313	95% Critical H Value (KM-Log)	1.76
212	KM Standard Error of Mean (logged)	0.0408	95% H-UCL (KM -Log)	0.00255
213	KM SD (logged)	0.313	95% Critical H Value (KM-Log)	1.76
214	KM Standard Error of Mean (logged)	0.0408		
215				
216	**DL/2 Statistics**			
217	**DL/2 Normal**		**DL/2 Log-Transformed**	
218	Mean in Original Scale	0.00161	Mean in Log Scale	-6.654
219	SD in Original Scale	0.00152	SD in Log Scale	0.562
220	95% t UCL (Assumes normality)	0.00192	95% H-Stat UCL	0.00173
221	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
222				
223	**Nonparametric Distribution Free UCL Statistics**			
224	**Detected Data appear Normal Distributed at 1% Significance Level**			
225				
226	**Suggested UCL to Use**			
227	95% KM (t) UCL	0.00268		
228				
229	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
230	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
231	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
232				
233	**Result (arsenic)**			
234				
235	**General Statistics**			
236	Total Number of Observations	64	Number of Distinct Observations	44
237	Number of Detects	47	Number of Non-Detects	17
238	Number of Distinct Detects	44	Number of Distinct Non-Detects	1
239	Minimum Detect	0.004	Minimum Non-Detect	0.004
240	Maximum Detect	0.131	Maximum Non-Detect	0.004
241	Variance Detects	9.3577E-4	Percent Non-Detects	26.56%
242	Mean Detects	0.0251	SD Detects	0.0306
243	Median Detects	0.0101	CV Detects	1.218
244	Skewness Detects	2.014	Kurtosis Detects	3.543
245	Mean of Logged Detects	-4.225	SD of Logged Detects	0.991
246				
247	**Normal GOF Test on Detects Only**			
248	Shapiro Wilk Test Statistic	0.692	**Shapiro Wilk GOF Test**	
249	1% Shapiro Wilk Critical Value	0.928	Detected Data Not Normal at 1% Significance Level	
250	Lilliefors Test Statistic	0.282	**Lilliefors GOF Test**	
251	1% Lilliefors Critical Value	0.15	Detected Data Not Normal at 1% Significance Level	
252	**Detected Data Not Normal at 1% Significance Level**			
253				
254	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
255	KM Mean	0.0195	KM Standard Error of Mean	0.00348
256	90KM SD	0.0276	95% KM (BCA) UCL	0.0255
257	95% KM (t) UCL	0.0253	95% KM (Percentile Bootstrap) UCL	0.0254
258	95% KM (z) UCL	0.0252	95% KM Bootstrap t UCL	0.0269
259	90% KM Chebyshev UCL	0.03	95% KM Chebyshev UCL	0.0347
260	97.5% KM Chebyshev UCL	0.0413	99% KM Chebyshev UCL	0.0542

	A–E	F	G–K	L
261				
262	**Gamma GOF Tests on Detected Observations Only**			
263	A-D Test Statistic	2.556	**Anderson-Darling GOF Test**	
264	5% A-D Critical Value	0.777	Detected Data Not Gamma Distributed at 5% Significance Level	
265	K-S Test Statistic	0.207	**Kolmogorov-Smirnov GOF**	
266	5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level	
267	**Detected Data Not Gamma Distributed at 5% Significance Level**			
268				
269	**Gamma Statistics on Detected Data Only**			
270	k hat (MLE)	1.06	k star (bias corrected MLE)	1.006
271	Theta hat (MLE)	0.0237	Theta star (bias corrected MLE)	0.025
272	nu hat (MLE)	99.64	nu star (bias corrected)	94.61
273	Mean (detects)	0.0251		
274				
275	**Gamma ROS Statistics using Imputed Non-Detects**			
276	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
277	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
278	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
279	This is especially true when the sample size is small.			
280	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
281	Minimum	0.004	Mean	0.0211
282	Maximum	0.131	Median	0.01
283	SD	0.027	CV	1.279
284	k hat (MLE)	1.209	k star (bias corrected MLE)	1.162
285	Theta hat (MLE)	0.0175	Theta star (bias corrected MLE)	0.0182
286	nu hat (MLE)	154.7	nu star (bias corrected)	148.8
287	Adjusted Level of Significance (β)	0.0463		
288	Approximate Chi Square Value (148.78, α)	121.6	Adjusted Chi Square Value (148.78, β)	121
289	95% Gamma Approximate UCL	0.0258	95% Gamma Adjusted UCL	0.0259
290				
291	**Estimates of Gamma Parameters using KM Estimates**			
292	Mean (KM)	0.0195	SD (KM)	0.0276
293	Variance (KM)	7.5957E-4	SE of Mean (KM)	0.00348
294	k hat (KM)	0.501	k star (KM)	0.488
295	nu hat (KM)	64.13	nu star (KM)	62.46
296	theta hat (KM)	0.0389	theta star (KM)	0.04
297	80% gamma percentile (KM)	0.032	90% gamma percentile (KM)	0.053
298	95% gamma percentile (KM)	0.0756	99% gamma percentile (KM)	0.131
299				
300	**Gamma Kaplan-Meier (KM) Statistics**			
301	Approximate Chi Square Value (62.46, α)	45.28	Adjusted Chi Square Value (62.46, β)	44.94
302	95% KM Approximate Gamma UCL	0.0269	95% KM Adjusted Gamma UCL	0.0271
303				
304	**Lognormal GOF Test on Detected Observations Only**			
305	Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**	
306	10% Shapiro Wilk Critical Value	0.954	Detected Data Not Lognormal at 10% Significance Level	
307	Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**	
308	10% Lilliefors Critical Value	0.118	Detected Data Not Lognormal at 10% Significance Level	
309	**Detected Data Not Lognormal at 10% Significance Level**			
310				
311	**Lognormal ROS Statistics Using Imputed Non-Detects**			
312	Mean in Original Scale	0.0189	Mean in Log Scale	-4.849

SD in Original Scale	0.0282	SD in Log Scale	1.381
95% t UCL (assumes normality of ROS data)	0.0248	95% Percentile Bootstrap UCL	0.0248
95% BCA Bootstrap UCL	0.0254	95% Bootstrap t UCL	0.0266
95% H-UCL (Log ROS)	0.0304		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.569	KM Geo Mean	0.0104
KM SD (logged)	1.017	95% Critical H Value (KM-Log)	2.259
KM Standard Error of Mean (logged)	0.128	95% H-UCL (KM -Log)	0.0232
KM SD (logged)	1.017	95% Critical H Value (KM-Log)	2.259
KM Standard Error of Mean (logged)	0.128		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.019	Mean in Log Scale	-4.754
SD in Original Scale	0.0281	SD in Log Scale	1.226
95% t UCL (Assumes normality)	0.0248	95% H-Stat UCL	0.0258

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

Suggested UCL to Use

95% KM (t) UCL	0.0253		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (barium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	62
		Number of Missing Observations	0
Minimum	0.126	Mean	4.33
Maximum	37.1	Median	1.35
SD	7.807	Std. Error of Mean	0.976
Coefficient of Variation	1.803	Skewness	3.028

Normal GOF Test

Shapiro Wilk Test Statistic	0.548	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5.959	95% Adjusted-CLT UCL (Chen-1995)	6.33
		95% Modified-t UCL (Johnson-1978)	6.021

Gamma GOF Test

A-D Test Statistic	2.513	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.807	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.136	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.592	k star (bias corrected MLE)	0.574
Theta hat (MLE)	7.317	Theta star (bias corrected MLE)	7.538
nu hat (MLE)	75.75	nu star (bias corrected)	73.53
MLE Mean (bias corrected)	4.33	MLE Sd (bias corrected)	5.713
		Approximate Chi Square Value (0.05)	54.79
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	54.41

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.812	95% Adjusted Gamma UCL	5.852

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0144	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0945	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.071	Mean of logged Data	0.419
Maximum of Logged Data	3.614	SD of logged Data	1.436

Assuming Lognormal Distribution

95% H-UCL	6.542	90% Chebyshev (MVUE) UCL	7.091
95% Chebyshev (MVUE) UCL	8.432	97.5% Chebyshev (MVUE) UCL	10.29
99% Chebyshev (MVUE) UCL	13.95		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	5.935	95% BCA Bootstrap UCL	6.237
95% Standard Bootstrap UCL	5.888	95% Bootstrap-t UCL	6.703
95% Hall's Bootstrap UCL	6.148	95% Percentile Bootstrap UCL	5.946
90% Chebyshev(Mean, Sd) UCL	7.258	95% Chebyshev(Mean, Sd) UCL	8.584
97.5% Chebyshev(Mean, Sd) UCL	10.42	99% Chebyshev(Mean, Sd) UCL	14.04

Suggested UCL to Use

95% H-UCL	6.542		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (beryllium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	55
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.0024	Minimum Non-Detect	0.002
Maximum Detect	0.0176	Maximum Non-Detect	0.002
Variance Detects	3.2792E-5	Percent Non-Detects	85.94%
Mean Detects	0.00932	SD Detects	0.00573
Median Detects	0.0083	CV Detects	0.614
Skewness Detects	0.283	Kurtosis Detects	-1.585
Mean of Logged Detects	-4.883	SD of Logged Detects	0.724

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.00303	KM Standard Error of Mean	4.3122E-4
90KM SD	0.00325	95% KM (BCA) UCL	0.00381
95% KM (t) UCL	0.00375	95% KM (Percentile Bootstrap) UCL	0.00374
95% KM (z) UCL	0.00374	95% KM Bootstrap t UCL	0.00392
90% KM Chebyshev UCL	0.00432	95% KM Chebyshev UCL	0.00491
97.5% KM Chebyshev UCL	0.00572	99% KM Chebyshev UCL	0.00732

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.32	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.568	k star (bias corrected MLE)	1.786
Theta hat (MLE)	0.00363	Theta star (bias corrected MLE)	0.00522
nu hat (MLE)	46.22	nu star (bias corrected)	32.15
Mean (detects)	0.00932		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0099
Maximum	0.0176	Median	0.01
SD	0.00205	CV	0.207
k hat (MLE)	17.16	k star (bias corrected MLE)	16.36
Theta hat (MLE)	5.7730E-4	Theta star (bias corrected MLE)	6.0531E-4
nu hat (MLE)	2196	nu star (bias corrected)	2094
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (N/A, α)	1989	Adjusted Chi Square Value (N/A, β)	1987
95% Gamma Approximate UCL	0.0104	95% Gamma Adjusted UCL	0.0104

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00303	SD (KM)	0.00325
Variance (KM)	1.0578E-5	SE of Mean (KM)	4.3122E-4
k hat (KM)	0.868	k star (KM)	0.837
nu hat (KM)	111.1	nu star (KM)	107.2
theta hat (KM)	0.00349	theta star (KM)	0.00362
80% gamma percentile (KM)	0.00494	90% gamma percentile (KM)	0.00729
95% gamma percentile (KM)	0.00967	99% gamma percentile (KM)	0.0153

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (107.19, α)	84.3	Adjusted Chi Square Value (107.19, β)	83.83
95% KM Approximate Gamma UCL	0.00385	95% KM Adjusted Gamma UCL	0.00387

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00178	Mean in Log Scale	-7.854
SD in Original Scale	0.00374	SD in Log Scale	1.856
95% t UCL (assumes normality of ROS data)	0.00256	95% Percentile Bootstrap UCL	0.00258
95% BCA Bootstrap UCL	0.0027	95% Bootstrap t UCL	0.00294
95% H-UCL (Log ROS)	0.00425		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.027	KM Geo Mean	0.00241
KM SD (logged)	0.529	95% Critical H Value (KM-Log)	1.883
KM Standard Error of Mean (logged)	0.0701	95% H-UCL (KM -Log)	0.00315
KM SD (logged)	0.529	95% Critical H Value (KM-Log)	1.883
KM Standard Error of Mean (logged)	0.0701		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00217	Mean in Log Scale	-6.623
SD in Original Scale	0.00356	SD in Log Scale	0.755
95% t UCL (Assumes normality)	0.00291	95% H-Stat UCL	0.00215

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00375		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (bismuth)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	7
Number of Detects	7	Number of Non-Detects	57
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.002	Minimum Non-Detect	0.002
Maximum Detect	0.0047	Maximum Non-Detect	0.002
Variance Detects	1.0333E-6	Percent Non-Detects	89.06%
Mean Detects	0.0033	SD Detects	0.00102
Median Detects	0.0033	CV Detects	0.308
Skewness Detects	0.117	Kurtosis Detects	-1.189
Mean of Logged Detects	-5.757	SD of Logged Detects	0.322

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.00214	KM Standard Error of Mean	6.9043E-5
90KM SD	5.1137E-4	95% KM (BCA) UCL	0.00226
95% KM (t) UCL	0.00226	95% KM (Percentile Bootstrap) UCL	0.00226
95% KM (z) UCL	0.00226	95% KM Bootstrap t UCL	0.00228
90% KM Chebyshev UCL	0.00235	95% KM Chebyshev UCL	0.00244
97.5% KM Chebyshev UCL	0.00257	99% KM Chebyshev UCL	0.00283

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.261	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.171	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level

	A–E	F	G–K	L
573	Detected data appear Gamma Distributed at 5% Significance Level			
574	Note GOF tests may be unreliable for small sample sizes			
575				
576	**Gamma Statistics on Detected Data Only**			
577	k hat (MLE)	11.78	k star (bias corrected MLE)	6.825
578	Theta hat (MLE)	2.8020E-4	Theta star (bias corrected MLE)	4.8351E-4
579	nu hat (MLE)	164.9	nu star (bias corrected)	95.55
580	Mean (detects)	0.0033		
581				
582	**Gamma ROS Statistics using Imputed Non-Detects**			
583	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
584	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
585	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
586	This is especially true when the sample size is small.			
587	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
588	Minimum	0.002	Mean	0.00927
589	Maximum	0.01	Median	0.01
590	SD	0.00213	CV	0.23
591	k hat (MLE)	10.19	k star (bias corrected MLE)	9.724
592	Theta hat (MLE)	9.0934E-4	Theta star (bias corrected MLE)	9.5304E-4
593	nu hat (MLE)	1304	nu star (bias corrected)	1245
594	Adjusted Level of Significance (β)	0.0463		
595	Approximate Chi Square Value (N/A, α)	1164	Adjusted Chi Square Value (N/A, β)	1162
596	95% Gamma Approximate UCL	0.00991	95% Gamma Adjusted UCL	0.00993
597				
598	**Estimates of Gamma Parameters using KM Estimates**			
599	Mean (KM)	0.00214	SD (KM)	5.1137E-4
600	Variance (KM)	2.6150E-7	SE of Mean (KM)	6.9043E-5
601	k hat (KM)	17.55	k star (KM)	16.74
602	nu hat (KM)	2246	nu star (KM)	2142
603	theta hat (KM)	1.2207E-4	theta star (KM)	1.2800E-4
604	80% gamma percentile (KM)	0.00257	90% gamma percentile (KM)	0.00283
605	95% gamma percentile (KM)	0.00307	99% gamma percentile (KM)	0.00354
606				
607	**Gamma Kaplan-Meier (KM) Statistics**			
608	Approximate Chi Square Value (N/A, α)	2036	Adjusted Chi Square Value (N/A, β)	2033
609	95% KM Approximate Gamma UCL	0.00225	95% KM Adjusted Gamma UCL	0.00226
610				
611	**Lognormal GOF Test on Detected Observations Only**			
612	Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**	
613	10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level	
614	Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**	
615	10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level	
616	**Detected Data appear Lognormal at 10% Significance Level**			
617	**Note GOF tests may be unreliable for small sample sizes**			
618				
619	**Lognormal ROS Statistics Using Imputed Non-Detects**			
620	Mean in Original Scale	9.7293E-4	Mean in Log Scale	-7.345
621	SD in Original Scale	9.8594E-4	SD in Log Scale	0.921
622	95% t UCL (assumes normality of ROS data)	0.00118	95% Percentile Bootstrap UCL	0.00118
623	95% BCA Bootstrap UCL	0.0012	95% Bootstrap t UCL	0.00124
624	95% H-UCL (Log ROS)	0.00127		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.165	KM Geo Mean	0.0021
KM SD (logged)	0.174	95% Critical H Value (KM-Log)	1.703
KM Standard Error of Mean (logged)	0.0234	95% H-UCL (KM -Log)	0.00222
KM SD (logged)	0.174	95% Critical H Value (KM-Log)	1.703
KM Standard Error of Mean (logged)	0.0234		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00125	Mean in Log Scale	-6.782
SD in Original Scale	7.8861E-4	SD in Log Scale	0.375
95% t UCL (Assumes normality)	0.00142	95% H-Stat UCL	0.00132
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00226		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (boron)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	62
		Number of Missing Observations	0
Minimum	0.7	Mean	4.482
Maximum	15.6	Median	3.885
SD	3.28	Std. Error of Mean	0.41
Coefficient of Variation	0.732	Skewness	1.29
Normal GOF Test			
Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.6866E-6	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.166	95% Adjusted-CLT UCL (Chen-1995)	5.227
		95% Modified-t UCL (Johnson-1978)	5.177
Gamma GOF Test			
A-D Test Statistic	0.275	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0579	**Kolmogorov-Smirnov Gamma GOF Test**	

5% K-S Critical Value	0.113	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.971	k star (bias corrected MLE)	1.889
Theta hat (MLE)	2.274	Theta star (bias corrected MLE)	2.372
nu hat (MLE)	252.3	nu star (bias corrected)	241.8
MLE Mean (bias corrected)	4.482	MLE Sd (bias corrected)	3.261
		Approximate Chi Square Value (0.05)	206.8
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	206.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	5.24	95% Adjusted Gamma UCL	5.259
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0638	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0776	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.357	Mean of logged Data	1.225
Maximum of Logged Data	2.747	SD of logged Data	0.787
Assuming Lognormal Distribution			
95% H-UCL	5.703	90% Chebyshev (MVUE) UCL	6.137
95% Chebyshev (MVUE) UCL	6.829	97.5% Chebyshev (MVUE) UCL	7.788
99% Chebyshev (MVUE) UCL	9.673		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	5.156	95% BCA Bootstrap UCL	5.169
95% Standard Bootstrap UCL	5.149	95% Bootstrap-t UCL	5.261
95% Hall's Bootstrap UCL	5.273	95% Percentile Bootstrap UCL	5.116
90% Chebyshev(Mean, Sd) UCL	5.712	95% Chebyshev(Mean, Sd) UCL	6.269
97.5% Chebyshev(Mean, Sd) UCL	7.042	99% Chebyshev(Mean, Sd) UCL	8.561
Suggested UCL to Use			
95% Approximate Gamma UCL	5.24		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (cadmium)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	50
Number of Detects	51	Number of Non-Detects	13

	A–E	F	G–K	L
729	Number of Distinct Detects	49	Number of Distinct Non-Detects	1
730	Minimum Detect	0.0016	Minimum Non-Detect	0.001
731	Maximum Detect	0.2	Maximum Non-Detect	0.001
732	Variance Detects	0.00156	Percent Non-Detects	20.31%
733	Mean Detects	0.0338	SD Detects	0.0395
734	Median Detects	0.0194	CV Detects	1.17
735	Skewness Detects	2.128	Kurtosis Detects	5.43
736	Mean of Logged Detects	-4.012	SD of Logged Detects	1.199
737				
738	**Normal GOF Test on Detects Only**			
739	Shapiro Wilk Test Statistic	0.754	**Normal GOF Test on Detected Observations Only**	
740	1% Shapiro Wilk P Value	9.552E-11	Detected Data Not Normal at 1% Significance Level	
741	Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**	
742	1% Lilliefors Critical Value	0.143	Detected Data Not Normal at 1% Significance Level	
743	**Detected Data Not Normal at 1% Significance Level**			
744				
745	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
746	KM Mean	0.0271	KM Standard Error of Mean	0.00472
747	90KM SD	0.0374	95% KM (BCA) UCL	0.035
748	95% KM (t) UCL	0.035	95% KM (Percentile Bootstrap) UCL	0.035
749	95% KM (z) UCL	0.0349	95% KM Bootstrap t UCL	0.0373
750	90% KM Chebyshev UCL	0.0413	95% KM Chebyshev UCL	0.0477
751	97.5% KM Chebyshev UCL	0.0566	99% KM Chebyshev UCL	0.0741
752				
753	**Gamma GOF Tests on Detected Observations Only**			
754	A-D Test Statistic	0.64	**Anderson-Darling GOF Test**	
755	5% A-D Critical Value	0.784	Detected data appear Gamma Distributed at 5% Significance Level	
756	K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**	
757	5% K-S Critical Value	0.128	Detected data appear Gamma Distributed at 5% Significance Level	
758	**Detected data appear Gamma Distributed at 5% Significance Level**			
759				
760	**Gamma Statistics on Detected Data Only**			
761	k hat (MLE)	0.931	k star (bias corrected MLE)	0.889
762	Theta hat (MLE)	0.0363	Theta star (bias corrected MLE)	0.038
763	nu hat (MLE)	94.96	nu star (bias corrected)	90.71
764	Mean (detects)	0.0338		
765				
766	**Gamma ROS Statistics using Imputed Non-Detects**			
767	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
768	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
769	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
770	This is especially true when the sample size is small.			
771	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
772	Minimum	0.0016	Mean	0.029
773	Maximum	0.2	Median	0.0134
774	SD	0.0365	CV	1.261
775	k hat (MLE)	0.979	k star (bias corrected MLE)	0.943
776	Theta hat (MLE)	0.0296	Theta star (bias corrected MLE)	0.0307
777	nu hat (MLE)	125.2	nu star (bias corrected)	120.7
778	Adjusted Level of Significance (β)	0.0463		
779	Approximate Chi Square Value (120.71, α)	96.34	Adjusted Chi Square Value (120.71, β)	95.84
780	95% Gamma Approximate UCL	0.0363	95% Gamma Adjusted UCL	0.0365

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0271	SD (KM)	0.0374
Variance (KM)	0.0014	SE of Mean (KM)	0.00472
k hat (KM)	0.528	k star (KM)	0.514
nu hat (KM)	67.57	nu star (KM)	65.74
theta hat (KM)	0.0514	theta star (KM)	0.0529
80% gamma percentile (KM)	0.0446	90% gamma percentile (KM)	0.073
95% gamma percentile (KM)	0.103	99% gamma percentile (KM)	0.178

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (65.74, α)	48.08	Adjusted Chi Square Value (65.74, β)	47.73
95% KM Approximate Gamma UCL	0.0371	95% KM Adjusted Gamma UCL	0.0374

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.971	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0.386	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0583	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.113	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0272	Mean in Log Scale	-4.569
SD in Original Scale	0.0376	SD in Log Scale	1.566
95% t UCL (assumes normality of ROS data)	0.0351	95% Percentile Bootstrap UCL	0.035
95% BCA Bootstrap UCL	0.0358	95% Bootstrap t UCL	0.0373
95% H-UCL (Log ROS)	0.0583		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.6	KM Geo Mean	0.01
KM SD (logged)	1.575	95% Critical H Value (KM-Log)	2.546
KM Standard Error of Mean (logged)	0.199	95% H-UCL (KM -Log)	0.0576
KM SD (logged)	1.575	95% Critical H Value (KM-Log)	2.546
KM Standard Error of Mean (logged)	0.199		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.027	Mean in Log Scale	-4.741
SD in Original Scale	0.0377	SD in Log Scale	1.805
95% t UCL (Assumes normality)	0.0349	95% H-Stat UCL	0.0845

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	0.0371		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

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

Result (calcium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	61
		Number of Missing Observations	0
Minimum	115	Mean	2087
Maximum	10700	Median	1665
SD	1944	Std. Error of Mean	242.9
Coefficient of Variation	0.931	Skewness	1.847

Normal GOF Test

Shapiro Wilk Test Statistic	0.837	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	2.1841E-9	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2493	95% Adjusted-CLT UCL (Chen-1995)	2547
		95% Modified-t UCL (Johnson-1978)	2502

Gamma GOF Test

A-D Test Statistic	0.484	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0744	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.233	k star (bias corrected MLE)	1.185
Theta hat (MLE)	1693	Theta star (bias corrected MLE)	1761
nu hat (MLE)	157.8	nu star (bias corrected)	151.7
MLE Mean (bias corrected)	2087	MLE Sd (bias corrected)	1917
		Approximate Chi Square Value (0.05)	124.3
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	123.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	2549	95% Adjusted Gamma UCL	2560

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.0741	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.116	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.101	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics			
Minimum of Logged Data	4.745	Mean of logged Data	7.186
Maximum of Logged Data	9.278	SD of logged Data	1.048
Assuming Lognormal Distribution			
95% H-UCL	3085	90% Chebyshev (MVUE) UCL	3323
95% Chebyshev (MVUE) UCL	3806	97.5% Chebyshev (MVUE) UCL	4476
99% Chebyshev (MVUE) UCL	5793		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2487	95% BCA Bootstrap UCL	2580
95% Standard Bootstrap UCL	2485	95% Bootstrap-t UCL	2560
95% Hall's Bootstrap UCL	2575	95% Percentile Bootstrap UCL	2529
90% Chebyshev(Mean, Sd) UCL	2816	95% Chebyshev(Mean, Sd) UCL	3146
97.5% Chebyshev(Mean, Sd) UCL	3604	99% Chebyshev(Mean, Sd) UCL	4504
Suggested UCL to Use			
95% Approximate Gamma UCL	2549		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (chromium)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	42
Number of Detects	48	Number of Non-Detects	16
Number of Distinct Detects	42	Number of Distinct Non-Detects	1
Minimum Detect	0.01	Minimum Non-Detect	0.01
Maximum Detect	1.82	Maximum Non-Detect	0.01
Variance Detects	0.126	Percent Non-Detects	25%
Mean Detects	0.205	SD Detects	0.355
Median Detects	0.059	CV Detects	1.734
Skewness Detects	2.856	Kurtosis Detects	9.26
Mean of Logged Detects	-2.625	SD of Logged Detects	1.395
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.596	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.929	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.148	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.156	KM Standard Error of Mean	0.0399
90KM SD	0.316	95% KM (BCA) UCL	0.229
95% KM (t) UCL	0.223	95% KM (Percentile Bootstrap) UCL	0.226

95% KM (z) UCL	0.222	95% KM Bootstrap t UCL	0.255
90% KM Chebyshev UCL	0.276	95% KM Chebyshev UCL	0.33
97.5% KM Chebyshev UCL	0.405	99% KM Chebyshev UCL	0.553
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.844	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.806	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.241	**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)	0.595	k star (bias corrected MLE)	0.572
Theta hat (MLE)	0.344	Theta star (bias corrected MLE)	0.358
nu hat (MLE)	57.16	nu star (bias corrected)	54.92
Mean (detects)	0.205		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.156
Maximum	1.82	Median	0.0315
SD	0.318	CV	2.039
k hat (MLE)	0.503	k star (bias corrected MLE)	0.49
Theta hat (MLE)	0.31	Theta star (bias corrected MLE)	0.319
nu hat (MLE)	64.35	nu star (bias corrected)	62.66
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (62.66, α)	45.46	Adjusted Chi Square Value (62.66, β)	45.12
95% Gamma Approximate UCL	0.215	95% Gamma Adjusted UCL	0.217
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.156	SD (KM)	0.316
Variance (KM)	0.0996	SE of Mean (KM)	0.0399
k hat (KM)	0.244	k star (KM)	0.243
nu hat (KM)	31.29	nu star (KM)	31.16
theta hat (KM)	0.638	theta star (KM)	0.641
80% gamma percentile (KM)	0.224	90% gamma percentile (KM)	0.469
95% gamma percentile (KM)	0.761	99% gamma percentile (KM)	1.542
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (31.16, α)	19.4	Adjusted Chi Square Value (31.16, β)	19.19
95% KM Approximate Gamma UCL	0.251	95% KM Adjusted Gamma UCL	0.253
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.954	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.117	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.154	Mean in Log Scale	-3.447
SD in Original Scale	0.319	SD in Log Scale	1.918
95% t UCL (assumes normality of ROS data)	0.221	95% Percentile Bootstrap UCL	0.221
95% BCA Bootstrap UCL	0.233	95% Bootstrap t UCL	0.253
95% H-UCL (Log ROS)	0.409		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.12	KM Geo Mean	0.0442
KM SD (logged)	1.471	95% Critical H Value (KM-Log)	2.418
KM Standard Error of Mean (logged)	0.186	95% H-UCL (KM -Log)	0.204
KM SD (logged)	1.471	95% Critical H Value (KM-Log)	2.418
KM Standard Error of Mean (logged)	0.186		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.155	Mean in Log Scale	-3.293
SD in Original Scale	0.319	SD in Log Scale	1.677
95% t UCL (Assumes normality)	0.221	95% H-Stat UCL	0.266

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

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.223		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cobalt)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	47
Number of Detects	49	Number of Non-Detects	15
Number of Distinct Detects	46	Number of Distinct Non-Detects	1
Minimum Detect	0.0041	Minimum Non-Detect	0.004
Maximum Detect	0.49	Maximum Non-Detect	0.004
Variance Detects	0.00997	Percent Non-Detects	23.44%
Mean Detects	0.0608	SD Detects	0.0998
Median Detects	0.0163	CV Detects	1.643
Skewness Detects	2.651	Kurtosis Detects	7.634
Mean of Logged Detects	-3.75	SD of Logged Detects	1.317

Normal GOF Test on Detects Only

	A–E	F	G–K	L
1041	Shapiro Wilk Test Statistic	0.614	**Shapiro Wilk GOF Test**	
1042	1% Shapiro Wilk Critical Value	0.929	Detected Data Not Normal at 1% Significance Level	
1043	Lilliefors Test Statistic	0.312	**Lilliefors GOF Test**	
1044	1% Lilliefors Critical Value	0.146	Detected Data Not Normal at 1% Significance Level	
1045	**Detected Data Not Normal at 1% Significance Level**			
1046				
1047	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1048	KM Mean	0.0475	KM Standard Error of Mean	0.0113
1049	90KM SD	0.0897	95% KM (BCA) UCL	0.0685
1050	95% KM (t) UCL	0.0664	95% KM (Percentile Bootstrap) UCL	0.067
1051	95% KM (z) UCL	0.0661	95% KM Bootstrap t UCL	0.0734
1052	90% KM Chebyshev UCL	0.0815	95% KM Chebyshev UCL	0.0969
1053	97.5% KM Chebyshev UCL	0.118	99% KM Chebyshev UCL	0.16
1054				
1055	**Gamma GOF Tests on Detected Observations Only**			
1056	A-D Test Statistic	3.345	**Anderson-Darling GOF Test**	
1057	5% A-D Critical Value	0.802	Detected Data Not Gamma Distributed at 5% Significance Level	
1058	K-S Test Statistic	0.255	**Kolmogorov-Smirnov GOF**	
1059	5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level	
1060	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1061				
1062	**Gamma Statistics on Detected Data Only**			
1063	k hat (MLE)	0.644	k star (bias corrected MLE)	0.618
1064	Theta hat (MLE)	0.0944	Theta star (bias corrected MLE)	0.0983
1065	nu hat (MLE)	63.11	nu star (bias corrected)	60.58
1066	Mean (detects)	0.0608		
1067				
1068	**Gamma ROS Statistics using Imputed Non-Detects**			
1069	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1070	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1071	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1072	This is especially true when the sample size is small.			
1073	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1074	Minimum	0.0041	Mean	0.0489
1075	Maximum	0.49	Median	0.0125
1076	SD	0.0898	CV	1.838
1077	k hat (MLE)	0.655	k star (bias corrected MLE)	0.634
1078	Theta hat (MLE)	0.0747	Theta star (bias corrected MLE)	0.077
1079	nu hat (MLE)	83.78	nu star (bias corrected)	81.19
1080	Adjusted Level of Significance (β)	0.0463		
1081	Approximate Chi Square Value (81.19, α)	61.42	Adjusted Chi Square Value (81.19, β)	61.03
1082	95% Gamma Approximate UCL	0.0646	95% Gamma Adjusted UCL	0.065
1083				
1084	**Estimates of Gamma Parameters using KM Estimates**			
1085	Mean (KM)	0.0475	SD (KM)	0.0897
1086	Variance (KM)	0.00805	SE of Mean (KM)	0.0113
1087	k hat (KM)	0.28	k star (KM)	0.277
1088	nu hat (KM)	35.8	nu star (KM)	35.45
1089	theta hat (KM)	0.17	theta star (KM)	0.171
1090	80% gamma percentile (KM)	0.0712	90% gamma percentile (KM)	0.141
1091	95% gamma percentile (KM)	0.223	99% gamma percentile (KM)	0.437
1092				

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (35.45, α)	22.83	Adjusted Chi Square Value (35.45, β)	22.6
95% KM Approximate Gamma UCL	0.0737	95% KM Adjusted Gamma UCL	0.0745
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.955	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.183	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.115	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0468	Mean in Log Scale	-4.468
SD in Original Scale	0.0908	SD in Log Scale	1.778
95% t UCL (assumes normality of ROS data)	0.0658	95% Percentile Bootstrap UCL	0.0659
95% BCA Bootstrap UCL	0.0686	95% Bootstrap t UCL	0.0734
95% H-UCL (Log ROS)	0.104		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.165	KM Geo Mean	0.0155
KM SD (logged)	1.365	95% Critical H Value (KM-Log)	2.286
KM Standard Error of Mean (logged)	0.172	95% H-UCL (KM -Log)	0.0584
KM SD (logged)	1.365	95% Critical H Value (KM-Log)	2.286
KM Standard Error of Mean (logged)	0.172		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.047	Mean in Log Scale	-4.328
SD in Original Scale	0.0907	SD in Log Scale	1.558
95% t UCL (Assumes normality)	0.0659	95% H-Stat UCL	0.073
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			
Suggested UCL to Use			
95% KM (t) UCL	0.0664		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (copper)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	61

	A	B	C	D	E	F	G	H	I	J	K	L
1145											Number of Missing Observations	0
1146					Minimum	0.39					Mean	1.393
1147					Maximum	4.26					Median	1.1
1148					SD	0.859					Std. Error of Mean	0.107
1149					Coefficient of Variation	0.617					Skewness	1.507
1150												
1151						**Normal GOF Test**						
1152					Shapiro Wilk Test Statistic	0.838			**Shapiro Wilk GOF Test**			
1153					1% Shapiro Wilk P Value	2.4390E-9			Data Not Normal at 1% Significance Level			
1154					Lilliefors Test Statistic	0.216			**Lilliefors GOF Test**			
1155					1% Lilliefors Critical Value	0.128			Data Not Normal at 1% Significance Level			
1156						**Data Not Normal at 1% Significance Level**						
1157												
1158						**Assuming Normal Distribution**						
1159			**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**			
1160					95% Student's-t UCL	1.572					95% Adjusted-CLT UCL (Chen-1995)	1.591
1161											95% Modified-t UCL (Johnson-1978)	1.575
1162												
1163						**Gamma GOF Test**						
1164					A-D Test Statistic	1.3			**Anderson-Darling Gamma GOF Test**			
1165					5% A-D Critical Value	0.757			Data Not Gamma Distributed at 5% Significance Level			
1166					K-S Test Statistic	0.155			**Kolmogorov-Smirnov Gamma GOF Test**			
1167					5% K-S Critical Value	0.112			Data Not Gamma Distributed at 5% Significance Level			
1168						**Data Not Gamma Distributed at 5% Significance Level**						
1169												
1170						**Gamma Statistics**						
1171					k hat (MLE)	3.336					k star (bias corrected MLE)	3.19
1172					Theta hat (MLE)	0.418					Theta star (bias corrected MLE)	0.437
1173					nu hat (MLE)	427					nu star (bias corrected)	408.3
1174					MLE Mean (bias corrected)	1.393					MLE Sd (bias corrected)	0.78
1175											Approximate Chi Square Value (0.05)	362.4
1176					Adjusted Level of Significance	0.0463					Adjusted Chi Square Value	361.5
1177												
1178						**Assuming Gamma Distribution**						
1179					95% Approximate Gamma UCL	1.569					95% Adjusted Gamma UCL	1.573
1180												
1181						**Lognormal GOF Test**						
1182					Shapiro Wilk Test Statistic	0.963			**Shapiro Wilk Lognormal GOF Test**			
1183					10% Shapiro Wilk P Value	0.133			Data appear Lognormal at 10% Significance Level			
1184					Lilliefors Test Statistic	0.117			**Lilliefors Lognormal GOF Test**			
1185					10% Lilliefors Critical Value	0.101			Data Not Lognormal at 10% Significance Level			
1186						**Data appear Approximate Lognormal at 10% Significance Level**						
1187												
1188						**Lognormal Statistics**						
1189					Minimum of Logged Data	-0.942					Mean of logged Data	0.174
1190					Maximum of Logged Data	1.449					SD of logged Data	0.551
1191												
1192						**Assuming Lognormal Distribution**						
1193					95% H-UCL	1.581					90% Chebyshev (MVUE) UCL	1.685
1194					95% Chebyshev (MVUE) UCL	1.823					97.5% Chebyshev (MVUE) UCL	2.014
1195					99% Chebyshev (MVUE) UCL	2.389						
1196												

	A–E	F	G–K	L
1197	**Nonparametric Distribution Free UCL Statistics**			
1198	**Data appear to follow a Discernible Distribution**			
1199				
1200	**Nonparametric Distribution Free UCLs**			
1201	95% CLT UCL	1.569	95% BCA Bootstrap UCL	1.582
1202	95% Standard Bootstrap UCL	1.566	95% Bootstrap-t UCL	1.604
1203	95% Hall's Bootstrap UCL	1.599	95% Percentile Bootstrap UCL	1.565
1204	90% Chebyshev(Mean, Sd) UCL	1.715	95% Chebyshev(Mean, Sd) UCL	1.861
1205	97.5% Chebyshev(Mean, Sd) UCL	2.063	99% Chebyshev(Mean, Sd) UCL	2.461
1206				
1207	**Suggested UCL to Use**			
1208	95% H-UCL	1.581		
1209				
1210	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1211	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1212	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1213				
1214				
1215	**Result (iron)**			
1216				
1217	**General Statistics**			
1218	Total Number of Observations	64	Number of Distinct Observations	63
1219			Number of Missing Observations	0
1220	Minimum	1.42	Mean	73.2
1221	Maximum	756	Median	14.85
1222	SD	160.3	Std. Error of Mean	20.04
1223	Coefficient of Variation	2.19	Skewness	3.114
1224				
1225	**Normal GOF Test**			
1226	Shapiro Wilk Test Statistic	0.49	**Shapiro Wilk GOF Test**	
1227	1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
1228	Lilliefors Test Statistic	0.371	**Lilliefors GOF Test**	
1229	1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	
1230	**Data Not Normal at 1% Significance Level**			
1231				
1232	**Assuming Normal Distribution**			
1233	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1234	95% Student's-t UCL	106.7	95% Adjusted-CLT UCL (Chen-1995)	114.5
1235			95% Modified-t UCL (Johnson-1978)	108
1236				
1237	**Gamma GOF Test**			
1238	A-D Test Statistic	5.706	**Anderson-Darling Gamma GOF Test**	
1239	5% A-D Critical Value	0.827	Data Not Gamma Distributed at 5% Significance Level	
1240	K-S Test Statistic	0.267	**Kolmogorov-Smirnov Gamma GOF Test**	
1241	5% K-S Critical Value	0.119	Data Not Gamma Distributed at 5% Significance Level	
1242	**Data Not Gamma Distributed at 5% Significance Level**			
1243				
1244	**Gamma Statistics**			
1245	k hat (MLE)	0.454	k star (bias corrected MLE)	0.443
1246	Theta hat (MLE)	161.1	Theta star (bias corrected MLE)	165.1
1247	nu hat (MLE)	58.16	nu star (bias corrected)	56.77
1248	MLE Mean (bias corrected)	73.2	MLE Sd (bias corrected)	109.9

		Approximate Chi Square Value (0.05)	40.45
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	40.13

Assuming Gamma Distribution

95% Approximate Gamma UCL	102.7	95% Adjusted Gamma UCL	103.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	6.9984E-5	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.101	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.351	Mean of logged Data	2.874
Maximum of Logged Data	6.628	SD of logged Data	1.545

Assuming Lognormal Distribution

95% H-UCL	95.35	90% Chebyshev (MVUE) UCL	100.8
95% Chebyshev (MVUE) UCL	120.9	97.5% Chebyshev (MVUE) UCL	148.9
99% Chebyshev (MVUE) UCL	204		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	106.2	95% BCA Bootstrap UCL	116.4
95% Standard Bootstrap UCL	106.4	95% Bootstrap-t UCL	123.5
95% Hall's Bootstrap UCL	113.7	95% Percentile Bootstrap UCL	108.5
90% Chebyshev(Mean, Sd) UCL	133.3	95% Chebyshev(Mean, Sd) UCL	160.5
97.5% Chebyshev(Mean, Sd) UCL	198.3	99% Chebyshev(Mean, Sd) UCL	272.6

Suggested UCL to Use

95% Student's-t UCL	106.7		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lead)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	37
Number of Detects	37	Number of Non-Detects	27
Number of Distinct Detects	36	Number of Distinct Non-Detects	1
Minimum Detect	0.005	Minimum Non-Detect	0.004
Maximum Detect	0.771	Maximum Non-Detect	0.004

	A–E	F	G–K	L
1301	Variance Detects	0.0338	Percent Non-Detects	42.19%
1302	Mean Detects	0.0987	SD Detects	0.184
1303	Median Detects	0.0134	CV Detects	1.863
1304	Skewness Detects	2.637	Kurtosis Detects	6.77
1305	Mean of Logged Detects	-3.523	SD of Logged Detects	1.459
1306				
1307	**Normal GOF Test on Detects Only**			
1308	Shapiro Wilk Test Statistic	0.563	**Shapiro Wilk GOF Test**	
1309	1% Shapiro Wilk Critical Value	0.814	Detected Data Not Normal at 1% Significance Level	
1310	Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**	
1311	1% Lilliefors Critical Value	0.168	Detected Data Not Normal at 1% Significance Level	
1312	**Detected Data Not Normal at 1% Significance Level**			
1313				
1314	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1315	KM Mean	0.0587	KM Standard Error of Mean	0.0185
1316	90KM SD	0.146	95% KM (BCA) UCL	0.0906
1317	95% KM (t) UCL	0.0896	95% KM (Percentile Bootstrap) UCL	0.09
1318	95% KM (z) UCL	0.0891	95% KM Bootstrap t UCL	0.109
1319	90% KM Chebyshev UCL	0.114	95% KM Chebyshev UCL	0.139
1320	97.5% KM Chebyshev UCL	0.174	99% KM Chebyshev UCL	0.242
1321				
1322	**Gamma GOF Tests on Detected Observations Only**			
1323	A-D Test Statistic	3.405	**Anderson-Darling GOF Test**	
1324	5% A-D Critical Value	0.81	Detected Data Not Gamma Distributed at 5% Significance Level	
1325	K-S Test Statistic	0.252	**Kolmogorov-Smirnov GOF**	
1326	5% K-S Critical Value	0.153	Detected Data Not Gamma Distributed at 5% Significance Level	
1327	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1328				
1329	**Gamma Statistics on Detected Data Only**			
1330	k hat (MLE)	0.523	k star (bias corrected MLE)	0.498
1331	Theta hat (MLE)	0.189	Theta star (bias corrected MLE)	0.198
1332	nu hat (MLE)	38.67	nu star (bias corrected)	36.86
1333	Mean (detects)	0.0987		
1334				
1335	**Gamma ROS Statistics using Imputed Non-Detects**			
1336	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1337	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1338	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1339	This is especially true when the sample size is small.			
1340	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1341	Minimum	0.005	Mean	0.0613
1342	Maximum	0.771	Median	0.01
1343	SD	0.146	CV	2.38
1344	k hat (MLE)	0.53	k star (bias corrected MLE)	0.516
1345	Theta hat (MLE)	0.116	Theta star (bias corrected MLE)	0.119
1346	nu hat (MLE)	67.86	nu star (bias corrected)	66.02
1347	Adjusted Level of Significance (β)	0.0463		
1348	Approximate Chi Square Value (66.02, α)	48.32	Adjusted Chi Square Value (66.02, β)	47.97
1349	95% Gamma Approximate UCL	0.0837	95% Gamma Adjusted UCL	0.0843
1350				
1351	**Estimates of Gamma Parameters using KM Estimates**			
1352	Mean (KM)	0.0587	SD (KM)	0.146

Variance (KM)	0.0212	SE of Mean (KM)	0.0185
k hat (KM)	0.163	k star (KM)	0.166
nu hat (KM)	20.83	nu star (KM)	21.18
theta hat (KM)	0.361	theta star (KM)	0.355
80% gamma percentile (KM)	0.0689	90% gamma percentile (KM)	0.176
95% gamma percentile (KM)	0.317	99% gamma percentile (KM)	0.717
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (21.18, α)	11.73	Adjusted Chi Square Value (21.18, β)	11.57
95% KM Approximate Gamma UCL	0.106	95% KM Adjusted Gamma UCL	0.108
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.946	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.132	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0576	Mean in Log Scale	-5.105
SD in Original Scale	0.147	SD in Log Scale	2.31
95% t UCL (assumes normality of ROS data)	0.0883	95% Percentile Bootstrap UCL	0.0891
95% BCA Bootstrap UCL	0.0953	95% Bootstrap t UCL	0.106
95% H-UCL (Log ROS)	0.225		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.366	KM Geo Mean	0.0127
KM SD (logged)	1.474	95% Critical H Value (KM-Log)	2.422
KM Standard Error of Mean (logged)	0.187	95% H-UCL (KM -Log)	0.059
KM SD (logged)	1.474	95% Critical H Value (KM-Log)	2.422
KM Standard Error of Mean (logged)	0.187		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0579	Mean in Log Scale	-4.659
SD in Original Scale	0.147	SD in Log Scale	1.736
95% t UCL (Assumes normality)	0.0886	95% H-Stat UCL	0.0777
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			
Suggested UCL to Use			
95% KM (t) UCL	0.0896		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lithium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	10
Number of Detects	10	Number of Non-Detects	54
Number of Distinct Detects	10	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.1
Maximum Detect	1.38	Maximum Non-Detect	0.1
Variance Detects	0.168	Percent Non-Detects	84.38%
Mean Detects	0.491	SD Detects	0.41
Median Detects	0.305	CV Detects	0.835
Skewness Detects	1.259	Kurtosis Detects	1.083
Mean of Logged Detects	-1.024	SD of Logged Detects	0.845

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.857	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.781	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.304	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.161	KM Standard Error of Mean	0.0276
90KM SD	0.209	95% KM (BCA) UCL	0.212
95% KM (t) UCL	0.207	95% KM (Percentile Bootstrap) UCL	0.209
95% KM (z) UCL	0.206	95% KM Bootstrap t UCL	0.234
90% KM Chebyshev UCL	0.244	95% KM Chebyshev UCL	0.281
97.5% KM Chebyshev UCL	0.333	99% KM Chebyshev UCL	0.436

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.325	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	**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)	1.747	k star (bias corrected MLE)	1.29
Theta hat (MLE)	0.281	Theta star (bias corrected MLE)	0.381
nu hat (MLE)	34.94	nu star (bias corrected)	25.79
Mean (detects)	0.491		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0852
Maximum	1.38	Median	0.01

	A–E	F	G–K	L
1457	SD	0.235	CV	2.755
1458	k hat (MLE)	0.414	k star (bias corrected MLE)	0.405
1459	Theta hat (MLE)	0.206	Theta star (bias corrected MLE)	0.21
1460	nu hat (MLE)	52.94	nu star (bias corrected)	51.8
1461	Adjusted Level of Significance (β)	0.0463		
1462	Approximate Chi Square Value (51.80, α)	36.27	Adjusted Chi Square Value (51.80, β)	35.97
1463	95% Gamma Approximate UCL	0.122	95% Gamma Adjusted UCL	0.123
1464				
1465	**Estimates of Gamma Parameters using KM Estimates**			
1466	Mean (KM)	0.161	SD (KM)	0.209
1467	Variance (KM)	0.0438	SE of Mean (KM)	0.0276
1468	k hat (KM)	0.592	k star (KM)	0.575
1469	nu hat (KM)	75.81	nu star (KM)	73.59
1470	theta hat (KM)	0.272	theta star (KM)	0.28
1471	80% gamma percentile (KM)	0.266	90% gamma percentile (KM)	0.423
1472	95% gamma percentile (KM)	0.589	99% gamma percentile (KM)	0.991
1473				
1474	**Gamma Kaplan-Meier (KM) Statistics**			
1475	Approximate Chi Square Value (73.59, α)	54.84	Adjusted Chi Square Value (73.59, β)	54.46
1476	95% KM Approximate Gamma UCL	0.216	95% KM Adjusted Gamma UCL	0.218
1477				
1478	**Lognormal GOF Test on Detected Observations Only**			
1479	Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
1480	10% Shapiro Wilk Critical Value	0.869	Detected Data appear Lognormal at 10% Significance Level	
1481	Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
1482	10% Lilliefors Critical Value	0.241	Detected Data appear Lognormal at 10% Significance Level	
1483	**Detected Data appear Lognormal at 10% Significance Level**			
1484				
1485	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1486	Mean in Original Scale	0.0924	Mean in Log Scale	-4.431
1487	SD in Original Scale	0.233	SD in Log Scale	2.2
1488	95% t UCL (assumes normality of ROS data)	0.141	95% Percentile Bootstrap UCL	0.142
1489	95% BCA Bootstrap UCL	0.154	95% Bootstrap t UCL	0.175
1490	95% H-UCL (Log ROS)	0.325		
1491				
1492	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1493	KM Mean (logged)	-2.103	KM Geo Mean	0.122
1494	KM SD (logged)	0.562	95% Critical H Value (KM-Log)	1.906
1495	KM Standard Error of Mean (logged)	0.074	95% H-UCL (KM -Log)	0.164
1496	KM SD (logged)	0.562	95% Critical H Value (KM-Log)	1.906
1497	KM Standard Error of Mean (logged)	0.074		
1498				
1499	**DL/2 Statistics**			
1500	**DL/2 Normal**		**DL/2 Log-Transformed**	
1501	Mean in Original Scale	0.119	Mean in Log Scale	-2.688
1502	SD in Original Scale	0.224	SD in Log Scale	0.789
1503	95% t UCL (Assumes normality)	0.166	95% H-Stat UCL	0.114
1504	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1505				
1506	**Nonparametric Distribution Free UCL Statistics**			
1507	**Detected Data appear Normal Distributed at 1% Significance Level**			
1508				

Suggested UCL to Use			
95% KM (t) UCL	0.207		

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

Result (magnesium)

General Statistics			
Total Number of Observations	64	Number of Distinct Observations	64
		Number of Missing Observations	0
Minimum	67.9	Mean	470.1
Maximum	1760	Median	388.5
SD	326.8	Std. Error of Mean	40.85
Coefficient of Variation	0.695	Skewness	2.075
Normal GOF Test			
Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	4.326E-11	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	538.3	95% Adjusted-CLT UCL (Chen-1995)	548.6
		95% Modified-t UCL (Johnson-1978)	540
Gamma GOF Test			
A-D Test Statistic	0.62	**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	0.0788	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.617	k star (bias corrected MLE)	2.504
Theta hat (MLE)	179.6	Theta star (bias corrected MLE)	187.7
nu hat (MLE)	334.9	nu star (bias corrected)	320.6
MLE Mean (bias corrected)	470.1	MLE Sd (bias corrected)	297
		Approximate Chi Square Value (0.05)	280.1
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	279.2
Assuming Gamma Distribution			
95% Approximate Gamma UCL	538	95% Adjusted Gamma UCL	539.7
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.247	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0813	**Lilliefors Lognormal GOF Test**	

10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.218	Mean of logged Data	5.95
Maximum of Logged Data	7.473	SD of logged Data	0.657

Assuming Lognormal Distribution

95% H-UCL	560.9	90% Chebyshev (MVUE) UCL	601.5
95% Chebyshev (MVUE) UCL	659.1	97.5% Chebyshev (MVUE) UCL	739.1
99% Chebyshev (MVUE) UCL	896.2		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	537.3	95% BCA Bootstrap UCL	551.4
95% Standard Bootstrap UCL	536.8	95% Bootstrap-t UCL	551.3
95% Hall's Bootstrap UCL	553.2	95% Percentile Bootstrap UCL	540
90% Chebyshev(Mean, Sd) UCL	592.6	95% Chebyshev(Mean, Sd) UCL	648.1
97.5% Chebyshev(Mean, Sd) UCL	725.2	99% Chebyshev(Mean, Sd) UCL	876.5

Suggested UCL to Use

95% Approximate Gamma UCL	538		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (manganese)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	64
		Number of Missing Observations	0
Minimum	0.631	Mean	27.52
Maximum	172	Median	11.05
SD	39.53	Std. Error of Mean	4.941
Coefficient of Variation	1.436	Skewness	2.224

Normal GOF Test

Shapiro Wilk Test Statistic	0.652	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	35.77	95% Adjusted-CLT UCL (Chen-1995)	37.12
		95% Modified-t UCL (Johnson-1978)	36

Gamma GOF Test			
A-D Test Statistic	2.62	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.792	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.156	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.116	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.762	k star (bias corrected MLE)	0.737
Theta hat (MLE)	36.1	Theta star (bias corrected MLE)	37.34
nu hat (MLE)	97.59	nu star (bias corrected)	94.35
MLE Mean (bias corrected)	27.52	MLE Sd (bias corrected)	32.06
		Approximate Chi Square Value (0.05)	72.95
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	72.51
Assuming Gamma Distribution			
95% Approximate Gamma UCL	35.6	95% Adjusted Gamma UCL	35.81
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.105	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.101	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.101	Data Not Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.46	Mean of logged Data	2.532
Maximum of Logged Data	5.147	SD of logged Data	1.25
Assuming Lognormal Distribution			
95% H-UCL	38.85	90% Chebyshev (MVUE) UCL	42.85
95% Chebyshev (MVUE) UCL	50.08	97.5% Chebyshev (MVUE) UCL	60.12
99% Chebyshev (MVUE) UCL	79.85		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	35.65	95% BCA Bootstrap UCL	36.94
95% Standard Bootstrap UCL	35.24	95% Bootstrap-t UCL	38.25
95% Hall's Bootstrap UCL	37.4	95% Percentile Bootstrap UCL	35.11
90% Chebyshev(Mean, Sd) UCL	42.34	95% Chebyshev(Mean, Sd) UCL	49.06
97.5% Chebyshev(Mean, Sd) UCL	58.38	99% Chebyshev(Mean, Sd) UCL	76.68
Suggested UCL to Use			
95% H-UCL	38.85		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (mercury)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	19
Number of Detects	35	Number of Non-Detects	29
Number of Distinct Detects	19	Number of Distinct Non-Detects	1
Minimum Detect	0.001	Minimum Non-Detect	0.001
Maximum Detect	0.0046	Maximum Non-Detect	0.001
Variance Detects	8.2067E-7	Percent Non-Detects	45.31%
Mean Detects	0.00219	SD Detects	9.0591E-4
Median Detects	0.0023	CV Detects	0.414
Skewness Detects	0.749	Kurtosis Detects	0.498
Mean of Logged Detects	-6.21	SD of Logged Detects	0.424

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.91	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.124	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.172	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.00165	KM Standard Error of Mean	1.1232E-4
90KM SD	8.8565E-4	95% KM (BCA) UCL	0.00182
95% KM (t) UCL	0.00184	95% KM (Percentile Bootstrap) UCL	0.00183
95% KM (z) UCL	0.00183	95% KM Bootstrap t UCL	0.00186
90% KM Chebyshev UCL	0.00199	95% KM Chebyshev UCL	0.00214
97.5% KM Chebyshev UCL	0.00235	99% KM Chebyshev UCL	0.00277

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.677	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.16	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.149	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)	6.07	k star (bias corrected MLE)	5.569
Theta hat (MLE)	3.6007E-4	Theta star (bias corrected MLE)	3.9247E-4
nu hat (MLE)	424.9	nu star (bias corrected)	389.8
Mean (detects)	0.00219		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.001	Mean	0.00573
Maximum	0.01	Median	0.0036
SD	0.00398	CV	0.694
k hat (MLE)	1.708	k star (bias corrected MLE)	1.639
Theta hat (MLE)	0.00335	Theta star (bias corrected MLE)	0.00349
nu hat (MLE)	218.6	nu star (bias corrected)	209.7
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (209.73, α)	177.2	Adjusted Chi Square Value (209.73, β)	176.5
95% Gamma Approximate UCL	0.00678	95% Gamma Adjusted UCL	0.0068
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00165	SD (KM)	8.8565E-4
Variance (KM)	7.8437E-7	SE of Mean (KM)	1.1232E-4
k hat (KM)	3.464	k star (KM)	3.312
nu hat (KM)	443.4	nu star (KM)	424
theta hat (KM)	4.7583E-4	theta star (KM)	4.9766E-4
80% gamma percentile (KM)	0.00232	90% gamma percentile (KM)	0.00286
95% gamma percentile (KM)	0.00336	99% gamma percentile (KM)	0.00444
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (423.98, α)	377.3	Adjusted Chi Square Value (423.98, β)	376.2
95% KM Approximate Gamma UCL	0.00185	95% KM Adjusted Gamma UCL	0.00186
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.944	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.136	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00152	Mean in Log Scale	-6.701
SD in Original Scale	0.001	SD in Log Scale	0.673
95% t UCL (assumes normality of ROS data)	0.00173	95% Percentile Bootstrap UCL	0.00172
95% BCA Bootstrap UCL	0.00173	95% Bootstrap t UCL	0.00176
95% H-UCL (Log ROS)	0.00183		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.526	KM Geo Mean	0.00146
KM SD (logged)	0.465	95% Critical H Value (KM-Log)	1.842
KM Standard Error of Mean (logged)	0.0589	95% H-UCL (KM -Log)	0.00182
KM SD (logged)	0.465	95% Critical H Value (KM-Log)	1.842
KM Standard Error of Mean (logged)	0.0589		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00142	Mean in Log Scale	-6.84
SD in Original Scale	0.00108	SD in Log Scale	0.764
95% t UCL (Assumes normality)	0.00165	95% H-Stat UCL	0.00175
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			

Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00184		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (molybdenum)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	63
		Number of Missing Observations	0
Minimum	0.0117	Mean	0.368
Maximum	3.01	Median	0.211
SD	0.495	Std. Error of Mean	0.0619
Coefficient of Variation	1.345	Skewness	3.197
Normal GOF Test			
Shapiro Wilk Test Statistic	0.662	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.472	95% Adjusted-CLT UCL (Chen-1995)	0.497
		95% Modified-t UCL (Johnson-1978)	0.476
Gamma GOF Test			
A-D Test Statistic	0.797	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.786	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.132	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.115	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.872	k star (bias corrected MLE)	0.841
Theta hat (MLE)	0.423	Theta star (bias corrected MLE)	0.438
nu hat (MLE)	111.6	nu star (bias corrected)	107.7
MLE Mean (bias corrected)	0.368	MLE Sd (bias corrected)	0.402
		Approximate Chi Square Value (0.05)	84.73
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	84.26
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.468	95% Adjusted Gamma UCL	0.471
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**	

10% Shapiro Wilk P Value	0.268	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.107	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.101	Data Not Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.448	Mean of logged Data	-1.672
Maximum of Logged Data	1.102	SD of logged Data	1.244

Assuming Lognormal Distribution

95% H-UCL	0.575	90% Chebyshev (MVUE) UCL	0.634
95% Chebyshev (MVUE) UCL	0.741	97.5% Chebyshev (MVUE) UCL	0.889
99% Chebyshev (MVUE) UCL	1.179		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.47	95% BCA Bootstrap UCL	0.503
95% Standard Bootstrap UCL	0.471	95% Bootstrap-t UCL	0.523
95% Hall's Bootstrap UCL	0.555	95% Percentile Bootstrap UCL	0.48
90% Chebyshev(Mean, Sd) UCL	0.554	95% Chebyshev(Mean, Sd) UCL	0.638
97.5% Chebyshev(Mean, Sd) UCL	0.755	99% Chebyshev(Mean, Sd) UCL	0.984

Suggested UCL to Use

95% H-UCL	0.575		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (nickel)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	51
Number of Detects	59	Number of Non-Detects	5
Number of Distinct Detects	50	Number of Distinct Non-Detects	1
Minimum Detect	0.041	Minimum Non-Detect	0.04
Maximum Detect	1.25	Maximum Non-Detect	0.04
Variance Detects	0.0412	Percent Non-Detects	7.813%
Mean Detects	0.186	SD Detects	0.203
Median Detects	0.102	CV Detects	1.092
Skewness Detects	3.062	Kurtosis Detects	12.54
Mean of Logged Detects	-2.043	SD of Logged Detects	0.791

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.669	**Normal GOF Test on Detected Observations Only**	

	A–E	F	G–K	L
1873	1% Shapiro Wilk P Value	1.110E-16	Detected Data Not Normal at 1% Significance Level	
1874	Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**	
1875	1% Lilliefors Critical Value	0.133	Detected Data Not Normal at 1% Significance Level	
1876	**Detected Data Not Normal at 1% Significance Level**			
1877				
1878	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1879	KM Mean	0.174	KM Standard Error of Mean	0.0248
1880	90KM SD	0.197	95% KM (BCA) UCL	0.222
1881	95% KM (t) UCL	0.216	95% KM (Percentile Bootstrap) UCL	0.218
1882	95% KM (z) UCL	0.215	95% KM Bootstrap t UCL	0.234
1883	90% KM Chebyshev UCL	0.249	95% KM Chebyshev UCL	0.283
1884	97.5% KM Chebyshev UCL	0.33	99% KM Chebyshev UCL	0.422
1885				
1886	**Gamma GOF Tests on Detected Observations Only**			
1887	A-D Test Statistic	2.749	**Anderson-Darling GOF Test**	
1888	5% A-D Critical Value	0.768	Detected Data Not Gamma Distributed at 5% Significance Level	
1889	K-S Test Statistic	0.178	**Kolmogorov-Smirnov GOF**	
1890	5% K-S Critical Value	0.118	Detected Data Not Gamma Distributed at 5% Significance Level	
1891	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1892				
1893	**Gamma Statistics on Detected Data Only**			
1894	k hat (MLE)	1.532	k star (bias corrected MLE)	1.466
1895	Theta hat (MLE)	0.121	Theta star (bias corrected MLE)	0.127
1896	nu hat (MLE)	180.8	nu star (bias corrected)	172.9
1897	Mean (detects)	0.186		
1898				
1899	**Gamma ROS Statistics using Imputed Non-Detects**			
1900	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1901	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1902	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1903	This is especially true when the sample size is small.			
1904	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1905	Minimum	0.01	Mean	0.172
1906	Maximum	1.25	Median	0.099
1907	SD	0.2	CV	1.164
1908	k hat (MLE)	1.172	k star (bias corrected MLE)	1.127
1909	Theta hat (MLE)	0.147	Theta star (bias corrected MLE)	0.153
1910	nu hat (MLE)	150	nu star (bias corrected)	144.3
1911	Adjusted Level of Significance (β)	0.0463		
1912	Approximate Chi Square Value (144.30, α)	117.5	Adjusted Chi Square Value (144.30, β)	117
1913	95% Gamma Approximate UCL	0.211	95% Gamma Adjusted UCL	0.212
1914				
1915	**Estimates of Gamma Parameters using KM Estimates**			
1916	Mean (KM)	0.174	SD (KM)	0.197
1917	Variance (KM)	0.0388	SE of Mean (KM)	0.0248
1918	k hat (KM)	0.784	k star (KM)	0.757
1919	nu hat (KM)	100.3	nu star (KM)	96.94
1920	theta hat (KM)	0.223	theta star (KM)	0.23
1921	80% gamma percentile (KM)	0.286	90% gamma percentile (KM)	0.43
1922	95% gamma percentile (KM)	0.577	99% gamma percentile (KM)	0.927
1923				
1924	**Gamma Kaplan-Meier (KM) Statistics**			

Approximate Chi Square Value (96.94, α)	75.23	Adjusted Chi Square Value (96.94, β)	74.79
95% KM Approximate Gamma UCL	0.225	95% KM Adjusted Gamma UCL	0.226

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.922	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	9.0268E-4	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.105	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.173	Mean in Log Scale	-2.186
SD in Original Scale	0.2	SD in Log Scale	0.908
95% t UCL (assumes normality of ROS data)	0.215	95% Percentile Bootstrap UCL	0.214
95% BCA Bootstrap UCL	0.222	95% Bootstrap t UCL	0.231
95% H-UCL (Log ROS)	0.218		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.135	KM Geo Mean	0.118
KM SD (logged)	0.816	95% Critical H Value (KM-Log)	2.108
KM Standard Error of Mean (logged)	0.103	95% H-UCL (KM -Log)	0.205
KM SD (logged)	0.816	95% Critical H Value (KM-Log)	2.108
KM Standard Error of Mean (logged)	0.103		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.173	Mean in Log Scale	-2.189
SD in Original Scale	0.2	SD in Log Scale	0.912
95% t UCL (Assumes normality)	0.215	95% H-Stat UCL	0.218

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

Suggested UCL to Use

95% KM (t) UCL	0.216		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (phosphorus)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	61
		Number of Missing Observations	0

	A	B	C	D	E	F	G	H	I	J	K	L
1977					Minimum	105					Mean	440.9
1978					Maximum	1230					Median	408
1979					SD	232.8					Std. Error of Mean	29.09
1980					Coefficient of Variation	0.528					Skewness	1.21
1981												
1982	**Normal GOF Test**											
1983					Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**					
1984					1% Shapiro Wilk P Value	1.3791E-4	Data Not Normal at 1% Significance Level					
1985					Lilliefors Test Statistic	0.0932	**Lilliefors GOF Test**					
1986					1% Lilliefors Critical Value	0.128	Data appear Normal at 1% Significance Level					
1987	**Data appear Approximate Normal at 1% Significance Level**											
1988												
1989	**Assuming Normal Distribution**											
1990	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1991					95% Student's-t UCL	489.5					95% Adjusted-CLT UCL (Chen-1995)	493.4
1992											95% Modified-t UCL (Johnson-1978)	490.2
1993												
1994	**Gamma GOF Test**											
1995					A-D Test Statistic	0.202	**Anderson-Darling Gamma GOF Test**					
1996					5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level					
1997					K-S Test Statistic	0.0645	**Kolmogorov-Smirnov Gamma GOF Test**					
1998					5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level					
1999	**Detected data appear Gamma Distributed at 5% Significance Level**											
2000												
2001	**Gamma Statistics**											
2002					k hat (MLE)	3.839					k star (bias corrected MLE)	3.67
2003					Theta hat (MLE)	114.8					Theta star (bias corrected MLE)	120.1
2004					nu hat (MLE)	491.4					nu star (bias corrected)	469.7
2005					MLE Mean (bias corrected)	440.9					MLE Sd (bias corrected)	230.2
2006											Approximate Chi Square Value (0.05)	420.5
2007					Adjusted Level of Significance	0.0463					Adjusted Chi Square Value	419.4
2008												
2009	**Assuming Gamma Distribution**											
2010					95% Approximate Gamma UCL	492.5					95% Adjusted Gamma UCL	493.8
2011												
2012	**Lognormal GOF Test**											
2013					Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**					
2014					10% Shapiro Wilk P Value	0.521	Data appear Lognormal at 10% Significance Level					
2015					Lilliefors Test Statistic	0.0913	**Lilliefors Lognormal GOF Test**					
2016					10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level					
2017	**Data appear Lognormal at 10% Significance Level**											
2018												
2019	**Lognormal Statistics**											
2020					Minimum of Logged Data	4.654					Mean of logged Data	5.953
2021					Maximum of Logged Data	7.115					SD of logged Data	0.54
2022												
2023	**Assuming Lognormal Distribution**											
2024					95% H-UCL	506.3					90% Chebyshev (MVUE) UCL	539.4
2025					95% Chebyshev (MVUE) UCL	582.6					97.5% Chebyshev (MVUE) UCL	642.6
2026					99% Chebyshev (MVUE) UCL	760.3						
2027												
2028	**Nonparametric Distribution Free UCL Statistics**											

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	488.7	95% BCA Bootstrap UCL	492.2
95% Standard Bootstrap UCL	488.6	95% Bootstrap-t UCL	496.1
95% Hall's Bootstrap UCL	496.3	95% Percentile Bootstrap UCL	489.4
90% Chebyshev(Mean, Sd) UCL	528.2	95% Chebyshev(Mean, Sd) UCL	567.7
97.5% Chebyshev(Mean, Sd) UCL	622.6	99% Chebyshev(Mean, Sd) UCL	730.4

Suggested UCL to Use

95% Student's-t UCL	489.5		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (potassium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	61
		Number of Missing Observations	0
Minimum	826	Mean	2989
Maximum	6410	Median	2660
SD	1540	Std. Error of Mean	192.5
Coefficient of Variation	0.515	Skewness	0.575

Normal GOF Test

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	7.6619E-4	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.117	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.128	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3310	95% Adjusted-CLT UCL (Chen-1995)	3320
		95% Modified-t UCL (Johnson-1978)	3313

Gamma GOF Test

A-D Test Statistic	0.438	**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	0.0642	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.704	k star (bias corrected MLE)	3.541
Theta hat (MLE)	807	Theta star (bias corrected MLE)	844.2

2081	nu hat (MLE)	474.1	nu star (bias corrected)	453.2
2082	MLE Mean (bias corrected)	2989	MLE Sd (bias corrected)	1588
2083			Approximate Chi Square Value (0.05)	404.9
2084	Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	403.8
2085				
2086	**Assuming Gamma Distribution**			
2087	95% Approximate Gamma UCL	3346	95% Adjusted Gamma UCL	3355
2088				
2089	**Lognormal GOF Test**			
2090	Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**	
2091	10% Shapiro Wilk P Value	0.0344	Data Not Lognormal at 10% Significance Level	
2092	Lilliefors Test Statistic	0.0806	**Lilliefors Lognormal GOF Test**	
2093	10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level	
2094	**Data appear Approximate Lognormal at 10% Significance Level**			
2095				
2096	**Lognormal Statistics**			
2097	Minimum of Logged Data	6.717	Mean of logged Data	7.862
2098	Maximum of Logged Data	8.766	SD of logged Data	0.553
2099				
2100	**Assuming Lognormal Distribution**			
2101	95% H-UCL	3452	90% Chebyshev (MVUE) UCL	3681
2102	95% Chebyshev (MVUE) UCL	3983	97.5% Chebyshev (MVUE) UCL	4401
2103	99% Chebyshev (MVUE) UCL	5222		
2104				
2105	**Nonparametric Distribution Free UCL Statistics**			
2106	**Data appear to follow a Discernible Distribution**			
2107				
2108	**Nonparametric Distribution Free UCLs**			
2109	95% CLT UCL	3306	95% BCA Bootstrap UCL	3297
2110	95% Standard Bootstrap UCL	3292	95% Bootstrap-t UCL	3326
2111	95% Hall's Bootstrap UCL	3318	95% Percentile Bootstrap UCL	3296
2112	90% Chebyshev(Mean, Sd) UCL	3566	95% Chebyshev(Mean, Sd) UCL	3828
2113	97.5% Chebyshev(Mean, Sd) UCL	4191	99% Chebyshev(Mean, Sd) UCL	4904
2114				
2115	**Suggested UCL to Use**			
2116	95% Student's-t UCL	3310		
2117				
2118	When a data set follows an approximate distribution passing only one of the GOF tests,			
2119	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
2120				
2121	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2122	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2123	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2124				
2125	**Result (selenium)**			
2126				
2127	**General Statistics**			
2128	Total Number of Observations	64	Number of Distinct Observations	6
2129	Number of Detects	6	Number of Non-Detects	58
2130	Number of Distinct Detects	5	Number of Distinct Non-Detects	1
2131	Minimum Detect	0.011	Minimum Non-Detect	0.01
2132	Maximum Detect	0.027	Maximum Non-Detect	0.01

	A–E	F	G–K	L
2133	Variance Detects	3.5867E-5	Percent Non-Detects	90.63%
2134	Mean Detects	0.0187	SD Detects	0.00599
2135	Median Detects	0.018	CV Detects	0.321
2136	Skewness Detects	0.173	Kurtosis Detects	-1.341
2137	Mean of Logged Detects	-4.026	SD of Logged Detects	0.334
2138				
2139	**Normal GOF Test on Detects Only**			
2140	Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
2141	1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
2142	Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**	
2143	1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	
2144	**Detected Data appear Normal at 1% Significance Level**			
2145	**Note GOF tests may be unreliable for small sample sizes**			
2146				
2147	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2148	KM Mean	0.0108	KM Standard Error of Mean	4.1496E-4
2149	90KM SD	0.00303	95% KM (BCA) UCL	0.0115
2150	95% KM (t) UCL	0.0115	95% KM (Percentile Bootstrap) UCL	0.0115
2151	95% KM (z) UCL	0.0115	95% KM Bootstrap t UCL	0.0115
2152	90% KM Chebyshev UCL	0.0121	95% KM Chebyshev UCL	0.0126
2153	97.5% KM Chebyshev UCL	0.0134	99% KM Chebyshev UCL	0.0149
2154				
2155	**Gamma GOF Tests on Detected Observations Only**			
2156	A-D Test Statistic	0.283	**Anderson-Darling GOF Test**	
2157	5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level	
2158	K-S Test Statistic	0.228	**Kolmogorov-Smirnov GOF**	
2159	5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level	
2160	**Detected data appear Gamma Distributed at 5% Significance Level**			
2161	**Note GOF tests may be unreliable for small sample sizes**			
2162				
2163	**Gamma Statistics on Detected Data Only**			
2164	k hat (MLE)	11.25	k star (bias corrected MLE)	5.737
2165	Theta hat (MLE)	0.00166	Theta star (bias corrected MLE)	0.00325
2166	nu hat (MLE)	135	nu star (bias corrected)	68.84
2167	Mean (detects)	0.0187		
2168				
2169	**Gamma ROS Statistics using Imputed Non-Detects**			
2170	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2171	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2172	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2173	This is especially true when the sample size is small.			
2174	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2175	Minimum	0.01	Mean	0.0108
2176	Maximum	0.027	Median	0.01
2177	SD	0.00305	CV	0.282
2178	k hat (MLE)	21.15	k star (bias corrected MLE)	20.17
2179	Theta hat (MLE)	5.1132E-4	Theta star (bias corrected MLE)	5.3619E-4
2180	nu hat (MLE)	2707	nu star (bias corrected)	2581
2181	Adjusted Level of Significance (β)	0.0463		
2182	Approximate Chi Square Value (N/A, α)	2464	Adjusted Chi Square Value (N/A, β)	2462
2183	95% Gamma Approximate UCL	0.0113	95% Gamma Adjusted UCL	0.0113
2184				

	A	B	C	D	E	F	G	H	I	J	K	L
2185	**Estimates of Gamma Parameters using KM Estimates**											
2186					Mean (KM)	0.0108					SD (KM)	0.00303
2187					Variance (KM)	9.1836E-6					SE of Mean (KM)	4.1496E-4
2188					k hat (KM)	12.73					k star (KM)	12.14
2189					nu hat (KM)	1629					nu star (KM)	1554
2190					theta hat (KM)	8.4935E-4					theta star (KM)	8.9036E-4
2191					80% gamma percentile (KM)	0.0133					90% gamma percentile (KM)	0.0149
2192					95% gamma percentile (KM)	0.0164					99% gamma percentile (KM)	0.0193
2193												
2194	**Gamma Kaplan-Meier (KM) Statistics**											
2195					Approximate Chi Square Value (N/A, α)	1464					Adjusted Chi Square Value (N/A, β)	1462
2196					95% KM Approximate Gamma UCL	0.0115					95% KM Adjusted Gamma UCL	0.0115
2197												
2198	**Lognormal GOF Test on Detected Observations Only**											
2199					Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**					
2200					10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level					
2201					Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**					
2202					10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level					
2203	**Detected Data appear Lognormal at 10% Significance Level**											
2204	**Note GOF tests may be unreliable for small sample sizes**											
2205												
2206	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2207					Mean in Original Scale	0.00474					Mean in Log Scale	-5.848
2208					SD in Original Scale	0.00539					SD in Log Scale	1.013
2209					95% t UCL (assumes normality of ROS data)	0.00586					95% Percentile Bootstrap UCL	0.00588
2210					95% BCA Bootstrap UCL	0.00598					95% Bootstrap t UCL	0.00621
2211					95% H-UCL (Log ROS)	0.00644						
2212												
2213	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2214					KM Mean (logged)	-4.551					KM Geo Mean	0.0106
2215					KM SD (logged)	0.193					95% Critical H Value (KM-Log)	1.71
2216					KM Standard Error of Mean (logged)	0.0264					95% H-UCL (KM -Log)	0.0112
2217					KM SD (logged)	0.193					95% Critical H Value (KM-Log)	1.71
2218					KM Standard Error of Mean (logged)	0.0264						
2219												
2220	**DL/2 Statistics**											
2221	**DL/2 Normal**						**DL/2 Log-Transformed**					
2222					Mean in Original Scale	0.00628					Mean in Log Scale	-5.179
2223					SD in Original Scale	0.00436					SD in Log Scale	0.385
2224					95% t UCL (Assumes normality)	0.00719					95% H-Stat UCL	0.00662
2225	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2226												
2227	**Nonparametric Distribution Free UCL Statistics**											
2228	**Detected Data appear Normal Distributed at 1% Significance Level**											
2229												
2230	**Suggested UCL to Use**											
2231					95% KM (t) UCL	0.0115						
2232												
2233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2234	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2235	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2236	**Result (sodium)**											

General Statistics

Total Number of Observations	64	Number of Distinct Observations	32
Number of Detects	36	Number of Non-Detects	28
Number of Distinct Detects	31	Number of Distinct Non-Detects	1
Minimum Detect	4.2	Minimum Non-Detect	4
Maximum Detect	51.6	Maximum Non-Detect	4
Variance Detects	146	Percent Non-Detects	43.75%
Mean Detects	12.93	SD Detects	12.08
Median Detects	7.1	CV Detects	0.934
Skewness Detects	1.684	Kurtosis Detects	2.124
Mean of Logged Detects	2.239	SD of Logged Detects	0.757

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.723	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.912	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.17	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	9.023	KM Standard Error of Mean	1.264
90KM SD	9.972	95% KM (BCA) UCL	11.3
95% KM (t) UCL	11.13	95% KM (Percentile Bootstrap) UCL	11.22
95% KM (z) UCL	11.1	95% KM Bootstrap t UCL	11.7
90% KM Chebyshev UCL	12.82	95% KM Chebyshev UCL	14.53
97.5% KM Chebyshev UCL	16.92	99% KM Chebyshev UCL	21.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.817	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.764	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.252	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.149	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)	1.705	k star (bias corrected MLE)	1.582
Theta hat (MLE)	7.583	Theta star (bias corrected MLE)	8.175
nu hat (MLE)	122.8	nu star (bias corrected)	113.9
Mean (detects)	12.93		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	7.278
Maximum	51.6	Median	4.55
SD	11.08	CV	1.523
k hat (MLE)	0.258	k star (bias corrected MLE)	0.256
Theta hat (MLE)	28.22	Theta star (bias corrected MLE)	28.4

2289	nu hat (MLE)	33.01	nu star (bias corrected)	32.8
2290	Adjusted Level of Significance (β)	0.0463		
2291	Approximate Chi Square Value (32.80, α)	20.7	Adjusted Chi Square Value (32.80, β)	20.48
2292	95% Gamma Approximate UCL	11.53	95% Gamma Adjusted UCL	11.65
2293				
2294	**Estimates of Gamma Parameters using KM Estimates**			
2295	Mean (KM)	9.023	SD (KM)	9.972
2296	Variance (KM)	99.45	SE of Mean (KM)	1.264
2297	k hat (KM)	0.819	k star (KM)	0.791
2298	nu hat (KM)	104.8	nu star (KM)	101.2
2299	theta hat (KM)	11.02	theta star (KM)	11.41
2300	80% gamma percentile (KM)	14.76	90% gamma percentile (KM)	22
2301	95% gamma percentile (KM)	29.39	99% gamma percentile (KM)	46.86
2302				
2303	**Gamma Kaplan-Meier (KM) Statistics**			
2304	Approximate Chi Square Value (101.22, α)	79.01	Adjusted Chi Square Value (101.22, β)	78.56
2305	95% KM Approximate Gamma UCL	11.56	95% KM Adjusted Gamma UCL	11.63
2306				
2307	**Lognormal GOF Test on Detected Observations Only**			
2308	Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**	
2309	10% Shapiro Wilk Critical Value	0.945	Detected Data Not Lognormal at 10% Significance Level	
2310	Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**	
2311	10% Lilliefors Critical Value	0.134	Detected Data Not Lognormal at 10% Significance Level	
2312	**Detected Data Not Lognormal at 10% Significance Level**			
2313				
2314	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2315	Mean in Original Scale	7.963	Mean in Log Scale	1.381
2316	SD in Original Scale	10.66	SD in Log Scale	1.21
2317	95% t UCL (assumes normality of ROS data)	10.19	95% Percentile Bootstrap UCL	10.21
2318	95% BCA Bootstrap UCL	10.42	95% Bootstrap t UCL	10.79
2319	95% H-UCL (Log ROS)	11.63		
2320				
2321	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2322	KM Mean (logged)	1.866	KM Geo Mean	6.461
2323	KM SD (logged)	0.702	95% Critical H Value (KM-Log)	2.011
2324	KM Standard Error of Mean (logged)	0.0889	95% H-UCL (KM -Log)	9.871
2325	KM SD (logged)	0.702	95% Critical H Value (KM-Log)	2.011
2326	KM Standard Error of Mean (logged)	0.0889		
2327				
2328	**DL/2 Statistics**			
2329	**DL/2 Normal**		**DL/2 Log-Transformed**	
2330	Mean in Original Scale	8.148	Mean in Log Scale	1.562
2331	SD in Original Scale	10.53	SD in Log Scale	0.957
2332	95% t UCL (Assumes normality)	10.35	95% H-Stat UCL	9.861
2333	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2334				
2335	**Nonparametric Distribution Free UCL Statistics**			
2336	**Data do not follow a Discernible Distribution**			
2337				
2338	**Suggested UCL to Use**			
2339	95% KM (t) UCL	11.13		
2340				

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

Result (strontium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	62
		Number of Missing Observations	0
Minimum	0.163	Mean	2.461
Maximum	10.4	Median	1.81
SD	2.269	Std. Error of Mean	0.284
Coefficient of Variation	0.922	Skewness	1.687

Normal GOF Test

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	4.039E-10	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.934	95% Adjusted-CLT UCL (Chen-1995)	2.991
		95% Modified-t UCL (Johnson-1978)	2.944

Gamma GOF Test

A-D Test Statistic	0.227	**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	0.054	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.291	k star (bias corrected MLE)	1.241
Theta hat (MLE)	1.906	Theta star (bias corrected MLE)	1.983
nu hat (MLE)	165.2	nu star (bias corrected)	158.8
MLE Mean (bias corrected)	2.461	MLE Sd (bias corrected)	2.209
		Approximate Chi Square Value (0.05)	130.7
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	130.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.991	95% Adjusted Gamma UCL	3.004

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.0743	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0901	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.814	Mean of logged Data	0.466
Maximum of Logged Data	2.342	SD of logged Data	1.022

Assuming Lognormal Distribution

95% H-UCL	3.591	90% Chebyshev (MVUE) UCL	3.864
95% Chebyshev (MVUE) UCL	4.413	97.5% Chebyshev (MVUE) UCL	5.175
99% Chebyshev (MVUE) UCL	6.672		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.927	95% BCA Bootstrap UCL	2.99
95% Standard Bootstrap UCL	2.927	95% Bootstrap-t UCL	3.024
95% Hall's Bootstrap UCL	3.014	95% Percentile Bootstrap UCL	2.949
90% Chebyshev(Mean, Sd) UCL	3.312	95% Chebyshev(Mean, Sd) UCL	3.697
97.5% Chebyshev(Mean, Sd) UCL	4.232	99% Chebyshev(Mean, Sd) UCL	5.283

Suggested UCL to Use

95% Approximate Gamma UCL	2.991		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (thallium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	30
Number of Detects	29	Number of Non-Detects	35
Number of Distinct Detects	29	Number of Distinct Non-Detects	1
Minimum Detect	5.0000E-4	Minimum Non-Detect	4.0000E-4
Maximum Detect	0.0301	Maximum Non-Detect	4.0000E-4
Variance Detects	3.2740E-5	Percent Non-Detects	54.69%
Mean Detects	0.00353	SD Detects	0.00572
Median Detects	0.00164	CV Detects	1.622
Skewness Detects	3.913	Kurtosis Detects	17.42
Mean of Logged Detects	-6.234	SD of Logged Detects	0.979

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.514	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.898	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.189	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.00182	KM Standard Error of Mean	5.2063E-4
90KM SD	0.00409	95% KM (BCA) UCL	0.00288
95% KM (t) UCL	0.00269	95% KM (Percentile Bootstrap) UCL	0.00278
95% KM (z) UCL	0.00267	95% KM Bootstrap t UCL	0.00375

	A	B	C	D	E	F	G	H	I	J	K	L
2445	90% KM Chebyshev UCL					0.00338	95% KM Chebyshev UCL					0.00409
2446	97.5% KM Chebyshev UCL					0.00507	99% KM Chebyshev UCL					0.007
2447												
2448	**Gamma GOF Tests on Detected Observations Only**											
2449	A-D Test Statistic					1.662	**Anderson-Darling GOF Test**					
2450	5% A-D Critical Value					0.775	Detected Data Not Gamma Distributed at 5% Significance Level					
2451	K-S Test Statistic					0.21	**Kolmogorov-Smirnov GOF**					
2452	5% K-S Critical Value					0.168	Detected Data Not Gamma Distributed at 5% Significance Level					
2453	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2454												
2455	**Gamma Statistics on Detected Data Only**											
2456	k hat (MLE)					0.985	k star (bias corrected MLE)					0.906
2457	Theta hat (MLE)					0.00358	Theta star (bias corrected MLE)					0.0039
2458	nu hat (MLE)					57.1	nu star (bias corrected)					52.53
2459	Mean (detects)					0.00353						
2460												
2461	**Gamma ROS Statistics using Imputed Non-Detects**											
2462	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2463	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2464	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2465	This is especially true when the sample size is small.											
2466	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2467	Minimum					5.0000E-4	Mean					0.00707
2468	Maximum					0.0301	Median					0.01
2469	SD					0.00501	CV					0.709
2470	k hat (MLE)					1.422	k star (bias corrected MLE)					1.366
2471	Theta hat (MLE)					0.00497	Theta star (bias corrected MLE)					0.00517
2472	nu hat (MLE)					182	nu star (bias corrected)					174.8
2473	Adjusted Level of Significance (β)					0.0463						
2474	Approximate Chi Square Value (174.83, α)					145.3	Adjusted Chi Square Value (174.83, β)					144.6
2475	95% Gamma Approximate UCL					0.00851	95% Gamma Adjusted UCL					0.00854
2476												
2477	**Estimates of Gamma Parameters using KM Estimates**											
2478	Mean (KM)					0.00182	SD (KM)					0.00409
2479	Variance (KM)					1.6749E-5	SE of Mean (KM)					5.2063E-4
2480	k hat (KM)					0.197	k star (KM)					0.198
2481	nu hat (KM)					25.25	nu star (KM)					25.4
2482	theta hat (KM)					0.00921	theta star (KM)					0.00916
2483	80% gamma percentile (KM)					0.00239	90% gamma percentile (KM)					0.0055
2484	95% gamma percentile (KM)					0.00938	99% gamma percentile (KM)					0.0201
2485												
2486	**Gamma Kaplan-Meier (KM) Statistics**											
2487	Approximate Chi Square Value (25.40, α)					14.92	Adjusted Chi Square Value (25.40, β)					14.73
2488	95% KM Approximate Gamma UCL					0.00309	95% KM Adjusted Gamma UCL					0.00313
2489												
2490	**Lognormal GOF Test on Detected Observations Only**											
2491	Shapiro Wilk Test Statistic					0.938	**Shapiro Wilk GOF Test**					
2492	10% Shapiro Wilk Critical Value					0.937	Detected Data appear Lognormal at 10% Significance Level					
2493	Lilliefors Test Statistic					0.118	**Lilliefors GOF Test**					
2494	10% Lilliefors Critical Value					0.148	Detected Data appear Lognormal at 10% Significance Level					
2495	**Detected Data appear Lognormal at 10% Significance Level**											
2496												

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00169	Mean in Log Scale	-7.785
SD in Original Scale	0.00417	SD in Log Scale	1.747
95% t UCL (assumes normality of ROS data)	0.00256	95% Percentile Bootstrap UCL	0.00258
95% BCA Bootstrap UCL	0.0029	95% Bootstrap t UCL	0.00357
95% H-UCL (Log ROS)	0.0035		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-7.104	KM Geo Mean	8.2210E-4
KM SD (logged)	1.023	95% Critical H Value (KM-Log)	2.261
KM Standard Error of Mean (logged)	0.13	95% H-UCL (KM -Log)	0.00186
KM SD (logged)	1.023	95% Critical H Value (KM-Log)	2.261
KM Standard Error of Mean (logged)	0.13		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00171	Mean in Log Scale	-7.483
SD in Original Scale	0.00416	SD in Log Scale	1.318
95% t UCL (Assumes normality)	0.00258	95% H-Stat UCL	0.00195
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 10% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.00186		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (tin)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	46
Number of Detects	47	Number of Non-Detects	17
Number of Distinct Detects	45	Number of Distinct Non-Detects	1
Minimum Detect	0.022	Minimum Non-Detect	0.02
Maximum Detect	8.76	Maximum Non-Detect	0.02
Variance Detects	1.64	Percent Non-Detects	26.56%
Mean Detects	0.534	SD Detects	1.281
Median Detects	0.185	CV Detects	2.397
Skewness Detects	6.007	Kurtosis Detects	38.97
Mean of Logged Detects	-1.573	SD of Logged Detects	1.308
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.363	**Shapiro Wilk GOF Test**	

	A–E	F	G–K	L
2549	1% Shapiro Wilk Critical Value	0.928	Detected Data Not Normal at 1% Significance Level	
2550	Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**	
2551	1% Lilliefors Critical Value	0.15	Detected Data Not Normal at 1% Significance Level	
2552	**Detected Data Not Normal at 1% Significance Level**			
2553				
2554	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2555	KM Mean	0.398	KM Standard Error of Mean	0.14
2556	90KM SD	1.109	95% KM (BCA) UCL	0.671
2557	95% KM (t) UCL	0.632	95% KM (Percentile Bootstrap) UCL	0.662
2558	95% KM (z) UCL	0.628	95% KM Bootstrap t UCL	1.042
2559	90% KM Chebyshev UCL	0.818	95% KM Chebyshev UCL	1.009
2560	97.5% KM Chebyshev UCL	1.273	99% KM Chebyshev UCL	1.792
2561				
2562	**Gamma GOF Tests on Detected Observations Only**			
2563	A-D Test Statistic	1.654	**Anderson-Darling GOF Test**	
2564	5% A-D Critical Value	0.801	Detected Data Not Gamma Distributed at 5% Significance Level	
2565	K-S Test Statistic	0.132	**Kolmogorov-Smirnov GOF**	
2566	5% K-S Critical Value	0.135	Detected data appear Gamma Distributed at 5% Significance Level	
2567	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**			
2568				
2569	**Gamma Statistics on Detected Data Only**			
2570	k hat (MLE)	0.646	k star (bias corrected MLE)	0.619
2571	Theta hat (MLE)	0.827	Theta star (bias corrected MLE)	0.863
2572	nu hat (MLE)	60.74	nu star (bias corrected)	58.2
2573	Mean (detects)	0.534		
2574				
2575	**Gamma ROS Statistics using Imputed Non-Detects**			
2576	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2577	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2578	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2579	This is especially true when the sample size is small.			
2580	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2581	Minimum	0.01	Mean	0.395
2582	Maximum	8.76	Median	0.09
2583	SD	1.119	CV	2.833
2584	k hat (MLE)	0.446	k star (bias corrected MLE)	0.436
2585	Theta hat (MLE)	0.885	Theta star (bias corrected MLE)	0.907
2586	nu hat (MLE)	57.11	nu star (bias corrected)	55.76
2587	Adjusted Level of Significance (β)	0.0463		
2588	Approximate Chi Square Value (55.76, α)	39.6	Adjusted Chi Square Value (55.76, β)	39.29
2589	95% Gamma Approximate UCL	0.556	95% Gamma Adjusted UCL	0.561
2590				
2591	**Estimates of Gamma Parameters using KM Estimates**			
2592	Mean (KM)	0.398	SD (KM)	1.109
2593	Variance (KM)	1.23	SE of Mean (KM)	0.14
2594	k hat (KM)	0.128	k star (KM)	0.133
2595	nu hat (KM)	16.45	nu star (KM)	17.01
2596	theta hat (KM)	3.094	theta star (KM)	2.992
2597	80% gamma percentile (KM)	0.388	90% gamma percentile (KM)	1.155
2598	95% gamma percentile (KM)	2.236	99% gamma percentile (KM)	5.457
2599				
2600	**Gamma Kaplan-Meier (KM) Statistics**			

2601	Approximate Chi Square Value (17.01, α)	8.679	Adjusted Chi Square Value (17.01, β)	8.541
2602	95% KM Approximate Gamma UCL	0.779	95% KM Adjusted Gamma UCL	0.792
2603				
2604	**Lognormal GOF Test on Detected Observations Only**			
2605	Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
2606	10% Shapiro Wilk Critical Value	0.954	Detected Data appear Lognormal at 10% Significance Level	
2607	Lilliefors Test Statistic	0.113	**Lilliefors GOF Test**	
2608	10% Lilliefors Critical Value	0.118	Detected Data appear Lognormal at 10% Significance Level	
2609	**Detected Data appear Lognormal at 10% Significance Level**			
2610				
2611	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2612	Mean in Original Scale	0.396	Mean in Log Scale	-2.39
2613	SD in Original Scale	1.119	SD in Log Scale	1.814
2614	95% t UCL (assumes normality of ROS data)	0.629	95% Percentile Bootstrap UCL	0.646
2615	95% BCA Bootstrap UCL	0.764	95% Bootstrap t UCL	1.053
2616	95% H-UCL (Log ROS)	0.906		
2617				
2618	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2619	KM Mean (logged)	-2.194	KM Geo Mean	0.111
2620	KM SD (logged)	1.516	95% Critical H Value (KM-Log)	2.48
2621	KM Standard Error of Mean (logged)	0.192	95% H-UCL (KM -Log)	0.565
2622	KM SD (logged)	1.516	95% Critical H Value (KM-Log)	2.48
2623	KM Standard Error of Mean (logged)	0.192		
2624				
2625	**DL/2 Statistics**			
2626	**DL/2 Normal**		**DL/2 Log-Transformed**	
2627	Mean in Original Scale	0.395	Mean in Log Scale	-2.378
2628	SD in Original Scale	1.119	SD in Log Scale	1.753
2629	95% t UCL (Assumes normality)	0.628	95% H-Stat UCL	0.791
2630	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
2631				
2632	**Nonparametric Distribution Free UCL Statistics**			
2633	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**			
2634				
2635	**Suggested UCL to Use**			
2636	95% KM Approximate Gamma UCL	0.779		
2637				
2638	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**			
2639	**Please verify the data were collected from random locations.**			
2640	**If the data were collected using judgmental or other non-random methods,**			
2641	**then contact a statistician to correctly calculate UCLs.**			
2642				
2643	When a data set follows an approximate distribution passing only one of the GOF tests,			
2644	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
2645				
2646	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2647	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2648	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2649				
2650	**Result (uranium)**			
2651				
2652	**General Statistics**			

Total Number of Observations	64	Number of Distinct Observations	25
Number of Detects	24	Number of Non-Detects	40
Number of Distinct Detects	24	Number of Distinct Non-Detects	1
Minimum Detect	4.3000E-4	Minimum Non-Detect	4.0000E-4
Maximum Detect	0.0306	Maximum Non-Detect	4.0000E-4
Variance Detects	9.6728E-5	Percent Non-Detects	62.5%
Mean Detects	0.00758	SD Detects	0.00984
Median Detects	0.00158	CV Detects	1.298
Skewness Detects	1.295	Kurtosis Detects	0.212
Mean of Logged Detects	-5.816	SD of Logged Detects	1.437
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.73	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.884	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.205	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00309	KM Standard Error of Mean	8.7383E-4
90KM SD	0.00684	95% KM (BCA) UCL	0.00467
95% KM (t) UCL	0.00455	95% KM (Percentile Bootstrap) UCL	0.00459
95% KM (z) UCL	0.00453	95% KM Bootstrap t UCL	0.00514
90% KM Chebyshev UCL	0.00571	95% KM Chebyshev UCL	0.0069
97.5% KM Chebyshev UCL	0.00855	99% KM Chebyshev UCL	0.0118
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.436	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.792	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.236	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.186	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.654	k star (bias corrected MLE)	0.6
Theta hat (MLE)	0.0116	Theta star (bias corrected MLE)	0.0126
nu hat (MLE)	31.39	nu star (bias corrected)	28.8
Mean (detects)	0.00758		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	4.3000E-4	Mean	0.00909
Maximum	0.0306	Median	0.01
SD	0.00606	CV	0.666
k hat (MLE)	1.54	k star (bias corrected MLE)	1.478
Theta hat (MLE)	0.00591	Theta star (bias corrected MLE)	0.00615
nu hat (MLE)	197.1	nu star (bias corrected)	189.2
Adjusted Level of Significance (β)	0.0463		

Approximate Chi Square Value (189.15, α)	158.3	Adjusted Chi Square Value (189.15, β)	157.7
95% Gamma Approximate UCL	0.0109	95% Gamma Adjusted UCL	0.0109

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00309	SD (KM)	0.00684
Variance (KM)	4.6833E-5	SE of Mean (KM)	8.7383E-4
k hat (KM)	0.204	k star (KM)	0.205
nu hat (KM)	26.12	nu star (KM)	26.23
theta hat (KM)	0.0152	theta star (KM)	0.0151
80% gamma percentile (KM)	0.00412	90% gamma percentile (KM)	0.00935
95% gamma percentile (KM)	0.0158	99% gamma percentile (KM)	0.0336

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (26.23, α)	15.55	Adjusted Chi Square Value (26.23, β)	15.36
95% KM Approximate Gamma UCL	0.00521	95% KM Adjusted Gamma UCL	0.00528

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.93	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.201	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.162	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0029	Mean in Log Scale	-8.6
SD in Original Scale	0.00698	SD in Log Scale	2.718
95% t UCL (assumes normality of ROS data)	0.00436	95% Percentile Bootstrap UCL	0.00437
95% BCA Bootstrap UCL	0.00461	95% Bootstrap t UCL	0.00493
95% H-UCL (Log ROS)	0.0246		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-7.071	KM Geo Mean	8.4946E-4
KM SD (logged)	1.299	95% Critical H Value (KM-Log)	2.232
KM Standard Error of Mean (logged)	0.166	95% H-UCL (KM -Log)	0.00285
KM SD (logged)	1.299	95% Critical H Value (KM-Log)	2.232
KM Standard Error of Mean (logged)	0.166		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00297	Mean in Log Scale	-7.504
SD in Original Scale	0.00695	SD in Log Scale	1.578
95% t UCL (Assumes normality)	0.00442	95% H-Stat UCL	0.00318

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

Suggested UCL to Use

95% KM (t) UCL	0.00455		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (vanadium)

General Statistics

Total Number of Observations	64	Number of Distinct Observations	23
Number of Detects	25	Number of Non-Detects	39
Number of Distinct Detects	23	Number of Distinct Non-Detects	1
Minimum Detect	0.02	Minimum Non-Detect	0.02
Maximum Detect	1.63	Maximum Non-Detect	0.02
Variance Detects	0.211	Percent Non-Detects	60.94%
Mean Detects	0.334	SD Detects	0.459
Median Detects	0.074	CV Detects	1.376
Skewness Detects	1.675	Kurtosis Detects	1.895
Mean of Logged Detects	-2.037	SD of Logged Detects	1.416

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.713	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.886	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.201	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.143	KM Standard Error of Mean	0.0409
90KM SD	0.32	95% KM (BCA) UCL	0.218
95% KM (t) UCL	0.211	95% KM (Percentile Bootstrap) UCL	0.215
95% KM (z) UCL	0.21	95% KM Bootstrap t UCL	0.246
90% KM Chebyshev UCL	0.265	95% KM Chebyshev UCL	0.321
97.5% KM Chebyshev UCL	0.398	99% KM Chebyshev UCL	0.549

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.6	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.793	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.183	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.65	k star (bias corrected MLE)	0.599
Theta hat (MLE)	0.514	Theta star (bias corrected MLE)	0.558
nu hat (MLE)	32.49	nu star (bias corrected)	29.93
Mean (detects)	0.334		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	1.63	Median	0.01
SD	0.325	CV	2.382
k hat (MLE)	0.407	k star (bias corrected MLE)	0.399
Theta hat (MLE)	0.335	Theta star (bias corrected MLE)	0.342
nu hat (MLE)	52.15	nu star (bias corrected)	51.03
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (51.03, α)	35.63	Adjusted Chi Square Value (51.03, β)	35.33
95% Gamma Approximate UCL	0.196	95% Gamma Adjusted UCL	0.197
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.143	SD (KM)	0.32
Variance (KM)	0.103	SE of Mean (KM)	0.0409
k hat (KM)	0.198	k star (KM)	0.199
nu hat (KM)	25.38	nu star (KM)	25.52
theta hat (KM)	0.719	theta star (KM)	0.715
80% gamma percentile (KM)	0.188	90% gamma percentile (KM)	0.431
95% gamma percentile (KM)	0.735	99% gamma percentile (KM)	1.573
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (25.52, α)	15.01	Adjusted Chi Square Value (25.52, β)	14.82
95% KM Approximate Gamma UCL	0.242	95% KM Adjusted Gamma UCL	0.245
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.931	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.159	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.133	Mean in Log Scale	-4.669
SD in Original Scale	0.327	SD in Log Scale	2.644
95% t UCL (assumes normality of ROS data)	0.201	95% Percentile Bootstrap UCL	0.202
95% BCA Bootstrap UCL	0.213	95% Bootstrap t UCL	0.233
95% H-UCL (Log ROS)	0.967		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.18	KM Geo Mean	0.0416
KM SD (logged)	1.261	95% Critical H Value (KM-Log)	2.21
KM Standard Error of Mean (logged)	0.161	95% H-UCL (KM -Log)	0.131
KM SD (logged)	1.261	95% Critical H Value (KM-Log)	2.21
KM Standard Error of Mean (logged)	0.161		
Note: KM UCLs may be biased low with this dataset. Other substitution method recommended			
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.137	Mean in Log Scale	-3.602

SD in Original Scale	0.325	SD in Log Scale	1.536
95% t UCL (Assumes normality)	0.204	95% H-Stat UCL	0.144
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			
Suggested UCL to Use			
95% KM (t) UCL	0.211		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (zinc)			
General Statistics			
Total Number of Observations	64	Number of Distinct Observations	64
		Number of Missing Observations	0
Minimum	1.2	Mean	7.208
Maximum	35.3	Median	5.38
SD	6.461	Std. Error of Mean	0.808
Coefficient of Variation	0.896	Skewness	2.34
Normal GOF Test			
Shapiro Wilk Test Statistic	0.76	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	6.983E-14	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.188	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.128	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.557	95% Adjusted-CLT UCL (Chen-1995)	8.789
		95% Modified-t UCL (Johnson-1978)	8.596
Gamma GOF Test			
A-D Test Statistic	0.753	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0992	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.113	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.805	k star (bias corrected MLE)	1.731
Theta hat (MLE)	3.993	Theta star (bias corrected MLE)	4.164

	A–E	F	G–K	L
2913	nu hat (MLE)	231.1	nu star (bias corrected)	221.6
2914	MLE Mean (bias corrected)	7.208	MLE Sd (bias corrected)	5.479
2915			Approximate Chi Square Value (0.05)	188.1
2916	Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	187.4
2917				
2918	**Assuming Gamma Distribution**			
2919	95% Approximate Gamma UCL	8.49	95% Adjusted Gamma UCL	8.522
2920				
2921	**Lognormal GOF Test**			
2922	Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**	
2923	10% Shapiro Wilk P Value	0.538	Data appear Lognormal at 10% Significance Level	
2924	Lilliefors Test Statistic	0.0441	**Lilliefors Lognormal GOF Test**	
2925	10% Lilliefors Critical Value	0.101	Data appear Lognormal at 10% Significance Level	
2926	**Data appear Lognormal at 10% Significance Level**			
2927				
2928	**Lognormal Statistics**			
2929	Minimum of Logged Data	0.182	Mean of logged Data	1.673
2930	Maximum of Logged Data	3.564	SD of logged Data	0.774
2931				
2932	**Assuming Lognormal Distribution**			
2933	95% H-UCL	8.798	90% Chebyshev (MVUE) UCL	9.466
2934	95% Chebyshev (MVUE) UCL	10.52	97.5% Chebyshev (MVUE) UCL	11.97
2935	99% Chebyshev (MVUE) UCL	14.84		
2936				
2937	**Nonparametric Distribution Free UCL Statistics**			
2938	**Data appear to follow a Discernible Distribution**			
2939				
2940	**Nonparametric Distribution Free UCLs**			
2941	95% CLT UCL	8.537	95% BCA Bootstrap UCL	8.774
2942	95% Standard Bootstrap UCL	8.481	95% Bootstrap-t UCL	8.84
2943	95% Hall's Bootstrap UCL	8.834	95% Percentile Bootstrap UCL	8.488
2944	90% Chebyshev(Mean, Sd) UCL	9.631	95% Chebyshev(Mean, Sd) UCL	10.73
2945	97.5% Chebyshev(Mean, Sd) UCL	12.25	99% Chebyshev(Mean, Sd) UCL	15.24
2946				
2947	**Suggested UCL to Use**			
2948	95% Approximate Gamma UCL	8.49		
2949				
2950	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2951	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2952	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2953				
2954	**Result (zirconium)**			
2955				
2956	**General Statistics**			
2957	Total Number of Observations	64	Number of Distinct Observations	14
2958	Number of Detects	13	Number of Non-Detects	51
2959	Number of Distinct Detects	13	Number of Distinct Non-Detects	1
2960	Minimum Detect	0.041	Minimum Non-Detect	0.04
2961	Maximum Detect	0.598	Maximum Non-Detect	0.04
2962	Variance Detects	0.0324	Percent Non-Detects	79.69%
2963	Mean Detects	0.21	SD Detects	0.18
2964	Median Detects	0.155	CV Detects	0.857

Row	A–E	F	G–K	L
2965	Skewness Detects	1.131	Kurtosis Detects	0.246
2966	Mean of Logged Detects	-1.914	SD of Logged Detects	0.902
2967				
2968	**Normal GOF Test on Detects Only**			
2969	Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk GOF Test**	
2970	1% Shapiro Wilk Critical Value	0.814	Detected Data appear Normal at 1% Significance Level	
2971	Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**	
2972	1% Lilliefors Critical Value	0.271	Detected Data appear Normal at 1% Significance Level	
2973	**Detected Data appear Normal at 1% Significance Level**			
2974				
2975	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2976	KM Mean	0.0746	KM Standard Error of Mean	0.0135
2977	90KM SD	0.104	95% KM (BCA) UCL	0.0994
2978	95% KM (t) UCL	0.0971	95% KM (Percentile Bootstrap) UCL	0.0978
2979	95% KM (z) UCL	0.0968	95% KM Bootstrap t UCL	0.109
2980	90% KM Chebyshev UCL	0.115	95% KM Chebyshev UCL	0.133
2981	97.5% KM Chebyshev UCL	0.159	99% KM Chebyshev UCL	0.209
2982				
2983	**Gamma GOF Tests on Detected Observations Only**			
2984	A-D Test Statistic	0.316	**Anderson-Darling GOF Test**	
2985	5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level	
2986	K-S Test Statistic	0.137	**Kolmogorov-Smirnov GOF**	
2987	5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level	
2988	**Detected data appear Gamma Distributed at 5% Significance Level**			
2989				
2990	**Gamma Statistics on Detected Data Only**			
2991	k hat (MLE)	1.555	k star (bias corrected MLE)	1.248
2992	Theta hat (MLE)	0.135	Theta star (bias corrected MLE)	0.168
2993	nu hat (MLE)	40.44	nu star (bias corrected)	32.44
2994	Mean (detects)	0.21		
2995				
2996	**Gamma ROS Statistics using Imputed Non-Detects**			
2997	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2998	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2999	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
3000	This is especially true when the sample size is small.			
3001	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
3002	Minimum	0.01	Mean	0.0507
3003	Maximum	0.598	Median	0.01
3004	SD	0.113	CV	2.23
3005	k hat (MLE)	0.577	k star (bias corrected MLE)	0.561
3006	Theta hat (MLE)	0.0878	Theta star (bias corrected MLE)	0.0904
3007	nu hat (MLE)	73.91	nu star (bias corrected)	71.78
3008	Adjusted Level of Significance (β)	0.0463		
3009	Approximate Chi Square Value (71.78, α)	53.27	Adjusted Chi Square Value (71.78, β)	52.9
3010	95% Gamma Approximate UCL	0.0683	95% Gamma Adjusted UCL	0.0687
3011				
3012	**Estimates of Gamma Parameters using KM Estimates**			
3013	Mean (KM)	0.0746	SD (KM)	0.104
3014	Variance (KM)	0.0108	SE of Mean (KM)	0.0135
3015	k hat (KM)	0.516	k star (KM)	0.503
3016	nu hat (KM)	66.1	nu star (KM)	64.33

theta hat (KM)	0.144	theta star (KM)	0.148
80% gamma percentile (KM)	0.123	90% gamma percentile (KM)	0.202
95% gamma percentile (KM)	0.286	99% gamma percentile (KM)	0.493
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (64.33, α)	46.88	Adjusted Chi Square Value (64.33, β)	46.54
95% KM Approximate Gamma UCL	0.102	95% KM Adjusted Gamma UCL	0.103
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0495	Mean in Log Scale	-4.912
SD in Original Scale	0.114	SD in Log Scale	2.13
95% t UCL (assumes normality of ROS data)	0.0733	95% Percentile Bootstrap UCL	0.0737
95% BCA Bootstrap UCL	0.0781	95% Bootstrap t UCL	0.0864
95% H-UCL (Log ROS)	0.166		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.954	KM Geo Mean	0.0521
KM SD (logged)	0.654	95% Critical H Value (KM-Log)	1.974
KM Standard Error of Mean (logged)	0.0851	95% H-UCL (KM -Log)	0.076
KM SD (logged)	0.654	95% Critical H Value (KM-Log)	1.974
KM Standard Error of Mean (logged)	0.0851		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0586	Mean in Log Scale	-3.506
SD in Original Scale	0.11	SD in Log Scale	0.901
95% t UCL (Assumes normality)	0.0816	95% H-Stat UCL	0.0577
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0971		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

B.2.7 Terrestrial Small Prey EPC ProUCL Output

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 3/15/2024 3:17:29 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (aluminum)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.57	Mean	0.67
Maximum	0.77	Median	0.67

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 Result (aluminum) 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.

Result (antimony)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
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 Result (antimony) 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.

Result (arsenic)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.0061	Mean	0.0113
Maximum	0.0165	Median	0.0113

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 Result (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.

Result (barium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.039	Mean	0.116
Maximum	0.193	Median	0.116

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 Result (barium) 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.

Result (beryllium)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (beryllium) 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.

Result (bismuth)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (bismuth) 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.

Result (boron)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.3	Mean	0.365
Maximum	0.43	Median	0.365

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 Result (boron) 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.

Result (cadmium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.0063	Mean	0.00835
Maximum	0.0104	Median	0.00835

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 Result (cadmium) 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.

Result (calcium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	397	Mean	543.5
Maximum	690	Median	543.5

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 Result (calcium) 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.

Result (chromium)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (chromium) 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.

Result (cobalt)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (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.

Result (copper)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.296	Mean	1.053
Maximum	1.81	Median	1.053

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 Result (copper) 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.

Result (iron)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2

		Number of Missing Observations	0
Minimum	5.72	Mean	22.46
Maximum	39.2	Median	22.46

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 Result (iron) 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.

Result (lead)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.004	Mean	0.0095
Maximum	0.015	Median	0.0095

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 Result (lead) 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.

Result (lithium)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (lithium) 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.

Result (magnesium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	314	Mean	322
Maximum	330	Median	322

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 Result (magnesium) 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.

Result (manganese)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.112	Mean	0.342
Maximum	0.571	Median	0.342

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 Result (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.

Result (mercury)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
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 Result (mercury) 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.

Result (molybdenum)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.0088	Mean	0.00995
Maximum	0.0111	Median	0.00995

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 Result (molybdenum) 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.

Result (nickel)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (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.

Result (phosphorus)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	2380	Mean	2665
Maximum	2950	Median	2665

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 Result (phosphorus) 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.

Result (potassium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	3020	Mean	3030
Maximum	3040	Median	3030

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 Result (potassium) 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.

Result (selenium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.083	Mean	0.164
Maximum	0.244	Median	0.164

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 Result (selenium) 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.

Result (sodium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	696	Mean	762.5
Maximum	829	Median	762.5

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 Result 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.

Result (strontium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.123	Mean	0.987
Maximum	1.85	Median	0.987

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 Result (strontium) 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.

Result (thallium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
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 Result (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.

Result (tin)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (tin) 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.

Result (uranium)

General Statistics

Total Number of Observations	2	Number of Distinct 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 Result (uranium) 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.

Result (vanadium)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	2
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

	A–E	F	G–K	L
469	Warning: This data set only has 2 observations!			
470	Data set is too small to compute reliable and meaningful statistics and estimates!			
471	The data set for variable Result (vanadium) was not processed!			
472				
473	It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
474	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
475				
476				
477				
478	Result (zinc)			
479				
480	General Statistics			
481	Total Number of Observations	2	Number of Distinct Observations	2
482			Number of Missing Observations	0
483	Minimum	4.56	Mean	5.43
484	Maximum	6.3	Median	5.43
485				
486	Warning: This data set only has 2 observations!			
487	Data set is too small to compute reliable and meaningful statistics and estimates!			
488	The data set for variable Result (zinc) was not processed!			
489				
490	It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
491	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
492				
493				
494	Result (zirconium)			
495				
496	General Statistics			
497	Total Number of Observations	2	Number of Distinct Observations	1
498	Number of Detects	0	Number of Non-Detects	2
499	Number of Distinct Detects	0	Number of Distinct Non-Detects	1
500				
501	Warning: This data set only has 2 observations!			
502	Data set is too small to compute reliable and meaningful statistics and estimates!			
503	The data set for variable Result (zirconium) was not processed!			
504				
505	It is suggested to collect at least 8 to 10 observations before using these statistical methods!			
506	If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.			
507				
508				

B.2.8 Angling Fish EPC ProUCL Output: North Driftwood (nd) Watershed & West Buskegau Watershed (wb)

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 7/12/2024 8:08:25 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (angling fish_nd_aluminum)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	5
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.7	Minimum Non-Detect	0.4
Maximum Detect	1.86	Maximum Non-Detect	0.4
Variance Detects	0.109	Percent Non-Detects	31.25%
Mean Detects	1.003	SD Detects	0.33
Median Detects	0.84	CV Detects	0.329
Skewness Detects	1.98	Kurtosis Detects	4.516
Mean of Logged Detects	-0.0367	SD of Logged Detects	0.28

Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.782	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level
Detected Data appear Approximate Normal at 1% Significance Level		

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.814	KM Standard Error of Mean	0.1
90KM SD	0.382	95% KM (BCA) UCL	0.971
95% KM (t) UCL	0.99	95% KM (Percentile Bootstrap) UCL	0.976
95% KM (z) UCL	0.979	95% KM Bootstrap t UCL	1.03
90% KM Chebyshev UCL	1.115	95% KM Chebyshev UCL	1.251
97.5% KM Chebyshev UCL	1.44	99% KM Chebyshev UCL	1.811

Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.684	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.255	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)	12.84	k star (bias corrected MLE)	9.397
Theta hat (MLE)	0.0781	Theta star (bias corrected MLE)	0.107
nu hat (MLE)	282.4	nu star (bias corrected)	206.7
Mean (detects)	1.003		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.124	Mean	0.79
Maximum	1.86	Median	0.805
SD	0.429	CV	0.543
k hat (MLE)	3.017	k star (bias corrected MLE)	2.493
Theta hat (MLE)	0.262	Theta star (bias corrected MLE)	0.317
nu hat (MLE)	96.54	nu star (bias corrected)	79.77
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (79.77, α)	60.19	Adjusted Chi Square Value (79.77, β)	58.26
95% Gamma Approximate UCL	1.047	95% Gamma Adjusted UCL	1.082
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.814	SD (KM)	0.382
Variance (KM)	0.146	SE of Mean (KM)	0.1
k hat (KM)	4.544	k star (KM)	3.733
nu hat (KM)	145.4	nu star (KM)	119.5
theta hat (KM)	0.179	theta star (KM)	0.218
80% gamma percentile (KM)	1.132	90% gamma percentile (KM)	1.379
95% gamma percentile (KM)	1.608	99% gamma percentile (KM)	2.098
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (119.47, α)	95.23	Adjusted Chi Square Value (119.47, β)	92.77
95% KM Approximate Gamma UCL	1.022	95% KM Adjusted Gamma UCL	1.049
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.231	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.842	Mean in Log Scale	-0.253
SD in Original Scale	0.367	SD in Log Scale	0.413
95% t UCL (assumes normality of ROS data)	1.003	95% Percentile Bootstrap UCL	0.992
95% BCA Bootstrap UCL	1.014	95% Bootstrap t UCL	1.05
95% H-UCL (Log ROS)	1.042		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-0.312	KM Geo Mean	0.732
KM SD (logged)	0.464	95% Critical H Value (KM-Log)	2.014
KM Standard Error of Mean (logged)	0.122	95% H-UCL (KM -Log)	1.038
KM SD (logged)	0.464	95% Critical H Value (KM-Log)	2.014
KM Standard Error of Mean (logged)	0.122		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.752	Mean in Log Scale	-0.528

SD in Original Scale	0.469	SD in Log Scale	0.787
95% t UCL (Assumes normality)	0.957	95% H-Stat UCL	1.307
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 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.99		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_nd_antimony)			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
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 Result (angling fish_nd_antimony) was not processed!			
Result (angling fish_nd_arsenic)			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0071	Mean	0.0532
Maximum	0.167	Median	0.046
SD	0.0422	Std. Error of Mean	0.0106
Coefficient of Variation	0.793	Skewness	1.397
Normal GOF Test			
Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0717	95% Adjusted-CLT UCL (Chen-1995)	0.0745
		95% Modified-t UCL (Johnson-1978)	0.0724

Gamma GOF Test

A-D Test Statistic	0.229	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.753	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	0.219	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.664	k star (bias corrected MLE)	1.394
Theta hat (MLE)	0.032	Theta star (bias corrected MLE)	0.0382
nu hat (MLE)	53.26	nu star (bias corrected)	44.61
MLE Mean (bias corrected)	0.0532	MLE Sd (bias corrected)	0.0451
		Approximate Chi Square Value (0.05)	30.29
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	28.95

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0784	95% Adjusted Gamma UCL	0.082

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.948	Mean of logged Data	-3.263
Maximum of Logged Data	-1.79	SD of logged Data	0.906

Assuming Lognormal Distribution

95% H-UCL	0.105	90% Chebyshev (MVUE) UCL	0.0969
95% Chebyshev (MVUE) UCL	0.116	97.5% Chebyshev (MVUE) UCL	0.141
99% Chebyshev (MVUE) UCL	0.192		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0706	95% BCA Bootstrap UCL	0.0743
95% Standard Bootstrap UCL	0.0702	95% Bootstrap-t UCL	0.079
95% Hall's Bootstrap UCL	0.091	95% Percentile Bootstrap UCL	0.0715
90% Chebyshev(Mean, Sd) UCL	0.0849	95% Chebyshev(Mean, Sd) UCL	0.0992
97.5% Chebyshev(Mean, Sd) UCL	0.119	99% Chebyshev(Mean, Sd) UCL	0.158

Suggested UCL to Use

95% Student's-t UCL	0.0717		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_barium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	0.012	Mean	0.0388
Maximum	0.073	Median	0.037
SD	0.0182	Std. Error of Mean	0.00456
Coefficient of Variation	0.47	Skewness	0.207

Normal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0468	95% Adjusted-CLT UCL (Chen-1995)	0.0466
		95% Modified-t UCL (Johnson-1978)	0.0468

Gamma GOF Test

A-D Test Statistic	0.286	**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	0.148	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.258	k star (bias corrected MLE)	3.501
Theta hat (MLE)	0.00912	Theta star (bias corrected MLE)	0.0111
nu hat (MLE)	136.2	nu star (bias corrected)	112
MLE Mean (bias corrected)	0.0388	MLE Sd (bias corrected)	0.0207
		Approximate Chi Square Value (0.05)	88.6
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	86.23

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0491	95% Adjusted Gamma UCL	0.0504

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.423	Mean of logged Data	-3.371
Maximum of Logged Data	-2.617	SD of logged Data	0.537

Assuming Lognormal Distribution

95% H-UCL	0.053	90% Chebyshev (MVUE) UCL	0.0557
95% Chebyshev (MVUE) UCL	0.0631	97.5% Chebyshev (MVUE) UCL	0.0734
99% Chebyshev (MVUE) UCL	0.0936		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0463	95% BCA Bootstrap UCL	0.0462
95% Standard Bootstrap UCL	0.046	95% Bootstrap-t UCL	0.0473
95% Hall's Bootstrap UCL	0.0464	95% Percentile Bootstrap UCL	0.046
90% Chebyshev(Mean, Sd) UCL	0.0525	95% Chebyshev(Mean, Sd) UCL	0.0587
97.5% Chebyshev(Mean, Sd) UCL	0.0673	99% Chebyshev(Mean, Sd) UCL	0.0842

Suggested UCL to Use

95% Student's-t UCL	0.0468		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_beryllium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_beryllium) was not processed!

Result (angling fish_nd_bismuth)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.0021	Minimum Non-Detect	0.002
Maximum Detect	0.0034	Maximum Non-Detect	0.002
Variance Detects	4.3000E-7	Percent Non-Detects	81.25%
Mean Detects	0.0027	SD Detects	6.5574E-4
Median Detects	0.0026	CV Detects	0.243
Skewness Detects	0.67	Kurtosis Detects	N/A
Mean of Logged Detects	-5.934	SD of Logged Detects	0.241

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

313				
314				
315	**Normal GOF Test on Detects Only**			
316	Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk GOF Test**	
317	1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level	
318	Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**	
319	1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level	
320	**Detected Data appear Normal at 1% Significance Level**			
321	**Note GOF tests may be unreliable for small sample sizes**			
322				
323	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
324	KM Mean	0.00213	KM Standard Error of Mean	1.0971E-4
325	90KM SD	3.5833E-4	95% KM (BCA) UCL	N/A
326	95% KM (t) UCL	0.00232	95% KM (Percentile Bootstrap) UCL	N/A
327	95% KM (z) UCL	0.00231	95% KM Bootstrap t UCL	N/A
328	90% KM Chebyshev UCL	0.00246	95% KM Chebyshev UCL	0.00261
329	97.5% KM Chebyshev UCL	0.00282	99% KM Chebyshev UCL	0.00322
330				
331	**Gamma GOF Tests on Detected Observations Only**			
332	A-D Test Statistic	0.256	**Anderson-Darling GOF Test**	
333	5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level	
334	K-S Test Statistic	0.233	**Kolmogorov-Smirnov GOF**	
335	5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level	
336	**Detected Data Not Gamma Distributed at 5% Significance Level**			
337				
338	**Gamma Statistics on Detected Data Only**			
339	k hat (MLE)	25.79	k star (bias corrected MLE)	N/A
340	Theta hat (MLE)	1.0468E-4	Theta star (bias corrected MLE)	N/A
341	nu hat (MLE)	154.8	nu star (bias corrected)	N/A
342	Mean (detects)	0.0027		
343				
344	**Gamma ROS Statistics using Imputed Non-Detects**			
345	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
346	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
347	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
348	This is especially true when the sample size is small.			
349	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
350	Minimum	0.0021	Mean	0.00863
351	Maximum	0.01	Median	0.01
352	SD	0.00295	CV	0.342
353	k hat (MLE)	5.065	k star (bias corrected MLE)	4.157
354	Theta hat (MLE)	0.0017	Theta star (bias corrected MLE)	0.00208
355	nu hat (MLE)	162.1	nu star (bias corrected)	133
356	Adjusted Level of Significance (β)	0.0335		
357	Approximate Chi Square Value (133.01, α)	107.4	Adjusted Chi Square Value (133.01, β)	104.7
358	95% Gamma Approximate UCL	0.0107	95% Gamma Adjusted UCL	N/A
359				
360	**Estimates of Gamma Parameters using KM Estimates**			
361	Mean (KM)	0.00213	SD (KM)	3.5833E-4
362	Variance (KM)	1.2840E-7	SE of Mean (KM)	1.0971E-4
363	k hat (KM)	35.38	k star (KM)	28.78
364	nu hat (KM)	1132	nu star (KM)	921.1

	A–E	F	G–K	L
365	theta hat (KM)	6.0246E-5	theta star (KM)	7.4041E-5
366	80% gamma percentile (KM)	0.00246	90% gamma percentile (KM)	0.00265
367	95% gamma percentile (KM)	0.00282	99% gamma percentile (KM)	0.00316
368				
369	**Gamma Kaplan-Meier (KM) Statistics**			
370	Approximate Chi Square Value (921.11, α)	851.7	Adjusted Chi Square Value (921.11, β)	844.1
371	95% KM Approximate Gamma UCL	0.00231	95% KM Adjusted Gamma UCL	0.00233
372				
373	**Lognormal GOF Test on Detected Observations Only**			
374	Shapiro Wilk Test Statistic	0.996	**Shapiro Wilk GOF Test**	
375	10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
376	Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**	
377	10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	
378	**Detected Data appear Lognormal at 10% Significance Level**			
379	**Note GOF tests may be unreliable for small sample sizes**			
380				
381	**Lognormal ROS Statistics Using Imputed Non-Detects**			
382	Mean in Original Scale	0.00115	Mean in Log Scale	-7.012
383	SD in Original Scale	8.7888E-4	SD in Log Scale	0.73
384	95% t UCL (assumes normality of ROS data)	0.00154	95% Percentile Bootstrap UCL	0.00152
385	95% BCA Bootstrap UCL	0.00158	95% Bootstrap t UCL	0.00172
386	95% H-UCL (Log ROS)	0.00182		
387				
388	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
389	KM Mean (logged)	-6.162	KM Geo Mean	0.00211
390	KM SD (logged)	0.139	95% Critical H Value (KM-Log)	1.763
391	KM Standard Error of Mean (logged)	0.0425	95% H-UCL (KM -Log)	0.00227
392	KM SD (logged)	0.139	95% Critical H Value (KM-Log)	1.763
393	KM Standard Error of Mean (logged)	0.0425		
394				
395	**DL/2 Statistics**			
396	**DL/2 Normal**		**DL/2 Log-Transformed**	
397	Mean in Original Scale	0.00132	Mean in Log Scale	-6.725
398	SD in Original Scale	7.2592E-4	SD in Log Scale	0.402
399	95% t UCL (Assumes normality)	0.00164	95% H-Stat UCL	0.00159
400	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
401				
402	**Nonparametric Distribution Free UCL Statistics**			
403	**Detected Data appear Normal Distributed at 1% Significance Level**			
404				
405	**Suggested UCL to Use**			
406	95% KM (t) UCL	0.00232		
407				
408	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
409	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
410	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
411				
412	**Result (angling fish_nd_boron)**			
413				
414	**General Statistics**			
415	Total Number of Observations	16	Number of Distinct Observations	1
416	Number of Detects	0	Number of Non-Detects	16

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 Result (angling fish_nd_boron) was not processed!

Result (angling fish_nd_cadmium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
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 Result (angling fish_nd_cadmium) was not processed!

Result (angling fish_nd_calcium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	136	Mean	658.4
Maximum	1270	Median	639
SD	319.3	Std. Error of Mean	79.82
Coefficient of Variation	0.485	Skewness	0.596

Normal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	798.4	95% Adjusted-CLT UCL (Chen-1995)	802.4
		95% Modified-t UCL (Johnson-1978)	800.4

Gamma GOF Test

A-D Test Statistic	0.26	**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	0.103	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.088	k star (bias corrected MLE)	3.363
Theta hat (MLE)	161.1	Theta star (bias corrected MLE)	195.8
nu hat (MLE)	130.8	nu star (bias corrected)	107.6
MLE Mean (bias corrected)	658.4	MLE Sd (bias corrected)	359.1
		Approximate Chi Square Value (0.05)	84.67
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	82.35

Assuming Gamma Distribution

95% Approximate Gamma UCL	836.8	95% Adjusted Gamma UCL	860.4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.913	Mean of logged Data	6.363
Maximum of Logged Data	7.147	SD of logged Data	0.559

Assuming Lognormal Distribution

95% H-UCL	919.1	90% Chebyshev (MVUE) UCL	961.9
95% Chebyshev (MVUE) UCL	1094	97.5% Chebyshev (MVUE) UCL	1277
99% Chebyshev (MVUE) UCL	1638		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	789.7	95% BCA Bootstrap UCL	794.2
95% Standard Bootstrap UCL	783.7	95% Bootstrap-t UCL	815.9
95% Hall's Bootstrap UCL	809.7	95% Percentile Bootstrap UCL	787.4
90% Chebyshev(Mean, Sd) UCL	897.9	95% Chebyshev(Mean, Sd) UCL	1006
97.5% Chebyshev(Mean, Sd) UCL	1157	99% Chebyshev(Mean, Sd) UCL	1453

Suggested UCL to Use

95% Student's-t UCL	798.4		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_cesium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0068	Mean	0.0185
Maximum	0.0317	Median	0.0179

521	SD	0.00713	Std. Error of Mean	0.00178
522	Coefficient of Variation	0.386	Skewness	0.193
523				
524	**Normal GOF Test**			
525	Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk GOF Test**	
526	1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
527	Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**	
528	1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
529	**Data appear Normal at 1% Significance Level**			
530				
531	**Assuming Normal Distribution**			
532	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
533	95% Student's-t UCL	0.0216	95% Adjusted-CLT UCL (Chen-1995)	0.0215
534			95% Modified-t UCL (Johnson-1978)	0.0216
535				
536	**Gamma GOF Test**			
537	A-D Test Statistic	0.242	**Anderson-Darling Gamma GOF Test**	
538	5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
539	K-S Test Statistic	0.123	**Kolmogorov-Smirnov Gamma GOF Test**	
540	5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level	
541	**Detected data appear Gamma Distributed at 5% Significance Level**			
542				
543	**Gamma Statistics**			
544	k hat (MLE)	6.369	k star (bias corrected MLE)	5.217
545	Theta hat (MLE)	0.0029	Theta star (bias corrected MLE)	0.00354
546	nu hat (MLE)	203.8	nu star (bias corrected)	166.9
547	MLE Mean (bias corrected)	0.0185	MLE Sd (bias corrected)	0.00809
548			Approximate Chi Square Value (0.05)	138.1
549	Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	135.1
550				
551	**Assuming Gamma Distribution**			
552	95% Approximate Gamma UCL	0.0223	95% Adjusted Gamma UCL	0.0228
553				
554	**Lognormal GOF Test**			
555	Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**	
556	10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
557	Lilliefors Test Statistic	0.152	**Lilliefors Lognormal GOF Test**	
558	10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
559	**Data appear Lognormal at 10% Significance Level**			
560				
561	**Lognormal Statistics**			
562	Minimum of Logged Data	-4.991	Mean of logged Data	-4.072
563	Maximum of Logged Data	-3.451	SD of logged Data	0.435
564				
565	**Assuming Lognormal Distribution**			
566	95% H-UCL	0.0234	90% Chebyshev (MVUE) UCL	0.0249
567	95% Chebyshev (MVUE) UCL	0.0277	97.5% Chebyshev (MVUE) UCL	0.0316
568	99% Chebyshev (MVUE) UCL	0.0393		
569				
570	**Nonparametric Distribution Free UCL Statistics**			
571	**Data appear to follow a Discernible Distribution**			
572				

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0214	95% BCA Bootstrap UCL	0.0212
95% Standard Bootstrap UCL	0.0213	95% Bootstrap-t UCL	0.0218
95% Hall's Bootstrap UCL	0.0217	95% Percentile Bootstrap UCL	0.0212
90% Chebyshev(Mean, Sd) UCL	0.0238	95% Chebyshev(Mean, Sd) UCL	0.0263
97.5% Chebyshev(Mean, Sd) UCL	0.0296	99% Chebyshev(Mean, Sd) UCL	0.0362

Suggested UCL to Use

95% Student's-t UCL	0.0216		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_chromium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	4	Number of Non-Detects	12
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.019	Minimum Non-Detect	0.01
Maximum Detect	0.036	Maximum Non-Detect	0.01
Variance Detects	6.0917E-5	Percent Non-Detects	75%
Mean Detects	0.0263	SD Detects	0.0078
Median Detects	0.025	CV Detects	0.297
Skewness Detects	0.592	Kurtosis Detects	-2.167
Mean of Logged Detects	-3.673	SD of Logged Detects	0.294

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.249	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.0141	KM Standard Error of Mean	0.00225
90KM SD	0.00781	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.018	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0178	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0208	95% KM Chebyshev UCL	0.0239
97.5% KM Chebyshev UCL	0.0281	99% KM Chebyshev UCL	0.0365

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.308	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.276	**Kolmogorov-Smirnov GOF**
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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	15.45	k star (bias corrected MLE)	4.028
Theta hat (MLE)	0.0017	Theta star (bias corrected MLE)	0.00652
nu hat (MLE)	123.6	nu star (bias corrected)	32.22
Mean (detects)	0.0263		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0142
Maximum	0.036	Median	0.01
SD	0.00802	CV	0.567
k hat (MLE)	4.887	k star (bias corrected MLE)	4.012
Theta hat (MLE)	0.0029	Theta star (bias corrected MLE)	0.00353
nu hat (MLE)	156.4	nu star (bias corrected)	128.4
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (128.39, α)	103.2	Adjusted Chi Square Value (128.39, β)	100.6
95% Gamma Approximate UCL	0.0176	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0141	SD (KM)	0.00781
Variance (KM)	6.0934E-5	SE of Mean (KM)	0.00225
k hat (KM)	3.245	k star (KM)	2.679
nu hat (KM)	103.9	nu star (KM)	85.71
theta hat (KM)	0.00433	theta star (KM)	0.00525
80% gamma percentile (KM)	0.0203	90% gamma percentile (KM)	0.0256
95% gamma percentile (KM)	0.0305	99% gamma percentile (KM)	0.0412

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.71, α)	65.37	Adjusted Chi Square Value (85.71, β)	63.35
95% KM Approximate Gamma UCL	0.0184	95% KM Adjusted Gamma UCL	0.019

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.241	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0122	Mean in Log Scale	-4.67
SD in Original Scale	0.00958	SD in Log Scale	0.762
95% t UCL (assumes normality of ROS data)	0.0164	95% Percentile Bootstrap UCL	0.0161
95% BCA Bootstrap UCL	0.017	95% Bootstrap t UCL	0.0183
95% H-UCL (Log ROS)	0.0199		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.372	KM Geo Mean	0.0126

KM SD (logged)	0.423	95% Critical H Value (KM-Log)	1.975
KM Standard Error of Mean (logged)	0.122	95% H-UCL (KM -Log)	0.0171
KM SD (logged)	0.423	95% Critical H Value (KM-Log)	1.975
KM Standard Error of Mean (logged)	0.122		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0103	Mean in Log Scale	-4.892
SD in Original Scale	0.0101	SD in Log Scale	0.739
95% t UCL (Assumes normality)	0.0147	95% H-Stat UCL	0.0154

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.018		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_cobalt)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_cobalt) was not processed!

Result (angling fish_nd_copper)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.103	Mean	0.147
Maximum	0.207	Median	0.144
SD	0.0272	Std. Error of Mean	0.00679
Coefficient of Variation	0.185	Skewness	0.581

Normal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.159	95% Adjusted-CLT UCL (Chen-1995)	0.159
		95% Modified-t UCL (Johnson-1978)	0.159
Gamma GOF Test			
A-D Test Statistic	0.228	**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	0.135	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	32.16	k star (bias corrected MLE)	26.17
Theta hat (MLE)	0.00457	Theta star (bias corrected MLE)	0.00562
nu hat (MLE)	1029	nu star (bias corrected)	837.5
MLE Mean (bias corrected)	0.147	MLE Sd (bias corrected)	0.0287
		Approximate Chi Square Value (0.05)	771.4
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	764.2
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.16	95% Adjusted Gamma UCL	0.161
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.273	Mean of logged Data	-1.933
Maximum of Logged Data	-1.575	SD of logged Data	0.182
Assuming Lognormal Distribution			
95% H-UCL	0.16	90% Chebyshev (MVUE) UCL	0.167
95% Chebyshev (MVUE) UCL	0.176	97.5% Chebyshev (MVUE) UCL	0.189
99% Chebyshev (MVUE) UCL	0.214		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.158	95% BCA Bootstrap UCL	0.16
95% Standard Bootstrap UCL	0.158	95% Bootstrap-t UCL	0.161
95% Hall's Bootstrap UCL	0.161	95% Percentile Bootstrap UCL	0.158
90% Chebyshev(Mean, Sd) UCL	0.167	95% Chebyshev(Mean, Sd) UCL	0.177
97.5% Chebyshev(Mean, Sd) UCL	0.189	99% Chebyshev(Mean, Sd) UCL	0.215
Suggested UCL to Use			

	A	B	C	D	E	F	G	H	I	J	K	L
781				95% Student's-t UCL		0.159						
782												
783	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
784	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
785	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
786												
787												
788	Result (angling fish_nd_iron)											
789												
790	General Statistics											
791				Total Number of Observations		16				Number of Distinct Observations		16
792										Number of Missing Observations		0
793				Minimum		1.16				Mean		2.521
794				Maximum		4.55				Median		2.34
795				SD		0.975				Std. Error of Mean		0.244
796				Coefficient of Variation		0.387				Skewness		0.94
797												
798	Normal GOF Test											
799				Shapiro Wilk Test Statistic		0.912	Shapiro Wilk GOF Test					
800				1% Shapiro Wilk Critical Value		0.844	Data appear Normal at 1% Significance Level					
801				Lilliefors Test Statistic		0.218	Lilliefors GOF Test					
802				1% Lilliefors Critical Value		0.248	Data appear Normal at 1% Significance Level					
803	Data appear Normal at 1% Significance Level											
804												
805	Assuming Normal Distribution											
806	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
807				95% Student's-t UCL		2.949				95% Adjusted-CLT UCL (Chen-1995)		2.984
808										95% Modified-t UCL (Johnson-1978)		2.958
809												
810	Gamma GOF Test											
811				A-D Test Statistic		0.291	Anderson-Darling Gamma GOF Test					
812				5% A-D Critical Value		0.74	Detected data appear Gamma Distributed at 5% Significance Level					
813				K-S Test Statistic		0.168	Kolmogorov-Smirnov Gamma GOF Test					
814				5% K-S Critical Value		0.215	Detected data appear Gamma Distributed at 5% Significance Level					
815	Detected data appear Gamma Distributed at 5% Significance Level											
816												
817	Gamma Statistics											
818				k hat (MLE)		7.689				k star (bias corrected MLE)		6.289
819				Theta hat (MLE)		0.328				Theta star (bias corrected MLE)		0.401
820				nu hat (MLE)		246.1				nu star (bias corrected)		201.3
821				MLE Mean (bias corrected)		2.521				MLE Sd (bias corrected)		1.005
822										Approximate Chi Square Value (0.05)		169.4
823				Adjusted Level of Significance		0.0335				Adjusted Chi Square Value		166.1
824												
825	Assuming Gamma Distribution											
826				95% Approximate Gamma UCL		2.995				95% Adjusted Gamma UCL		3.055
827												
828	Lognormal GOF Test											
829				Shapiro Wilk Test Statistic		0.974	Shapiro Wilk Lognormal GOF Test					
830				10% Shapiro Wilk Critical Value		0.906	Data appear Lognormal at 10% Significance Level					
831				Lilliefors Test Statistic		0.148	Lilliefors Lognormal GOF Test					
832				10% Lilliefors Critical Value		0.196	Data appear Lognormal at 10% Significance Level					

	A–E	F	G–K	L
833	Data appear Lognormal at 10% Significance Level			
834				
835	**Lognormal Statistics**			
836	Minimum of Logged Data	0.148	Mean of logged Data	0.858
837	Maximum of Logged Data	1.515	SD of logged Data	0.375
838				
839	**Assuming Lognormal Distribution**			
840	95% H-UCL	3.051	90% Chebyshev (MVUE) UCL	3.241
841	95% Chebyshev (MVUE) UCL	3.567	97.5% Chebyshev (MVUE) UCL	4.021
842	99% Chebyshev (MVUE) UCL	4.912		
843				
844	**Nonparametric Distribution Free UCL Statistics**			
845	**Data appear to follow a Discernible Distribution**			
846				
847	**Nonparametric Distribution Free UCLs**			
848	95% CLT UCL	2.922	95% BCA Bootstrap UCL	2.98
849	95% Standard Bootstrap UCL	2.916	95% Bootstrap-t UCL	3.099
850	95% Hall's Bootstrap UCL	3.114	95% Percentile Bootstrap UCL	2.907
851	90% Chebyshev(Mean, Sd) UCL	3.253	95% Chebyshev(Mean, Sd) UCL	3.584
852	97.5% Chebyshev(Mean, Sd) UCL	4.044	99% Chebyshev(Mean, Sd) UCL	4.948
853				
854	**Suggested UCL to Use**			
855	95% Student's-t UCL	2.949		
856				
857	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
858	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
859	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
860				
861	**Result (angling fish_nd_lead)**			
862				
863	**General Statistics**			
864	Total Number of Observations	16	Number of Distinct Observations	3
865	Number of Detects	2	Number of Non-Detects	14
866	Number of Distinct Detects	2	Number of Distinct Non-Detects	1
867	Minimum Detect	0.0079	Minimum Non-Detect	0.004
868	Maximum Detect	0.0091	Maximum Non-Detect	0.004
869	Variance Detects	7.2000E-7	Percent Non-Detects	87.5%
870	Mean Detects	0.0085	SD Detects	8.4853E-4
871	Median Detects	0.0085	CV Detects	0.0998
872	Skewness Detects	N/A	Kurtosis Detects	N/A
873	Mean of Logged Detects	-4.77	SD of Logged Detects	0.1
874				
875	**Warning: Data set has only 2 Detected Values.**			
876	**This is not enough to compute meaningful or reliable statistics and estimates.**			
877				
878				
879	**Normal GOF Test on Detects Only**			
880	**Not Enough Data to Perform GOF Test**			
881				
882	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
883	KM Mean	0.00456	KM Standard Error of Mean	5.3149E-4
884	90KM SD	0.0015	95% KM (BCA) UCL	N/A

	A	B	C	D	E	F	G	H	I	J	K	L
885					95% KM (t) UCL	0.00549					95% KM (Percentile Bootstrap) UCL	N/A
886					95% KM (z) UCL	0.00544					95% KM Bootstrap t UCL	N/A
887					90% KM Chebyshev UCL	0.00616					95% KM Chebyshev UCL	0.00688
888					97.5% KM Chebyshev UCL	0.00788					99% KM Chebyshev UCL	0.00985
889												
890	**Gamma GOF Tests on Detected Observations Only**											
891	**Not Enough Data to Perform GOF Test**											
892												
893	**Gamma Statistics on Detected Data Only**											
894					k hat (MLE)	200.4					k star (bias corrected MLE)	N/A
895					Theta hat (MLE)	4.2424E-5					Theta star (bias corrected MLE)	N/A
896					nu hat (MLE)	801.4					nu star (bias corrected)	N/A
897					Mean (detects)	0.0085						
898												
899	**Estimates of Gamma Parameters using KM Estimates**											
900					Mean (KM)	0.00456					SD (KM)	0.0015
901					Variance (KM)	2.2598E-6					SE of Mean (KM)	5.3149E-4
902					k hat (KM)	9.211					k star (KM)	7.526
903					nu hat (KM)	294.8					nu star (KM)	240.8
904					theta hat (KM)	4.9531E-4					theta star (KM)	6.0624E-4
905					80% gamma percentile (KM)	0.00587					90% gamma percentile (KM)	0.00678
906					95% gamma percentile (KM)	0.0076					99% gamma percentile (KM)	0.00929
907												
908	**Gamma Kaplan-Meier (KM) Statistics**											
909											Adjusted Level of Significance (β)	0.0335
910					Approximate Chi Square Value (240.83, α)	205.9					Adjusted Chi Square Value (240.83, β)	202.2
911					95% KM Approximate Gamma UCL	0.00534					95% KM Adjusted Gamma UCL	0.00543
912												
913	**Lognormal GOF Test on Detected Observations Only**											
914	**Not Enough Data to Perform GOF Test**											
915												
916	**Lognormal ROS Statistics Using Imputed Non-Detects**											
917					Mean in Original Scale	0.00484					Mean in Log Scale	-5.397
918					SD in Original Scale	0.00185					SD in Log Scale	0.37
919					95% t UCL (assumes normality of ROS data)	0.00564					95% Percentile Bootstrap UCL	0.00556
920					95% BCA Bootstrap UCL	0.00565					95% Bootstrap t UCL	0.00582
921					95% H-UCL (Log ROS)	0.00583						
922												
923	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
924					KM Mean (logged)	-5.428					KM Geo Mean	0.00439
925					KM SD (logged)	0.25					95% Critical H Value (KM-Log)	1.834
926					KM Standard Error of Mean (logged)	0.0883					95% H-UCL (KM -Log)	0.0051
927					KM SD (logged)	0.25					95% Critical H Value (KM-Log)	1.834
928					KM Standard Error of Mean (logged)	0.0883						
929												
930	**DL/2 Statistics**											
931				**DL/2 Normal**					**DL/2 Log-Transformed**			
932					Mean in Original Scale	0.00281					Mean in Log Scale	-6.034
933					SD in Original Scale	0.00223					SD in Log Scale	0.494
934					95% t UCL (Assumes normality)	0.00379					95% H-Stat UCL	0.00351
935	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
936												

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.00549

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_lithium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_lithium) was not processed!

Result (angling fish_nd_magnesium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	283	Mean	319.9
Maximum	350	Median	321
SD	15.97	Std. Error of Mean	3.993
Coefficient of Variation	0.0499	Skewness	-0.307

Normal GOF Test

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	326.9	95% Adjusted-CLT UCL (Chen-1995)	326.2
		95% Modified-t UCL (Johnson-1978)	326.9

Gamma GOF Test

A-D Test Statistic	0.289	**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	0.133	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	422.6	k star (bias corrected MLE)	343.4
Theta hat (MLE)	0.757	Theta star (bias corrected MLE)	0.932
nu hat (MLE)	13522	nu star (bias corrected)	10988
MLE Mean (bias corrected)	319.9	MLE Sd (bias corrected)	17.27
		Approximate Chi Square Value (0.05)	10746
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	10718

Assuming Gamma Distribution

95% Approximate Gamma UCL	327.2	95% Adjusted Gamma UCL	328

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.645	Mean of logged Data	5.767
Maximum of Logged Data	5.858	SD of logged Data	0.0504

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	332
95% Chebyshev (MVUE) UCL	337.5	97.5% Chebyshev (MVUE) UCL	345.1
99% Chebyshev (MVUE) UCL	360.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	326.5	95% BCA Bootstrap UCL	326.1
95% Standard Bootstrap UCL	326.2	95% Bootstrap-t UCL	326.6
95% Hall's Bootstrap UCL	326.8	95% Percentile Bootstrap UCL	326.3
90% Chebyshev(Mean, Sd) UCL	331.9	95% Chebyshev(Mean, Sd) UCL	337.3
97.5% Chebyshev(Mean, Sd) UCL	344.9	99% Chebyshev(Mean, Sd) UCL	359.7

Suggested UCL to Use

95% Student's-t UCL	326.9		

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 using results from simulation studies.
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.

Result (angling fish_nd_manganese)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.092	Mean	0.507
Maximum	0.866	Median	0.57
SD	0.208	Std. Error of Mean	0.0519
Coefficient of Variation	0.409	Skewness	-0.67

Normal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.598	95% Adjusted-CLT UCL (Chen-1995)	0.583
		95% Modified-t UCL (Johnson-1978)	0.597

Gamma GOF Test

A-D Test Statistic	1.191	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.266	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.216	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.067	k star (bias corrected MLE)	3.346
Theta hat (MLE)	0.125	Theta star (bias corrected MLE)	0.152
nu hat (MLE)	130.1	nu star (bias corrected)	107.1
MLE Mean (bias corrected)	0.507	MLE Sd (bias corrected)	0.277
		Approximate Chi Square Value (0.05)	84.19
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	81.88

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.645	95% Adjusted Gamma UCL	0.663

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.386	Mean of logged Data	-0.807
Maximum of Logged Data	-0.144	SD of logged Data	0.602

Assuming Lognormal Distribution

95% H-UCL	0.748	90% Chebyshev (MVUE) UCL	0.777
95% Chebyshev (MVUE) UCL	0.889	97.5% Chebyshev (MVUE) UCL	1.046

99% Chebyshev (MVUE) UCL	1.353		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.592	95% BCA Bootstrap UCL	0.58
95% Standard Bootstrap UCL	0.588	95% Bootstrap-t UCL	0.588
95% Hall's Bootstrap UCL	0.584	95% Percentile Bootstrap UCL	0.583
90% Chebyshev(Mean, Sd) UCL	0.663	95% Chebyshev(Mean, Sd) UCL	0.733
97.5% Chebyshev(Mean, Sd) UCL	0.831	99% Chebyshev(Mean, Sd) UCL	1.024
Suggested UCL to Use			
95% Student's-t UCL	0.598		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
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.

Result (angling fish_nd_mercury)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.204	Mean	1.033
Maximum	6.03	Median	0.522
SD	1.449	Std. Error of Mean	0.362
Coefficient of Variation	1.403	Skewness	3.088
Normal GOF Test			
Shapiro Wilk Test Statistic	0.571	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.668	95% Adjusted-CLT UCL (Chen-1995)	1.928
		95% Modified-t UCL (Johnson-1978)	1.715
Gamma GOF Test			
A-D Test Statistic	1.192	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.257	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	1.141	k star (bias corrected MLE)	0.969
Theta hat (MLE)	0.905	Theta star (bias corrected MLE)	1.066
nu hat (MLE)	36.52	nu star (bias corrected)	31.01
MLE Mean (bias corrected)	1.033	MLE Sd (bias corrected)	1.05
		Approximate Chi Square Value (0.05)	19.29
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	18.24
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.661	95% Adjusted Gamma UCL	1.757
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.192	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-1.59	Mean of logged Data	-0.466
Maximum of Logged Data	1.797	SD of logged Data	0.912
Assuming Lognormal Distribution			
95% H-UCL	1.743	90% Chebyshev (MVUE) UCL	1.602
95% Chebyshev (MVUE) UCL	1.911	97.5% Chebyshev (MVUE) UCL	2.341
99% Chebyshev (MVUE) UCL	3.184		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.629	95% BCA Bootstrap UCL	1.985
95% Standard Bootstrap UCL	1.597	95% Bootstrap-t UCL	2.73
95% Hall's Bootstrap UCL	3.555	95% Percentile Bootstrap UCL	1.64
90% Chebyshev(Mean, Sd) UCL	2.12	95% Chebyshev(Mean, Sd) UCL	2.613
97.5% Chebyshev(Mean, Sd) UCL	3.296	99% Chebyshev(Mean, Sd) UCL	4.639
Suggested UCL to Use			
95% H-UCL	1.743		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_nd_methylmercury)			

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	0.135	Mean	1.126
Maximum	6.23	Median	0.54
SD	1.563	Std. Error of Mean	0.391
Coefficient of Variation	1.388	Skewness	2.67
Normal GOF Test			
Shapiro Wilk Test Statistic	0.636	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.351	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.811	95% Adjusted-CLT UCL (Chen-1995)	2.047
		95% Modified-t UCL (Johnson-1978)	1.854
Gamma GOF Test			
A-D Test Statistic	0.834	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.765	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.268	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.222	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.956	k star (bias corrected MLE)	0.819
Theta hat (MLE)	1.177	Theta star (bias corrected MLE)	1.375
nu hat (MLE)	30.6	nu star (bias corrected)	26.2
MLE Mean (bias corrected)	1.126	MLE Sd (bias corrected)	1.244
		Approximate Chi Square Value (0.05)	15.53
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	14.6
Assuming Gamma Distribution			
95% Approximate Gamma UCL	1.899	95% Adjusted Gamma UCL	2.02
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.002	Mean of logged Data	-0.488
Maximum of Logged Data	1.829	SD of logged Data	1.076
Assuming Lognormal Distribution			
95% H-UCL	2.399	90% Chebyshev (MVUE) UCL	1.969
95% Chebyshev (MVUE) UCL	2.391	97.5% Chebyshev (MVUE) UCL	2.975

99% Chebyshev (MVUE) UCL	4.124		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.769	95% BCA Bootstrap UCL	2.052
95% Standard Bootstrap UCL	1.737	95% Bootstrap-t UCL	2.678
95% Hall's Bootstrap UCL	3.956	95% Percentile Bootstrap UCL	1.772
90% Chebyshev(Mean, Sd) UCL	2.298	95% Chebyshev(Mean, Sd) UCL	2.829
97.5% Chebyshev(Mean, Sd) UCL	3.566	99% Chebyshev(Mean, Sd) UCL	5.014

Suggested UCL to Use

95% H-UCL	2.399		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_molybdenum)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_molybdenum) was not processed!

Result (angling fish_nd_nickel)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_nickel) was not processed!

Result (angling fish_nd_phosphorus)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	2240	Mean	2485
Maximum	2900	Median	2445
SD	205.1	Std. Error of Mean	51.28
Coefficient of Variation	0.0825	Skewness	0.859
Normal GOF Test			
Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2575	95% Adjusted-CLT UCL (Chen-1995)	2581
		95% Modified-t UCL (Johnson-1978)	2577
Gamma GOF Test			
A-D Test Statistic	0.485	**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	0.167	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	162.2	k star (bias corrected MLE)	131.8
Theta hat (MLE)	15.32	Theta star (bias corrected MLE)	18.85
nu hat (MLE)	5189	nu star (bias corrected)	4218
MLE Mean (bias corrected)	2485	MLE Sd (bias corrected)	216.5
		Approximate Chi Square Value (0.05)	4068
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	4051
Assuming Gamma Distribution			
95% Approximate Gamma UCL	2577	95% Adjusted Gamma UCL	2587
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	7.714	Mean of logged Data	7.815
Maximum of Logged Data	7.972	SD of logged Data	0.0805

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	2635
95% Chebyshev (MVUE) UCL	2703	97.5% Chebyshev (MVUE) UCL	2797
99% Chebyshev (MVUE) UCL	2983		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2569	95% BCA Bootstrap UCL	2579
95% Standard Bootstrap UCL	2565	95% Bootstrap-t UCL	2590
95% Hall's Bootstrap UCL	2589	95% Percentile Bootstrap UCL	2569
90% Chebyshev(Mean, Sd) UCL	2639	95% Chebyshev(Mean, Sd) UCL	2709
97.5% Chebyshev(Mean, Sd) UCL	2805	99% Chebyshev(Mean, Sd) UCL	2995

Suggested UCL to Use

95% Student's-t UCL	2575		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_potassium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	3290	Mean	3900
Maximum	4620	Median	3880
SD	329.6	Std. Error of Mean	82.4
Coefficient of Variation	0.0845	Skewness	0.385

Normal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.137	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4044	95% Adjusted-CLT UCL (Chen-1995)	4044
		95% Modified-t UCL (Johnson-1978)	4046

Gamma GOF Test

A-D Test Statistic	0.208	**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	0.123	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

	A–E	F	G–K	L
1405	**Gamma Statistics**			
1406	k hat (MLE)	150.9	k star (bias corrected MLE)	122.6
1407	Theta hat (MLE)	25.85	Theta star (bias corrected MLE)	31.8
1408	nu hat (MLE)	4828	nu star (bias corrected)	3924
1409	MLE Mean (bias corrected)	3900	MLE Sd (bias corrected)	352.2
1410			Approximate Chi Square Value (0.05)	3780
1411	Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	3764
1412				
1413	**Assuming Gamma Distribution**			
1414	95% Approximate Gamma UCL	4049	95% Adjusted Gamma UCL	4067
1415				
1416	**Lognormal GOF Test**			
1417	Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk Lognormal GOF Test**	
1418	10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
1419	Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**	
1420	10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
1421	**Data appear Lognormal at 10% Significance Level**			
1422				
1423	**Lognormal Statistics**			
1424	Minimum of Logged Data	8.099	Mean of logged Data	8.265
1425	Maximum of Logged Data	8.438	SD of logged Data	0.084
1426				
1427	**Assuming Lognormal Distribution**			
1428	95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	4146
1429	95% Chebyshev (MVUE) UCL	4257	97.5% Chebyshev (MVUE) UCL	4412
1430	99% Chebyshev (MVUE) UCL	4716		
1431				
1432	**Nonparametric Distribution Free UCL Statistics**			
1433	**Data appear to follow a Discernible Distribution**			
1434				
1435	**Nonparametric Distribution Free UCLs**			
1436	95% CLT UCL	4036	95% BCA Bootstrap UCL	4039
1437	95% Standard Bootstrap UCL	4031	95% Bootstrap-t UCL	4055
1438	95% Hall's Bootstrap UCL	4071	95% Percentile Bootstrap UCL	4034
1439	90% Chebyshev(Mean, Sd) UCL	4147	95% Chebyshev(Mean, Sd) UCL	4259
1440	97.5% Chebyshev(Mean, Sd) UCL	4415	99% Chebyshev(Mean, Sd) UCL	4720
1441				
1442	**Suggested UCL to Use**			
1443	95% Student's-t UCL	4044		
1444				
1445	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1446	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1447	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1448				
1449				
1450	**Result (angling fish_nd_selenium)**			
1451				
1452	**General Statistics**			
1453	Total Number of Observations	16	Number of Distinct Observations	14
1454			Number of Missing Observations	0
1455	Minimum	0.083	Mean	0.109
1456	Maximum	0.148	Median	0.104

1457	SD	0.0171	Std. Error of Mean	0.00427
1458	Coefficient of Variation	0.157	Skewness	0.65
1459				
1460	**Normal GOF Test**			
1461	Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**	
1462	1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
1463	Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**	
1464	1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
1465	**Data appear Normal at 1% Significance Level**			
1466				
1467	**Assuming Normal Distribution**			
1468	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1469	95% Student's-t UCL	0.117	95% Adjusted-CLT UCL (Chen-1995)	0.117
1470			95% Modified-t UCL (Johnson-1978)	0.117
1471				
1472	**Gamma GOF Test**			
1473	A-D Test Statistic	0.221	**Anderson-Darling Gamma GOF Test**	
1474	5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level	
1475	K-S Test Statistic	0.145	**Kolmogorov-Smirnov Gamma GOF Test**	
1476	5% K-S Critical Value	0.214	Detected data appear Gamma Distributed at 5% Significance Level	
1477	**Detected data appear Gamma Distributed at 5% Significance Level**			
1478				
1479	**Gamma Statistics**			
1480	k hat (MLE)	45.05	k star (bias corrected MLE)	36.65
1481	Theta hat (MLE)	0.00242	Theta star (bias corrected MLE)	0.00298
1482	nu hat (MLE)	1442	nu star (bias corrected)	1173
1483	MLE Mean (bias corrected)	0.109	MLE Sd (bias corrected)	0.018
1484			Approximate Chi Square Value (0.05)	1094
1485	Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	1086
1486				
1487	**Assuming Gamma Distribution**			
1488	95% Approximate Gamma UCL	0.117	95% Adjusted Gamma UCL	0.118
1489				
1490	**Lognormal GOF Test**			
1491	Shapiro Wilk Test Statistic	0.981	**Shapiro Wilk Lognormal GOF Test**	
1492	10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
1493	Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**	
1494	10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
1495	**Data appear Lognormal at 10% Significance Level**			
1496				
1497	**Lognormal Statistics**			
1498	Minimum of Logged Data	-2.489	Mean of logged Data	-2.226
1499	Maximum of Logged Data	-1.911	SD of logged Data	0.153
1500				
1501	**Assuming Lognormal Distribution**			
1502	95% H-UCL	0.117	90% Chebyshev (MVUE) UCL	0.122
1503	95% Chebyshev (MVUE) UCL	0.127	97.5% Chebyshev (MVUE) UCL	0.135
1504	99% Chebyshev (MVUE) UCL	0.151		
1505				
1506	**Nonparametric Distribution Free UCL Statistics**			
1507	**Data appear to follow a Discernible Distribution**			
1508				

Nonparametric Distribution Free UCLs			
95% CLT UCL	0.116	95% BCA Bootstrap UCL	0.116
95% Standard Bootstrap UCL	0.116	95% Bootstrap-t UCL	0.118
95% Hall's Bootstrap UCL	0.118	95% Percentile Bootstrap UCL	0.116
90% Chebyshev(Mean, Sd) UCL	0.122	95% Chebyshev(Mean, Sd) UCL	0.128
97.5% Chebyshev(Mean, Sd) UCL	0.136	99% Chebyshev(Mean, Sd) UCL	0.152
Suggested UCL to Use			
95% Student's-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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_nd_sodium)

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	188	Mean	337.8
Maximum	461	Median	338.5
SD	66.73	Std. Error of Mean	16.68
Coefficient of Variation	0.198	Skewness	-0.0485
Normal GOF Test			
Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	367	95% Adjusted-CLT UCL (Chen-1995)	365
		95% Modified-t UCL (Johnson-1978)	367
Gamma GOF Test			
A-D Test Statistic	0.46	**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	0.174	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	25.47	k star (bias corrected MLE)	20.74
Theta hat (MLE)	13.26	Theta star (bias corrected MLE)	16.29
nu hat (MLE)	815.1	nu star (bias corrected)	663.6
MLE Mean (bias corrected)	337.8	MLE Sd (bias corrected)	74.17
		Approximate Chi Square Value (0.05)	604.8
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	598.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	370.6	95% Adjusted Gamma UCL	374.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.236	Mean of logged Data	5.803
Maximum of Logged Data	6.133	SD of logged Data	0.211

Assuming Lognormal Distribution

95% H-UCL	373.6	90% Chebyshev (MVUE) UCL	391.9
95% Chebyshev (MVUE) UCL	416.3	97.5% Chebyshev (MVUE) UCL	450.1
99% Chebyshev (MVUE) UCL	516.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	365.2	95% BCA Bootstrap UCL	363.8
95% Standard Bootstrap UCL	364.4	95% Bootstrap-t UCL	368.2
95% Hall's Bootstrap UCL	368.9	95% Percentile Bootstrap UCL	363.6
90% Chebyshev(Mean, Sd) UCL	387.8	95% Chebyshev(Mean, Sd) UCL	410.5
97.5% Chebyshev(Mean, Sd) UCL	441.9	99% Chebyshev(Mean, Sd) UCL	503.7

Suggested UCL to Use

95% Student's-t UCL	367		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

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.

Result (angling fish_nd_strontium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.024	Mean	0.172
Maximum	0.326	Median	0.178
SD	0.0864	Std. Error of Mean	0.0216
Coefficient of Variation	0.503	Skewness	0.212

Normal GOF Test

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
1613					1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level					
1614					Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**					
1615					1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level					
1616	**Data appear Normal at 1% Significance Level**											
1617												
1618	**Assuming Normal Distribution**											
1619	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1620					95% Student's-t UCL	0.21					95% Adjusted-CLT UCL (Chen-1995)	0.209
1621											95% Modified-t UCL (Johnson-1978)	0.21
1622												
1623	**Gamma GOF Test**											
1624					A-D Test Statistic	0.277	**Anderson-Darling Gamma GOF Test**					
1625					5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level					
1626					K-S Test Statistic	0.144	**Kolmogorov-Smirnov Gamma GOF Test**					
1627					5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level					
1628	**Detected data appear Gamma Distributed at 5% Significance Level**											
1629												
1630	**Gamma Statistics**											
1631					k hat (MLE)	3.253					k star (bias corrected MLE)	2.684
1632					Theta hat (MLE)	0.0528					Theta star (bias corrected MLE)	0.064
1633					nu hat (MLE)	104.1					nu star (bias corrected)	85.9
1634					MLE Mean (bias corrected)	0.172					MLE Sd (bias corrected)	0.105
1635											Approximate Chi Square Value (0.05)	65.54
1636					Adjusted Level of Significance	0.0335					Adjusted Chi Square Value	63.52
1637												
1638	**Assuming Gamma Distribution**											
1639					95% Approximate Gamma UCL	0.225					95% Adjusted Gamma UCL	0.232
1640												
1641	**Lognormal GOF Test**											
1642					Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**					
1643					10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level					
1644					Lilliefors Test Statistic	0.154	**Lilliefors Lognormal GOF Test**					
1645					10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level					
1646	**Data appear Approximate Lognormal at 10% Significance Level**											
1647												
1648	**Lognormal Statistics**											
1649					Minimum of Logged Data	-3.73					Mean of logged Data	-1.923
1650					Maximum of Logged Data	-1.121					SD of logged Data	0.66
1651												
1652	**Assuming Lognormal Distribution**											
1653					95% H-UCL	0.266					90% Chebyshev (MVUE) UCL	0.272
1654					95% Chebyshev (MVUE) UCL	0.314					97.5% Chebyshev (MVUE) UCL	0.373
1655					99% Chebyshev (MVUE) UCL	0.488						
1656												
1657	**Nonparametric Distribution Free UCL Statistics**											
1658	**Data appear to follow a Discernible Distribution**											
1659												
1660	**Nonparametric Distribution Free UCLs**											
1661					95% CLT UCL	0.207					95% BCA Bootstrap UCL	0.207
1662					95% Standard Bootstrap UCL	0.206					95% Bootstrap-t UCL	0.211
1663					95% Hall's Bootstrap UCL	0.209					95% Percentile Bootstrap UCL	0.205
1664					90% Chebyshev(Mean, Sd) UCL	0.237					95% Chebyshev(Mean, Sd) UCL	0.266

	A–E	F	G–K	L
1665	97.5% Chebyshev(Mean, Sd) UCL	0.307	99% Chebyshev(Mean, Sd) UCL	0.387
1666				
1667	**Suggested UCL to Use**			
1668	95% Student's-t UCL	0.21		
1669				
1670	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1671	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1672	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1673				
1674				
1675	**Result (angling fish_nd_thallium)**			
1676				
1677	**General Statistics**			
1678	Total Number of Observations	16	Number of Distinct Observations	16
1679			Number of Missing Observations	0
1680	Minimum	8.4000E-4	Mean	0.00328
1681	Maximum	0.00586	Median	0.00314
1682	SD	0.0014	Std. Error of Mean	3.5072E-4
1683	Coefficient of Variation	0.428	Skewness	0.212
1684				
1685	**Normal GOF Test**			
1686	Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**	
1687	1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
1688	Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**	
1689	1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	
1690	**Data appear Normal at 1% Significance Level**			
1691				
1692	**Assuming Normal Distribution**			
1693	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1694	95% Student's-t UCL	0.00389	95% Adjusted-CLT UCL (Chen-1995)	0.00388
1695			95% Modified-t UCL (Johnson-1978)	0.0039
1696				
1697	**Gamma GOF Test**			
1698	A-D Test Statistic	0.198	**Anderson-Darling Gamma GOF Test**	
1699	5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
1700	K-S Test Statistic	0.0948	**Kolmogorov-Smirnov Gamma GOF Test**	
1701	5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level	
1702	**Detected data appear Gamma Distributed at 5% Significance Level**			
1703				
1704	**Gamma Statistics**			
1705	k hat (MLE)	5.037	k star (bias corrected MLE)	4.134
1706	Theta hat (MLE)	6.5111E-4	Theta star (bias corrected MLE)	7.9329E-4
1707	nu hat (MLE)	161.2	nu star (bias corrected)	132.3
1708	MLE Mean (bias corrected)	0.00328	MLE Sd (bias corrected)	0.00161
1709			Approximate Chi Square Value (0.05)	106.7
1710	Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	104.1
1711				
1712	**Assuming Gamma Distribution**			
1713	95% Approximate Gamma UCL	0.00407	95% Adjusted Gamma UCL	0.00417
1714				
1715	**Lognormal GOF Test**			
1716	Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk Lognormal GOF Test**	

10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.112	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-7.082	Mean of logged Data	-5.823
Maximum of Logged Data	-5.14	SD of logged Data	0.499
Assuming Lognormal Distribution			
95% H-UCL	0.00437	90% Chebyshev (MVUE) UCL	0.00461
95% Chebyshev (MVUE) UCL	0.00519	97.5% Chebyshev (MVUE) UCL	0.006
99% Chebyshev (MVUE) UCL	0.00758		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.00386	95% BCA Bootstrap UCL	0.00382
95% Standard Bootstrap UCL	0.00383	95% Bootstrap-t UCL	0.00392
95% Hall's Bootstrap UCL	0.00387	95% Percentile Bootstrap UCL	0.00382
90% Chebyshev(Mean, Sd) UCL	0.00433	95% Chebyshev(Mean, Sd) UCL	0.00481
97.5% Chebyshev(Mean, Sd) UCL	0.00547	99% Chebyshev(Mean, Sd) UCL	0.00677
Suggested UCL to Use			
95% Student's-t UCL	0.00389		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_nd_tin)			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	8	Number of Non-Detects	8
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.021	Minimum Non-Detect	0.02
Maximum Detect	0.234	Maximum Non-Detect	0.02
Variance Detects	0.00507	Percent Non-Detects	50%
Mean Detects	0.0648	SD Detects	0.0712
Median Detects	0.0405	CV Detects	1.099
Skewness Detects	2.441	Kurtosis Detects	6.184
Mean of Logged Detects	-3.073	SD of Logged Detects	0.784
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.641	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.749	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.333	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0424	KM Standard Error of Mean	0.0139
90KM SD	0.0521	95% KM (BCA) UCL	0.0693
95% KM (t) UCL	0.0668	95% KM (Percentile Bootstrap) UCL	0.0676
95% KM (z) UCL	0.0653	95% KM Bootstrap t UCL	0.144
90% KM Chebyshev UCL	0.0842	95% KM Chebyshev UCL	0.103
97.5% KM Chebyshev UCL	0.129	99% KM Chebyshev UCL	0.181
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.785	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.727	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.307	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.299	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)	1.636	k star (bias corrected MLE)	1.106
Theta hat (MLE)	0.0396	Theta star (bias corrected MLE)	0.0586
nu hat (MLE)	26.17	nu star (bias corrected)	17.69
Mean (detects)	0.0648		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.0374
Maximum	0.234	Median	0.0155
SD	0.0562	CV	1.505
k hat (MLE)	1.04	k star (bias corrected MLE)	0.887
Theta hat (MLE)	0.0359	Theta star (bias corrected MLE)	0.0421
nu hat (MLE)	33.29	nu star (bias corrected)	28.38
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (28.38, α)	17.22	Adjusted Chi Square Value (28.38, β)	16.24
95% Gamma Approximate UCL	0.0616	95% Gamma Adjusted UCL	0.0653
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0424	SD (KM)	0.0521
Variance (KM)	0.00272	SE of Mean (KM)	0.0139
k hat (KM)	0.661	k star (KM)	0.579
nu hat (KM)	21.15	nu star (KM)	18.52
theta hat (KM)	0.0641	theta star (KM)	0.0732
80% gamma percentile (KM)	0.0698	90% gamma percentile (KM)	0.111
95% gamma percentile (KM)	0.154	99% gamma percentile (KM)	0.26
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (18.52, α)	9.765	Adjusted Chi Square Value (18.52, β)	9.048
95% KM Approximate Gamma UCL	0.0804	95% KM Adjusted Gamma UCL	0.0867
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk GOF Test**	

10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0353	Mean in Log Scale	-4.22
SD in Original Scale	0.0574	SD in Log Scale	1.399
95% t UCL (assumes normality of ROS data)	0.0604	95% Percentile Bootstrap UCL	0.0604
95% BCA Bootstrap UCL	0.0763	95% Bootstrap t UCL	0.105
95% H-UCL (Log ROS)	0.132		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.493	KM Geo Mean	0.0304
KM SD (logged)	0.667	95% Critical H Value (KM-Log)	2.24
KM Standard Error of Mean (logged)	0.178	95% H-UCL (KM -Log)	0.0559
KM SD (logged)	0.667	95% Critical H Value (KM-Log)	2.24
KM Standard Error of Mean (logged)	0.178		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0374	Mean in Log Scale	-3.839
SD in Original Scale	0.0562	SD in Log Scale	0.956
95% t UCL (Assumes normality)	0.062	95% H-Stat UCL	0.0651
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 10% Significance Level			
Suggested UCL to Use			
KM H-UCL	0.0559		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_nd_uranium)			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_uranium) was not processed!

Result (angling fish_nd_vanadium)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
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 Result (angling fish_nd_vanadium) was not processed!

Result (angling fish_nd_zinc)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	3.22	Mean	4.473
Maximum	6.51	Median	4.25
SD	0.934	Std. Error of Mean	0.234
Coefficient of Variation	0.209	Skewness	0.898

Normal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.883	95% Adjusted-CLT UCL (Chen-1995)	4.913
		95% Modified-t UCL (Johnson-1978)	4.891

Gamma GOF Test

A-D Test Statistic	0.428	**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	0.184	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	26.28	k star (bias corrected MLE)	21.4
Theta hat (MLE)	0.17	Theta star (bias corrected MLE)	0.209
nu hat (MLE)	841	nu star (bias corrected)	684.6

	A–E	F	G–K	L
1925	MLE Mean (bias corrected)	4.473	MLE Sd (bias corrected)	0.967
1926			Approximate Chi Square Value (0.05)	624.9
1927	Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	618.5
1928				
1929	**Assuming Gamma Distribution**			
1930	95% Approximate Gamma UCL	4.9	95% Adjusted Gamma UCL	4.952
1931				
1932	**Lognormal GOF Test**			
1933	Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**	
1934	10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level	
1935	Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**	
1936	10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level	
1937	**Data appear Lognormal at 10% Significance Level**			
1938				
1939	**Lognormal Statistics**			
1940	Minimum of Logged Data	1.169	Mean of logged Data	1.479
1941	Maximum of Logged Data	1.873	SD of logged Data	0.199
1942				
1943	**Assuming Lognormal Distribution**			
1944	95% H-UCL	4.91	90% Chebyshev (MVUE) UCL	5.142
1945	95% Chebyshev (MVUE) UCL	5.446	97.5% Chebyshev (MVUE) UCL	5.868
1946	99% Chebyshev (MVUE) UCL	6.697		
1947				
1948	**Nonparametric Distribution Free UCL Statistics**			
1949	**Data appear to follow a Discernible Distribution**			
1950				
1951	**Nonparametric Distribution Free UCLs**			
1952	95% CLT UCL	4.857	95% BCA Bootstrap UCL	4.902
1953	95% Standard Bootstrap UCL	4.833	95% Bootstrap-t UCL	4.935
1954	95% Hall's Bootstrap UCL	4.902	95% Percentile Bootstrap UCL	4.844
1955	90% Chebyshev(Mean, Sd) UCL	5.174	95% Chebyshev(Mean, Sd) UCL	5.491
1956	97.5% Chebyshev(Mean, Sd) UCL	5.932	99% Chebyshev(Mean, Sd) UCL	6.797
1957				
1958	**Suggested UCL to Use**			
1959	95% Student's-t UCL	4.883		
1960				
1961	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1962	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1963	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1964				
1965	**Result (angling fish_nd_zirconium)**			
1966				
1967	**General Statistics**			
1968	Total Number of Observations	16	Number of Distinct Observations	2
1969	Number of Detects	1	Number of Non-Detects	15
1970	Number of Distinct Detects	1	Number of Distinct Non-Detects	1
1971				
1972	**Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!**			
1973	**It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).**			
1974				
1975	**The data set for variable Result (angling fish_nd_zirconium) was not processed!**			
1976				

Result (angling fish_wb_aluminum)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	3
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 Result (angling fish_wb_aluminum) was not processed!

Result (angling fish_wb_antimony)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

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 Result (angling fish_wb_antimony) was not processed!

Result (angling fish_wb_arsenic)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.0103	Mean	0.0187
Maximum	0.0337	Median	0.0122
SD	0.013	Std. Error of Mean	0.0075
Coefficient of Variation	0.694	Skewness	1.69

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.359	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0406	95% Adjusted-CLT UCL (Chen-1995)	0.0389
		95% Modified-t UCL (Johnson-1978)	0.0419

Gamma GOF Test

A-D Test Statistic	0.481	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.383	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.434	Detected data appear Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.568	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00525	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	21.41	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.855	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.337	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.576	Mean of logged Data	-4.124
Maximum of Logged Data	-3.39	SD of logged Data	0.641

Assuming Lognormal Distribution

95% H-UCL	0.874	90% Chebyshev (MVUE) UCL	0.038
95% Chebyshev (MVUE) UCL	0.0468	97.5% Chebyshev (MVUE) UCL	0.0591
99% Chebyshev (MVUE) UCL	0.0832		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0311	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.0412	95% Chebyshev(Mean, Sd) UCL	0.0514
97.5% Chebyshev(Mean, Sd) UCL	0.0656	99% Chebyshev(Mean, Sd) UCL	0.0934

Suggested UCL to Use

95% Student's-t UCL	0.0406

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_barium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Result (angling fish_wb_barium) was not processed!

Result (angling fish_wb_beryllium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

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 Result (angling fish_wb_beryllium) was not processed!

Result (angling fish_wb_bismuth)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Result (angling fish_wb_bismuth) was not processed!

Result (angling fish_wb_boron)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	1

Number of Detects	0	Number of Non-Detects	3
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 Result (angling fish_wb_boron) was not processed!			
Result (angling fish_wb_cadmium)			
General Statistics			
Total Number of Observations	3	Number of Distinct Observations	3
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	2
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable Result (angling fish_wb_cadmium) was not processed!			
Result (angling fish_wb_calcium)			
General Statistics			
Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	165	Mean	425.3
Maximum	775	Median	336
SD	314.7	Std. Error of Mean	181.7
Coefficient of Variation	0.74	Skewness	1.175
Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,			
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,			
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
The Chebyshev UCL often results in gross overestimates of the mean.			
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
Normal GOF Test			
Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	955.8	95% Adjusted-CLT UCL (Chen-1995)	855.8
		95% Modified-t UCL (Johnson-1978)	976.3

	A–E	F	G–K	L
2185				
2186	**Gamma GOF Test**			
2187	A-D Test Statistic	0.264	**Anderson-Darling Gamma GOF Test**	
2188	5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level	
2189	K-S Test Statistic	0.235	**Kolmogorov-Smirnov Gamma GOF Test**	
2190	5% K-S Critical Value	0.434	Detected data appear Gamma Distributed at 5% Significance Level	
2191	**Data Not Gamma Distributed at 5% Significance Level**			
2192				
2193	**Gamma Statistics**			
2194	k hat (MLE)	2.729	k star (bias corrected MLE)	N/A
2195	Theta hat (MLE)	155.8	Theta star (bias corrected MLE)	N/A
2196	nu hat (MLE)	16.38	nu star (bias corrected)	N/A
2197	MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
2198			Approximate Chi Square Value (0.05)	N/A
2199	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A
2200				
2201	**Assuming Gamma Distribution**			
2202	95% Approximate Gamma UCL	N/A	95% Adjusted Gamma UCL	N/A
2203				
2204	**Lognormal GOF Test**			
2205	Shapiro Wilk Test Statistic	0.998	**Shapiro Wilk Lognormal GOF Test**	
2206	10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
2207	Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**	
2208	10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	
2209	**Data appear Lognormal at 10% Significance Level**			
2210	**Note GOF tests may be unreliable for small sample sizes**			
2211				
2212	**Lognormal Statistics**			
2213	Minimum of Logged Data	5.106	Mean of logged Data	5.859
2214	Maximum of Logged Data	6.653	SD of logged Data	0.774
2215				
2216	**Assuming Lognormal Distribution**			
2217	95% H-UCL	118742	90% Chebyshev (MVUE) UCL	953.6
2218	95% Chebyshev (MVUE) UCL	1194	97.5% Chebyshev (MVUE) UCL	1527
2219	99% Chebyshev (MVUE) UCL	2181		
2220				
2221	**Nonparametric Distribution Free UCL Statistics**			
2222	**Data appear to follow a Discernible Distribution**			
2223				
2224	**Nonparametric Distribution Free UCLs**			
2225	95% CLT UCL	724.2	95% BCA Bootstrap UCL	N/A
2226	95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
2227	95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
2228	90% Chebyshev(Mean, Sd) UCL	970.3	95% Chebyshev(Mean, Sd) UCL	1217
2229	97.5% Chebyshev(Mean, Sd) UCL	1560	99% Chebyshev(Mean, Sd) UCL	2233
2230				
2231	**Suggested UCL to Use**			
2232	95% Student's-t UCL	955.8		
2233	**Recommended UCL exceeds the maximum observation**			
2234				
2235	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2236	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_cesium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.005	Mean	0.0104
Maximum	0.0183	Median	0.008
SD	0.00698	Std. Error of Mean	0.00403
Coefficient of Variation	0.669	Skewness	1.379

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0222	95% Adjusted-CLT UCL (Chen-1995)	0.0205
		95% Modified-t UCL (Johnson-1978)	0.0227

Gamma GOF Test

A-D Test Statistic	0.307	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.636	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	0.434	Detected data appear Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.573	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00292	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	21.44	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**

10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal Statistics			
Minimum of Logged Data	-5.298	Mean of logged Data	-4.709
Maximum of Logged Data	-4.001	SD of logged Data	0.657
Assuming Lognormal Distribution			
95% H-UCL	0.594	90% Chebyshev (MVUE) UCL	0.0215
95% Chebyshev (MVUE) UCL	0.0266	97.5% Chebyshev (MVUE) UCL	0.0337
99% Chebyshev (MVUE) UCL	0.0475		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0171	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.0225	95% Chebyshev(Mean, Sd) UCL	0.028
97.5% Chebyshev(Mean, Sd) UCL	0.0356	99% Chebyshev(Mean, Sd) UCL	0.0505
Suggested UCL to Use			
95% Student's-t UCL	0.0222		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_wb_chromium)			
General Statistics			
Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	1
Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!			
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).			
The data set for variable Result (angling fish_wb_chromium) was not processed!			
Result (angling fish_wb_cobalt)			
General Statistics			
Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

	A-E	F	G-K	L
2341				
2342	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
2343	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
2344	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
2345				
2346	The data set for variable Result (angling fish_wb_cobalt) was not processed!			
2347				
2348				
2349				
2350	Result (angling fish_wb_copper)			
2351				
2352	**General Statistics**			
2353	Total Number of Observations	3	Number of Distinct Observations	3
2354			Number of Missing Observations	0
2355	Minimum	0.095	Mean	0.127
2356	Maximum	0.165	Median	0.121
2357	SD	0.0354	Std. Error of Mean	0.0204
2358	Coefficient of Variation	0.279	Skewness	0.741
2359				
2360	Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,			
2361	refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,			
2362	but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
2363	The Chebyshev UCL often results in gross overestimates of the mean.			
2364	Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
2365				
2366	**Normal GOF Test**			
2367	Shapiro Wilk Test Statistic	0.978	**Shapiro Wilk GOF Test**	
2368	1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
2369	Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
2370	1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	
2371	**Data appear Normal at 1% Significance Level**			
2372	**Note GOF tests may be unreliable for small sample sizes**			
2373				
2374	**Assuming Normal Distribution**			
2375	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2376	95% Student's-t UCL	0.187	95% Adjusted-CLT UCL (Chen-1995)	0.17
2377			95% Modified-t UCL (Johnson-1978)	0.188
2378				
2379	**Gamma GOF Test**			
2380	A-D Test Statistic	0.259	**Anderson-Darling Gamma GOF Test**	
2381	5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level	
2382	K-S Test Statistic	0.234	**Kolmogorov-Smirnov Gamma GOF Test**	
2383	5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level	
2384	**Data Not Gamma Distributed at 5% Significance Level**			
2385				
2386	**Gamma Statistics**			
2387	k hat (MLE)	19.66	k star (bias corrected MLE)	N/A
2388	Theta hat (MLE)	0.00646	Theta star (bias corrected MLE)	N/A
2389	nu hat (MLE)	118	nu star (bias corrected)	N/A
2390	MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
2391			Approximate Chi Square Value (0.05)	N/A
2392	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.995	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-2.354	Mean of logged Data	-2.089
Maximum of Logged Data	-1.802	SD of logged Data	0.277

Assuming Lognormal Distribution

95% H-UCL	0.276	90% Chebyshev (MVUE) UCL	0.187
95% Chebyshev (MVUE) UCL	0.215	97.5% Chebyshev (MVUE) UCL	0.252
99% Chebyshev (MVUE) UCL	0.327		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.161	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.188	95% Chebyshev(Mean, Sd) UCL	0.216
97.5% Chebyshev(Mean, Sd) UCL	0.255	99% Chebyshev(Mean, Sd) UCL	0.33

Suggested UCL to Use

95% Student's-t UCL	0.187		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_iron)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	1.08	Mean	1.64
Maximum	2.2	Median	1.64
SD	0.56	Std. Error of Mean	0.323
Coefficient of Variation	0.341	Skewness	3.793E-15

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

Row	A–E	F	G–K	L
2445	but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
2446	The Chebyshev UCL often results in gross overestimates of the mean.			
2447	Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
2448				
2449	**Normal GOF Test**			
2450	Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**	
2451	1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
2452	Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**	
2453	1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	
2454	**Data appear Normal at 1% Significance Level**			
2455	**Note GOF tests may be unreliable for small sample sizes**			
2456				
2457	**Assuming Normal Distribution**			
2458	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2459	95% Student's-t UCL	2.584	95% Adjusted-CLT UCL (Chen-1995)	2.172
2460			95% Modified-t UCL (Johnson-1978)	2.584
2461				
2462	**Gamma GOF Test**			
2463	A-D Test Statistic	0.252	**Anderson-Darling Gamma GOF Test**	
2464	5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level	
2465	K-S Test Statistic	0.231	**Kolmogorov-Smirnov Gamma GOF Test**	
2466	5% K-S Critical Value	0.432	Detected data appear Gamma Distributed at 5% Significance Level	
2467	**Data Not Gamma Distributed at 5% Significance Level**			
2468				
2469	**Gamma Statistics**			
2470	k hat (MLE)	12.26	k star (bias corrected MLE)	N/A
2471	Theta hat (MLE)	0.134	Theta star (bias corrected MLE)	N/A
2472	nu hat (MLE)	73.58	nu star (bias corrected)	N/A
2473	MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
2474			Approximate Chi Square Value (0.05)	N/A
2475	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A
2476				
2477	**Assuming Gamma Distribution**			
2478	95% Approximate Gamma UCL	N/A	95% Adjusted Gamma UCL	N/A
2479				
2480	**Lognormal GOF Test**			
2481	Shapiro Wilk Test Statistic	0.99	**Shapiro Wilk Lognormal GOF Test**	
2482	10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
2483	Lilliefors Test Statistic	0.213	**Lilliefors Lognormal GOF Test**	
2484	10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	
2485	**Data appear Lognormal at 10% Significance Level**			
2486	**Note GOF tests may be unreliable for small sample sizes**			
2487				
2488	**Lognormal Statistics**			
2489	Minimum of Logged Data	0.077	Mean of logged Data	0.453
2490	Maximum of Logged Data	0.788	SD of logged Data	0.358
2491				
2492	**Assuming Lognormal Distribution**			
2493	95% H-UCL	5.521	90% Chebyshev (MVUE) UCL	2.642
2494	95% Chebyshev (MVUE) UCL	3.095	97.5% Chebyshev (MVUE) UCL	3.724
2495	99% Chebyshev (MVUE) UCL	4.96		
2496				

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.172	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	2.61	95% Chebyshev(Mean, Sd) UCL	3.049
97.5% Chebyshev(Mean, Sd) UCL	3.659	99% Chebyshev(Mean, Sd) UCL	4.857

Suggested UCL to Use

95% Student's-t UCL	2.584		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_lead)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

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 Result (angling fish_wb_lead) was not processed!

Result (angling fish_wb_lithium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	3
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 Result (angling fish_wb_lithium) was not processed!

Result (angling fish_wb_magnesium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0

Minimum	170	Mean	223.3
Maximum	319	Median	181
SD	83.03	Std. Error of Mean	47.94
Coefficient of Variation	0.372	Skewness	1.698

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.805	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	363.3	95% Adjusted-CLT UCL (Chen-1995)	352.4
		95% Modified-t UCL (Johnson-1978)	371.1

Gamma GOF Test

A-D Test Statistic	0.514	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.394	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.432	Detected data appear Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	12.02	k star (bias corrected MLE)	N/A
Theta hat (MLE)	18.58	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	72.13	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.824	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.353	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	5.136	Mean of logged Data	5.366

Maximum of Logged Data	5.765	SD of logged Data	0.347

Assuming Lognormal Distribution

95% H-UCL	700.7	90% Chebyshev (MVUE) UCL	354.6
95% Chebyshev (MVUE) UCL	414.3	97.5% Chebyshev (MVUE) UCL	497.2
99% Chebyshev (MVUE) UCL	659.9		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	302.2	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	367.1	95% Chebyshev(Mean, Sd) UCL	432.3
97.5% Chebyshev(Mean, Sd) UCL	522.7	99% Chebyshev(Mean, Sd) UCL	700.3

Suggested UCL to Use

95% Student's-t UCL	363.3		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_manganese)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.029	Mean	0.0727
Maximum	0.139	Median	0.05
SD	0.0584	Std. Error of Mean	0.0337
Coefficient of Variation	0.804	Skewness	1.483

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.318	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL	**95% UCLs (Adjusted for Skewness)**

95% Student's-t UCL	0.171	95% Adjusted-CLT UCL (Chen-1995)	0.159
		95% Modified-t UCL (Johnson-1978)	0.176

Gamma GOF Test

A-D Test Statistic	0.322	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.636	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	0.435	Detected data appear Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.484	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0293	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	14.9	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.246	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.54	Mean of logged Data	-2.836
Maximum of Logged Data	-1.973	SD of logged Data	0.796

Assuming Lognormal Distribution

95% H-UCL	27.54	90% Chebyshev (MVUE) UCL	0.163
95% Chebyshev (MVUE) UCL	0.205	97.5% Chebyshev (MVUE) UCL	0.263
99% Chebyshev (MVUE) UCL	0.376		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.128	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.174	95% Chebyshev(Mean, Sd) UCL	0.22
97.5% Chebyshev(Mean, Sd) UCL	0.283	99% Chebyshev(Mean, Sd) UCL	0.408

Suggested UCL to Use

95% Student's-t UCL	0.171		

Recommended UCL exceeds the maximum observation

2705	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2706	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2707	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2708				
2709				
2710	**Result (angling fish_wb_mercury)**			
2711				
2712	**General Statistics**			
2713	Total Number of Observations	3	Number of Distinct Observations	3
2714			Number of Missing Observations	0
2715	Minimum	0.144	Mean	0.637
2716	Maximum	1.46	Median	0.307
2717	SD	0.717	Std. Error of Mean	0.414
2718	Coefficient of Variation	1.126	Skewness	1.632
2719				
2720	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**			
2721	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**			
2722	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**			
2723	**The Chebyshev UCL often results in gross overestimates of the mean.**			
2724	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**			
2725				
2726	**Normal GOF Test**			
2727	Shapiro Wilk Test Statistic	0.841	**Shapiro Wilk GOF Test**	
2728	1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
2729	Lilliefors Test Statistic	0.344	**Lilliefors GOF Test**	
2730	1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	
2731	**Data appear Normal at 1% Significance Level**			
2732	**Note GOF tests may be unreliable for small sample sizes**			
2733				
2734	**Assuming Normal Distribution**			
2735	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2736	95% Student's-t UCL	1.846	95% Adjusted-CLT UCL (Chen-1995)	1.735
2737			95% Modified-t UCL (Johnson-1978)	1.911
2738				
2739	**Gamma GOF Test**			
2740	A-D Test Statistic	0.351	**Anderson-Darling Gamma GOF Test**	
2741	5% A-D Critical Value	0.64	Detected data appear Gamma Distributed at 5% Significance Level	
2742	K-S Test Statistic	0.322	**Kolmogorov-Smirnov Gamma GOF Test**	
2743	5% K-S Critical Value	0.439	Detected data appear Gamma Distributed at 5% Significance Level	
2744	**Data Not Gamma Distributed at 5% Significance Level**			
2745				
2746	**Gamma Statistics**			
2747	k hat (MLE)	1.221	k star (bias corrected MLE)	N/A
2748	Theta hat (MLE)	0.522	Theta star (bias corrected MLE)	N/A
2749	nu hat (MLE)	7.325	nu star (bias corrected)	N/A
2750	MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
2751			Approximate Chi Square Value (0.05)	N/A
2752	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A
2753				
2754	**Assuming Gamma Distribution**			
2755	95% Approximate Gamma UCL	N/A	95% Adjusted Gamma UCL	N/A
2756				

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.256	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-1.938	Mean of logged Data	-0.913
Maximum of Logged Data	0.378	SD of logged Data	1.181

Assuming Lognormal Distribution

95% H-UCL	317157	90% Chebyshev (MVUE) UCL	1.683
95% Chebyshev (MVUE) UCL	2.169	97.5% Chebyshev (MVUE) UCL	2.843
99% Chebyshev (MVUE) UCL	4.168		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.318	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	1.88	95% Chebyshev(Mean, Sd) UCL	2.442
97.5% Chebyshev(Mean, Sd) UCL	3.224	99% Chebyshev(Mean, Sd) UCL	4.758

Suggested UCL to Use

95% Student's-t UCL	1.846		

Recommended UCL exceeds the maximum observation

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_methylmercury)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.104	Mean	0.725
Maximum	1.84	Median	0.23
SD	0.968	Std. Error of Mean	0.559
Coefficient of Variation	1.336	Skewness	1.699

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.804	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.357	95% Adjusted-CLT UCL (Chen-1995)	2.23
		95% Modified-t UCL (Johnson-1978)	2.448

Gamma GOF Test

A-D Test Statistic	0.395	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.642	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.352	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.442	Detected data appear Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.822	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.881	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.934	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.28	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-2.263	Mean of logged Data	-1.041
Maximum of Logged Data	0.61	SD of logged Data	1.484

Assuming Lognormal Distribution

95% H-UCL	7.241E+8	90% Chebyshev (MVUE) UCL	2.026
95% Chebyshev (MVUE) UCL	2.643	97.5% Chebyshev (MVUE) UCL	3.5
99% Chebyshev (MVUE) UCL	5.182		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.644	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	2.401	95% Chebyshev(Mean, Sd) UCL	3.161
97.5% Chebyshev(Mean, Sd) UCL	4.215	99% Chebyshev(Mean, Sd) UCL	6.285

Suggested UCL to Use

95% Student's-t UCL	2.357

Recommended UCL exceeds the maximum observation

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_molybdenum)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

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 Result (angling fish_wb_molybdenum) was not processed!

Result (angling fish_wb_nickel)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	3
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 Result (angling fish_wb_nickel) was not processed!

Result (angling fish_wb_phosphorus)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	1550	Mean	1650
Maximum	1830	Median	1570
SD	156.2	Std. Error of Mean	90.18
Coefficient of Variation	0.0947	Skewness	1.7

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.803	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1913	95% Adjusted-CLT UCL (Chen-1995)	1893
		95% Modified-t UCL (Johnson-1978)	1928

Gamma GOF Test

A-D Test Statistic	0.531	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.4	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	173	k star (bias corrected MLE)	N/A
Theta hat (MLE)	9.538	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1038	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors Lognormal GOF Test**

10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	7.346	Mean of logged Data	7.406
Maximum of Logged Data	7.512	SD of logged Data	0.0924

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	1914
95% Chebyshev (MVUE) UCL	2033	97.5% Chebyshev (MVUE) UCL	2199
99% Chebyshev (MVUE) UCL	2525		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1798	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	1921	95% Chebyshev(Mean, Sd) UCL	2043
97.5% Chebyshev(Mean, Sd) UCL	2213	99% Chebyshev(Mean, Sd) UCL	2547

Suggested UCL to Use

95% Student's-t UCL	1913		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_potassium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	2920	Mean	3037
Maximum	3170	Median	3020
SD	125.8	Std. Error of Mean	72.65
Coefficient of Variation	0.0414	Skewness	0.586

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
3017					1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level					
3018	**Data appear Normal at 1% Significance Level**											
3019	**Note GOF tests may be unreliable for small sample sizes**											
3020												
3021	**Assuming Normal Distribution**											
3022	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
3023					95% Student's-t UCL	3249					95% Adjusted-CLT UCL (Chen-1995)	3182
3024											95% Modified-t UCL (Johnson-1978)	3253
3025												
3026	**Gamma GOF Test**											
3027					A-D Test Statistic	0.262	**Anderson-Darling Gamma GOF Test**					
3028					5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level					
3029					K-S Test Statistic	0.235	**Kolmogorov-Smirnov Gamma GOF Test**					
3030					5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level					
3031	**Data Not Gamma Distributed at 5% Significance Level**											
3032												
3033	**Gamma Statistics**											
3034					k hat (MLE)	877.8					k star (bias corrected MLE)	N/A
3035					Theta hat (MLE)	3.46					Theta star (bias corrected MLE)	N/A
3036					nu hat (MLE)	5267					nu star (bias corrected)	N/A
3037					MLE Mean (bias corrected)	N/A					MLE Sd (bias corrected)	N/A
3038											Approximate Chi Square Value (0.05)	N/A
3039					Adjusted Level of Significance	N/A					Adjusted Chi Square Value	N/A
3040												
3041	**Assuming Gamma Distribution**											
3042					95% Approximate Gamma UCL	N/A					95% Adjusted Gamma UCL	N/A
3043												
3044	**Lognormal GOF Test**											
3045					Shapiro Wilk Test Statistic	0.989	**Shapiro Wilk Lognormal GOF Test**					
3046					10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level					
3047					Lilliefors Test Statistic	0.214	**Lilliefors Lognormal GOF Test**					
3048					10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level					
3049	**Data appear Lognormal at 10% Significance Level**											
3050	**Note GOF tests may be unreliable for small sample sizes**											
3051												
3052	**Lognormal Statistics**											
3053					Minimum of Logged Data	7.979					Mean of logged Data	8.018
3054					Maximum of Logged Data	8.061					SD of logged Data	0.0413
3055												
3056	**Assuming Lognormal Distribution**											
3057					95% H-UCL	N/A					90% Chebyshev (MVUE) UCL	3254
3058					95% Chebyshev (MVUE) UCL	3352					97.5% Chebyshev (MVUE) UCL	3489
3059					99% Chebyshev (MVUE) UCL	3757						
3060												
3061	**Nonparametric Distribution Free UCL Statistics**											
3062	**Data appear to follow a Discernible Distribution**											
3063												
3064	**Nonparametric Distribution Free UCLs**											
3065					95% CLT UCL	3156					95% BCA Bootstrap UCL	N/A
3066					95% Standard Bootstrap UCL	N/A					95% Bootstrap-t UCL	N/A
3067					95% Hall's Bootstrap UCL	N/A					95% Percentile Bootstrap UCL	N/A
3068					90% Chebyshev(Mean, Sd) UCL	3255					95% Chebyshev(Mean, Sd) UCL	3353

97.5% Chebyshev(Mean, Sd) UCL	3490	99% Chebyshev(Mean, Sd) UCL	3760
Suggested UCL to Use			
95% Student's-t UCL	3249		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_wb_selenium)			
General Statistics			
Total Number of Observations	3	Number of Distinct Observations	2
		Number of Missing Observations	0
Minimum	0.2	Mean	0.224
Maximum	0.273	Median	0.2
SD	0.0421	Std. Error of Mean	0.0243
Coefficient of Variation	0.188	Skewness	1.732
Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,			
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,			
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
The Chebyshev UCL often results in gross overestimates of the mean.			
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
Normal GOF Test			
Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.295	95% Adjusted-CLT UCL (Chen-1995)	0.29
		95% Modified-t UCL (Johnson-1978)	0.299
Gamma GOF Test			
A-D Test Statistic	0.619	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.427	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	45.22	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00496	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	271.3	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	N/A	95% Adjusted Gamma UCL	N/A
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal Statistics			
Minimum of Logged Data	-1.609	Mean of logged Data	-1.506
Maximum of Logged Data	-1.298	SD of logged Data	0.18
Assuming Lognormal Distribution			
95% H-UCL	0.337	90% Chebyshev (MVUE) UCL	0.294
95% Chebyshev (MVUE) UCL	0.325	97.5% Chebyshev (MVUE) UCL	0.369
99% Chebyshev (MVUE) UCL	0.455		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.264	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.297	95% Chebyshev(Mean, Sd) UCL	0.33
97.5% Chebyshev(Mean, Sd) UCL	0.376	99% Chebyshev(Mean, Sd) UCL	0.466
Suggested UCL to Use			
95% Student's-t UCL	0.295		
Recommended UCL exceeds the maximum observation			
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (angling fish_wb_sodium)			
General Statistics			
Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	594	Mean	740.7
Maximum	848	Median	780

SD	131.5	Std. Error of Mean	75.92
Coefficient of Variation	0.178	Skewness	-1.226

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	962.3	95% Adjusted-CLT UCL (Chen-1995)	808.1
		95% Modified-t UCL (Johnson-1978)	953.4

Gamma GOF Test

A-D Test Statistic	0.359	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.322	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	44.81	k star (bias corrected MLE)	N/A
Theta hat (MLE)	16.53	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	268.9	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.299	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level
Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	6.387	Mean of logged Data	6.596
Maximum of Logged Data	6.743	SD of logged Data	0.186

Assuming Lognormal Distribution			
95% H-UCL	1136	90% Chebyshev (MVUE) UCL	978.8
95% Chebyshev (MVUE) UCL	1087	97.5% Chebyshev (MVUE) UCL	1236
99% Chebyshev (MVUE) UCL	1530		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	865.5	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	968.4	95% Chebyshev(Mean, Sd) UCL	1072
97.5% Chebyshev(Mean, Sd) UCL	1215	99% Chebyshev(Mean, Sd) UCL	1496
Suggested UCL to Use			
95% Student's-t UCL	962.3		
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 using results from simulation studies.
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.

Result (angling fish_wb_strontium)

General Statistics			
Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	0.035	Mean	0.176
Maximum	0.388	Median	0.105
SD	0.187	Std. Error of Mean	0.108
Coefficient of Variation	1.062	Skewness	1.463

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test		
Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level
Data appear Normal at 1% Significance Level		
Note GOF tests may be unreliable for small sample sizes		

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.491	95% Adjusted-CLT UCL (Chen-1995)	0.451
		95% Modified-t UCL (Johnson-1978)	0.506
Gamma GOF Test			
A-D Test Statistic	0.276	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.64	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.255	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.439	Detected data appear Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.259	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.14	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	7.554	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	N/A	95% Adjusted Gamma UCL	N/A
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.997	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.19	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal Statistics			
Minimum of Logged Data	-3.352	Mean of logged Data	-2.184
Maximum of Logged Data	-0.947	SD of logged Data	1.204
Assuming Lognormal Distribution			
95% H-UCL	152771	90% Chebyshev (MVUE) UCL	0.484
95% Chebyshev (MVUE) UCL	0.624	97.5% Chebyshev (MVUE) UCL	0.819
99% Chebyshev (MVUE) UCL	1.202		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.353	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.5	95% Chebyshev(Mean, Sd) UCL	0.646
97.5% Chebyshev(Mean, Sd) UCL	0.85	99% Chebyshev(Mean, Sd) UCL	1.25
Suggested UCL to Use			
95% Student's-t UCL	0.491		
Recommended UCL exceeds the maximum observation			

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_thallium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	5.7000E-4	Mean	0.00153
Maximum	0.00209	Median	0.00194
SD	8.3764E-4	Std. Error of Mean	4.8361E-4
Coefficient of Variation	0.546	Skewness	-1.67

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00295	95% Adjusted-CLT UCL (Chen-1995)	0.00183
		95% Modified-t UCL (Johnson-1978)	0.00287

Gamma GOF Test

A-D Test Statistic	0.539	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.404	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.434	Detected data appear Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.532	k star (bias corrected MLE)	N/A
Theta hat (MLE)	4.3415E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	21.19	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	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.367	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-7.47	Mean of logged Data	-6.629
Maximum of Logged Data	-6.171	SD of logged Data	0.73

Assuming Lognormal Distribution

95% H-UCL	0.233	90% Chebyshev (MVUE) UCL	0.00343
95% Chebyshev (MVUE) UCL	0.00427	97.5% Chebyshev (MVUE) UCL	0.00544
99% Chebyshev (MVUE) UCL	0.00774		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00233	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	0.00298	95% Chebyshev(Mean, Sd) UCL	0.00364
97.5% Chebyshev(Mean, Sd) UCL	0.00455	99% Chebyshev(Mean, Sd) UCL	0.00635

Suggested UCL to Use

95% Student's-t UCL	0.00295		

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 using results from simulation studies.
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.

Result (angling fish_wb_tin)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	1
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	0.032	Minimum Non-Detect	0.02
Maximum Detect	0.109	Maximum Non-Detect	0.02

Variance Detects	0.00296	Percent Non-Detects	33.33%
Mean Detects	0.0705	SD Detects	0.0544
Median Detects	0.0705	CV Detects	0.772
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.829	SD of Logged Detects	0.867

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 incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

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	0.0537	KM Standard Error of Mean	0.0322
90KM SD	0.0394	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.148	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.107	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.15	95% KM Chebyshev UCL	0.194
97.5% KM Chebyshev UCL	0.255	99% KM Chebyshev UCL	0.374

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.98	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0237	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	11.92	nu star (bias corrected)	N/A
Mean (detects)	0.0705		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0537	SD (KM)	0.0394
Variance (KM)	0.00155	SE of Mean (KM)	0.0322
k hat (KM)	1.852	k star (KM)	N/A
nu hat (KM)	11.11	nu star (KM)	N/A
theta hat (KM)	0.029	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
95% KM Approximate Gamma UCL	N/A	95% KM Adjusted Gamma UCL	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	0.0482	Mean in Log Scale	-3.757
SD in Original Scale	0.0545	SD in Log Scale	1.72
95% t UCL (assumes normality of ROS data)	0.14	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	7.677E+10		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.19	KM Geo Mean	0.0412
KM SD (logged)	0.715	95% Critical H Value (KM-Log)	9.314
KM Standard Error of Mean (logged)	0.584	95% H-UCL (KM -Log)	5.887
KM SD (logged)	0.715	95% Critical H Value (KM-Log)	9.314
KM Standard Error of Mean (logged)	0.584		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0503	Mean in Log Scale	-3.421
SD in Original Scale	0.052	SD in Log Scale	1.195
95% t UCL (Assumes normality)	0.138	95% H-Stat UCL	35243

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

Suggested UCL to Use

Recommendation cannot be provided			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (angling fish_wb_uranium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

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 Result (angling fish_wb_uranium) was not processed!

Result (angling fish_wb_vanadium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	3
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

	A–E	F	G–K	L
3537				
3538	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!			
3539	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!			
3540	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).			
3541				
3542	The data set for variable Result (angling fish_wb_vanadium) was not processed!			
3543				
3544				
3545				
3546	Result (angling fish_wb_zinc)			
3547				
3548	**General Statistics**			
3549	Total Number of Observations	3	Number of Distinct Observations	3
3550			Number of Missing Observations	0
3551	Minimum	3.22	Mean	6.36
3552	Maximum	8.91	Median	6.95
3553	SD	2.891	Std. Error of Mean	1.669
3554	Coefficient of Variation	0.454	Skewness	-0.88
3555				
3556	Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,			
3557	refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,			
3558	but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
3559	The Chebyshev UCL often results in gross overestimates of the mean.			
3560	Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
3561				
3562	**Normal GOF Test**			
3563	Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**	
3564	1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level	
3565	Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**	
3566	1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level	
3567	**Data appear Normal at 1% Significance Level**			
3568	**Note GOF tests may be unreliable for small sample sizes**			
3569				
3570	**Assuming Normal Distribution**			
3571	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3572	95% Student's-t UCL	11.23	95% Adjusted-CLT UCL (Chen-1995)	8.199
3573			95% Modified-t UCL (Johnson-1978)	11.09
3574				
3575	**Gamma GOF Test**			
3576	A-D Test Statistic	0.335	**Anderson-Darling Gamma GOF Test**	
3577	5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level	
3578	K-S Test Statistic	0.306	**Kolmogorov-Smirnov Gamma GOF Test**	
3579	5% K-S Critical Value	0.433	Detected data appear Gamma Distributed at 5% Significance Level	
3580	**Data Not Gamma Distributed at 5% Significance Level**			
3581				
3582	**Gamma Statistics**			
3583	k hat (MLE)	6.049	k star (bias corrected MLE)	N/A
3584	Theta hat (MLE)	1.051	Theta star (bias corrected MLE)	N/A
3585	nu hat (MLE)	36.29	nu star (bias corrected)	N/A
3586	MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
3587			Approximate Chi Square Value (0.05)	N/A
3588	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	1.169	Mean of logged Data	1.765
Maximum of Logged Data	2.187	SD of logged Data	0.531

Assuming Lognormal Distribution

95% H-UCL	89.34	90% Chebyshev (MVUE) UCL	12.09
95% Chebyshev (MVUE) UCL	14.67	97.5% Chebyshev (MVUE) UCL	18.24
99% Chebyshev (MVUE) UCL	25.27		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	9.105	95% BCA Bootstrap 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
90% Chebyshev(Mean, Sd) UCL	11.37	95% Chebyshev(Mean, Sd) UCL	13.63
97.5% Chebyshev(Mean, Sd) UCL	16.78	99% Chebyshev(Mean, Sd) UCL	22.96

Suggested UCL to Use

95% Student's-t UCL	11.23		

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 using results from simulation studies.

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.

Result (angling fish_wb_zirconium)

General Statistics

Total Number of Observations	3	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	3
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).

	A	B	C	D	E	F	G	H	I	J	K	L
3641												
3642	The data set for variable Result (angling fish_wb_zirconium) was not processed!											
3643												
3644												

B.2.9 Forage Fish EPC ProUCL Output: North Driftwood (nd) Watershed, West Buskegau (wb) Watershed, & Jocko Creek (jc) Watershed

UCL Statistics for Data Sets with Non-Detects	
User Selected Options	
Date/Time of Computation	ProUCL 5.2 4/23/2024 8:46:01 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (forage fish_jc_aluminum)

General Statistics			
Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	1.52	Mean	2.127
Maximum	3.47	Median	1.89
SD	0.651	Std. Error of Mean	0.246
Coefficient of Variation	0.306	Skewness	1.801

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test		
Shapiro Wilk Test Statistic	0.81	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level
Data appear Normal at 1% Significance Level		
Note GOF tests may be unreliable for small sample sizes		

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.605	95% Adjusted-CLT UCL (Chen-1995)	2.711
		95% Modified-t UCL (Johnson-1978)	2.633

Gamma GOF Test		
A-D Test Statistic	0.532	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.281	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		
Note GOF tests may be unreliable for small sample sizes		

Gamma Statistics			
k hat (MLE)	14.97	k star (bias corrected MLE)	8.649
Theta hat (MLE)	0.142	Theta star (bias corrected MLE)	0.246
nu hat (MLE)	209.6	nu star (bias corrected)	121.1
MLE Mean (bias corrected)	2.127	MLE Sd (bias corrected)	0.723

		Approximate Chi Square Value (0.05)	96.67
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	90.09

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.664	95% Adjusted Gamma UCL	2.859

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.263	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	0.419	Mean of logged Data	0.721
Maximum of Logged Data	1.244	SD of logged Data	0.269

Assuming Lognormal Distribution

95% H-UCL	2.697	90% Chebyshev (MVUE) UCL	2.77
95% Chebyshev (MVUE) UCL	3.064	97.5% Chebyshev (MVUE) UCL	3.472
99% Chebyshev (MVUE) UCL	4.274		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.532	95% BCA Bootstrap UCL	2.713
95% Standard Bootstrap UCL	2.509	95% Bootstrap-t UCL	3.462
95% Hall's Bootstrap UCL	4.99	95% Percentile Bootstrap UCL	2.559
90% Chebyshev(Mean, Sd) UCL	2.865	95% Chebyshev(Mean, Sd) UCL	3.2
97.5% Chebyshev(Mean, Sd) UCL	3.664	99% Chebyshev(Mean, Sd) UCL	4.575

Suggested UCL to Use

95% Student's-t UCL	2.605		

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_jc_antimony)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	1
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 Result (forage fish_jc_antimony) was not processed!

Result (forage fish_jc_arsenic)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.0112	Mean	0.0162
Maximum	0.0222	Median	0.0172
SD	0.00396	Std. Error of Mean	0.0015
Coefficient of Variation	0.244	Skewness	0.164

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0191	95% Adjusted-CLT UCL (Chen-1995)	0.0188
		95% Modified-t UCL (Johnson-1978)	0.0191

Gamma GOF Test

A-D Test Statistic	0.328	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.707	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	0.311	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	19.27	k star (bias corrected MLE)	11.1
Theta hat (MLE)	8.4159E-4	Theta star (bias corrected MLE)	0.00146
nu hat (MLE)	269.7	nu star (bias corrected)	155.5
MLE Mean (bias corrected)	0.0162	MLE Sd (bias corrected)	0.00487
		Approximate Chi Square Value (0.05)	127.6
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	120

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0197	95% Adjusted Gamma UCL	0.021

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.205	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.492	Mean of logged Data	-4.148
Maximum of Logged Data	-3.808	SD of logged Data	0.249

Assuming Lognormal Distribution

95% H-UCL	0.0201	90% Chebyshev (MVUE) UCL	0.0208
95% Chebyshev (MVUE) UCL	0.0229	97.5% Chebyshev (MVUE) UCL	0.0258
99% Chebyshev (MVUE) UCL	0.0314		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0187	95% BCA Bootstrap UCL	0.0186
95% Standard Bootstrap UCL	0.0186	95% Bootstrap-t UCL	0.0193
95% Hall's Bootstrap UCL	0.0184	95% Percentile Bootstrap UCL	0.0187
90% Chebyshev(Mean, Sd) UCL	0.0207	95% Chebyshev(Mean, Sd) UCL	0.0227
97.5% Chebyshev(Mean, Sd) UCL	0.0256	99% Chebyshev(Mean, Sd) UCL	0.0311

Suggested UCL to Use

95% Student's-t UCL	0.0191		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_jc_barium)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.872	Mean	1.29
Maximum	2.19	Median	1.06
SD	0.535	Std. Error of Mean	0.202
Coefficient of Variation	0.414	Skewness	1.218

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.767	**Shapiro Wilk GOF Test**	

209	1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
210	Lilliefors Test Statistic	0.339	**Lilliefors GOF Test**	
211	1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	
212	**Data appear Normal at 1% Significance Level**			
213	**Note GOF tests may be unreliable for small sample sizes**			
214				
215	**Assuming Normal Distribution**			
216	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
217	95% Student's-t UCL	1.683	95% Adjusted-CLT UCL (Chen-1995)	1.722
218			95% Modified-t UCL (Johnson-1978)	1.699
219				
220	**Gamma GOF Test**			
221	A-D Test Statistic	0.79	**Anderson-Darling Gamma GOF Test**	
222	5% A-D Critical Value	0.709	Data Not Gamma Distributed at 5% Significance Level	
223	K-S Test Statistic	0.321	**Kolmogorov-Smirnov Gamma GOF Test**	
224	5% K-S Critical Value	0.312	Data Not Gamma Distributed at 5% Significance Level	
225	**Data Not Gamma Distributed at 5% Significance Level**			
226				
227	**Gamma Statistics**			
228	k hat (MLE)	7.981	k star (bias corrected MLE)	4.656
229	Theta hat (MLE)	0.162	Theta star (bias corrected MLE)	0.277
230	nu hat (MLE)	111.7	nu star (bias corrected)	65.18
231	MLE Mean (bias corrected)	1.29	MLE Sd (bias corrected)	0.598
232			Approximate Chi Square Value (0.05)	47.61
233	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	43.11
234				
235	**Assuming Gamma Distribution**			
236	95% Approximate Gamma UCL	1.767	95% Adjusted Gamma UCL	1.951
237				
238	**Lognormal GOF Test**			
239	Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk Lognormal GOF Test**	
240	10% Shapiro Wilk Critical Value	0.838	Data Not Lognormal at 10% Significance Level	
241	Lilliefors Test Statistic	0.297	**Lilliefors Lognormal GOF Test**	
242	10% Lilliefors Critical Value	0.28	Data Not Lognormal at 10% Significance Level	
243	**Data Not Lognormal at 10% Significance Level**			
244				
245	**Lognormal Statistics**			
246	Minimum of Logged Data	-0.137	Mean of logged Data	0.191
247	Maximum of Logged Data	0.784	SD of logged Data	0.372
248				
249	**Assuming Lognormal Distribution**			
250	95% H-UCL	1.833	90% Chebyshev (MVUE) UCL	1.826
251	95% Chebyshev (MVUE) UCL	2.072	97.5% Chebyshev (MVUE) UCL	2.413
252	99% Chebyshev (MVUE) UCL	3.084		
253				
254	**Nonparametric Distribution Free UCL Statistics**			
255	**Data appear to follow a Discernible Distribution**			
256				
257	**Nonparametric Distribution Free UCLs**			
258	95% CLT UCL	1.623	95% BCA Bootstrap UCL	1.667
259	95% Standard Bootstrap UCL	1.601	95% Bootstrap-t UCL	2.956
260	95% Hall's Bootstrap UCL	4.248	95% Percentile Bootstrap UCL	1.629

	A	B	C	D	E	F	G	H	I	J	K	L
261	90% Chebyshev(Mean, Sd) UCL					1.897	95% Chebyshev(Mean, Sd) UCL					2.171
262	97.5% Chebyshev(Mean, Sd) UCL					2.552	99% Chebyshev(Mean, Sd) UCL					3.301
263												
264	Suggested UCL to Use											
265	95% Student's-t UCL					1.683						
266												
267	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
268	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
269	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
270												
271	Result (forage fish_jc_beryllium)											
272												
273	General Statistics											
274	Total Number of Observations					7	Number of Distinct Observations					1
275	Number of Detects					0	Number of Non-Detects					7
276	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
277												
278	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
279	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
280	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
281												
282	The data set for variable Result (forage fish_jc_beryllium) was not processed!											
283												
284												
285	Result (forage fish_jc_bismuth)											
286												
287	General Statistics											
288	Total Number of Observations					7	Number of Distinct Observations					1
289	Number of Detects					0	Number of Non-Detects					7
290	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
291												
292	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
293	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
294	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
295												
296	The data set for variable Result (forage fish_jc_bismuth) was not processed!											
297												
298												
299	Result (forage fish_jc_boron)											
300												
301	General Statistics											
302	Total Number of Observations					7	Number of Distinct Observations					1
303	Number of Detects					0	Number of Non-Detects					7
304	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
305												
306	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
307	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
308	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
309												
310	The data set for variable Result (forage fish_jc_boron) was not processed!											
311												
312												

	A	B	C	D	E	F	G	H	I	J	K	L
313												
314	Result (forage fish_jc_cadmium)											
315												
316	**General Statistics**											
317					Total Number of Observations	7					Number of Distinct Observations	7
318											Number of Missing Observations	0
319					Minimum	0.0226					Mean	0.0308
320					Maximum	0.0531					Median	0.0252
321					SD	0.011					Std. Error of Mean	0.00417
322					Coefficient of Variation	0.358					Skewness	1.774
323												
324	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**											
325	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**											
326	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**											
327	**The Chebyshev UCL often results in gross overestimates of the mean.**											
328	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**											
329												
330	**Normal GOF Test**											
331					Shapiro Wilk Test Statistic	0.746	**Shapiro Wilk GOF Test**					
332					1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level					
333					Lilliefors Test Statistic	0.34	**Lilliefors GOF Test**					
334					1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level					
335	**Data appear Normal at 1% Significance Level**											
336	**Note GOF tests may be unreliable for small sample sizes**											
337												
338	**Assuming Normal Distribution**											
339	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
340					95% Student's-t UCL	0.0389					95% Adjusted-CLT UCL (Chen-1995)	0.0407
341											95% Modified-t UCL (Johnson-1978)	0.0394
342												
343	**Gamma GOF Test**											
344					A-D Test Statistic	0.82	**Anderson-Darling Gamma GOF Test**					
345					5% A-D Critical Value	0.708	Data Not Gamma Distributed at 5% Significance Level					
346					K-S Test Statistic	0.332	**Kolmogorov-Smirnov Gamma GOF Test**					
347					5% K-S Critical Value	0.312	Data Not Gamma Distributed at 5% Significance Level					
348	**Data Not Gamma Distributed at 5% Significance Level**											
349												
350	**Gamma Statistics**											
351					k hat (MLE)	11.29					k star (bias corrected MLE)	6.546
352					Theta hat (MLE)	0.00273					Theta star (bias corrected MLE)	0.00471
353					nu hat (MLE)	158					nu star (bias corrected)	91.65
354					MLE Mean (bias corrected)	0.0308					MLE Sd (bias corrected)	0.012
355											Approximate Chi Square Value (0.05)	70.57
356					Adjusted Level of Significance	0.0158					Adjusted Chi Square Value	65.01
357												
358	**Assuming Gamma Distribution**											
359					95% Approximate Gamma UCL	0.04					95% Adjusted Gamma UCL	0.0435
360												
361	**Lognormal GOF Test**											
362					Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk Lognormal GOF Test**					
363					10% Shapiro Wilk Critical Value	0.838	Data Not Lognormal at 10% Significance Level					
364					Lilliefors Test Statistic	0.313	**Lilliefors Lognormal GOF Test**					

10% Lilliefors Critical Value	0.28	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3.79	Mean of logged Data	-3.524
Maximum of Logged Data	-2.936	SD of logged Data	0.308
Assuming Lognormal Distribution			
95% H-UCL	0.0409	90% Chebyshev (MVUE) UCL	0.0414
95% Chebyshev (MVUE) UCL	0.0463	97.5% Chebyshev (MVUE) UCL	0.053
99% Chebyshev (MVUE) UCL	0.0663		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0377	95% BCA Bootstrap UCL	0.0404
95% Standard Bootstrap UCL	0.0373	95% Bootstrap-t UCL	0.0777
95% Hall's Bootstrap UCL	0.0833	95% Percentile Bootstrap UCL	0.0382
90% Chebyshev(Mean, Sd) UCL	0.0433	95% Chebyshev(Mean, Sd) UCL	0.049
97.5% Chebyshev(Mean, Sd) UCL	0.0569	99% Chebyshev(Mean, Sd) UCL	0.0723
Suggested UCL to Use			
95% Student's-t UCL	0.0389		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_jc_calcium)			
General Statistics			
Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	6560	Mean	7947
Maximum	10600	Median	7090
SD	1761	Std. Error of Mean	665.4
Coefficient of Variation	0.222	Skewness	1.159
Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,			
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,			
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
The Chebyshev UCL often results in gross overestimates of the mean.			
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
Normal GOF Test			
Shapiro Wilk Test Statistic	0.726	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	9240	95% Adjusted-CLT UCL (Chen-1995)	9353
		95% Modified-t UCL (Johnson-1978)	9289
Gamma GOF Test			
A-D Test Statistic	0.99	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.707	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.359	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.311	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	26.28	k star (bias corrected MLE)	15.11
Theta hat (MLE)	302.4	Theta star (bias corrected MLE)	526
nu hat (MLE)	367.9	nu star (bias corrected)	211.5
MLE Mean (bias corrected)	7947	MLE Sd (bias corrected)	2044
		Approximate Chi Square Value (0.05)	178.9
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	169.8
Assuming Gamma Distribution			
95% Approximate Gamma UCL	9398	95% Adjusted Gamma UCL	9902
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.749	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.342	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	8.789	Mean of logged Data	8.961
Maximum of Logged Data	9.269	SD of logged Data	0.206
Assuming Lognormal Distribution			
95% H-UCL	9426	90% Chebyshev (MVUE) UCL	9798
95% Chebyshev (MVUE) UCL	10640	97.5% Chebyshev (MVUE) UCL	11808
99% Chebyshev (MVUE) UCL	14103		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9042	95% BCA Bootstrap UCL	9124
95% Standard Bootstrap UCL	8990	95% Bootstrap-t UCL	15058
95% Hall's Bootstrap UCL	19747	95% Percentile Bootstrap UCL	9019
90% Chebyshev(Mean, Sd) UCL	9943	95% Chebyshev(Mean, Sd) UCL	10848
97.5% Chebyshev(Mean, Sd) UCL	12103	99% Chebyshev(Mean, Sd) UCL	14568
Suggested UCL to Use			
Recommendation cannot be provided			

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

Result (forage fish_jc_chromium)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	1
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 Result (forage fish_jc_chromium) was not processed!

Result (forage fish_jc_cobalt)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.0072	Mean	0.00976
Maximum	0.0135	Median	0.0092
SD	0.00241	Std. Error of Mean	9.0996E-4
Coefficient of Variation	0.247	Skewness	0.791

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0115	95% Adjusted-CLT UCL (Chen-1995)	0.0115
		95% Modified-t UCL (Johnson-1978)	0.0116

Gamma GOF Test

A-D Test Statistic	0.388	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.707	Detected data appear Gamma Distributed at 5% Significance Level

	A–E	F	G–K	L
521	K-S Test Statistic	0.233	**Kolmogorov-Smirnov Gamma GOF Test**	
522	5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
523	**Detected data appear Gamma Distributed at 5% Significance Level**			
524	**Note GOF tests may be unreliable for small sample sizes**			
525				
526	**Gamma Statistics**			
527	k hat (MLE)	20.33	k star (bias corrected MLE)	11.71
528	Theta hat (MLE)	4.7992E-4	Theta star (bias corrected MLE)	8.3303E-4
529	nu hat (MLE)	284.6	nu star (bias corrected)	164
530	MLE Mean (bias corrected)	0.00976	MLE Sd (bias corrected)	0.00285
531			Approximate Chi Square Value (0.05)	135.4
532	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	127.5
533				
534	**Assuming Gamma Distribution**			
535	95% Approximate Gamma UCL	0.0118	95% Adjusted Gamma UCL	0.0125
536				
537	**Lognormal GOF Test**			
538	Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**	
539	10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
540	Lilliefors Test Statistic	0.217	**Lilliefors Lognormal GOF Test**	
541	10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
542	**Data appear Lognormal at 10% Significance Level**			
543	**Note GOF tests may be unreliable for small sample sizes**			
544				
545	**Lognormal Statistics**			
546	Minimum of Logged Data	-4.934	Mean of logged Data	-4.655
547	Maximum of Logged Data	-4.305	SD of logged Data	0.238
548				
549	**Assuming Lognormal Distribution**			
550	95% H-UCL	0.012	90% Chebyshev (MVUE) UCL	0.0124
551	95% Chebyshev (MVUE) UCL	0.0136	97.5% Chebyshev (MVUE) UCL	0.0152
552	99% Chebyshev (MVUE) UCL	0.0185		
553				
554	**Nonparametric Distribution Free UCL Statistics**			
555	**Data appear to follow a Discernible Distribution**			
556				
557	**Nonparametric Distribution Free UCLs**			
558	95% CLT UCL	0.0113	95% BCA Bootstrap UCL	0.0113
559	95% Standard Bootstrap UCL	0.0112	95% Bootstrap-t UCL	0.0132
560	95% Hall's Bootstrap UCL	0.0244	95% Percentile Bootstrap UCL	0.0113
561	90% Chebyshev(Mean, Sd) UCL	0.0125	95% Chebyshev(Mean, Sd) UCL	0.0137
562	97.5% Chebyshev(Mean, Sd) UCL	0.0154	99% Chebyshev(Mean, Sd) UCL	0.0188
563				
564	**Suggested UCL to Use**			
565	95% Student's-t UCL	0.0115		
566				
567	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
568	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
569	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
570				
571				
572	**Result (forage fish_jc_copper)**			

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.853	Mean	1.169
Maximum	1.59	Median	1.14
SD	0.235	Std. Error of Mean	0.0889
Coefficient of Variation	0.201	Skewness	0.745

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.342	95% Adjusted-CLT UCL (Chen-1995)	1.342
		95% Modified-t UCL (Johnson-1978)	1.346

Gamma GOF Test

A-D Test Statistic	0.241	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.707	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	0.311	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	29.85	k star (bias corrected MLE)	17.15
Theta hat (MLE)	0.0392	Theta star (bias corrected MLE)	0.0681
nu hat (MLE)	417.9	nu star (bias corrected)	240.2
MLE Mean (bias corrected)	1.169	MLE Sd (bias corrected)	0.282
		Approximate Chi Square Value (0.05)	205.3
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	195.5

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.368	95% Adjusted Gamma UCL	1.436

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-0.159	Mean of logged Data	0.139
Maximum of Logged Data	0.464	SD of logged Data	0.197

Assuming Lognormal Distribution

95% H-UCL	1.376	90% Chebyshev (MVUE) UCL	1.431
95% Chebyshev (MVUE) UCL	1.549	97.5% Chebyshev (MVUE) UCL	1.714
99% Chebyshev (MVUE) UCL	2.037		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.315	95% BCA Bootstrap UCL	1.321
95% Standard Bootstrap UCL	1.306	95% Bootstrap-t UCL	1.401
95% Hall's Bootstrap UCL	1.734	95% Percentile Bootstrap UCL	1.313
90% Chebyshev(Mean, Sd) UCL	1.436	95% Chebyshev(Mean, Sd) UCL	1.556
97.5% Chebyshev(Mean, Sd) UCL	1.724	99% Chebyshev(Mean, Sd) UCL	2.053

Suggested UCL to Use

95% Student's-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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_jc_iron)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	18.6	Mean	21.99
Maximum	26	Median	22
SD	2.614	Std. Error of Mean	0.988
Coefficient of Variation	0.119	Skewness	0.304

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

	A–E	F	G–K	L
677	Note GOF tests may be unreliable for small sample sizes			
678				
679	**Assuming Normal Distribution**			
680	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
681	95% Student's-t UCL	23.91	95% Adjusted-CLT UCL (Chen-1995)	23.73
682			95% Modified-t UCL (Johnson-1978)	23.92
683				
684	**Gamma GOF Test**			
685	A-D Test Statistic	0.217	**Anderson-Darling Gamma GOF Test**	
686	5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level	
687	K-S Test Statistic	0.208	**Kolmogorov-Smirnov Gamma GOF Test**	
688	5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
689	**Detected data appear Gamma Distributed at 5% Significance Level**			
690	**Note GOF tests may be unreliable for small sample sizes**			
691				
692	**Gamma Statistics**			
693	k hat (MLE)	83.2	k star (bias corrected MLE)	47.64
694	Theta hat (MLE)	0.264	Theta star (bias corrected MLE)	0.462
695	nu hat (MLE)	1165	nu star (bias corrected)	666.9
696	MLE Mean (bias corrected)	21.99	MLE Sd (bias corrected)	3.185
697			Approximate Chi Square Value (0.05)	608
698	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	590.9
699				
700	**Assuming Gamma Distribution**			
701	95% Approximate Gamma UCL	24.12	95% Adjusted Gamma UCL	24.81
702				
703	**Lognormal GOF Test**			
704	Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**	
705	10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
706	Lilliefors Test Statistic	0.189	**Lilliefors Lognormal GOF Test**	
707	10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
708	**Data appear Lognormal at 10% Significance Level**			
709	**Note GOF tests may be unreliable for small sample sizes**			
710				
711	**Lognormal Statistics**			
712	Minimum of Logged Data	2.923	Mean of logged Data	3.084
713	Maximum of Logged Data	3.258	SD of logged Data	0.118
714				
715	**Assuming Lognormal Distribution**			
716	95% H-UCL	24.12	90% Chebyshev (MVUE) UCL	24.94
717	95% Chebyshev (MVUE) UCL	26.27	97.5% Chebyshev (MVUE) UCL	28.13
718	99% Chebyshev (MVUE) UCL	31.78		
719				
720	**Nonparametric Distribution Free UCL Statistics**			
721	**Data appear to follow a Discernible Distribution**			
722				
723	**Nonparametric Distribution Free UCLs**			
724	95% CLT UCL	23.61	95% BCA Bootstrap UCL	23.63
725	95% Standard Bootstrap UCL	23.53	95% Bootstrap-t UCL	24.05
726	95% Hall's Bootstrap UCL	23.81	95% Percentile Bootstrap UCL	23.61
727	90% Chebyshev(Mean, Sd) UCL	24.95	95% Chebyshev(Mean, Sd) UCL	26.29
728	97.5% Chebyshev(Mean, Sd) UCL	28.16	99% Chebyshev(Mean, Sd) UCL	31.82

Suggested UCL to Use

95% Student's-t UCL	23.91

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_jc_lead)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.069	Mean	0.0982
Maximum	0.163	Median	0.0816
SD	0.0371	Std. Error of Mean	0.014
Coefficient of Variation	0.378	Skewness	1.28

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.125	95% Adjusted-CLT UCL (Chen-1995)	0.129
		95% Modified-t UCL (Johnson-1978)	0.127

Gamma GOF Test

A-D Test Statistic	0.766	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.709	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.329	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.312	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.571	k star (bias corrected MLE)	5.564
Theta hat (MLE)	0.0103	Theta star (bias corrected MLE)	0.0177
nu hat (MLE)	134	nu star (bias corrected)	77.9
MLE Mean (bias corrected)	0.0982	MLE Sd (bias corrected)	0.0416
		Approximate Chi Square Value (0.05)	58.57
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	53.53

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.131	95% Adjusted Gamma UCL	0.143

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.307	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.674	Mean of logged Data	-2.374
Maximum of Logged Data	-1.814	SD of logged Data	0.339

Assuming Lognormal Distribution

95% H-UCL	0.135	90% Chebyshev (MVUE) UCL	0.135
95% Chebyshev (MVUE) UCL	0.153	97.5% Chebyshev (MVUE) UCL	0.176
99% Chebyshev (MVUE) UCL	0.223		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.121	95% BCA Bootstrap UCL	0.127
95% Standard Bootstrap UCL	0.12	95% Bootstrap-t UCL	0.225
95% Hall's Bootstrap UCL	0.306	95% Percentile Bootstrap UCL	0.123
90% Chebyshev(Mean, Sd) UCL	0.14	95% Chebyshev(Mean, Sd) UCL	0.159
97.5% Chebyshev(Mean, Sd) UCL	0.186	99% Chebyshev(Mean, Sd) UCL	0.238

Suggested UCL to Use

95% Student's-t UCL	0.125		

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

Result (forage fish_jc_lithium)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	1
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 Result (forage fish_jc_lithium) was not processed!

Result (forage fish_jc_magnesium)

General Statistics			
Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	304	Mean	334.6
Maximum	390	Median	338
SD	30.5	Std. Error of Mean	11.53
Coefficient of Variation	0.0911	Skewness	0.91

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test			
Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	357	95% Adjusted-CLT UCL (Chen-1995)	357.8
		95% Modified-t UCL (Johnson-1978)	357.6
Gamma GOF Test			
A-D Test Statistic	0.358	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.708	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	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics			
k hat (MLE)	145.1	k star (bias corrected MLE)	83.02
Theta hat (MLE)	2.305	Theta star (bias corrected MLE)	4.03
nu hat (MLE)	2032	nu star (bias corrected)	1162
MLE Mean (bias corrected)	334.6	MLE Sd (bias corrected)	36.72
		Approximate Chi Square Value (0.05)	1084
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	1061
Assuming Gamma Distribution			
95% Approximate Gamma UCL	358.7	95% Adjusted Gamma UCL	366.5
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors Lognormal GOF Test**	

10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	5.717	Mean of logged Data	5.809
Maximum of Logged Data	5.966	SD of logged Data	0.089

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	368.3
95% Chebyshev (MVUE) UCL	383.6	97.5% Chebyshev (MVUE) UCL	404.9
99% Chebyshev (MVUE) UCL	446.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	353.5	95% BCA Bootstrap UCL	355
95% Standard Bootstrap UCL	352.7	95% Bootstrap-t UCL	363.3
95% Hall's Bootstrap UCL	362.1	95% Percentile Bootstrap UCL	353.3
90% Chebyshev(Mean, Sd) UCL	369.1	95% Chebyshev(Mean, Sd) UCL	384.8
97.5% Chebyshev(Mean, Sd) UCL	406.6	99% Chebyshev(Mean, Sd) UCL	449.3

Suggested UCL to Use

95% Student's-t UCL	357		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_jc_manganese)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	7.24	Mean	8.809
Maximum	11.5	Median	8.21
SD	1.631	Std. Error of Mean	0.616
Coefficient of Variation	0.185	Skewness	0.75

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	10.01	95% Adjusted-CLT UCL (Chen-1995)	10.01
		95% Modified-t UCL (Johnson-1978)	10.04
Gamma GOF Test			
A-D Test Statistic	0.431	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.707	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.237	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics			
k hat (MLE)	35.7	k star (bias corrected MLE)	20.49
Theta hat (MLE)	0.247	Theta star (bias corrected MLE)	0.43
nu hat (MLE)	499.8	nu star (bias corrected)	286.9
MLE Mean (bias corrected)	8.809	MLE Sd (bias corrected)	1.946
		Approximate Chi Square Value (0.05)	248.7
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	237.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL	10.16	95% Adjusted Gamma UCL	10.62
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.22	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal Statistics			
Minimum of Logged Data	1.98	Mean of logged Data	2.162
Maximum of Logged Data	2.442	SD of logged Data	0.179
Assuming Lognormal Distribution			
95% H-UCL	10.19	90% Chebyshev (MVUE) UCL	10.6
95% Chebyshev (MVUE) UCL	11.41	97.5% Chebyshev (MVUE) UCL	12.53
99% Chebyshev (MVUE) UCL	14.75		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9.822	95% BCA Bootstrap UCL	9.95
95% Standard Bootstrap UCL	9.796	95% Bootstrap-t UCL	10.76
95% Hall's Bootstrap UCL	9.852	95% Percentile Bootstrap UCL	9.856
90% Chebyshev(Mean, Sd) UCL	10.66	95% Chebyshev(Mean, Sd) UCL	11.5

97.5% Chebyshev(Mean, Sd) UCL	12.66	99% Chebyshev(Mean, Sd) UCL	14.94

Suggested UCL to Use

95% Student's-t UCL	10.01		

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

Result (forage fish_jc_mercury)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.0559	Mean	0.082
Maximum	0.131	Median	0.0738
SD	0.0278	Std. Error of Mean	0.0105
Coefficient of Variation	0.339	Skewness	1.139

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.102	95% Adjusted-CLT UCL (Chen-1995)	0.104
		95% Modified-t UCL (Johnson-1978)	0.103

Gamma GOF Test

A-D Test Statistic	0.441	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.228	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	11.44	k star (bias corrected MLE)	6.633
Theta hat (MLE)	0.00717	Theta star (bias corrected MLE)	0.0124
nu hat (MLE)	160.2	nu star (bias corrected)	92.86
MLE Mean (bias corrected)	0.082	MLE Sd (bias corrected)	0.0318

	A–E	F	G–K	L
1041			Approximate Chi Square Value (0.05)	71.63
1042	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	66.03
1043				
1044	**Assuming Gamma Distribution**			
1045	95% Approximate Gamma UCL	0.106	95% Adjusted Gamma UCL	0.115
1046				
1047	**Lognormal GOF Test**			
1048	Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**	
1049	10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
1050	Lilliefors Test Statistic	0.209	**Lilliefors Lognormal GOF Test**	
1051	10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
1052	**Data appear Lognormal at 10% Significance Level**			
1053	**Note GOF tests may be unreliable for small sample sizes**			
1054				
1055	**Lognormal Statistics**			
1056	Minimum of Logged Data	-2.884	Mean of logged Data	-2.545
1057	Maximum of Logged Data	-2.033	SD of logged Data	0.313
1058				
1059	**Assuming Lognormal Distribution**			
1060	95% H-UCL	0.11	90% Chebyshev (MVUE) UCL	0.111
1061	95% Chebyshev (MVUE) UCL	0.124	97.5% Chebyshev (MVUE) UCL	0.142
1062	99% Chebyshev (MVUE) UCL	0.178		
1063				
1064	**Nonparametric Distribution Free UCL Statistics**			
1065	**Data appear to follow a Discernible Distribution**			
1066				
1067	**Nonparametric Distribution Free UCLs**			
1068	95% CLT UCL	0.0993	95% BCA Bootstrap UCL	0.102
1069	95% Standard Bootstrap UCL	0.0984	95% Bootstrap-t UCL	0.132
1070	95% Hall's Bootstrap UCL	0.216	95% Percentile Bootstrap UCL	0.1
1071	90% Chebyshev(Mean, Sd) UCL	0.113	95% Chebyshev(Mean, Sd) UCL	0.128
1072	97.5% Chebyshev(Mean, Sd) UCL	0.148	99% Chebyshev(Mean, Sd) UCL	0.186
1073				
1074	**Suggested UCL to Use**			
1075	95% Student's-t UCL	0.102		
1076				
1077	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1078	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1079	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1080				
1081				
1082	Result (forage fish_jc_methylmercury)			
1083				
1084	**General Statistics**			
1085	Total Number of Observations	7	Number of Distinct Observations	7
1086			Number of Missing Observations	0
1087	Minimum	0.0495	Mean	0.0816
1088	Maximum	0.152	Median	0.0608
1089	SD	0.0387	Std. Error of Mean	0.0146
1090	Coefficient of Variation	0.475	Skewness	1.301
1091				
1092	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**			

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.814	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.11	95% Adjusted-CLT UCL (Chen-1995)	0.113
		95% Modified-t UCL (Johnson-1978)	0.111

Gamma GOF Test

A-D Test Statistic	0.578	**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	0.283	**Kolmogorov-Smirnov Gamma GOF Test**	
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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	6.166	k star (bias corrected MLE)	3.619
Theta hat (MLE)	0.0132	Theta star (bias corrected MLE)	0.0225
nu hat (MLE)	86.33	nu star (bias corrected)	50.66
MLE Mean (bias corrected)	0.0816	MLE Sd (bias corrected)	0.0429
		Approximate Chi Square Value (0.05)	35.32
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	31.49

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.117	95% Adjusted Gamma UCL	0.131

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.262	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.006	Mean of logged Data	-2.589
Maximum of Logged Data	-1.884	SD of logged Data	0.424

Assuming Lognormal Distribution

95% H-UCL	0.123	90% Chebyshev (MVUE) UCL	0.12
95% Chebyshev (MVUE) UCL	0.138	97.5% Chebyshev (MVUE) UCL	0.162

99% Chebyshev (MVUE) UCL	0.211		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.106	95% BCA Bootstrap UCL	0.111
95% Standard Bootstrap UCL	0.104	95% Bootstrap-t UCL	0.177
95% Hall's Bootstrap UCL	0.24	95% Percentile Bootstrap UCL	0.106
90% Chebyshev(Mean, Sd) UCL	0.126	95% Chebyshev(Mean, Sd) UCL	0.145
97.5% Chebyshev(Mean, Sd) UCL	0.173	99% Chebyshev(Mean, Sd) UCL	0.227

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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_jc_molybdenum)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.0178	Mean	0.0222
Maximum	0.0258	Median	0.023
SD	0.00297	Std. Error of Mean	0.00112
Coefficient of Variation	0.134	Skewness	-0.526

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0244	95% Adjusted-CLT UCL (Chen-1995)	0.0238
		95% Modified-t UCL (Johnson-1978)	0.0243

Gamma GOF Test

A-D Test Statistic	0.363	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.2	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics			
k hat (MLE)	62.14	k star (bias corrected MLE)	35.6
Theta hat (MLE)	3.5702E-4	Theta star (bias corrected MLE)	6.2312E-4
nu hat (MLE)	870	nu star (bias corrected)	498.5
MLE Mean (bias corrected)	0.0222	MLE Sd (bias corrected)	0.00372
		Approximate Chi Square Value (0.05)	447.7
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	433.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.0247	95% Adjusted Gamma UCL	0.0255
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.196	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal Statistics			
Minimum of Logged Data	-4.029	Mean of logged Data	-3.816
Maximum of Logged Data	-3.657	SD of logged Data	0.139
Assuming Lognormal Distribution			
95% H-UCL	0.0248	90% Chebyshev (MVUE) UCL	0.0257
95% Chebyshev (MVUE) UCL	0.0273	97.5% Chebyshev (MVUE) UCL	0.0295
99% Chebyshev (MVUE) UCL	0.0338		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.024	95% BCA Bootstrap UCL	0.0237
95% Standard Bootstrap UCL	0.0239	95% Bootstrap-t UCL	0.024
95% Hall's Bootstrap UCL	0.0236	95% Percentile Bootstrap UCL	0.0239
90% Chebyshev(Mean, Sd) UCL	0.0256	95% Chebyshev(Mean, Sd) UCL	0.0271
97.5% Chebyshev(Mean, Sd) UCL	0.0292	99% Chebyshev(Mean, Sd) UCL	0.0334
Suggested UCL to Use			
95% Student's-t UCL	0.0244		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
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.			

Result (forage fish_jc_nickel)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	1
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 Result (forage fish_jc_nickel) was not processed!

Result (forage fish_jc_phosphorus)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	5400	Mean	6439
Maximum	7960	Median	6040
SD	971.6	Std. Error of Mean	367.2
Coefficient of Variation	0.151	Skewness	0.646

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,

refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	7152	95% Adjusted-CLT UCL (Chen-1995)	7138
		95% Modified-t UCL (Johnson-1978)	7167

Gamma GOF Test

A-D Test Statistic	0.383	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.232	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	53.04	k star (bias corrected MLE)	30.4
Theta hat (MLE)	121.4	Theta star (bias corrected MLE)	211.8
nu hat (MLE)	742.5	nu star (bias corrected)	425.6
MLE Mean (bias corrected)	6439	MLE Sd (bias corrected)	1168
		Approximate Chi Square Value (0.05)	378.8
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	365.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	7235	95% Adjusted Gamma UCL	7500

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.216	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	8.594	Mean of logged Data	8.761
Maximum of Logged Data	8.982	SD of logged Data	0.147

Assuming Lognormal Distribution

95% H-UCL	7238	90% Chebyshev (MVUE) UCL	7514
95% Chebyshev (MVUE) UCL	8001	97.5% Chebyshev (MVUE) UCL	8678
99% Chebyshev (MVUE) UCL	10007		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	7043	95% BCA Bootstrap UCL	7119
95% Standard Bootstrap UCL	7021	95% Bootstrap-t UCL	7539
95% Hall's Bootstrap UCL	7079	95% Percentile Bootstrap UCL	7041
90% Chebyshev(Mean, Sd) UCL	7540	95% Chebyshev(Mean, Sd) UCL	8039
97.5% Chebyshev(Mean, Sd) UCL	8732	99% Chebyshev(Mean, Sd) UCL	10093

Suggested UCL to Use

95% Student's-t UCL	7152		

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

Result (forage fish_jc_potassium)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0

Minimum	2510	Mean	2721
Maximum	3100	Median	2680
SD	182.3	Std. Error of Mean	68.92
Coefficient of Variation	0.067	Skewness	1.696

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.317	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2855	95% Adjusted-CLT UCL (Chen-1995)	2882
		95% Modified-t UCL (Johnson-1978)	2863

Gamma GOF Test

A-D Test Statistic	0.67	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.304	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	272.9	k star (bias corrected MLE)	156
Theta hat (MLE)	9.972	Theta star (bias corrected MLE)	17.44
nu hat (MLE)	3821	nu star (bias corrected)	2185
MLE Mean (bias corrected)	2721	MLE Sd (bias corrected)	217.9
		Approximate Chi Square Value (0.05)	2077
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	2045

Assuming Gamma Distribution

95% Approximate Gamma UCL	2862	95% Adjusted Gamma UCL	2907

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.304	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data Not Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level
Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

	A–E	F	G–K	L
1405	Minimum of Logged Data	7.828	Mean of logged Data	7.907
1406	Maximum of Logged Data	8.039	SD of logged Data	0.0646
1407				
1408	**Assuming Lognormal Distribution**			
1409	95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	2921
1410	95% Chebyshev (MVUE) UCL	3011	97.5% Chebyshev (MVUE) UCL	3137
1411	99% Chebyshev (MVUE) UCL	3383		
1412				
1413	**Nonparametric Distribution Free UCL Statistics**			
1414	**Data appear to follow a Discernible Distribution**			
1415				
1416	**Nonparametric Distribution Free UCLs**			
1417	95% CLT UCL	2835	95% BCA Bootstrap UCL	2867
1418	95% Standard Bootstrap UCL	2830	95% Bootstrap-t UCL	2948
1419	95% Hall's Bootstrap UCL	3445	95% Percentile Bootstrap UCL	2844
1420	90% Chebyshev(Mean, Sd) UCL	2928	95% Chebyshev(Mean, Sd) UCL	3022
1421	97.5% Chebyshev(Mean, Sd) UCL	3152	99% Chebyshev(Mean, Sd) UCL	3407
1422				
1423	**Suggested UCL to Use**			
1424	95% Student's-t UCL	2855		
1425				
1426	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1427	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1428	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1429				
1430				
1431	**Result (forage fish_jc_selenium)**			
1432				
1433	**General Statistics**			
1434	Total Number of Observations	7	Number of Distinct Observations	6
1435			Number of Missing Observations	0
1436	Minimum	0.176	Mean	0.201
1437	Maximum	0.253	Median	0.193
1438	SD	0.0286	Std. Error of Mean	0.0108
1439	Coefficient of Variation	0.142	Skewness	0.999
1440				
1441	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**			
1442	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**			
1443	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**			
1444	**The Chebyshev UCL often results in gross overestimates of the mean.**			
1445	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**			
1446				
1447	**Normal GOF Test**			
1448	Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**	
1449	1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
1450	Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
1451	1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	
1452	**Data appear Normal at 1% Significance Level**			
1453	**Note GOF tests may be unreliable for small sample sizes**			
1454				
1455	**Assuming Normal Distribution**			
1456	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	

95% Student's-t UCL	0.222	95% Adjusted-CLT UCL (Chen-1995)	0.224
		95% Modified-t UCL (Johnson-1978)	0.223

Gamma GOF Test

A-D Test Statistic	0.434	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.708	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	0.311	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	60.96	k star (bias corrected MLE)	34.93
Theta hat (MLE)	0.0033	Theta star (bias corrected MLE)	0.00577
nu hat (MLE)	853.5	nu star (bias corrected)	489
MLE Mean (bias corrected)	0.201	MLE Sd (bias corrected)	0.0341
		Approximate Chi Square Value (0.05)	438.8
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	424.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.225	95% Adjusted Gamma UCL	0.232

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.206	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-1.737	Mean of logged Data	-1.611
Maximum of Logged Data	-1.374	SD of logged Data	0.137

Assuming Lognormal Distribution

95% H-UCL	0.224	90% Chebyshev (MVUE) UCL	0.233
95% Chebyshev (MVUE) UCL	0.247	97.5% Chebyshev (MVUE) UCL	0.266
99% Chebyshev (MVUE) UCL	0.305		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.219	95% BCA Bootstrap UCL	0.221
95% Standard Bootstrap UCL	0.218	95% Bootstrap-t UCL	0.231
95% Hall's Bootstrap UCL	0.221	95% Percentile Bootstrap UCL	0.22
90% Chebyshev(Mean, Sd) UCL	0.234	95% Chebyshev(Mean, Sd) UCL	0.249
97.5% Chebyshev(Mean, Sd) UCL	0.269	99% Chebyshev(Mean, Sd) UCL	0.309

Suggested UCL to Use

95% Student's-t UCL	0.222		

	A–E	F	G–K	L
1509	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1510	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1511	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1512				
1513	Result(forage fish_jc_sodium)			
1514				
1515	**General Statistics**			
1516	Total Number of Observations	7	Number of Distinct Observations	7
1517			Number of Missing Observations	0
1518	Minimum	771	Mean	801.3
1519	Maximum	828	Median	803
1520	SD	20.01	Std. Error of Mean	7.565
1521	Coefficient of Variation	0.025	Skewness	-0.129
1522				
1523	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**			
1524	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**			
1525	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**			
1526	**The Chebyshev UCL often results in gross overestimates of the mean.**			
1527	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**			
1528				
1529	**Normal GOF Test**			
1530	Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**	
1531	1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
1532	Lilliefors Test Statistic	0.135	**Lilliefors GOF Test**	
1533	1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	
1534	**Data appear Normal at 1% Significance Level**			
1535	**Note GOF tests may be unreliable for small sample sizes**			
1536				
1537	**Assuming Normal Distribution**			
1538	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1539	95% Student's-t UCL	816	95% Adjusted-CLT UCL (Chen-1995)	813.3
1540			95% Modified-t UCL (Johnson-1978)	815.9
1541				
1542	**Gamma GOF Test**			
1543	A-D Test Statistic	0.178	**Anderson-Darling Gamma GOF Test**	
1544	5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level	
1545	K-S Test Statistic	0.153	**Kolmogorov-Smirnov Gamma GOF Test**	
1546	5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
1547	**Detected data appear Gamma Distributed at 5% Significance Level**			
1548	**Note GOF tests may be unreliable for small sample sizes**			
1549				
1550	**Gamma Statistics**			
1551	k hat (MLE)	1866	k star (bias corrected MLE)	1067
1552	Theta hat (MLE)	0.429	Theta star (bias corrected MLE)	0.751
1553	nu hat (MLE)	26129	nu star (bias corrected)	14932
1554	MLE Mean (bias corrected)	801.3	MLE Sd (bias corrected)	24.54
1555			Approximate Chi Square Value (0.05)	14649
1556	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	14563
1557				
1558	**Assuming Gamma Distribution**			
1559	95% Approximate Gamma UCL	816.8	95% Adjusted Gamma UCL	821.6
1560				

	A B C D E	F	G H I J K	L
1561	**Lognormal GOF Test**			
1562	Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**	
1563	10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
1564	Lilliefors Test Statistic	0.134	**Lilliefors Lognormal GOF Test**	
1565	10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
1566	**Data appear Lognormal at 10% Significance Level**			
1567	**Note GOF tests may be unreliable for small sample sizes**			
1568				
1569	**Lognormal Statistics**			
1570	Minimum of Logged Data	6.648	Mean of logged Data	6.686
1571	Maximum of Logged Data	6.719	SD of logged Data	0.025
1572				
1573	**Assuming Lognormal Distribution**			
1574	95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	824
1575	95% Chebyshev (MVUE) UCL	834.3	97.5% Chebyshev (MVUE) UCL	848.6
1576	99% Chebyshev (MVUE) UCL	876.7		
1577				
1578	**Nonparametric Distribution Free UCL Statistics**			
1579	**Data appear to follow a Discernible Distribution**			
1580				
1581	**Nonparametric Distribution Free UCLs**			
1582	95% CLT UCL	813.7	95% BCA Bootstrap UCL	812.6
1583	95% Standard Bootstrap UCL	813.2	95% Bootstrap-t UCL	816.5
1584	95% Hall's Bootstrap UCL	816.6	95% Percentile Bootstrap UCL	813.4
1585	90% Chebyshev(Mean, Sd) UCL	824	95% Chebyshev(Mean, Sd) UCL	834.3
1586	97.5% Chebyshev(Mean, Sd) UCL	848.5	99% Chebyshev(Mean, Sd) UCL	876.6
1587				
1588	**Suggested UCL to Use**			
1589	95% Student's-t UCL	816		
1590				
1591	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1592	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1593	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1594				
1595	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**			
1596	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**			
1597				
1598	**Result (forage fish_jc_strontium)**			
1599				
1600	**General Statistics**			
1601	Total Number of Observations	7	Number of Distinct Observations	7
1602			Number of Missing Observations	0
1603	Minimum	4.59	Mean	5.823
1604	Maximum	6.88	Median	6.24
1605	SD	1.061	Std. Error of Mean	0.401
1606	Coefficient of Variation	0.182	Skewness	-0.275
1607				
1608	**Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,**			
1609	**refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,**			
1610	**but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).**			
1611	**The Chebyshev UCL often results in gross overestimates of the mean.**			
1612	**Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.**			

1613				
1614	**Normal GOF Test**			
1615	Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**	
1616	1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level	
1617	Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**	
1618	1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level	
1619	**Data appear Normal at 1% Significance Level**			
1620	**Note GOF tests may be unreliable for small sample sizes**			
1621				
1622	**Assuming Normal Distribution**			
1623	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1624	95% Student's-t UCL	6.602	95% Adjusted-CLT UCL (Chen-1995)	6.438
1625			95% Modified-t UCL (Johnson-1978)	6.595
1626				
1627	**Gamma GOF Test**			
1628	A-D Test Statistic	0.761	**Anderson-Darling Gamma GOF Test**	
1629	5% A-D Critical Value	0.707	Data Not Gamma Distributed at 5% Significance Level	
1630	K-S Test Statistic	0.252	**Kolmogorov-Smirnov Gamma GOF Test**	
1631	5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level	
1632	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**			
1633	**Note GOF tests may be unreliable for small sample sizes**			
1634				
1635	**Gamma Statistics**			
1636	k hat (MLE)	33.89	k star (bias corrected MLE)	19.46
1637	Theta hat (MLE)	0.172	Theta star (bias corrected MLE)	0.299
1638	nu hat (MLE)	474.5	nu star (bias corrected)	272.5
1639	MLE Mean (bias corrected)	5.823	MLE Sd (bias corrected)	1.32
1640			Approximate Chi Square Value (0.05)	235.3
1641	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	224.8
1642				
1643	**Assuming Gamma Distribution**			
1644	95% Approximate Gamma UCL	6.744	95% Adjusted Gamma UCL	7.059
1645				
1646	**Lognormal GOF Test**			
1647	Shapiro Wilk Test Statistic	0.795	**Shapiro Wilk Lognormal GOF Test**	
1648	10% Shapiro Wilk Critical Value	0.838	Data Not Lognormal at 10% Significance Level	
1649	Lilliefors Test Statistic	0.244	**Lilliefors Lognormal GOF Test**	
1650	10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	
1651	**Data appear Approximate Lognormal at 10% Significance Level**			
1652	**Note GOF tests may be unreliable for small sample sizes**			
1653				
1654	**Lognormal Statistics**			
1655	Minimum of Logged Data	1.524	Mean of logged Data	1.747
1656	Maximum of Logged Data	1.929	SD of logged Data	0.188
1657				
1658	**Assuming Lognormal Distribution**			
1659	95% H-UCL	6.792	90% Chebyshev (MVUE) UCL	7.065
1660	95% Chebyshev (MVUE) UCL	7.627	97.5% Chebyshev (MVUE) UCL	8.408
1661	99% Chebyshev (MVUE) UCL	9.94		
1662				
1663	**Nonparametric Distribution Free UCL Statistics**			
1664	**Data appear to follow a Discernible Distribution**			

Nonparametric Distribution Free UCLs

95% CLT UCL	6.482	95% BCA Bootstrap UCL	6.416
95% Standard Bootstrap UCL	6.455	95% Bootstrap-t UCL	6.547
95% Hall's Bootstrap UCL	6.262	95% Percentile Bootstrap UCL	6.454
90% Chebyshev(Mean, Sd) UCL	7.026	95% Chebyshev(Mean, Sd) UCL	7.571
97.5% Chebyshev(Mean, Sd) UCL	8.327	99% Chebyshev(Mean, Sd) UCL	9.813

Suggested UCL to Use

95% Student's-t UCL	6.602		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
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.

Result (forage fish_jc_thallium)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.00438	Mean	0.00623
Maximum	0.0106	Median	0.00537
SD	0.0023	Std. Error of Mean	8.6769E-4
Coefficient of Variation	0.368	Skewness	1.488

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00792	95% Adjusted-CLT UCL (Chen-1995)	0.00818
		95% Modified-t UCL (Johnson-1978)	0.008

Gamma GOF Test

A-D Test Statistic	0.664	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.324	**Kolmogorov-Smirnov Gamma GOF Test**

	A–E	F	G–K	L
1717	5% K-S Critical Value	0.312	Data Not Gamma Distributed at 5% Significance Level	
1718	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**			
1719	**Note GOF tests may be unreliable for small sample sizes**			
1720				
1721	**Gamma Statistics**			
1722	k hat (MLE)	10.29	k star (bias corrected MLE)	5.973
1723	Theta hat (MLE)	6.0604E-4	Theta star (bias corrected MLE)	0.00104
1724	nu hat (MLE)	144	nu star (bias corrected)	83.63
1725	MLE Mean (bias corrected)	0.00623	MLE Sd (bias corrected)	0.00255
1726			Approximate Chi Square Value (0.05)	63.55
1727	Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	58.29
1728				
1729	**Assuming Gamma Distribution**			
1730	95% Approximate Gamma UCL	0.0082	95% Adjusted Gamma UCL	0.00894
1731				
1732	**Lognormal GOF Test**			
1733	Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk Lognormal GOF Test**	
1734	10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
1735	Lilliefors Test Statistic	0.302	**Lilliefors Lognormal GOF Test**	
1736	10% Lilliefors Critical Value	0.28	Data Not Lognormal at 10% Significance Level	
1737	**Data appear Approximate Lognormal at 10% Significance Level**			
1738	**Note GOF tests may be unreliable for small sample sizes**			
1739				
1740	**Lognormal Statistics**			
1741	Minimum of Logged Data	-5.431	Mean of logged Data	-5.127
1742	Maximum of Logged Data	-4.547	SD of logged Data	0.326
1743				
1744	**Assuming Lognormal Distribution**			
1745	95% H-UCL	0.00844	90% Chebyshev (MVUE) UCL	0.00851
1746	95% Chebyshev (MVUE) UCL	0.00955	97.5% Chebyshev (MVUE) UCL	0.011
1747	99% Chebyshev (MVUE) UCL	0.0138		
1748				
1749	**Nonparametric Distribution Free UCL Statistics**			
1750	**Data appear to follow a Discernible Distribution**			
1751				
1752	**Nonparametric Distribution Free UCLs**			
1753	95% CLT UCL	0.00766	95% BCA Bootstrap UCL	0.00808
1754	95% Standard Bootstrap UCL	0.00759	95% Bootstrap-t UCL	0.013
1755	95% Hall's Bootstrap UCL	0.0172	95% Percentile Bootstrap UCL	0.00771
1756	90% Chebyshev(Mean, Sd) UCL	0.00884	95% Chebyshev(Mean, Sd) UCL	0.01
1757	97.5% Chebyshev(Mean, Sd) UCL	0.0117	99% Chebyshev(Mean, Sd) UCL	0.0149
1758				
1759	**Suggested UCL to Use**			
1760	95% Student's-t UCL	0.00792		
1761				
1762	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1763	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1764	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1765				
1766				
1767	**Result (forage fish_jc_tin)**			
1768				

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.064	Mean	0.122
Maximum	0.186	Median	0.13
SD	0.045	Std. Error of Mean	0.017
Coefficient of Variation	0.368	Skewness	0.0018

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.155	95% Adjusted-CLT UCL (Chen-1995)	0.15
		95% Modified-t UCL (Johnson-1978)	0.155

Gamma GOF Test

A-D Test Statistic	0.277	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.709	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	0.312	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	7.93	k star (bias corrected MLE)	4.627
Theta hat (MLE)	0.0154	Theta star (bias corrected MLE)	0.0264
nu hat (MLE)	111	nu star (bias corrected)	64.78
MLE Mean (bias corrected)	0.122	MLE Sd (bias corrected)	0.0568
		Approximate Chi Square Value (0.05)	47.26
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	42.78

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.168	95% Adjusted Gamma UCL	0.185

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes			
Lognormal Statistics			
Minimum of Logged Data	-2.749	Mean of logged Data	-2.166
Maximum of Logged Data	-1.682	SD of logged Data	0.398
Assuming Lognormal Distribution			
95% H-UCL	0.18	90% Chebyshev (MVUE) UCL	0.178
95% Chebyshev (MVUE) UCL	0.203	97.5% Chebyshev (MVUE) UCL	0.238
99% Chebyshev (MVUE) UCL	0.307		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.15	95% BCA Bootstrap UCL	0.149
95% Standard Bootstrap UCL	0.149	95% Bootstrap-t UCL	0.154
95% Hall's Bootstrap UCL	0.147	95% Percentile Bootstrap UCL	0.149
90% Chebyshev(Mean, Sd) UCL	0.173	95% Chebyshev(Mean, Sd) UCL	0.196
97.5% Chebyshev(Mean, Sd) UCL	0.229	99% Chebyshev(Mean, Sd) UCL	0.292
Suggested UCL to Use			
95% Student's-t UCL	0.155		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_jc_uranium)			
General Statistics			
Total Number of Observations	7	Number of Distinct Observations	5
Number of Detects	4	Number of Non-Detects	3
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	4.5000E-4	Minimum Non-Detect	4.0000E-4
Maximum Detect	6.6000E-4	Maximum Non-Detect	4.0000E-4
Variance Detects	7.6250E-9	Percent Non-Detects	42.86%
Mean Detects	5.5750E-4	SD Detects	8.7321E-5
Median Detects	5.6000E-4	CV Detects	0.157
Skewness Detects	-0.16	Kurtosis Detects	0.505
Mean of Logged Detects	-7.501	SD of Logged Detects	0.16
Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,			
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,			
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).			
The Chebyshev UCL often results in gross overestimates of the mean.			
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.997	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**	

1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	4.9000E-4	KM Standard Error of Mean	4.2185E-5
90KM SD	9.6658E-5	95% KM (BCA) UCL	N/A
95% KM (t) UCL	5.7197E-4	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	5.5939E-4	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	6.1656E-4	95% KM Chebyshev UCL	6.7388E-4
97.5% KM Chebyshev UCL	7.5345E-4	99% KM Chebyshev UCL	9.0974E-4
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.209	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.656	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.178	**Kolmogorov-Smirnov GOF**	
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			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics on Detected Data Only			
k hat (MLE)	53.12	k star (bias corrected MLE)	13.45
Theta hat (MLE)	1.0494E-5	Theta star (bias corrected MLE)	4.1456E-5
nu hat (MLE)	425	nu star (bias corrected)	107.6
Mean (detects)	5.5750E-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	4.5000E-4	Mean	0.0046
Maximum	0.01	Median	6.6000E-4
SD	0.00505	CV	1.096
k hat (MLE)	0.689	k star (bias corrected MLE)	0.489
Theta hat (MLE)	0.00668	Theta star (bias corrected MLE)	0.00942
nu hat (MLE)	9.643	nu star (bias corrected)	6.843
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (6.84, α)	2.085	Adjusted Chi Square Value (6.84, β)	1.385
95% Gamma Approximate UCL	0.0151	95% Gamma Adjusted UCL	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	4.9000E-4	SD (KM)	9.6658E-5
Variance (KM)	9.3429E-9	SE of Mean (KM)	4.2185E-5
k hat (KM)	25.7	k star (KM)	14.78
nu hat (KM)	359.8	nu star (KM)	206.9
theta hat (KM)	1.9067E-5	theta star (KM)	3.3152E-5
80% gamma percentile (KM)	5.9280E-4	90% gamma percentile (KM)	6.5878E-4
95% gamma percentile (KM)	7.1674E-4	99% gamma percentile (KM)	8.3411E-4
Gamma Kaplan-Meier (KM) Statistics			

	A	B	C	D	E	F	G	H	I	J	K	L
1925					Approximate Chi Square Value (206.92, α)	174.6					Adjusted Chi Square Value (206.92, β)	165.7
1926					95% KM Approximate Gamma UCL	5.8059E-4					95% KM Adjusted Gamma UCL	6.1207E-4
1927												
1928	**Lognormal GOF Test on Detected Observations Only**											
1929					Shapiro Wilk Test Statistic	0.989	**Shapiro Wilk GOF Test**					
1930					10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level					
1931					Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**					
1932					10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level					
1933	**Detected Data appear Lognormal at 10% Significance Level**											
1934	**Note GOF tests may be unreliable for small sample sizes**											
1935												
1936	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1937					Mean in Original Scale	4.6606E-4					Mean in Log Scale	-7.707
1938					SD in Original Scale	1.3214E-4					SD in Log Scale	0.289
1939					95% t UCL (assumes normality of ROS data)	5.6311E-4					95% Percentile Bootstrap UCL	5.4193E-4
1940					95% BCA Bootstrap UCL	5.4098E-4					95% Bootstrap t UCL	5.7582E-4
1941					95% H-UCL (Log ROS)	6.0732E-4						
1942												
1943	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1944					KM Mean (logged)	-7.64					KM Geo Mean	4.8096E-4
1945					KM SD (logged)	0.191					95% Critical H Value (KM-Log)	1.977
1946					KM Standard Error of Mean (logged)	0.0833					95% H-UCL (KM -Log)	5.7138E-4
1947					KM SD (logged)	0.191					95% Critical H Value (KM-Log)	1.977
1948					KM Standard Error of Mean (logged)	0.0833						
1949												
1950	**DL/2 Statistics**											
1951	**DL/2 Normal**						**DL/2 Log-Transformed**					
1952					Mean in Original Scale	4.0429E-4					Mean in Log Scale	-7.937
1953					SD in Original Scale	2.0082E-4					SD in Log Scale	0.555
1954					95% t UCL (Assumes normality)	5.5178E-4					95% H-Stat UCL	7.4660E-4
1955	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1956												
1957	**Nonparametric Distribution Free UCL Statistics**											
1958	**Detected Data appear Normal Distributed at 1% Significance Level**											
1959												
1960	**Suggested UCL to Use**											
1961					95% KM (t) UCL	5.7197E-4						
1962												
1963	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1964	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
1965	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1966												
1967	**Result (forage fish_jc_vanadium)**											
1968												
1969	**General Statistics**											
1970					Total Number of Observations	7					Number of Distinct Observations	1
1971					Number of Detects	0					Number of Non-Detects	7
1972					Number of Distinct Detects	0					Number of Distinct Non-Detects	1
1973												
1974	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1975	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1976	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											

The data set for variable Result (forage fish_jc_vanadium) was not processed!

Result (forage fish_jc_zinc)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	29.2	Mean	37.5
Maximum	45.1	Median	37.9
SD	5.274	Std. Error of Mean	1.993
Coefficient of Variation	0.141	Skewness	-0.252

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.991	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	41.37	95% Adjusted-CLT UCL (Chen-1995)	40.58
		95% Modified-t UCL (Johnson-1978)	41.34

Gamma GOF Test

A-D Test Statistic	0.169	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.151	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	57.06	k star (bias corrected MLE)	32.7
Theta hat (MLE)	0.657	Theta star (bias corrected MLE)	1.147
nu hat (MLE)	798.8	nu star (bias corrected)	457.8
MLE Mean (bias corrected)	37.5	MLE Sd (bias corrected)	6.558
		Approximate Chi Square Value (0.05)	409.2
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	395.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	41.95	95% Adjusted Gamma UCL	43.44

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.978	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.164	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.28	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	3.374	Mean of logged Data	3.616
Maximum of Logged Data	3.809	SD of logged Data	0.145

Assuming Lognormal Distribution

95% H-UCL	42.07	90% Chebyshev (MVUE) UCL	43.66
95% Chebyshev (MVUE) UCL	46.45	97.5% Chebyshev (MVUE) UCL	50.32
99% Chebyshev (MVUE) UCL	57.92		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	40.78	95% BCA Bootstrap UCL	40.39
95% Standard Bootstrap UCL	40.63	95% Bootstrap-t UCL	41.17
95% Hall's Bootstrap UCL	40.82	95% Percentile Bootstrap UCL	40.49
90% Chebyshev(Mean, Sd) UCL	43.48	95% Chebyshev(Mean, Sd) UCL	46.19
97.5% Chebyshev(Mean, Sd) UCL	49.95	99% Chebyshev(Mean, Sd) UCL	57.33

Suggested UCL to Use

95% Student's-t UCL	41.37		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
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.

Result (forage fish_jc_zirconium)

General Statistics

Total Number of Observations	7	Number of Distinct Observations	1
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 Result (forage fish_jc_zirconium) was not processed!

Result (forage fish_nd_aluminum)

General Statistics			
Total Number of Observations	33	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	0.7	Mean	3.387
Maximum	12.8	Median	2.41
SD	2.798	Std. Error of Mean	0.487
Coefficient of Variation	0.826	Skewness	1.603
Normal GOF Test			
Shapiro Wilk Test Statistic	0.832	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.212	95% Adjusted-CLT UCL (Chen-1995)	4.333
		95% Modified-t UCL (Johnson-1978)	4.234
Gamma GOF Test			
A-D Test Statistic	0.64	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.136	**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)	1.819	k star (bias corrected MLE)	1.674
Theta hat (MLE)	1.862	Theta star (bias corrected MLE)	2.023
nu hat (MLE)	120.1	nu star (bias corrected)	110.5
MLE Mean (bias corrected)	3.387	MLE Sd (bias corrected)	2.617
		Approximate Chi Square Value (0.05)	87.23
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	86.16
Assuming Gamma Distribution			
95% Approximate Gamma UCL	4.29	95% Adjusted Gamma UCL	4.343
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.357	Mean of logged Data	0.921
Maximum of Logged Data	2.549	SD of logged Data	0.786

Assuming Lognormal Distribution

95% H-UCL	4.64	90% Chebyshev (MVUE) UCL	4.908
95% Chebyshev (MVUE) UCL	5.6	97.5% Chebyshev (MVUE) UCL	6.562
99% Chebyshev (MVUE) UCL	8.451		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.188	95% BCA Bootstrap UCL	4.348
95% Standard Bootstrap UCL	4.171	95% Bootstrap-t UCL	4.337
95% Hall's Bootstrap UCL	4.398	95% Percentile Bootstrap UCL	4.224
90% Chebyshev(Mean, Sd) UCL	4.848	95% Chebyshev(Mean, Sd) UCL	5.51
97.5% Chebyshev(Mean, Sd) UCL	6.428	99% Chebyshev(Mean, Sd) UCL	8.233

Suggested UCL to Use

95% Student's-t UCL	4.212		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_nd_antimony)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	33
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 Result (forage fish_nd_antimony) was not processed!

Result (forage fish_nd_arsenic)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	32
		Number of Missing Observations	0
Minimum	0.0095	Mean	0.0221
Maximum	0.0353	Median	0.0209
SD	0.00693	Std. Error of Mean	0.00121
Coefficient of Variation	0.314	Skewness	0.293

Normal GOF Test

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**

2185	1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level	
2186	Lilliefors Test Statistic	0.108	**Lilliefors GOF Test**	
2187	1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
2188	**Data appear Normal at 1% Significance Level**			
2189				
2190	**Assuming Normal Distribution**			
2191	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2192	95% Student's-t UCL	0.0241	95% Adjusted-CLT UCL (Chen-1995)	0.0241
2193			95% Modified-t UCL (Johnson-1978)	0.0241
2194				
2195	**Gamma GOF Test**			
2196	A-D Test Statistic	0.236	**Anderson-Darling Gamma GOF Test**	
2197	5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level	
2198	K-S Test Statistic	0.0772	**Kolmogorov-Smirnov Gamma GOF Test**	
2199	5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level	
2200	**Detected data appear Gamma Distributed at 5% Significance Level**			
2201				
2202	**Gamma Statistics**			
2203	k hat (MLE)	10.04	k star (bias corrected MLE)	9.15
2204	Theta hat (MLE)	0.0022	Theta star (bias corrected MLE)	0.00241
2205	nu hat (MLE)	662.8	nu star (bias corrected)	603.9
2206	MLE Mean (bias corrected)	0.0221	MLE Sd (bias corrected)	0.0073
2207			Approximate Chi Square Value (0.05)	547.9
2208	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	545.2
2209				
2210	**Assuming Gamma Distribution**			
2211	95% Approximate Gamma UCL	0.0243	95% Adjusted Gamma UCL	0.0245
2212				
2213	**Lognormal GOF Test**			
2214	Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**	
2215	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
2216	Lilliefors Test Statistic	0.0734	**Lilliefors Lognormal GOF Test**	
2217	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
2218	**Data appear Lognormal at 10% Significance Level**			
2219				
2220	**Lognormal Statistics**			
2221	Minimum of Logged Data	-4.656	Mean of logged Data	-3.864
2222	Maximum of Logged Data	-3.344	SD of logged Data	0.331
2223				
2224	**Assuming Lognormal Distribution**			
2225	95% H-UCL	0.0246	90% Chebyshev (MVUE) UCL	0.026
2226	95% Chebyshev (MVUE) UCL	0.0278	97.5% Chebyshev (MVUE) UCL	0.0302
2227	99% Chebyshev (MVUE) UCL	0.035		
2228				
2229	**Nonparametric Distribution Free UCL Statistics**			
2230	**Data appear to follow a Discernible Distribution**			
2231				
2232	**Nonparametric Distribution Free UCLs**			
2233	95% CLT UCL	0.0241	95% BCA Bootstrap UCL	0.0241
2234	95% Standard Bootstrap UCL	0.024	95% Bootstrap-t UCL	0.024
2235	95% Hall's Bootstrap UCL	0.024	95% Percentile Bootstrap UCL	0.0241
2236	90% Chebyshev(Mean, Sd) UCL	0.0257	95% Chebyshev(Mean, Sd) UCL	0.0273

97.5% Chebyshev(Mean, Sd) UCL	0.0296	99% Chebyshev(Mean, Sd) UCL	0.0341
Suggested UCL to Use			
95% Student's-t UCL	0.0241		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_nd_barium)			
General Statistics			
Total Number of Observations	33	Number of Distinct Observations	32
		Number of Missing Observations	0
Minimum	0.5	Mean	3.089
Maximum	12.8	Median	2.8
SD	2.383	Std. Error of Mean	0.415
Coefficient of Variation	0.771	Skewness	2.476
Normal GOF Test			
Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.208	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.177	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3.792	95% Adjusted-CLT UCL (Chen-1995)	3.963
		95% Modified-t UCL (Johnson-1978)	3.822
Gamma GOF Test			
A-D Test Statistic	0.463	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.125	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.155	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.358	k star (bias corrected MLE)	2.164
Theta hat (MLE)	1.31	Theta star (bias corrected MLE)	1.427
nu hat (MLE)	155.7	nu star (bias corrected)	142.8
MLE Mean (bias corrected)	3.089	MLE Sd (bias corrected)	2.1
		Approximate Chi Square Value (0.05)	116.2
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	115
Assuming Gamma Distribution			
95% Approximate Gamma UCL	3.797	95% Adjusted Gamma UCL	3.838
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk Lognormal GOF Test**	

	A–E	F	G–K	L
2289	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
2290	Lilliefors Test Statistic	0.104	**Lilliefors Lognormal GOF Test**	
2291	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
2292	**Data appear Lognormal at 10% Significance Level**			
2293				
2294	**Lognormal Statistics**			
2295	Minimum of Logged Data	-0.693	Mean of logged Data	0.901
2296	Maximum of Logged Data	2.549	SD of logged Data	0.688
2297				
2298	**Assuming Lognormal Distribution**			
2299	95% H-UCL	4.03	90% Chebyshev (MVUE) UCL	4.297
2300	95% Chebyshev (MVUE) UCL	4.842	97.5% Chebyshev (MVUE) UCL	5.599
2301	99% Chebyshev (MVUE) UCL	7.084		
2302				
2303	**Nonparametric Distribution Free UCL Statistics**			
2304	**Data appear to follow a Discernible Distribution**			
2305				
2306	**Nonparametric Distribution Free UCLs**			
2307	95% CLT UCL	3.772	95% BCA Bootstrap UCL	3.99
2308	95% Standard Bootstrap UCL	3.757	95% Bootstrap-t UCL	4.124
2309	95% Hall's Bootstrap UCL	4.843	95% Percentile Bootstrap UCL	3.799
2310	90% Chebyshev(Mean, Sd) UCL	4.334	95% Chebyshev(Mean, Sd) UCL	4.897
2311	97.5% Chebyshev(Mean, Sd) UCL	5.68	99% Chebyshev(Mean, Sd) UCL	7.216
2312				
2313	**Suggested UCL to Use**			
2314	95% Adjusted Gamma UCL	3.838		
2315				
2316	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2317	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2318	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2319				
2320	**Result (forage fish_nd_beryllium)**			
2321				
2322	**General Statistics**			
2323	Total Number of Observations	33	Number of Distinct Observations	1
2324	Number of Detects	0	Number of Non-Detects	33
2325	Number of Distinct Detects	0	Number of Distinct Non-Detects	1
2326				
2327	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**			
2328	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**			
2329	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**			
2330				
2331	**The data set for variable Result (forage fish_nd_beryllium) was not processed!**			
2332				
2333				
2334	**Result (forage fish_nd_bismuth)**			
2335				
2336	**General Statistics**			
2337	Total Number of Observations	33	Number of Distinct Observations	1
2338	Number of Detects	0	Number of Non-Detects	33
2339	Number of Distinct Detects	0	Number of Distinct Non-Detects	1
2340				

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 Result (forage fish_nd_bismuth) was not processed!

Result (forage fish_nd_boron)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	33
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 Result (forage fish_nd_boron) was not processed!

Result (forage fish_nd_cadmium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	31
		Number of Missing Observations	0
Minimum	0.0068	Mean	0.0151
Maximum	0.0415	Median	0.0116
SD	0.00909	Std. Error of Mean	0.00158
Coefficient of Variation	0.601	Skewness	1.526

Normal GOF Test

Shapiro Wilk Test Statistic	0.793	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.177	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0178	95% Adjusted-CLT UCL (Chen-1995)	0.0182
		95% Modified-t UCL (Johnson-1978)	0.0179

Gamma GOF Test

A-D Test Statistic	1.501	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.202	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

	A–E	F	G–K	L
2393	k hat (MLE)	3.748	k star (bias corrected MLE)	3.428
2394	Theta hat (MLE)	0.00403	Theta star (bias corrected MLE)	0.00441
2395	nu hat (MLE)	247.4	nu star (bias corrected)	226.2
2396	MLE Mean (bias corrected)	0.0151	MLE Sd (bias corrected)	0.00816
2397			Approximate Chi Square Value (0.05)	192.4
2398	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	190.8
2399				
2400	**Assuming Gamma Distribution**			
2401	95% Approximate Gamma UCL	0.0178	95% Adjusted Gamma UCL	0.0179
2402				
2403	**Lognormal GOF Test**			
2404	Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk Lognormal GOF Test**	
2405	10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level	
2406	Lilliefors Test Statistic	0.165	**Lilliefors Lognormal GOF Test**	
2407	10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level	
2408	**Data Not Lognormal at 10% Significance Level**			
2409				
2410	**Lognormal Statistics**			
2411	Minimum of Logged Data	-4.991	Mean of logged Data	-4.332
2412	Maximum of Logged Data	-3.182	SD of logged Data	0.509
2413				
2414	**Assuming Lognormal Distribution**			
2415	95% H-UCL	0.0178	90% Chebyshev (MVUE) UCL	0.0191
2416	95% Chebyshev (MVUE) UCL	0.0209	97.5% Chebyshev (MVUE) UCL	0.0235
2417	99% Chebyshev (MVUE) UCL	0.0287		
2418				
2419	**Nonparametric Distribution Free UCL Statistics**			
2420	**Data do not follow a Discernible Distribution**			
2421				
2422	**Nonparametric Distribution Free UCLs**			
2423	95% CLT UCL	0.0177	95% BCA Bootstrap UCL	0.0181
2424	95% Standard Bootstrap UCL	0.0177	95% Bootstrap-t UCL	0.0184
2425	95% Hall's Bootstrap UCL	0.0181	95% Percentile Bootstrap UCL	0.0178
2426	90% Chebyshev(Mean, Sd) UCL	0.0199	95% Chebyshev(Mean, Sd) UCL	0.022
2427	97.5% Chebyshev(Mean, Sd) UCL	0.025	99% Chebyshev(Mean, Sd) UCL	0.0309
2428				
2429	**Suggested UCL to Use**			
2430	95% Student's-t UCL	0.0178		
2431				
2432	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2433	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2434	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2435				
2436				
2437	**Result (forage fish_nd_calcium)**			
2438				
2439	**General Statistics**			
2440	Total Number of Observations	33	Number of Distinct Observations	32
2441			Number of Missing Observations	0
2442	Minimum	3900	Mean	8293
2443	Maximum	13000	Median	8150
2444	SD	1825	Std. Error of Mean	317.8

	A	B	C	D	E	F	G	H	I	J	K	L
2445					Coefficient of Variation	0.22					Skewness	0.215
2446												
2447	**Normal GOF Test**											
2448					Shapiro Wilk Test Statistic	0.99	**Shapiro Wilk GOF Test**					
2449					1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level					
2450					Lilliefors Test Statistic	0.0871	**Lilliefors GOF Test**					
2451					1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level					
2452	**Data appear Normal at 1% Significance Level**											
2453												
2454	**Assuming Normal Distribution**											
2455	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
2456					95% Student's-t UCL	8832					95% Adjusted-CLT UCL (Chen-1995)	8829
2457											95% Modified-t UCL (Johnson-1978)	8834
2458												
2459	**Gamma GOF Test**											
2460					A-D Test Statistic	0.182	**Anderson-Darling Gamma GOF Test**					
2461					5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level					
2462					K-S Test Statistic	0.0606	**Kolmogorov-Smirnov Gamma GOF Test**					
2463					5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level					
2464	**Detected data appear Gamma Distributed at 5% Significance Level**											
2465												
2466	**Gamma Statistics**											
2467					k hat (MLE)	20.27					k star (bias corrected MLE)	18.45
2468					Theta hat (MLE)	409.1					Theta star (bias corrected MLE)	449.6
2469					nu hat (MLE)	1338					nu star (bias corrected)	1218
2470					MLE Mean (bias corrected)	8293					MLE Sd (bias corrected)	1931
2471											Approximate Chi Square Value (0.05)	1138
2472					Adjusted Level of Significance	0.0419					Adjusted Chi Square Value	1134
2473												
2474	**Assuming Gamma Distribution**											
2475					95% Approximate Gamma UCL	8877					95% Adjusted Gamma UCL	8908
2476												
2477	**Lognormal GOF Test**											
2478					Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk Lognormal GOF Test**					
2479					10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level					
2480					Lilliefors Test Statistic	0.0727	**Lilliefors Lognormal GOF Test**					
2481					10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level					
2482	**Data appear Lognormal at 10% Significance Level**											
2483												
2484	**Lognormal Statistics**											
2485					Minimum of Logged Data	8.269					Mean of logged Data	8.998
2486					Maximum of Logged Data	9.473					SD of logged Data	0.232
2487												
2488	**Assuming Lognormal Distribution**											
2489					95% H-UCL	8932					90% Chebyshev (MVUE) UCL	9319
2490					95% Chebyshev (MVUE) UCL	9780					97.5% Chebyshev (MVUE) UCL	10418
2491					99% Chebyshev (MVUE) UCL	11673						
2492												
2493	**Nonparametric Distribution Free UCL Statistics**											
2494	**Data appear to follow a Discernible Distribution**											
2495												
2496	**Nonparametric Distribution Free UCLs**											

95% CLT UCL	8816	95% BCA Bootstrap UCL	8810
95% Standard Bootstrap UCL	8812	95% Bootstrap-t UCL	8830
95% Hall's Bootstrap UCL	8840	95% Percentile Bootstrap UCL	8812
90% Chebyshev(Mean, Sd) UCL	9247	95% Chebyshev(Mean, Sd) UCL	9678
97.5% Chebyshev(Mean, Sd) UCL	10278	99% Chebyshev(Mean, Sd) UCL	11455
Suggested UCL to Use			
95% Student's-t UCL	8832		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Result (forage fish_nd_chromium)

General Statistics			
Total Number of Observations	33	Number of Distinct Observations	21
Number of Detects	27	Number of Non-Detects	6
Number of Distinct Detects	20	Number of Distinct Non-Detects	1
Minimum Detect	0.012	Minimum Non-Detect	0.01
Maximum Detect	0.16	Maximum Non-Detect	0.01
Variance Detects	8.5628E-4	Percent Non-Detects	18.18%
Mean Detects	0.0303	SD Detects	0.0293
Median Detects	0.02	CV Detects	0.967
Skewness Detects	3.69	Kurtosis Detects	15.64
Mean of Logged Detects	-3.719	SD of Logged Detects	0.59
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.556	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.894	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.283	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.194	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0266	KM Standard Error of Mean	0.00481
90KM SD	0.0271	95% KM (BCA) UCL	0.0359
95% KM (t) UCL	0.0347	95% KM (Percentile Bootstrap) UCL	0.0353
95% KM (z) UCL	0.0345	95% KM Bootstrap t UCL	0.0445
90% KM Chebyshev UCL	0.041	95% KM Chebyshev UCL	0.0475
97.5% KM Chebyshev UCL	0.0566	99% KM Chebyshev UCL	0.0745
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	1.744	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.755	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.168	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.17	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	2.42	k star (bias corrected MLE)	2.176
Theta hat (MLE)	0.0125	Theta star (bias corrected MLE)	0.0139

nu hat (MLE)	130.7	nu star (bias corrected)	117.5
Mean (detects)	0.0303		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0266
Maximum	0.16	Median	0.017
SD	0.0275	CV	1.036
k hat (MLE)	2.136	k star (bias corrected MLE)	1.962
Theta hat (MLE)	0.0124	Theta star (bias corrected MLE)	0.0135
nu hat (MLE)	140.9	nu star (bias corrected)	129.5
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (129.47, α)	104.2	Adjusted Chi Square Value (129.47, β)	103
95% Gamma Approximate UCL	0.033	95% Gamma Adjusted UCL	0.0334

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0266	SD (KM)	0.0271
Variance (KM)	7.3570E-4	SE of Mean (KM)	0.00481
k hat (KM)	0.96	k star (KM)	0.893
nu hat (KM)	63.36	nu star (KM)	58.93
theta hat (KM)	0.0277	theta star (KM)	0.0298
80% gamma percentile (KM)	0.0431	90% gamma percentile (KM)	0.0629
95% gamma percentile (KM)	0.0829	99% gamma percentile (KM)	0.13

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (58.93, α)	42.28	Adjusted Chi Square Value (58.93, β)	41.56
95% KM Approximate Gamma UCL	0.037	95% KM Adjusted Gamma UCL	0.0377

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.935	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.153	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.026	Mean in Log Scale	-3.96
SD in Original Scale	0.028	SD in Log Scale	0.751
95% t UCL (assumes normality of ROS data)	0.0342	95% Percentile Bootstrap UCL	0.0341
95% BCA Bootstrap UCL	0.0367	95% Bootstrap t UCL	0.043
95% H-UCL (Log ROS)	0.0337		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.88	KM Geo Mean	0.0207
KM SD (logged)	0.625	95% Critical H Value (KM-Log)	2.042
KM Standard Error of Mean (logged)	0.111	95% H-UCL (KM -Log)	0.0315
KM SD (logged)	0.625	95% Critical H Value (KM-Log)	2.042
KM Standard Error of Mean (logged)	0.111		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0257	Mean in Log Scale	-4.006
SD in Original Scale	0.0282	SD in Log Scale	0.816
95% t UCL (Assumes normality)	0.034	95% H-Stat UCL	0.035

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	0.0377	95% GROS Adjusted Gamma UCL	0.0334

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_nd_cobalt)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	31
		Number of Missing Observations	0
Minimum	0.0065	Mean	0.0152
Maximum	0.0435	Median	0.0127
SD	0.00847	Std. Error of Mean	0.00147
Coefficient of Variation	0.557	Skewness	1.956

Normal GOF Test

Shapiro Wilk Test Statistic	0.778	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.177	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0177	95% Adjusted-CLT UCL (Chen-1995)	0.0182
		95% Modified-t UCL (Johnson-1978)	0.0178

Gamma GOF Test

A-D Test Statistic	1.14	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.178	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.62	k star (bias corrected MLE)	4.22
Theta hat (MLE)	0.00329	Theta star (bias corrected MLE)	0.0036
nu hat (MLE)	304.9	nu star (bias corrected)	278.5
MLE Mean (bias corrected)	0.0152	MLE Sd (bias corrected)	0.0074
		Approximate Chi Square Value (0.05)	240.9
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	239.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.0176	95% Adjusted Gamma UCL	0.0177
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-5.036	Mean of logged Data	-4.298
Maximum of Logged Data	-3.135	SD of logged Data	0.454
Assuming Lognormal Distribution			
95% H-UCL	0.0176	90% Chebyshev (MVUE) UCL	0.0187
95% Chebyshev (MVUE) UCL	0.0204	97.5% Chebyshev (MVUE) UCL	0.0227
99% Chebyshev (MVUE) UCL	0.0273		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0176	95% BCA Bootstrap UCL	0.0183
95% Standard Bootstrap UCL	0.0176	95% Bootstrap-t UCL	0.0185
95% Hall's Bootstrap UCL	0.0184	95% Percentile Bootstrap UCL	0.0177
90% Chebyshev(Mean, Sd) UCL	0.0196	95% Chebyshev(Mean, Sd) UCL	0.0216
97.5% Chebyshev(Mean, Sd) UCL	0.0244	99% Chebyshev(Mean, Sd) UCL	0.0299
Suggested UCL to Use			
95% Student's-t UCL	0.0177		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_nd_copper)			
General Statistics			
Total Number of Observations	33	Number of Distinct Observations	31
		Number of Missing Observations	0
Minimum	0.61	Mean	1.591
Maximum	5.81	Median	1.14
SD	1.167	Std. Error of Mean	0.203

	A	B	C	D	E	F	G	H	I	J	K	L
2705					Coefficient of Variation	0.734					Skewness	2.121
2706												
2707	**Normal GOF Test**											
2708					Shapiro Wilk Test Statistic	0.718	**Shapiro Wilk GOF Test**					
2709					1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level					
2710					Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**					
2711					1% Lilliefors Critical Value	0.177	Data Not Normal at 1% Significance Level					
2712	**Data Not Normal at 1% Significance Level**											
2713												
2714	**Assuming Normal Distribution**											
2715	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
2716					95% Student's-t UCL	1.935					95% Adjusted-CLT UCL (Chen-1995)	2.005
2717											95% Modified-t UCL (Johnson-1978)	1.948
2718												
2719	**Gamma GOF Test**											
2720					A-D Test Statistic	2.011	**Anderson-Darling Gamma GOF Test**					
2721					5% A-D Critical Value	0.754	Data Not Gamma Distributed at 5% Significance Level					
2722					K-S Test Statistic	0.215	**Kolmogorov-Smirnov Gamma GOF Test**					
2723					5% K-S Critical Value	0.154	Data Not Gamma Distributed at 5% Significance Level					
2724	**Data Not Gamma Distributed at 5% Significance Level**											
2725												
2726	**Gamma Statistics**											
2727					k hat (MLE)	2.936					k star (bias corrected MLE)	2.689
2728					Theta hat (MLE)	0.542					Theta star (bias corrected MLE)	0.592
2729					nu hat (MLE)	193.8					nu star (bias corrected)	177.5
2730					MLE Mean (bias corrected)	1.591					MLE Sd (bias corrected)	0.97
2731											Approximate Chi Square Value (0.05)	147.7
2732					Adjusted Level of Significance	0.0419					Adjusted Chi Square Value	146.3
2733												
2734	**Assuming Gamma Distribution**											
2735					95% Approximate Gamma UCL	1.912					95% Adjusted Gamma UCL	1.931
2736												
2737	**Lognormal GOF Test**											
2738					Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**					
2739					10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level					
2740					Lilliefors Test Statistic	0.18	**Lilliefors Lognormal GOF Test**					
2741					10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level					
2742	**Data Not Lognormal at 10% Significance Level**											
2743												
2744	**Lognormal Statistics**											
2745					Minimum of Logged Data	-0.494					Mean of logged Data	0.285
2746					Maximum of Logged Data	1.76					SD of logged Data	0.563
2747												
2748	**Assuming Lognormal Distribution**											
2749					95% H-UCL	1.897					90% Chebyshev (MVUE) UCL	2.03
2750					95% Chebyshev (MVUE) UCL	2.247					97.5% Chebyshev (MVUE) UCL	2.55
2751					99% Chebyshev (MVUE) UCL	3.144						
2752												
2753	**Nonparametric Distribution Free UCL Statistics**											
2754	**Data do not follow a Discernible Distribution**											
2755												
2756	**Nonparametric Distribution Free UCLs**											

	A–E	F	G–K	L
2757	95% CLT UCL	1.925	95% BCA Bootstrap UCL	2.01
2758	95% Standard Bootstrap UCL	1.921	95% Bootstrap-t UCL	2.085
2759	95% Hall's Bootstrap UCL	2.042	95% Percentile Bootstrap UCL	1.945
2760	90% Chebyshev(Mean, Sd) UCL	2.201	95% Chebyshev(Mean, Sd) UCL	2.477
2761	97.5% Chebyshev(Mean, Sd) UCL	2.86	99% Chebyshev(Mean, Sd) UCL	3.613
2762				
2763	**Suggested UCL to Use**			
2764	95% Student's-t UCL	1.935		
2765				
2766	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2767	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2768	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2769				
2770				
2771	**Result (forage fish_nd_iron)**			
2772				
2773	**General Statistics**			
2774	Total Number of Observations	33	Number of Distinct Observations	32
2775			Number of Missing Observations	0
2776	Minimum	19.6	Mean	36.97
2777	Maximum	51	Median	38.4
2778	SD	8.234	Std. Error of Mean	1.433
2779	Coefficient of Variation	0.223	Skewness	-0.64
2780				
2781	**Normal GOF Test**			
2782	Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**	
2783	1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level	
2784	Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**	
2785	1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
2786	**Data appear Normal at 1% Significance Level**			
2787				
2788	**Assuming Normal Distribution**			
2789	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2790	95% Student's-t UCL	39.39	95% Adjusted-CLT UCL (Chen-1995)	39.15
2791			95% Modified-t UCL (Johnson-1978)	39.37
2792				
2793	**Gamma GOF Test**			
2794	A-D Test Statistic	1.178	**Anderson-Darling Gamma GOF Test**	
2795	5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level	
2796	K-S Test Statistic	0.166	**Kolmogorov-Smirnov Gamma GOF Test**	
2797	5% K-S Critical Value	0.153	Data Not Gamma Distributed at 5% Significance Level	
2798	**Data Not Gamma Distributed at 5% Significance Level**			
2799				
2800	**Gamma Statistics**			
2801	k hat (MLE)	17.79	k star (bias corrected MLE)	16.19
2802	Theta hat (MLE)	2.078	Theta star (bias corrected MLE)	2.283
2803	nu hat (MLE)	1174	nu star (bias corrected)	1068
2804	MLE Mean (bias corrected)	36.97	MLE Sd (bias corrected)	9.188
2805			Approximate Chi Square Value (0.05)	993.6
2806	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	989.9
2807				
2808	**Assuming Gamma Distribution**			

95% Approximate Gamma UCL	39.75	95% Adjusted Gamma UCL	39.9
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.185	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level	
Data Not Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	2.976	Mean of logged Data	3.582
Maximum of Logged Data	3.932	SD of logged Data	0.253
Assuming Lognormal Distribution			
95% H-UCL	40.16	90% Chebyshev (MVUE) UCL	42.03
95% Chebyshev (MVUE) UCL	44.27	97.5% Chebyshev (MVUE) UCL	47.39
99% Chebyshev (MVUE) UCL	53.52		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	39.32	95% BCA Bootstrap UCL	39.13
95% Standard Bootstrap UCL	39.3	95% Bootstrap-t UCL	39.19
95% Hall's Bootstrap UCL	39.13	95% Percentile Bootstrap UCL	39.31
90% Chebyshev(Mean, Sd) UCL	41.27	95% Chebyshev(Mean, Sd) UCL	43.21
97.5% Chebyshev(Mean, Sd) UCL	45.92	99% Chebyshev(Mean, Sd) UCL	51.23
Suggested UCL to Use			
95% Student's-t UCL	39.39		
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 using results from simulation studies.			
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.			
Result (forage fish_nd_lead)			
General Statistics			
Total Number of Observations	33	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	0.0122	Mean	0.0271
Maximum	0.0782	Median	0.0236
SD	0.0143	Std. Error of Mean	0.00249
Coefficient of Variation	0.527	Skewness	2.004
Normal GOF Test			
Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	

2861	Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**	
2862	1% Lilliefors Critical Value	0.177	Data Not Normal at 1% Significance Level	
2863	**Data Not Normal at 1% Significance Level**			
2864				
2865	**Assuming Normal Distribution**			
2866	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2867	95% Student's-t UCL	0.0314	95% Adjusted-CLT UCL (Chen-1995)	0.0322
2868			95% Modified-t UCL (Johnson-1978)	0.0315
2869				
2870	**Gamma GOF Test**			
2871	A-D Test Statistic	0.718	**Anderson-Darling Gamma GOF Test**	
2872	5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level	
2873	K-S Test Statistic	0.133	**Kolmogorov-Smirnov Gamma GOF Test**	
2874	5% K-S Critical Value	0.154	Detected data appear Gamma Distributed at 5% Significance Level	
2875	**Detected data appear Gamma Distributed at 5% Significance Level**			
2876				
2877	**Gamma Statistics**			
2878	k hat (MLE)	5.002	k star (bias corrected MLE)	4.567
2879	Theta hat (MLE)	0.00542	Theta star (bias corrected MLE)	0.00594
2880	nu hat (MLE)	330.1	nu star (bias corrected)	301.4
2881	MLE Mean (bias corrected)	0.0271	MLE Sd (bias corrected)	0.0127
2882			Approximate Chi Square Value (0.05)	262.2
2883	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	260.3
2884				
2885	**Assuming Gamma Distribution**			
2886	95% Approximate Gamma UCL	0.0312	95% Adjusted Gamma UCL	0.0314
2887				
2888	**Lognormal GOF Test**			
2889	Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	
2890	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
2891	Lilliefors Test Statistic	0.102	**Lilliefors Lognormal GOF Test**	
2892	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
2893	**Data appear Lognormal at 10% Significance Level**			
2894				
2895	**Lognormal Statistics**			
2896	Minimum of Logged Data	-4.406	Mean of logged Data	-3.71
2897	Maximum of Logged Data	-2.548	SD of logged Data	0.44
2898				
2899	**Assuming Lognormal Distribution**			
2900	95% H-UCL	0.0312	90% Chebyshev (MVUE) UCL	0.0333
2901	95% Chebyshev (MVUE) UCL	0.0362	97.5% Chebyshev (MVUE) UCL	0.0402
2902	99% Chebyshev (MVUE) UCL	0.0481		
2903				
2904	**Nonparametric Distribution Free UCL Statistics**			
2905	**Data appear to follow a Discernible Distribution**			
2906				
2907	**Nonparametric Distribution Free UCLs**			
2908	95% CLT UCL	0.0312	95% BCA Bootstrap UCL	0.032
2909	95% Standard Bootstrap UCL	0.0311	95% Bootstrap-t UCL	0.0327
2910	95% Hall's Bootstrap UCL	0.0333	95% Percentile Bootstrap UCL	0.0314
2911	90% Chebyshev(Mean, Sd) UCL	0.0346	95% Chebyshev(Mean, Sd) UCL	0.038
2912	97.5% Chebyshev(Mean, Sd) UCL	0.0427	99% Chebyshev(Mean, Sd) UCL	0.0519

Suggested UCL to Use

95% Adjusted Gamma UCL	0.0314

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

Result (forage fish_nd_lithium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	33
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 Result (forage fish_nd_lithium) was not processed!

Result (forage fish_nd_magnesium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	29
		Number of Missing Observations	0
Minimum	286	Mean	349.3
Maximum	444	Median	350
SD	36.64	Std. Error of Mean	6.379
Coefficient of Variation	0.105	Skewness	0.408

Normal GOF Test

Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	360.1	95% Adjusted-CLT UCL (Chen-1995)	360.3
		95% Modified-t UCL (Johnson-1978)	360.2

Gamma GOF Test

A-D Test Statistic	0.36	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.745	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	0.153	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

2965	**Gamma Statistics**			
2966	k hat (MLE)	94.92	k star (bias corrected MLE)	86.31
2967	Theta hat (MLE)	3.68	Theta star (bias corrected MLE)	4.047
2968	nu hat (MLE)	6265	nu star (bias corrected)	5697
2969	MLE Mean (bias corrected)	349.3	MLE Sd (bias corrected)	37.6
2970			Approximate Chi Square Value (0.05)	5522
2971	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	5513
2972				
2973	**Assuming Gamma Distribution**			
2974	95% Approximate Gamma UCL	360.3	95% Adjusted Gamma UCL	360.9
2975				
2976	**Lognormal GOF Test**			
2977	Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk Lognormal GOF Test**	
2978	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
2979	Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**	
2980	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
2981	**Data appear Lognormal at 10% Significance Level**			
2982				
2983	**Lognormal Statistics**			
2984	Minimum of Logged Data	5.656	Mean of logged Data	5.851
2985	Maximum of Logged Data	6.096	SD of logged Data	0.104
2986				
2987	**Assuming Lognormal Distribution**			
2988	95% H-UCL	360.5	90% Chebyshev (MVUE) UCL	368.3
2989	95% Chebyshev (MVUE) UCL	377	97.5% Chebyshev (MVUE) UCL	388.9
2990	99% Chebyshev (MVUE) UCL	412.4		
2991				
2992	**Nonparametric Distribution Free UCL Statistics**			
2993	**Data appear to follow a Discernible Distribution**			
2994				
2995	**Nonparametric Distribution Free UCLs**			
2996	95% CLT UCL	359.8	95% BCA Bootstrap UCL	359.8
2997	95% Standard Bootstrap UCL	359.6	95% Bootstrap-t UCL	360.3
2998	95% Hall's Bootstrap UCL	360.6	95% Percentile Bootstrap UCL	359.9
2999	90% Chebyshev(Mean, Sd) UCL	368.4	95% Chebyshev(Mean, Sd) UCL	377.1
3000	97.5% Chebyshev(Mean, Sd) UCL	389.1	99% Chebyshev(Mean, Sd) UCL	412.8
3001				
3002	**Suggested UCL to Use**			
3003	95% Student's-t UCL	360.1		
3004				
3005	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3006	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3007	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3008				
3009				
3010	**Result (forage fish_nd_manganese)**			
3011				
3012	**General Statistics**			
3013	Total Number of Observations	33	Number of Distinct Observations	32
3014			Number of Missing Observations	0
3015	Minimum	2.21	Mean	6.831
3016	Maximum	23.6	Median	6.36

3017	SD	4.355	Std. Error of Mean	0.758
3018	Coefficient of Variation	0.638	Skewness	2.03
3019				
3020	**Normal GOF Test**			
3021	Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**	
3022	1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
3023	Lilliefors Test Statistic	0.165	**Lilliefors GOF Test**	
3024	1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
3025	**Data appear Approximate Normal at 1% Significance Level**			
3026				
3027	**Assuming Normal Distribution**			
3028	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3029	95% Student's-t UCL	8.115	95% Adjusted-CLT UCL (Chen-1995)	8.364
3030			95% Modified-t UCL (Johnson-1978)	8.16
3031				
3032	**Gamma GOF Test**			
3033	A-D Test Statistic	0.48	**Anderson-Darling Gamma GOF Test**	
3034	5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
3035	K-S Test Statistic	0.0918	**Kolmogorov-Smirnov Gamma GOF Test**	
3036	5% K-S Critical Value	0.154	Detected data appear Gamma Distributed at 5% Significance Level	
3037	**Detected data appear Gamma Distributed at 5% Significance Level**			
3038				
3039	**Gamma Statistics**			
3040	k hat (MLE)	3.191	k star (bias corrected MLE)	2.921
3041	Theta hat (MLE)	2.141	Theta star (bias corrected MLE)	2.338
3042	nu hat (MLE)	210.6	nu star (bias corrected)	192.8
3043	MLE Mean (bias corrected)	6.831	MLE Sd (bias corrected)	3.997
3044			Approximate Chi Square Value (0.05)	161.7
3045	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	160.2
3046				
3047	**Assuming Gamma Distribution**			
3048	95% Approximate Gamma UCL	8.146	95% Adjusted Gamma UCL	8.22
3049				
3050	**Lognormal GOF Test**			
3051	Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**	
3052	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
3053	Lilliefors Test Statistic	0.128	**Lilliefors Lognormal GOF Test**	
3054	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
3055	**Data appear Lognormal at 10% Significance Level**			
3056				
3057	**Lognormal Statistics**			
3058	Minimum of Logged Data	0.793	Mean of logged Data	1.757
3059	Maximum of Logged Data	3.161	SD of logged Data	0.579
3060				
3061	**Assuming Lognormal Distribution**			
3062	95% H-UCL	8.405	90% Chebyshev (MVUE) UCL	8.99
3063	95% Chebyshev (MVUE) UCL	9.978	97.5% Chebyshev (MVUE) UCL	11.35
3064	99% Chebyshev (MVUE) UCL	14.04		
3065				
3066	**Nonparametric Distribution Free UCL Statistics**			
3067	**Data appear to follow a Discernible Distribution**			
3068				

	A–E	F	G–K	L
3069	**Nonparametric Distribution Free UCLs**			
3070	95% CLT UCL	8.078	95% BCA Bootstrap UCL	8.336
3071	95% Standard Bootstrap UCL	8.057	95% Bootstrap-t UCL	8.508
3072	95% Hall's Bootstrap UCL	9.077	95% Percentile Bootstrap UCL	8.13
3073	90% Chebyshev(Mean, Sd) UCL	9.105	95% Chebyshev(Mean, Sd) UCL	10.14
3074	97.5% Chebyshev(Mean, Sd) UCL	11.57	99% Chebyshev(Mean, Sd) UCL	14.37
3075				
3076	**Suggested UCL to Use**			
3077	95% Student's-t UCL	8.115		
3078				
3079	When a data set follows an approximate distribution passing only one of the GOF tests,			
3080	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
3081				
3082	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3083	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3084	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3085				
3086				
3087	**Result (forage fish_nd_mercury)**			
3088				
3089	**General Statistics**			
3090	Total Number of Observations	33	Number of Distinct Observations	33
3091			Number of Missing Observations	0
3092	Minimum	0.0086	Mean	0.0402
3093	Maximum	0.128	Median	0.0342
3094	SD	0.0248	Std. Error of Mean	0.00432
3095	Coefficient of Variation	0.616	Skewness	1.764
3096				
3097	**Normal GOF Test**			
3098	Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk GOF Test**	
3099	1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
3100	Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
3101	1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
3102	**Data appear Approximate Normal at 1% Significance Level**			
3103				
3104	**Assuming Normal Distribution**			
3105	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3106	95% Student's-t UCL	0.0475	95% Adjusted-CLT UCL (Chen-1995)	0.0487
3107			95% Modified-t UCL (Johnson-1978)	0.0478
3108				
3109	**Gamma GOF Test**			
3110	A-D Test Statistic	0.236	**Anderson-Darling Gamma GOF Test**	
3111	5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
3112	K-S Test Statistic	0.0975	**Kolmogorov-Smirnov Gamma GOF Test**	
3113	5% K-S Critical Value	0.154	Detected data appear Gamma Distributed at 5% Significance Level	
3114	**Detected data appear Gamma Distributed at 5% Significance Level**			
3115				
3116	**Gamma Statistics**			
3117	k hat (MLE)	3.285	k star (bias corrected MLE)	3.006
3118	Theta hat (MLE)	0.0122	Theta star (bias corrected MLE)	0.0134
3119	nu hat (MLE)	216.8	nu star (bias corrected)	198.4
3120	MLE Mean (bias corrected)	0.0402	MLE Sd (bias corrected)	0.0232

3121			Approximate Chi Square Value (0.05)	166.8
3122	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	165.3
3123				
3124	**Assuming Gamma Distribution**			
3125	95% Approximate Gamma UCL	0.0478	95% Adjusted Gamma UCL	0.0483
3126				
3127	**Lognormal GOF Test**			
3128	Shapiro Wilk Test Statistic	0.996	**Shapiro Wilk Lognormal GOF Test**	
3129	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
3130	Lilliefors Test Statistic	0.06	**Lilliefors Lognormal GOF Test**	
3131	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
3132	**Data appear Lognormal at 10% Significance Level**			
3133				
3134	**Lognormal Statistics**			
3135	Minimum of Logged Data	-4.756	Mean of logged Data	-3.373
3136	Maximum of Logged Data	-2.056	SD of logged Data	0.576
3137				
3138	**Assuming Lognormal Distribution**			
3139	95% H-UCL	0.0496	90% Chebyshev (MVUE) UCL	0.053
3140	95% Chebyshev (MVUE) UCL	0.0588	97.5% Chebyshev (MVUE) UCL	0.0669
3141	99% Chebyshev (MVUE) UCL	0.0827		
3142				
3143	**Nonparametric Distribution Free UCL Statistics**			
3144	**Data appear to follow a Discernible Distribution**			
3145				
3146	**Nonparametric Distribution Free UCLs**			
3147	95% CLT UCL	0.0473	95% BCA Bootstrap UCL	0.0492
3148	95% Standard Bootstrap UCL	0.0473	95% Bootstrap-t UCL	0.0498
3149	95% Hall's Bootstrap UCL	0.0508	95% Percentile Bootstrap UCL	0.0478
3150	90% Chebyshev(Mean, Sd) UCL	0.0532	95% Chebyshev(Mean, Sd) UCL	0.059
3151	97.5% Chebyshev(Mean, Sd) UCL	0.0672	99% Chebyshev(Mean, Sd) UCL	0.0832
3152				
3153	**Suggested UCL to Use**			
3154	95% Student's-t UCL	0.0475		
3155				
3156	When a data set follows an approximate distribution passing only one of the GOF tests,			
3157	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
3158				
3159	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3160	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3161	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3162				
3163				
3164	**Result (forage fish_nd_methylmercury)**			
3165				
3166	**General Statistics**			
3167	Total Number of Observations	33	Number of Distinct Observations	33
3168			Number of Missing Observations	0
3169	Minimum	0.0062	Mean	0.0382
3170	Maximum	0.132	Median	0.0324
3171	SD	0.0272	Std. Error of Mean	0.00473
3172	Coefficient of Variation	0.712	Skewness	1.965

Normal GOF Test

Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0462	95% Adjusted-CLT UCL (Chen-1995)	0.0477
		95% Modified-t UCL (Johnson-1978)	0.0465

Gamma GOF Test

A-D Test Statistic	0.314	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0864	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.155	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.558	k star (bias corrected MLE)	2.345
Theta hat (MLE)	0.0149	Theta star (bias corrected MLE)	0.0163
nu hat (MLE)	168.8	nu star (bias corrected)	154.8
MLE Mean (bias corrected)	0.0382	MLE Sd (bias corrected)	0.0249
		Approximate Chi Square Value (0.05)	127
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	125.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0465	95% Adjusted Gamma UCL	0.047

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0658	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.083	Mean of logged Data	-3.473
Maximum of Logged Data	-2.025	SD of logged Data	0.662

Assuming Lognormal Distribution

95% H-UCL	0.0492	90% Chebyshev (MVUE) UCL	0.0526
95% Chebyshev (MVUE) UCL	0.059	97.5% Chebyshev (MVUE) UCL	0.068
99% Chebyshev (MVUE) UCL	0.0856		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.046	95% BCA Bootstrap UCL	0.0482

95% Standard Bootstrap UCL	0.046	95% Bootstrap-t UCL	0.0492
95% Hall's Bootstrap UCL	0.0515	95% Percentile Bootstrap UCL	0.0466
90% Chebyshev(Mean, Sd) UCL	0.0524	95% Chebyshev(Mean, Sd) UCL	0.0588
97.5% Chebyshev(Mean, Sd) UCL	0.0677	99% Chebyshev(Mean, Sd) UCL	0.0853

Suggested UCL to Use

95% Student's-t UCL	0.0462		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_nd_molybdenum)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	29
		Number of Missing Observations	0
Minimum	0.0179	Mean	0.0316
Maximum	0.0443	Median	0.0312
SD	0.00573	Std. Error of Mean	9.9707E-4
Coefficient of Variation	0.181	Skewness	-0.178

Normal GOF Test

Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0967	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0333	95% Adjusted-CLT UCL (Chen-1995)	0.0332
		95% Modified-t UCL (Johnson-1978)	0.0332

Gamma GOF Test

A-D Test Statistic	0.644	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.117	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	29.06	k star (bias corrected MLE)	26.44
Theta hat (MLE)	0.00109	Theta star (bias corrected MLE)	0.00119
nu hat (MLE)	1918	nu star (bias corrected)	1745
MLE Mean (bias corrected)	0.0316	MLE Sd (bias corrected)	0.00614
		Approximate Chi Square Value (0.05)	1649
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	1644

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0334	95% Adjusted Gamma UCL	0.0335

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.023	Mean of logged Data	-3.473
Maximum of Logged Data	-3.117	SD of logged Data	0.194

Assuming Lognormal Distribution

95% H-UCL	0.0336	90% Chebyshev (MVUE) UCL	0.0348
95% Chebyshev (MVUE) UCL	0.0363	97.5% Chebyshev (MVUE) UCL	0.0383
99% Chebyshev (MVUE) UCL	0.0423		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0332	95% BCA Bootstrap UCL	0.0331
95% Standard Bootstrap UCL	0.0331	95% Bootstrap-t UCL	0.0331
95% Hall's Bootstrap UCL	0.0331	95% Percentile Bootstrap UCL	0.0331
90% Chebyshev(Mean, Sd) UCL	0.0346	95% Chebyshev(Mean, Sd) UCL	0.0359
97.5% Chebyshev(Mean, Sd) UCL	0.0378	99% Chebyshev(Mean, Sd) UCL	0.0415

Suggested UCL to Use

95% Student's-t UCL	0.0333		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
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.

Result (forage fish_nd_nickel)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	33
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 Result (forage fish_nd_nickel) was not processed!

	A–E	F	G–K	L
3329				
3330				
3331				
3332	Result (forage fish_nd_phosphorus)			
3333				
3334	**General Statistics**			
3335	Total Number of Observations	33	Number of Distinct Observations	32
3336			Number of Missing Observations	0
3337	Minimum	3930	Mean	6255
3338	Maximum	8620	Median	6220
3339	SD	957.2	Std. Error of Mean	166.6
3340	Coefficient of Variation	0.153	Skewness	0.0694
3341				
3342	**Normal GOF Test**			
3343	Shapiro Wilk Test Statistic	0.993	**Shapiro Wilk GOF Test**	
3344	1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level	
3345	Lilliefors Test Statistic	0.075	**Lilliefors GOF Test**	
3346	1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
3347	**Data appear Normal at 1% Significance Level**			
3348				
3349	**Assuming Normal Distribution**			
3350	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3351	95% Student's-t UCL	6538	95% Adjusted-CLT UCL (Chen-1995)	6532
3352			95% Modified-t UCL (Johnson-1978)	6538
3353				
3354	**Gamma GOF Test**			
3355	A-D Test Statistic	0.166	**Anderson-Darling Gamma GOF Test**	
3356	5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level	
3357	K-S Test Statistic	0.0622	**Kolmogorov-Smirnov Gamma GOF Test**	
3358	5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level	
3359	**Detected data appear Gamma Distributed at 5% Significance Level**			
3360				
3361	**Gamma Statistics**			
3362	k hat (MLE)	42.79	k star (bias corrected MLE)	38.92
3363	Theta hat (MLE)	146.2	Theta star (bias corrected MLE)	160.7
3364	nu hat (MLE)	2824	nu star (bias corrected)	2569
3365	MLE Mean (bias corrected)	6255	MLE Sd (bias corrected)	1003
3366			Approximate Chi Square Value (0.05)	2452
3367	Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	2446
3368				
3369	**Assuming Gamma Distribution**			
3370	95% Approximate Gamma UCL	6553	95% Adjusted Gamma UCL	6569
3371				
3372	**Lognormal GOF Test**			
3373	Shapiro Wilk Test Statistic	0.982	**Shapiro Wilk Lognormal GOF Test**	
3374	10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
3375	Lilliefors Test Statistic	0.0721	**Lilliefors Lognormal GOF Test**	
3376	10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
3377	**Data appear Lognormal at 10% Significance Level**			
3378				
3379	**Lognormal Statistics**			
3380	Minimum of Logged Data	8.276	Mean of logged Data	8.729

3381	Maximum of Logged Data	9.062	SD of logged Data	0.157
3382				
3383	**Assuming Lognormal Distribution**			
3384	95% H-UCL	6568	90% Chebyshev (MVUE) UCL	6774
3385	95% Chebyshev (MVUE) UCL	7008	97.5% Chebyshev (MVUE) UCL	7333
3386	99% Chebyshev (MVUE) UCL	7971		
3387				
3388	**Nonparametric Distribution Free UCL Statistics**			
3389	**Data appear to follow a Discernible Distribution**			
3390				
3391	**Nonparametric Distribution Free UCLs**			
3392	95% CLT UCL	6530	95% BCA Bootstrap UCL	6525
3393	95% Standard Bootstrap UCL	6529	95% Bootstrap-t UCL	6545
3394	95% Hall's Bootstrap UCL	6548	95% Percentile Bootstrap UCL	6532
3395	90% Chebyshev(Mean, Sd) UCL	6755	95% Chebyshev(Mean, Sd) UCL	6982
3396	97.5% Chebyshev(Mean, Sd) UCL	7296	99% Chebyshev(Mean, Sd) UCL	7913
3397				
3398	**Suggested UCL to Use**			
3399	95% Student's-t UCL	6538		
3400				
3401	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3402	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3403	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3404				
3405				
3406	**Result (forage fish_nd_potassium)**			
3407				
3408	**General Statistics**			
3409	Total Number of Observations	33	Number of Distinct Observations	24
3410			Number of Missing Observations	0
3411	Minimum	2310	Mean	2815
3412	Maximum	3200	Median	2810
3413	SD	216.5	Std. Error of Mean	37.69
3414	Coefficient of Variation	0.0769	Skewness	-0.519
3415				
3416	**Normal GOF Test**			
3417	Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**	
3418	1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level	
3419	Lilliefors Test Statistic	0.127	**Lilliefors GOF Test**	
3420	1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
3421	**Data appear Normal at 1% Significance Level**			
3422				
3423	**Assuming Normal Distribution**			
3424	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3425	95% Student's-t UCL	2879	95% Adjusted-CLT UCL (Chen-1995)	2874
3426			95% Modified-t UCL (Johnson-1978)	2878
3427				
3428	**Gamma GOF Test**			
3429	A-D Test Statistic	0.632	**Anderson-Darling Gamma GOF Test**	
3430	5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level	
3431	K-S Test Statistic	0.136	**Kolmogorov-Smirnov Gamma GOF Test**	
3432	5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	168.8	k star (bias corrected MLE)	153.5
Theta hat (MLE)	16.68	Theta star (bias corrected MLE)	18.34
nu hat (MLE)	11142	nu star (bias corrected)	10130
MLE Mean (bias corrected)	2815	MLE Sd (bias corrected)	227.2
		Approximate Chi Square Value (0.05)	9897
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	9886

Assuming Gamma Distribution

95% Approximate Gamma UCL	2881	95% Adjusted Gamma UCL	2885

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	7.745	Mean of logged Data	7.94
Maximum of Logged Data	8.071	SD of logged Data	0.0789

Assuming Lognormal Distribution

95% H-UCL	N/A	90% Chebyshev (MVUE) UCL	2931
95% Chebyshev (MVUE) UCL	2984	97.5% Chebyshev (MVUE) UCL	3057
99% Chebyshev (MVUE) UCL	3200		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2877	95% BCA Bootstrap UCL	2871
95% Standard Bootstrap UCL	2876	95% Bootstrap-t UCL	2874
95% Hall's Bootstrap UCL	2873	95% Percentile Bootstrap UCL	2876
90% Chebyshev(Mean, Sd) UCL	2928	95% Chebyshev(Mean, Sd) UCL	2979
97.5% Chebyshev(Mean, Sd) UCL	3051	99% Chebyshev(Mean, Sd) UCL	3190

Suggested UCL to Use

95% Student's-t UCL	2879		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
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.

Result (forage fish_nd_selenium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	30
		Number of Missing Observations	0
Minimum	0.13	Mean	0.233
Maximum	0.408	Median	0.218
SD	0.0753	Std. Error of Mean	0.0131
Coefficient of Variation	0.324	Skewness	0.848

Normal GOF Test

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.255	95% Adjusted-CLT UCL (Chen-1995)	0.256
		95% Modified-t UCL (Johnson-1978)	0.255

Gamma GOF Test

A-D Test Statistic	0.433	**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	0.108	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.64	k star (bias corrected MLE)	9.692
Theta hat (MLE)	0.0219	Theta star (bias corrected MLE)	0.024
nu hat (MLE)	702.2	nu star (bias corrected)	639.7
MLE Mean (bias corrected)	0.233	MLE Sd (bias corrected)	0.0748
		Approximate Chi Square Value (0.05)	582
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	579.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.256	95% Adjusted Gamma UCL	0.257

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.108	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.04	Mean of logged Data	-1.505
Maximum of Logged Data	-0.896	SD of logged Data	0.311

Assuming Lognormal Distribution

95% H-UCL	0.257	90% Chebyshev (MVUE) UCL	0.271
95% Chebyshev (MVUE) UCL	0.288	97.5% Chebyshev (MVUE) UCL	0.313

3537	99% Chebyshev (MVUE) UCL	0.36		
3538				
3539	**Nonparametric Distribution Free UCL Statistics**			
3540	**Data appear to follow a Discernible Distribution**			
3541				
3542	**Nonparametric Distribution Free UCLs**			
3543	95% CLT UCL	0.254	95% BCA Bootstrap UCL	0.256
3544	95% Standard Bootstrap UCL	0.254	95% Bootstrap-t UCL	0.259
3545	95% Hall's Bootstrap UCL	0.257	95% Percentile Bootstrap UCL	0.254
3546	90% Chebyshev(Mean, Sd) UCL	0.272	95% Chebyshev(Mean, Sd) UCL	0.29
3547	97.5% Chebyshev(Mean, Sd) UCL	0.315	99% Chebyshev(Mean, Sd) UCL	0.363
3548				
3549	**Suggested UCL to Use**			
3550	95% Student's-t UCL	0.255		
3551				
3552	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
3553	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
3554	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
3555				
3556	**Result (forage fish_nd_sodium)**			
3557				
3558	**General Statistics**			
3559	Total Number of Observations	33	Number of Distinct Observations	33
3560			Number of Missing Observations	0
3561	Minimum	335	Mean	792.8
3562	Maximum	1130	Median	830
3563	SD	196	Std. Error of Mean	34.12
3564	Coefficient of Variation	0.247	Skewness	-0.83
3565				
3566	**Normal GOF Test**			
3567	Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**	
3568	1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
3569	Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
3570	1% Lilliefors Critical Value	0.177	Data Not Normal at 1% Significance Level	
3571	**Data Not Normal at 1% Significance Level**			
3572				
3573	**Assuming Normal Distribution**			
3574	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
3575	95% Student's-t UCL	850.6	95% Adjusted-CLT UCL (Chen-1995)	843.6
3576			95% Modified-t UCL (Johnson-1978)	849.7
3577				
3578	**Gamma GOF Test**			
3579	A-D Test Statistic	2.184	**Anderson-Darling Gamma GOF Test**	
3580	5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level	
3581	K-S Test Statistic	0.249	**Kolmogorov-Smirnov Gamma GOF Test**	
3582	5% K-S Critical Value	0.153	Data Not Gamma Distributed at 5% Significance Level	
3583	**Data Not Gamma Distributed at 5% Significance Level**			
3584				
3585	**Gamma Statistics**			
3586	k hat (MLE)	13.28	k star (bias corrected MLE)	12.1
3587	Theta hat (MLE)	59.68	Theta star (bias corrected MLE)	65.54
3588	nu hat (MLE)	876.7	nu star (bias corrected)	798.3

MLE Mean (bias corrected)	792.8	MLE Sd (bias corrected)	227.9
		Approximate Chi Square Value (0.05)	733.8
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	730.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	862.5	95% Adjusted Gamma UCL	866.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.814	Mean of logged Data	6.637
Maximum of Logged Data	7.03	SD of logged Data	0.301

Assuming Lognormal Distribution

95% H-UCL	878.5	90% Chebyshev (MVUE) UCL	924.7
95% Chebyshev (MVUE) UCL	982.4	97.5% Chebyshev (MVUE) UCL	1062
99% Chebyshev (MVUE) UCL	1220		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	848.9	95% BCA Bootstrap UCL	842.2
95% Standard Bootstrap UCL	848.8	95% Bootstrap-t UCL	845.6
95% Hall's Bootstrap UCL	845	95% Percentile Bootstrap UCL	848.2
90% Chebyshev(Mean, Sd) UCL	895.1	95% Chebyshev(Mean, Sd) UCL	941.5
97.5% Chebyshev(Mean, Sd) UCL	1006	99% Chebyshev(Mean, Sd) UCL	1132

Suggested UCL to Use

95% Student's-t UCL	850.6		

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 using results from simulation studies.
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.

Result (forage fish_nd_strontium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	31
		Number of Missing Observations	0
Minimum	3.09	Mean	8.149
Maximum	13.8	Median	7.48
SD	2.737	Std. Error of Mean	0.476
Coefficient of Variation	0.336	Skewness	0.462

Normal GOF Test			
Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.956	95% Adjusted-CLT UCL (Chen-1995)	8.974
		95% Modified-t UCL (Johnson-1978)	8.963
Gamma GOF Test			
A-D Test Statistic	0.215	**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	0.0979	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	8.918	k star (bias corrected MLE)	8.127
Theta hat (MLE)	0.914	Theta star (bias corrected MLE)	1.003
nu hat (MLE)	588.6	nu star (bias corrected)	536.4
MLE Mean (bias corrected)	8.149	MLE Sd (bias corrected)	2.859
		Approximate Chi Square Value (0.05)	483.7
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	481.1
Assuming Gamma Distribution			
95% Approximate Gamma UCL	9.038	95% Adjusted Gamma UCL	9.086
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0751	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.128	Mean of logged Data	2.041
Maximum of Logged Data	2.625	SD of logged Data	0.351
Assuming Lognormal Distribution			
95% H-UCL	9.17	90% Chebyshev (MVUE) UCL	9.703
95% Chebyshev (MVUE) UCL	10.4	97.5% Chebyshev (MVUE) UCL	11.36
99% Chebyshev (MVUE) UCL	13.25		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	8.933	95% BCA Bootstrap UCL	8.92

95% Standard Bootstrap UCL	8.918	95% Bootstrap-t UCL	8.992
95% Hall's Bootstrap UCL	8.988	95% Percentile Bootstrap UCL	8.923
90% Chebyshev(Mean, Sd) UCL	9.579	95% Chebyshev(Mean, Sd) UCL	10.23
97.5% Chebyshev(Mean, Sd) UCL	11.12	99% Chebyshev(Mean, Sd) UCL	12.89

Suggested UCL to Use

95% Student's-t UCL	8.956		

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

Result (forage fish_nd_thallium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	0.00125	Mean	0.00393
Maximum	0.0105	Median	0.00394
SD	0.00231	Std. Error of Mean	4.0240E-4
Coefficient of Variation	0.589	Skewness	0.985

Normal GOF Test

Shapiro Wilk Test Statistic	0.899	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.00461	95% Adjusted-CLT UCL (Chen-1995)	0.00466
		95% Modified-t UCL (Johnson-1978)	0.00462

Gamma GOF Test

A-D Test Statistic	0.741	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.143	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.154	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.016	k star (bias corrected MLE)	2.762
Theta hat (MLE)	0.0013	Theta star (bias corrected MLE)	0.00142
nu hat (MLE)	199.1	nu star (bias corrected)	182.3
MLE Mean (bias corrected)	0.00393	MLE Sd (bias corrected)	0.00236
		Approximate Chi Square Value (0.05)	152.1
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	150.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.00471	95% Adjusted Gamma UCL	0.00475

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.685	Mean of logged Data	-5.715
Maximum of Logged Data	-4.556	SD of logged Data	0.618

Assuming Lognormal Distribution

95% H-UCL	0.00498	90% Chebyshev (MVUE) UCL	0.00533
95% Chebyshev (MVUE) UCL	0.00595	97.5% Chebyshev (MVUE) UCL	0.00681
99% Chebyshev (MVUE) UCL	0.00849		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.00459	95% BCA Bootstrap UCL	0.00464
95% Standard Bootstrap UCL	0.00458	95% Bootstrap-t UCL	0.00469
95% Hall's Bootstrap UCL	0.00472	95% Percentile Bootstrap UCL	0.00461
90% Chebyshev(Mean, Sd) UCL	0.00513	95% Chebyshev(Mean, Sd) UCL	0.00568
97.5% Chebyshev(Mean, Sd) UCL	0.00644	99% Chebyshev(Mean, Sd) UCL	0.00793

Suggested UCL to Use

95% Student's-t UCL	0.00461		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_nd_tin)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	28
Number of Detects	27	Number of Non-Detects	6
Number of Distinct Detects	27	Number of Distinct Non-Detects	1
Minimum Detect	0.061	Minimum Non-Detect	0.02
Maximum Detect	0.397	Maximum Non-Detect	0.02
Variance Detects	0.00376	Percent Non-Detects	18.18%
Mean Detects	0.14	SD Detects	0.0613
Median Detects	0.136	CV Detects	0.439
Skewness Detects	2.886	Kurtosis Detects	11.99
Mean of Logged Detects	-2.037	SD of Logged Detects	0.36

Normal GOF Test on Detects Only

	A–E	F	G–K	L
3797	Shapiro Wilk Test Statistic	0.733	**Shapiro Wilk GOF Test**	
3798	1% Shapiro Wilk Critical Value	0.894	Detected Data Not Normal at 1% Significance Level	
3799	Lilliefors Test Statistic	0.206	**Lilliefors GOF Test**	
3800	1% Lilliefors Critical Value	0.194	Detected Data Not Normal at 1% Significance Level	
3801	**Detected Data Not Normal at 1% Significance Level**			
3802				
3803	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
3804	KM Mean	0.118	KM Standard Error of Mean	0.0127
3805	90KM SD	0.0714	95% KM (BCA) UCL	0.139
3806	95% KM (t) UCL	0.139	95% KM (Percentile Bootstrap) UCL	0.139
3807	95% KM (z) UCL	0.139	95% KM Bootstrap t UCL	0.143
3808	90% KM Chebyshev UCL	0.156	95% KM Chebyshev UCL	0.173
3809	97.5% KM Chebyshev UCL	0.197	99% KM Chebyshev UCL	0.244
3810				
3811	**Gamma GOF Tests on Detected Observations Only**			
3812	A-D Test Statistic	0.783	**Anderson-Darling GOF Test**	
3813	5% A-D Critical Value	0.745	Detected Data Not Gamma Distributed at 5% Significance Level	
3814	K-S Test Statistic	0.152	**Kolmogorov-Smirnov GOF**	
3815	5% K-S Critical Value	0.168	Detected data appear Gamma Distributed at 5% Significance Level	
3816	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**			
3817				
3818	**Gamma Statistics on Detected Data Only**			
3819	k hat (MLE)	7.509	k star (bias corrected MLE)	6.699
3820	Theta hat (MLE)	0.0186	Theta star (bias corrected MLE)	0.0208
3821	nu hat (MLE)	405.5	nu star (bias corrected)	361.8
3822	Mean (detects)	0.14		
3823				
3824	**Gamma ROS Statistics using Imputed Non-Detects**			
3825	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
3826	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
3827	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
3828	This is especially true when the sample size is small.			
3829	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
3830	Minimum	0.0151	Mean	0.121
3831	Maximum	0.397	Median	0.124
3832	SD	0.0684	CV	0.564
3833	k hat (MLE)	3.189	k star (bias corrected MLE)	2.919
3834	Theta hat (MLE)	0.038	Theta star (bias corrected MLE)	0.0415
3835	nu hat (MLE)	210.4	nu star (bias corrected)	192.6
3836	Adjusted Level of Significance (β)	0.0419		
3837	Approximate Chi Square Value (192.65, α)	161.5	Adjusted Chi Square Value (192.65, β)	160.1
3838	95% Gamma Approximate UCL	0.145	95% Gamma Adjusted UCL	0.146
3839				
3840	**Estimates of Gamma Parameters using KM Estimates**			
3841	Mean (KM)	0.118	SD (KM)	0.0714
3842	Variance (KM)	0.0051	SE of Mean (KM)	0.0127
3843	k hat (KM)	2.729	k star (KM)	2.501
3844	nu hat (KM)	180.1	nu star (KM)	165
3845	theta hat (KM)	0.0432	theta star (KM)	0.0472
3846	80% gamma percentile (KM)	0.172	90% gamma percentile (KM)	0.218
3847	95% gamma percentile (KM)	0.261	99% gamma percentile (KM)	0.356
3848				

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (165.04, α)	136.3	Adjusted Chi Square Value (165.04, β)	135
95% KM Approximate Gamma UCL	0.143	95% KM Adjusted Gamma UCL	0.144
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.935	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.153	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Approximate Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.125	Mean in Log Scale	-2.181
SD in Original Scale	0.0637	SD in Log Scale	0.455
95% t UCL (assumes normality of ROS data)	0.144	95% Percentile Bootstrap UCL	0.143
95% BCA Bootstrap UCL	0.146	95% Bootstrap t UCL	0.151
95% H-UCL (Log ROS)	0.146		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.378	KM Geo Mean	0.0928
KM SD (logged)	0.791	95% Critical H Value (KM-Log)	2.205
KM Standard Error of Mean (logged)	0.14	95% H-UCL (KM -Log)	0.173
KM SD (logged)	0.791	95% Critical H Value (KM-Log)	2.205
KM Standard Error of Mean (logged)	0.14		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.116	Mean in Log Scale	-2.504
SD in Original Scale	0.0751	SD in Log Scale	1.057
95% t UCL (Assumes normality)	0.138	95% H-Stat UCL	0.229
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	0.144	95% GROS Adjusted Gamma UCL	0.146
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_nd_uranium)			
General Statistics			
Total Number of Observations	33	Number of Distinct Observations	29
Number of Detects	30	Number of Non-Detects	3
Number of Distinct Detects	28	Number of Distinct Non-Detects	1
Minimum Detect	5.5000E-4	Minimum Non-Detect	4.0000E-4

3901	Maximum Detect	0.00609	Maximum Non-Detect	4.0000E-4
3902	Variance Detects	2.8052E-6	Percent Non-Detects	9.091%
3903	Mean Detects	0.0018	SD Detects	0.00167
3904	Median Detects	0.00106	CV Detects	0.932
3905	Skewness Detects	1.631	Kurtosis Detects	1.435
3906	Mean of Logged Detects	-6.64	SD of Logged Detects	0.758
3907				
3908	**Normal GOF Test on Detects Only**			
3909	Shapiro Wilk Test Statistic	0.711	**Shapiro Wilk GOF Test**	
3910	1% Shapiro Wilk Critical Value	0.9	Detected Data Not Normal at 1% Significance Level	
3911	Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**	
3912	1% Lilliefors Critical Value	0.185	Detected Data Not Normal at 1% Significance Level	
3913	**Detected Data Not Normal at 1% Significance Level**			
3914				
3915	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
3916	KM Mean	0.00167	KM Standard Error of Mean	2.8694E-4
3917	90KM SD	0.00162	95% KM (BCA) UCL	0.00215
3918	95% KM (t) UCL	0.00216	95% KM (Percentile Bootstrap) UCL	0.00215
3919	95% KM (z) UCL	0.00214	95% KM Bootstrap t UCL	0.00225
3920	90% KM Chebyshev UCL	0.00253	95% KM Chebyshev UCL	0.00292
3921	97.5% KM Chebyshev UCL	0.00346	99% KM Chebyshev UCL	0.00453
3922				
3923	**Gamma GOF Tests on Detected Observations Only**			
3924	A-D Test Statistic	2.089	**Anderson-Darling GOF Test**	
3925	5% A-D Critical Value	0.761	Detected Data Not Gamma Distributed at 5% Significance Level	
3926	K-S Test Statistic	0.251	**Kolmogorov-Smirnov GOF**	
3927	5% K-S Critical Value	0.163	Detected Data Not Gamma Distributed at 5% Significance Level	
3928	**Detected Data Not Gamma Distributed at 5% Significance Level**			
3929				
3930	**Gamma Statistics on Detected Data Only**			
3931	k hat (MLE)	1.72	k star (bias corrected MLE)	1.571
3932	Theta hat (MLE)	0.00104	Theta star (bias corrected MLE)	0.00114
3933	nu hat (MLE)	103.2	nu star (bias corrected)	94.24
3934	Mean (detects)	0.0018		
3935				
3936	**Gamma ROS Statistics using Imputed Non-Detects**			
3937	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
3938	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
3939	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
3940	This is especially true when the sample size is small.			
3941	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
3942	Minimum	5.5000E-4	Mean	0.00254
3943	Maximum	0.01	Median	0.00107
3944	SD	0.00288	CV	1.131
3945	k hat (MLE)	1.18	k star (bias corrected MLE)	1.093
3946	Theta hat (MLE)	0.00215	Theta star (bias corrected MLE)	0.00233
3947	nu hat (MLE)	77.89	nu star (bias corrected)	72.15
3948	Adjusted Level of Significance (β)	0.0419		
3949	Approximate Chi Square Value (72.15, α)	53.59	Adjusted Chi Square Value (72.15, β)	52.76
3950	95% Gamma Approximate UCL	0.00342	95% Gamma Adjusted UCL	0.00348
3951				
3952	**Estimates of Gamma Parameters using KM Estimates**			

Mean (KM)	0.00167	SD (KM)	0.00162
Variance (KM)	2.6264E-6	SE of Mean (KM)	2.8694E-4
k hat (KM)	1.062	k star (KM)	0.986
nu hat (KM)	70.08	nu star (KM)	65.04
theta hat (KM)	0.00157	theta star (KM)	0.00169
80% gamma percentile (KM)	0.00269	90% gamma percentile (KM)	0.00386
95% gamma percentile (KM)	0.00503	99% gamma percentile (KM)	0.00775
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (65.04, α)	47.49	Adjusted Chi Square Value (65.04, β)	46.71
95% KM Approximate Gamma UCL	0.00229	95% KM Adjusted Gamma UCL	0.00233
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.939	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.146	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00166	Mean in Log Scale	-6.797
SD in Original Scale	0.00166	SD in Log Scale	0.883
95% t UCL (assumes normality of ROS data)	0.00214	95% Percentile Bootstrap UCL	0.00214
95% BCA Bootstrap UCL	0.00219	95% Bootstrap t UCL	0.00227
95% H-UCL (Log ROS)	0.00236		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.747	KM Geo Mean	0.00117
KM SD (logged)	0.788	95% Critical H Value (KM-Log)	2.202
KM Standard Error of Mean (logged)	0.14	95% H-UCL (KM -Log)	0.00218
KM SD (logged)	0.788	95% Critical H Value (KM-Log)	2.202
KM Standard Error of Mean (logged)	0.14		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00165	Mean in Log Scale	-6.81
SD in Original Scale	0.00166	SD in Log Scale	0.906
95% t UCL (Assumes normality)	0.00214	95% H-Stat UCL	0.00242
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			
Suggested UCL to Use			
95% KM (t) UCL	0.00216		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_nd_vanadium)

	A–E	F	G–K	L
4005	**General Statistics**			
4006	Total Number of Observations	33	Number of Distinct Observations	6
4007	Number of Detects	5	Number of Non-Detects	28
4008	Number of Distinct Detects	5	Number of Distinct Non-Detects	1
4009	Minimum Detect	0.023	Minimum Non-Detect	0.02
4010	Maximum Detect	0.067	Maximum Non-Detect	0.02
4011	Variance Detects	4.2930E-4	Percent Non-Detects	84.85%
4012	Mean Detects	0.0406	SD Detects	0.0207
4013	Median Detects	0.028	CV Detects	0.51
4014	Skewness Detects	0.659	Kurtosis Detects	-2.798
4015	Mean of Logged Detects	-3.306	SD of Logged Detects	0.5
4016				
4017	**Normal GOF Test on Detects Only**			
4018	Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**	
4019	1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level	
4020	Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**	
4021	1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level	
4022	**Detected Data appear Normal at 1% Significance Level**			
4023	**Note GOF tests may be unreliable for small sample sizes**			
4024				
4025	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
4026	KM Mean	0.0231	KM Standard Error of Mean	0.00201
4027	90KM SD	0.0103	95% KM (BCA) UCL	0.027
4028	95% KM (t) UCL	0.0265	95% KM (Percentile Bootstrap) UCL	0.0266
4029	95% KM (z) UCL	0.0264	95% KM Bootstrap t UCL	0.0321
4030	90% KM Chebyshev UCL	0.0291	95% KM Chebyshev UCL	0.0319
4031	97.5% KM Chebyshev UCL	0.0357	99% KM Chebyshev UCL	0.0431
4032				
4033	**Gamma GOF Tests on Detected Observations Only**			
4034	A-D Test Statistic	0.596	**Anderson-Darling GOF Test**	
4035	5% A-D Critical Value	0.681	Detected data appear Gamma Distributed at 5% Significance Level	
4036	K-S Test Statistic	0.337	**Kolmogorov-Smirnov GOF**	
4037	5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level	
4038	**Detected data appear Gamma Distributed at 5% Significance Level**			
4039	**Note GOF tests may be unreliable for small sample sizes**			
4040				
4041	**Gamma Statistics on Detected Data Only**			
4042	k hat (MLE)	5.055	k star (bias corrected MLE)	2.155
4043	Theta hat (MLE)	0.00803	Theta star (bias corrected MLE)	0.0188
4044	nu hat (MLE)	50.55	nu star (bias corrected)	21.55
4045	Mean (detects)	0.0406		
4046				
4047	**Gamma ROS Statistics using Imputed Non-Detects**			
4048	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
4049	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
4050	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
4051	This is especially true when the sample size is small.			
4052	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
4053	Minimum	0.01	Mean	0.0146
4054	Maximum	0.067	Median	0.01
4055	SD	0.0133	CV	0.911
4056	k hat (MLE)	2.872	k star (bias corrected MLE)	2.631

Theta hat (MLE)	0.0051	Theta star (bias corrected MLE)	0.00556
nu hat (MLE)	189.5	nu star (bias corrected)	173.6
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (173.63, α)	144.2	Adjusted Chi Square Value (173.63, β)	142.8
95% Gamma Approximate UCL	0.0176	95% Gamma Adjusted UCL	0.0178
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0231	SD (KM)	0.0103
Variance (KM)	1.0659E-4	SE of Mean (KM)	0.00201
k hat (KM)	5.015	k star (KM)	4.58
nu hat (KM)	331	nu star (KM)	302.3
theta hat (KM)	0.00461	theta star (KM)	0.00505
80% gamma percentile (KM)	0.0314	90% gamma percentile (KM)	0.0376
95% gamma percentile (KM)	0.0433	99% gamma percentile (KM)	0.0553
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (302.25, α)	263	Adjusted Chi Square Value (302.25, β)	261.1
95% KM Approximate Gamma UCL	0.0266	95% KM Adjusted Gamma UCL	0.0268
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.827	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.305	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00998	Mean in Log Scale	-5.495
SD in Original Scale	0.0155	SD in Log Scale	1.39
95% t UCL (assumes normality of ROS data)	0.0146	95% Percentile Bootstrap UCL	0.0145
95% BCA Bootstrap UCL	0.0157	95% Bootstrap t UCL	0.0183
95% H-UCL (Log ROS)	0.0223		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.82	KM Geo Mean	0.0219
KM SD (logged)	0.278	95% Critical H Value (KM-Log)	1.785
KM Standard Error of Mean (logged)	0.0542	95% H-UCL (KM -Log)	0.0249
KM SD (logged)	0.278	95% Critical H Value (KM-Log)	1.785
KM Standard Error of Mean (logged)	0.0542		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0146	Mean in Log Scale	-4.408
SD in Original Scale	0.0133	SD in Log Scale	0.505
95% t UCL (Assumes normality)	0.0186	95% H-Stat UCL	0.0164
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			

95% KM (t) UCL	0.0265		

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

Result (forage fish_nd_zinc)

General Statistics			
Total Number of Observations	33	Number of Distinct Observations	32
		Number of Missing Observations	0
Minimum	25.4	Mean	42.38
Maximum	76.8	Median	37.1
SD	14.48	Std. Error of Mean	2.521
Coefficient of Variation	0.342	Skewness	1.115

Normal GOF Test			
Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.906	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.177	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	46.66	95% Adjusted-CLT UCL (Chen-1995)	47.05
		95% Modified-t UCL (Johnson-1978)	46.74

Gamma GOF Test			
A-D Test Statistic	0.974	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.147	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.153	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	10.16	k star (bias corrected MLE)	9.255
Theta hat (MLE)	4.172	Theta star (bias corrected MLE)	4.58
nu hat (MLE)	670.5	nu star (bias corrected)	610.8
MLE Mean (bias corrected)	42.38	MLE Sd (bias corrected)	13.93
		Approximate Chi Square Value (0.05)	554.5
Adjusted Level of Significance	0.0419	Adjusted Chi Square Value	551.8

Assuming Gamma Distribution			
95% Approximate Gamma UCL	46.69	95% Adjusted Gamma UCL	46.92

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.139	Data appear Lognormal at 10% Significance Level	

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.235	Mean of logged Data	3.697
Maximum of Logged Data	4.341	SD of logged Data	0.312

Assuming Lognormal Distribution

95% H-UCL	46.77	90% Chebyshev (MVUE) UCL	49.29
95% Chebyshev (MVUE) UCL	52.47	97.5% Chebyshev (MVUE) UCL	56.89
99% Chebyshev (MVUE) UCL	65.56		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	46.53	95% BCA Bootstrap UCL	47.25
95% Standard Bootstrap UCL	46.49	95% Bootstrap-t UCL	47.47
95% Hall's Bootstrap UCL	47.09	95% Percentile Bootstrap UCL	46.64
90% Chebyshev(Mean, Sd) UCL	49.95	95% Chebyshev(Mean, Sd) UCL	53.37
97.5% Chebyshev(Mean, Sd) UCL	58.13	99% Chebyshev(Mean, Sd) UCL	67.47

Suggested UCL to Use

95% Student's-t UCL	46.66		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_nd_zirconium)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	33
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 Result (forage fish_nd_zirconium) was not processed!

Result (forage fish_wb_aluminum)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	1.27	Mean	6.178

	A	B	C	D	E	F	G	H	I	J	K	L
4213					Maximum	21.2					Median	3.14
4214					SD	5.962					Std. Error of Mean	1.654
4215					Coefficient of Variation	0.965					Skewness	1.598
4216												
4217	**Normal GOF Test**											
4218					Shapiro Wilk Test Statistic	0.804	**Shapiro Wilk GOF Test**					
4219					1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level					
4220					Lilliefors Test Statistic	0.233	**Lilliefors GOF Test**					
4221					1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level					
4222	**Data appear Approximate Normal at 1% Significance Level**											
4223												
4224	**Assuming Normal Distribution**											
4225	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
4226					95% Student's-t UCL	9.126					95% Adjusted-CLT UCL (Chen-1995)	9.682
4227											95% Modified-t UCL (Johnson-1978)	9.248
4228												
4229	**Gamma GOF Test**											
4230					A-D Test Statistic	0.499	**Anderson-Darling Gamma GOF Test**					
4231					5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level					
4232					K-S Test Statistic	0.203	**Kolmogorov-Smirnov Gamma GOF Test**					
4233					5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level					
4234	**Detected data appear Gamma Distributed at 5% Significance Level**											
4235												
4236	**Gamma Statistics**											
4237					k hat (MLE)	1.405					k star (bias corrected MLE)	1.132
4238					Theta hat (MLE)	4.396					Theta star (bias corrected MLE)	5.456
4239					nu hat (MLE)	36.54					nu star (bias corrected)	29.44
4240					MLE Mean (bias corrected)	6.178					MLE Sd (bias corrected)	5.806
4241											Approximate Chi Square Value (0.05)	18.06
4242					Adjusted Level of Significance	0.0301					Adjusted Chi Square Value	16.79
4243												
4244	**Assuming Gamma Distribution**											
4245					95% Approximate Gamma UCL	10.08					95% Adjusted Gamma UCL	10.83
4246												
4247	**Lognormal GOF Test**											
4248					Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk Lognormal GOF Test**					
4249					10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level					
4250					Lilliefors Test Statistic	0.158	**Lilliefors Lognormal GOF Test**					
4251					10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level					
4252	**Data appear Lognormal at 10% Significance Level**											
4253												
4254	**Lognormal Statistics**											
4255					Minimum of Logged Data	0.239					Mean of logged Data	1.425
4256					Maximum of Logged Data	3.054					SD of logged Data	0.923
4257												
4258	**Assuming Lognormal Distribution**											
4259					95% H-UCL	13.13					90% Chebyshev (MVUE) UCL	11.11
4260					95% Chebyshev (MVUE) UCL	13.38					97.5% Chebyshev (MVUE) UCL	16.53
4261					99% Chebyshev (MVUE) UCL	22.71						
4262												
4263	**Nonparametric Distribution Free UCL Statistics**											
4264	**Data appear to follow a Discernible Distribution**											

Nonparametric Distribution Free UCLs

95% CLT UCL	8.898	95% BCA Bootstrap UCL	9.768
95% Standard Bootstrap UCL	8.838	95% Bootstrap-t UCL	11.18
95% Hall's Bootstrap UCL	12.48	95% Percentile Bootstrap UCL	8.94
90% Chebyshev(Mean, Sd) UCL	11.14	95% Chebyshev(Mean, Sd) UCL	13.39
97.5% Chebyshev(Mean, Sd) UCL	16.51	99% Chebyshev(Mean, Sd) UCL	22.63

Suggested UCL to Use

95% Student's-t UCL	9.126		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_antimony)

General Statistics

Total Number of Observations	13	Number of Distinct 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 Result (forage fish_wb_antimony) was not processed!

Result (forage fish_wb_arsenic)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0213	Mean	0.0341
Maximum	0.0484	Median	0.0339
SD	0.00836	Std. Error of Mean	0.00232
Coefficient of Variation	0.245	Skewness	0.225

Normal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0382	95% Adjusted-CLT UCL (Chen-1995)	0.0381

		95% Modified-t UCL (Johnson-1978)	0.0382
Gamma GOF Test			
A-D Test Statistic	0.217	**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	0.133	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	17.64	k star (bias corrected MLE)	13.62
Theta hat (MLE)	0.00193	Theta star (bias corrected MLE)	0.0025
nu hat (MLE)	458.7	nu star (bias corrected)	354.2
MLE Mean (bias corrected)	0.0341	MLE Sd (bias corrected)	0.00923
		Approximate Chi Square Value (0.05)	311.6
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	305.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.0387	95% Adjusted Gamma UCL	0.0395
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.147	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3.849	Mean of logged Data	-3.408
Maximum of Logged Data	-3.028	SD of logged Data	0.252
Assuming Lognormal Distribution			
95% H-UCL	0.0392	90% Chebyshev (MVUE) UCL	0.0413
95% Chebyshev (MVUE) UCL	0.0446	97.5% Chebyshev (MVUE) UCL	0.0491
99% Chebyshev (MVUE) UCL	0.058		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0379	95% BCA Bootstrap UCL	0.0379
95% Standard Bootstrap UCL	0.0378	95% Bootstrap-t UCL	0.0383
95% Hall's Bootstrap UCL	0.0382	95% Percentile Bootstrap UCL	0.0379
90% Chebyshev(Mean, Sd) UCL	0.041	95% Chebyshev(Mean, Sd) UCL	0.0442
97.5% Chebyshev(Mean, Sd) UCL	0.0486	99% Chebyshev(Mean, Sd) UCL	0.0571
Suggested UCL to Use			
95% Student's-t UCL	0.0382		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Result (forage fish_wb_barium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	1.34	Mean	3.923
Maximum	7.54	Median	3.54
SD	2.05	Std. Error of Mean	0.569
Coefficient of Variation	0.523	Skewness	0.76

Normal GOF Test

Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.936	95% Adjusted-CLT UCL (Chen-1995)	4.986
		95% Modified-t UCL (Johnson-1978)	4.956

Gamma GOF Test

A-D Test Statistic	0.353	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.171	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.11	k star (bias corrected MLE)	3.213
Theta hat (MLE)	0.954	Theta star (bias corrected MLE)	1.221
nu hat (MLE)	106.9	nu star (bias corrected)	83.54
MLE Mean (bias corrected)	3.923	MLE Sd (bias corrected)	2.189
		Approximate Chi Square Value (0.05)	63.48
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	60.99

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.163	95% Adjusted Gamma UCL	5.374

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.293	Mean of logged Data	1.24
Maximum of Logged Data	2.02	SD of logged Data	0.529

Assuming Lognormal Distribution

95% H-UCL	5.52	90% Chebyshev (MVUE) UCL	5.709
95% Chebyshev (MVUE) UCL	6.516	97.5% Chebyshev (MVUE) UCL	7.635
99% Chebyshev (MVUE) UCL	9.834		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.858	95% BCA Bootstrap UCL	5.102
95% Standard Bootstrap UCL	4.856	95% Bootstrap-t UCL	5.143
95% Hall's Bootstrap UCL	4.901	95% Percentile Bootstrap UCL	4.901
90% Chebyshev(Mean, Sd) UCL	5.629	95% Chebyshev(Mean, Sd) UCL	6.402
97.5% Chebyshev(Mean, Sd) UCL	7.474	99% Chebyshev(Mean, Sd) UCL	9.581

Suggested UCL to Use

95% Student's-t UCL	4.936		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_beryllium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	13
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 Result (forage fish_wb_beryllium) was not processed!

Result (forage fish_wb_bismuth)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	13
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 Result (forage fish_wb_bismuth) was not processed!

Result (forage fish_wb_boron)

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	13
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 Result (forage fish_wb_boron) was not processed!			
Result (forage fish_wb_cadmium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.0064	Mean	0.0139
Maximum	0.0246	Median	0.0135
SD	0.00561	Std. Error of Mean	0.00156
Coefficient of Variation	0.404	Skewness	0.495
Normal GOF Test			
Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0166	95% Adjusted-CLT UCL (Chen-1995)	0.0167
		95% Modified-t UCL (Johnson-1978)	0.0167
Gamma GOF Test			
A-D Test Statistic	0.346	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.153	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	6.458	k star (bias corrected MLE)	5.019
Theta hat (MLE)	0.00215	Theta star (bias corrected MLE)	0.00276
nu hat (MLE)	167.9	nu star (bias corrected)	130.5
MLE Mean (bias corrected)	0.0139	MLE Sd (bias corrected)	0.00619
		Approximate Chi Square Value (0.05)	105.1
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	101.9
Assuming Gamma Distribution			

95% Approximate Gamma UCL	0.0172	95% Adjusted Gamma UCL	0.0178
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.164	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-5.051	Mean of logged Data	-4.357
Maximum of Logged Data	-3.705	SD of logged Data	0.424
Assuming Lognormal Distribution			
95% H-UCL	0.018	90% Chebyshev (MVUE) UCL	0.0189
95% Chebyshev (MVUE) UCL	0.0212	97.5% Chebyshev (MVUE) UCL	0.0243
99% Chebyshev (MVUE) UCL	0.0305		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0164	95% BCA Bootstrap UCL	0.0166
95% Standard Bootstrap UCL	0.0163	95% Bootstrap-t UCL	0.017
95% Hall's Bootstrap UCL	0.0169	95% Percentile Bootstrap UCL	0.0164
90% Chebyshev(Mean, Sd) UCL	0.0185	95% Chebyshev(Mean, Sd) UCL	0.0207
97.5% Chebyshev(Mean, Sd) UCL	0.0236	99% Chebyshev(Mean, Sd) UCL	0.0294
Suggested UCL to Use			
95% Student's-t UCL	0.0166		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_calcium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	5850	Mean	8291
Maximum	11900	Median	7880
SD	1947	Std. Error of Mean	540
Coefficient of Variation	0.235	Skewness	0.787
Normal GOF Test			
Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	9253	95% Adjusted-CLT UCL (Chen-1995)	9305
		95% Modified-t UCL (Johnson-1978)	9273

Gamma GOF Test

A-D Test Statistic	0.344	**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	0.154	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	20.87	k star (bias corrected MLE)	16.1
Theta hat (MLE)	397.3	Theta star (bias corrected MLE)	514.9
nu hat (MLE)	542.5	nu star (bias corrected)	418.6
MLE Mean (bias corrected)	8291	MLE Sd (bias corrected)	2066
		Approximate Chi Square Value (0.05)	372.2
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	366

Assuming Gamma Distribution

95% Approximate Gamma UCL	9325	95% Adjusted Gamma UCL	9484

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.139	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	8.674	Mean of logged Data	8.999
Maximum of Logged Data	9.384	SD of logged Data	0.226

Assuming Lognormal Distribution

95% H-UCL	9369	90% Chebyshev (MVUE) UCL	9855
95% Chebyshev (MVUE) UCL	10566	97.5% Chebyshev (MVUE) UCL	11552
99% Chebyshev (MVUE) UCL	13489		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	9179	95% BCA Bootstrap UCL	9277
95% Standard Bootstrap UCL	9155	95% Bootstrap-t UCL	9512
95% Hall's Bootstrap UCL	9561	95% Percentile Bootstrap UCL	9178
90% Chebyshev(Mean, Sd) UCL	9911	95% Chebyshev(Mean, Sd) UCL	10645
97.5% Chebyshev(Mean, Sd) UCL	11663	99% Chebyshev(Mean, Sd) UCL	13664

Suggested UCL to Use

95% Student's-t UCL	9253		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_chromium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.012	Minimum Non-Detect	0.01
Maximum Detect	0.064	Maximum Non-Detect	0.01
Variance Detects	3.1988E-4	Percent Non-Detects	7.692%
Mean Detects	0.0303	SD Detects	0.0179
Median Detects	0.0205	CV Detects	0.59
Skewness Detects	0.776	Kurtosis Detects	-0.861
Mean of Logged Detects	-3.652	SD of Logged Detects	0.58

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.0288	KM Standard Error of Mean	0.00502
90KM SD	0.0173	95% KM (BCA) UCL	0.0368
95% KM (t) UCL	0.0377	95% KM (Percentile Bootstrap) UCL	0.0369
95% KM (z) UCL	0.037	95% KM Bootstrap t UCL	0.0401
90% KM Chebyshev UCL	0.0438	95% KM Chebyshev UCL	0.0506
97.5% KM Chebyshev UCL	0.0601	99% KM Chebyshev UCL	0.0787

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.622	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.228	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.247	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)	3.36	k star (bias corrected MLE)	2.576
Theta hat (MLE)	0.00903	Theta star (bias corrected MLE)	0.0118
nu hat (MLE)	80.65	nu star (bias corrected)	61.82
Mean (detects)	0.0303		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

	A–E	F	G–K	L
4681	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
4682	Minimum	0.01	Mean	0.0288
4683	Maximum	0.064	Median	0.019
4684	SD	0.018	CV	0.627
4685	k hat (MLE)	2.989	k star (bias corrected MLE)	2.35
4686	Theta hat (MLE)	0.00963	Theta star (bias corrected MLE)	0.0122
4687	nu hat (MLE)	77.71	nu star (bias corrected)	61.11
4688	Adjusted Level of Significance (β)	0.0301		
4689	Approximate Chi Square Value (61.11, α)	44.13	Adjusted Chi Square Value (61.11, β)	42.08
4690	95% Gamma Approximate UCL	0.0398	95% Gamma Adjusted UCL	0.0418
4691				
4692	**Estimates of Gamma Parameters using KM Estimates**			
4693	Mean (KM)	0.0288	SD (KM)	0.0173
4694	Variance (KM)	3.0002E-4	SE of Mean (KM)	0.00502
4695	k hat (KM)	2.759	k star (KM)	2.173
4696	nu hat (KM)	71.73	nu star (KM)	56.51
4697	theta hat (KM)	0.0104	theta star (KM)	0.0132
4698	80% gamma percentile (KM)	0.0426	90% gamma percentile (KM)	0.0549
4699	95% gamma percentile (KM)	0.0665	99% gamma percentile (KM)	0.0921
4700				
4701	**Gamma Kaplan-Meier (KM) Statistics**			
4702	Approximate Chi Square Value (56.51, α)	40.23	Adjusted Chi Square Value (56.51, β)	38.28
4703	95% KM Approximate Gamma UCL	0.0404	95% KM Adjusted Gamma UCL	0.0425
4704				
4705	**Lognormal GOF Test on Detected Observations Only**			
4706	Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk GOF Test**	
4707	10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level	
4708	Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**	
4709	10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level	
4710	**Detected Data appear Lognormal at 10% Significance Level**			
4711				
4712	**Lognormal ROS Statistics Using Imputed Non-Detects**			
4713	Mean in Original Scale	0.0285	Mean in Log Scale	-3.76
4714	SD in Original Scale	0.0184	SD in Log Scale	0.679
4715	95% t UCL (assumes normality of ROS data)	0.0376	95% Percentile Bootstrap UCL	0.037
4716	95% BCA Bootstrap UCL	0.0378	95% Bootstrap t UCL	0.0392
4717	95% H-UCL (Log ROS)	0.0464		
4718				
4719	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
4720	KM Mean (logged)	-3.725	KM Geo Mean	0.0241
4721	KM SD (logged)	0.591	95% Critical H Value (KM-Log)	2.223
4722	KM Standard Error of Mean (logged)	0.171	95% H-UCL (KM -Log)	0.042
4723	KM SD (logged)	0.591	95% Critical H Value (KM-Log)	2.223
4724	KM Standard Error of Mean (logged)	0.171		
4725				
4726	**DL/2 Statistics**			
4727	**DL/2 Normal**		**DL/2 Log-Transformed**	
4728	Mean in Original Scale	0.0284	Mean in Log Scale	-3.778
4729	SD in Original Scale	0.0185	SD in Log Scale	0.719
4730	95% t UCL (Assumes normality)	0.0375	95% H-Stat UCL	0.0487
4731	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
4732				

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0377

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

Result (forage fish_wb_cobalt)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0137	Mean	0.0244
Maximum	0.0436	Median	0.0227
SD	0.0092	Std. Error of Mean	0.00255
Coefficient of Variation	0.377	Skewness	0.848

Normal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0289	95% Adjusted-CLT UCL (Chen-1995)	0.0292
		95% Modified-t UCL (Johnson-1978)	0.029

Gamma GOF Test

A-D Test Statistic	0.29	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.157	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.155	k star (bias corrected MLE)	6.325
Theta hat (MLE)	0.00299	Theta star (bias corrected MLE)	0.00385
nu hat (MLE)	212	nu star (bias corrected)	164.4
MLE Mean (bias corrected)	0.0244	MLE Sd (bias corrected)	0.00969
		Approximate Chi Square Value (0.05)	135.8
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	132.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0295	95% Adjusted Gamma UCL	0.0303

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.29	Mean of logged Data	-3.777
Maximum of Logged Data	-3.133	SD of logged Data	0.365

Assuming Lognormal Distribution

95% H-UCL	0.0301	90% Chebyshev (MVUE) UCL	0.0318
95% Chebyshev (MVUE) UCL	0.0352	97.5% Chebyshev (MVUE) UCL	0.04
99% Chebyshev (MVUE) UCL	0.0492		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0286	95% BCA Bootstrap UCL	0.029
95% Standard Bootstrap UCL	0.0284	95% Bootstrap-t UCL	0.0298
95% Hall's Bootstrap UCL	0.0299	95% Percentile Bootstrap UCL	0.0286
90% Chebyshev(Mean, Sd) UCL	0.032	95% Chebyshev(Mean, Sd) UCL	0.0355
97.5% Chebyshev(Mean, Sd) UCL	0.0403	99% Chebyshev(Mean, Sd) UCL	0.0497

Suggested UCL to Use

95% Student's-t UCL	0.0289		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_copper)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.644	Mean	0.985
Maximum	1.52	Median	0.972
SD	0.322	Std. Error of Mean	0.0892
Coefficient of Variation	0.327	Skewness	0.322

Normal GOF Test

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL	**95% UCLs (Adjusted for Skewness)**

4837	95% Student's-t UCL	1.143	95% Adjusted-CLT UCL (Chen-1995)	1.14
4838			95% Modified-t UCL (Johnson-1978)	1.145
4839				
4840	**Gamma GOF Test**			
4841	A-D Test Statistic	0.727	**Anderson-Darling Gamma GOF Test**	
4842	5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
4843	K-S Test Statistic	0.196	**Kolmogorov-Smirnov Gamma GOF Test**	
4844	5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level	
4845	**Detected data appear Gamma Distributed at 5% Significance Level**			
4846				
4847	**Gamma Statistics**			
4848	k hat (MLE)	10.22	k star (bias corrected MLE)	7.911
4849	Theta hat (MLE)	0.0964	Theta star (bias corrected MLE)	0.124
4850	nu hat (MLE)	265.7	nu star (bias corrected)	205.7
4851	MLE Mean (bias corrected)	0.985	MLE Sd (bias corrected)	0.35
4852			Approximate Chi Square Value (0.05)	173.5
4853	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	169.3
4854				
4855	**Assuming Gamma Distribution**			
4856	95% Approximate Gamma UCL	1.167	95% Adjusted Gamma UCL	1.196
4857				
4858	**Lognormal GOF Test**			
4859	Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk Lognormal GOF Test**	
4860	10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level	
4861	Lilliefors Test Statistic	0.185	**Lilliefors Lognormal GOF Test**	
4862	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
4863	**Data appear Approximate Lognormal at 10% Significance Level**			
4864				
4865	**Lognormal Statistics**			
4866	Minimum of Logged Data	-0.44	Mean of logged Data	-0.0653
4867	Maximum of Logged Data	0.419	SD of logged Data	0.329
4868				
4869	**Assuming Lognormal Distribution**			
4870	95% H-UCL	1.188	90% Chebyshev (MVUE) UCL	1.257
4871	95% Chebyshev (MVUE) UCL	1.381	97.5% Chebyshev (MVUE) UCL	1.552
4872	99% Chebyshev (MVUE) UCL	1.889		
4873				
4874	**Nonparametric Distribution Free UCL Statistics**			
4875	**Data appear to follow a Discernible Distribution**			
4876				
4877	**Nonparametric Distribution Free UCLs**			
4878	95% CLT UCL	1.131	95% BCA Bootstrap UCL	1.137
4879	95% Standard Bootstrap UCL	1.128	95% Bootstrap-t UCL	1.155
4880	95% Hall's Bootstrap UCL	1.124	95% Percentile Bootstrap UCL	1.13
4881	90% Chebyshev(Mean, Sd) UCL	1.252	95% Chebyshev(Mean, Sd) UCL	1.373
4882	97.5% Chebyshev(Mean, Sd) UCL	1.541	99% Chebyshev(Mean, Sd) UCL	1.872
4883				
4884	**Suggested UCL to Use**			
4885	95% Student's-t UCL	1.143		
4886				
4887	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
4888	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_iron)

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	33.9	Mean	43.85
Maximum	66	Median	41.7
SD	10.18	Std. Error of Mean	2.823
Coefficient of Variation	0.232	Skewness	0.996
Normal GOF Test			
Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	48.89	95% Adjusted-CLT UCL (Chen-1995)	49.33
		95% Modified-t UCL (Johnson-1978)	49.02
Gamma GOF Test			
A-D Test Statistic	0.623	**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	0.205	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	22	k star (bias corrected MLE)	16.98
Theta hat (MLE)	1.993	Theta star (bias corrected MLE)	2.583
nu hat (MLE)	572.1	nu star (bias corrected)	441.4
MLE Mean (bias corrected)	43.85	MLE Sd (bias corrected)	10.64
		Approximate Chi Square Value (0.05)	393.7
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	387.2
Assuming Gamma Distribution			
95% Approximate Gamma UCL	49.17	95% Adjusted Gamma UCL	49.98
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.195	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	3.523	Mean of logged Data	3.758

Maximum of Logged Data	4.19	SD of logged Data	0.218
Assuming Lognormal Distribution			
95% H-UCL	49.3	90% Chebyshev (MVUE) UCL	51.82
95% Chebyshev (MVUE) UCL	55.44	97.5% Chebyshev (MVUE) UCL	60.47
99% Chebyshev (MVUE) UCL	70.36		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	48.5	95% BCA Bootstrap UCL	48.97
95% Standard Bootstrap UCL	48.32	95% Bootstrap-t UCL	50.27
95% Hall's Bootstrap UCL	49.17	95% Percentile Bootstrap UCL	48.48
90% Chebyshev(Mean, Sd) UCL	52.32	95% Chebyshev(Mean, Sd) UCL	56.16
97.5% Chebyshev(Mean, Sd) UCL	61.49	99% Chebyshev(Mean, Sd) UCL	71.95
Suggested UCL to Use			
95% Student's-t UCL	48.89		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_lead)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0297	Mean	0.0566
Maximum	0.0933	Median	0.0536
SD	0.0226	Std. Error of Mean	0.00628
Coefficient of Variation	0.4	Skewness	0.291
Normal GOF Test			
Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.174	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0678	95% Adjusted-CLT UCL (Chen-1995)	0.0675
		95% Modified-t UCL (Johnson-1978)	0.0679
Gamma GOF Test			
A-D Test Statistic	0.467	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.174	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.612	k star (bias corrected MLE)	5.137
Theta hat (MLE)	0.00856	Theta star (bias corrected MLE)	0.011
nu hat (MLE)	171.9	nu star (bias corrected)	133.6
MLE Mean (bias corrected)	0.0566	MLE Sd (bias corrected)	0.025
		Approximate Chi Square Value (0.05)	107.9
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	104.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0701	95% Adjusted Gamma UCL	0.0723

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.517	Mean of logged Data	-2.949
Maximum of Logged Data	-2.372	SD of logged Data	0.415

Assuming Lognormal Distribution

95% H-UCL	0.0727	90% Chebyshev (MVUE) UCL	0.0766
95% Chebyshev (MVUE) UCL	0.0856	97.5% Chebyshev (MVUE) UCL	0.0982
99% Chebyshev (MVUE) UCL	0.123		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0669	95% BCA Bootstrap UCL	0.067
95% Standard Bootstrap UCL	0.0666	95% Bootstrap-t UCL	0.0683
95% Hall's Bootstrap UCL	0.0666	95% Percentile Bootstrap UCL	0.0666
90% Chebyshev(Mean, Sd) UCL	0.0754	95% Chebyshev(Mean, Sd) UCL	0.084
97.5% Chebyshev(Mean, Sd) UCL	0.0958	99% Chebyshev(Mean, Sd) UCL	0.119

Suggested UCL to Use

95% Student's-t UCL	0.0678		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_lithium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	13
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 Result (forage fish_wb_lithium) was not processed!

Result (forage fish_wb_magnesium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	214	Mean	259.4
Maximum	299	Median	265
SD	28.82	Std. Error of Mean	7.992
Coefficient of Variation	0.111	Skewness	-0.254

Normal GOF Test

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	273.6	95% Adjusted-CLT UCL (Chen-1995)	271.9
		95% Modified-t UCL (Johnson-1978)	273.5

Gamma GOF Test

A-D Test Statistic	0.473	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.732	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	0.236	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	85.74	k star (bias corrected MLE)	66.01
Theta hat (MLE)	3.025	Theta star (bias corrected MLE)	3.93
nu hat (MLE)	2229	nu star (bias corrected)	1716
MLE Mean (bias corrected)	259.4	MLE Sd (bias corrected)	31.93
		Approximate Chi Square Value (0.05)	1621
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	1608

Assuming Gamma Distribution

95% Approximate Gamma UCL	274.6	95% Adjusted Gamma UCL	276.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level

Lilliefors Test Statistic	0.187	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	5.366	Mean of logged Data	5.552
Maximum of Logged Data	5.7	SD of logged Data	0.113

Assuming Lognormal Distribution

95% H-UCL	275	90% Chebyshev (MVUE) UCL	283.9
95% Chebyshev (MVUE) UCL	295	97.5% Chebyshev (MVUE) UCL	310.4
99% Chebyshev (MVUE) UCL	340.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	272.5	95% BCA Bootstrap UCL	271.1
95% Standard Bootstrap UCL	272	95% Bootstrap-t UCL	273.3
95% Hall's Bootstrap UCL	271.4	95% Percentile Bootstrap UCL	272.2
90% Chebyshev(Mean, Sd) UCL	283.4	95% Chebyshev(Mean, Sd) UCL	294.2
97.5% Chebyshev(Mean, Sd) UCL	309.3	99% Chebyshev(Mean, Sd) UCL	338.9

Suggested UCL to Use

95% Student's-t UCL	273.6		

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 using results from simulation studies.
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.

Result (forage fish_wb_manganese)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	5.36	Mean	12.23
Maximum	35.5	Median	10.1
SD	9.321	Std. Error of Mean	2.585
Coefficient of Variation	0.762	Skewness	2.018

Normal GOF Test

Shapiro Wilk Test Statistic	0.672	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.382	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.271	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

	A B C D E	F	G H I J K	L
5149	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
5150	95% Student's-t UCL	16.84	95% Adjusted-CLT UCL (Chen-1995)	18.03
5151			95% Modified-t UCL (Johnson-1978)	17.08
5152				
5153	**Gamma GOF Test**			
5154	A-D Test Statistic	1.2	**Anderson-Darling Gamma GOF Test**	
5155	5% A-D Critical Value	0.74	Data Not Gamma Distributed at 5% Significance Level	
5156	K-S Test Statistic	0.314	**Kolmogorov-Smirnov Gamma GOF Test**	
5157	5% K-S Critical Value	0.238	Data Not Gamma Distributed at 5% Significance Level	
5158	**Data Not Gamma Distributed at 5% Significance Level**			
5159				
5160	**Gamma Statistics**			
5161	k hat (MLE)	2.879	k star (bias corrected MLE)	2.266
5162	Theta hat (MLE)	4.249	Theta star (bias corrected MLE)	5.398
5163	nu hat (MLE)	74.86	nu star (bias corrected)	58.92
5164	MLE Mean (bias corrected)	12.23	MLE Sd (bias corrected)	8.126
5165			Approximate Chi Square Value (0.05)	42.27
5166	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	40.27
5167				
5168	**Assuming Gamma Distribution**			
5169	95% Approximate Gamma UCL	17.05	95% Adjusted Gamma UCL	17.9
5170				
5171	**Lognormal GOF Test**			
5172	Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk Lognormal GOF Test**	
5173	10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level	
5174	Lilliefors Test Statistic	0.268	**Lilliefors Lognormal GOF Test**	
5175	10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level	
5176	**Data Not Lognormal at 10% Significance Level**			
5177				
5178	**Lognormal Statistics**			
5179	Minimum of Logged Data	1.679	Mean of logged Data	2.32
5180	Maximum of Logged Data	3.57	SD of logged Data	0.576
5181				
5182	**Assuming Lognormal Distribution**			
5183	95% H-UCL	17.33	90% Chebyshev (MVUE) UCL	17.71
5184	95% Chebyshev (MVUE) UCL	20.37	97.5% Chebyshev (MVUE) UCL	24.06
5185	99% Chebyshev (MVUE) UCL	31.3		
5186				
5187	**Nonparametric Distribution Free UCL Statistics**			
5188	**Data do not follow a Discernible Distribution**			
5189				
5190	**Nonparametric Distribution Free UCLs**			
5191	95% CLT UCL	16.48	95% BCA Bootstrap UCL	17.87
5192	95% Standard Bootstrap UCL	16.35	95% Bootstrap-t UCL	28.1
5193	95% Hall's Bootstrap UCL	44.82	95% Percentile Bootstrap UCL	16.65
5194	90% Chebyshev(Mean, Sd) UCL	19.99	95% Chebyshev(Mean, Sd) UCL	23.5
5195	97.5% Chebyshev(Mean, Sd) UCL	28.38	99% Chebyshev(Mean, Sd) UCL	37.95
5196				
5197	**Suggested UCL to Use**			
5198	95% Student's-t UCL	16.84		
5199				
5200	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_mercury)

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0164	Mean	0.027
Maximum	0.0643	Median	0.0238
SD	0.0124	Std. Error of Mean	0.00344
Coefficient of Variation	0.459	Skewness	2.522
Normal GOF Test			
Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0332	95% Adjusted-CLT UCL (Chen-1995)	0.0353
		95% Modified-t UCL (Johnson-1978)	0.0336
Gamma GOF Test			
A-D Test Statistic	0.719	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.735	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	0.237	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	7.438	k star (bias corrected MLE)	5.773
Theta hat (MLE)	0.00363	Theta star (bias corrected MLE)	0.00468
nu hat (MLE)	193.4	nu star (bias corrected)	150.1
MLE Mean (bias corrected)	0.027	MLE Sd (bias corrected)	0.0113
		Approximate Chi Square Value (0.05)	122.8
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	119.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.033	95% Adjusted Gamma UCL	0.034
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.155	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Approximate Lognormal at 10% Significance Level			
Lognormal Statistics			

Minimum of Logged Data	-4.11	Mean of logged Data	-3.68
Maximum of Logged Data	-2.744	SD of logged Data	0.358
Assuming Lognormal Distribution			
95% H-UCL	0.033	90% Chebyshev (MVUE) UCL	0.0349
95% Chebyshev (MVUE) UCL	0.0385	97.5% Chebyshev (MVUE) UCL	0.0436
99% Chebyshev (MVUE) UCL	0.0536		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0327	95% BCA Bootstrap UCL	0.0353
95% Standard Bootstrap UCL	0.0324	95% Bootstrap-t UCL	0.039
95% Hall's Bootstrap UCL	0.0558	95% Percentile Bootstrap UCL	0.0327
90% Chebyshev(Mean, Sd) UCL	0.0373	95% Chebyshev(Mean, Sd) UCL	0.042
97.5% Chebyshev(Mean, Sd) UCL	0.0485	99% Chebyshev(Mean, Sd) UCL	0.0612
Suggested UCL to Use			
95% Student's-t UCL	0.0332		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_methylmercury)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0125	Mean	0.0236
Maximum	0.0506	Median	0.022
SD	0.0107	Std. Error of Mean	0.00297
Coefficient of Variation	0.453	Skewness	1.335
Normal GOF Test			
Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0289	95% Adjusted-CLT UCL (Chen-1995)	0.0297
		95% Modified-t UCL (Johnson-1978)	0.0291
Gamma GOF Test			

A-D Test Statistic	0.407	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.735	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	0.237	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	6.1	k star (bias corrected MLE)	4.743
Theta hat (MLE)	0.00387	Theta star (bias corrected MLE)	0.00498
nu hat (MLE)	158.6	nu star (bias corrected)	123.3
MLE Mean (bias corrected)	0.0236	MLE Sd (bias corrected)	0.0108
		Approximate Chi Square Value (0.05)	98.68
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	95.54
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.0295	95% Adjusted Gamma UCL	0.0305
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.163	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-4.382	Mean of logged Data	-3.83
Maximum of Logged Data	-2.984	SD of logged Data	0.419
Assuming Lognormal Distribution			
95% H-UCL	0.0302	90% Chebyshev (MVUE) UCL	0.0319
95% Chebyshev (MVUE) UCL	0.0356	97.5% Chebyshev (MVUE) UCL	0.0409
99% Chebyshev (MVUE) UCL	0.0512		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0285	95% BCA Bootstrap UCL	0.0293
95% Standard Bootstrap UCL	0.0283	95% Bootstrap-t UCL	0.0307
95% Hall's Bootstrap UCL	0.0319	95% Percentile Bootstrap UCL	0.0285
90% Chebyshev(Mean, Sd) UCL	0.0325	95% Chebyshev(Mean, Sd) UCL	0.0365
97.5% Chebyshev(Mean, Sd) UCL	0.0421	99% Chebyshev(Mean, Sd) UCL	0.0531
Suggested UCL to Use			
95% Student's-t UCL	0.0289		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_molybdenum)			

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0229	Mean	0.0354
Maximum	0.0655	Median	0.032
SD	0.0105	Std. Error of Mean	0.00292
Coefficient of Variation	0.297	Skewness	2.107
Normal GOF Test			
Shapiro Wilk Test Statistic	0.798	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0406	95% Adjusted-CLT UCL (Chen-1995)	0.042
		95% Modified-t UCL (Johnson-1978)	0.0409
Gamma GOF Test			
A-D Test Statistic	0.601	**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	0.157	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	15.32	k star (bias corrected MLE)	11.84
Theta hat (MLE)	0.00231	Theta star (bias corrected MLE)	0.00299
nu hat (MLE)	398.4	nu star (bias corrected)	307.8
MLE Mean (bias corrected)	0.0354	MLE Sd (bias corrected)	0.0103
		Approximate Chi Square Value (0.05)	268.2
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	262.9
Assuming Gamma Distribution			
95% Approximate Gamma UCL	0.0406	95% Adjusted Gamma UCL	0.0414
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-3.777	Mean of logged Data	-3.374
Maximum of Logged Data	-2.726	SD of logged Data	0.255
Assuming Lognormal Distribution			
95% H-UCL	0.0406	90% Chebyshev (MVUE) UCL	0.0428

95% Chebyshev (MVUE) UCL	0.0463	97.5% Chebyshev (MVUE) UCL	0.051
99% Chebyshev (MVUE) UCL	0.0603		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.0402	95% BCA Bootstrap UCL	0.0425
95% Standard Bootstrap UCL	0.0402	95% Bootstrap-t UCL	0.0446
95% Hall's Bootstrap UCL	0.0634	95% Percentile Bootstrap UCL	0.0408
90% Chebyshev(Mean, Sd) UCL	0.0441	95% Chebyshev(Mean, Sd) UCL	0.0481
97.5% Chebyshev(Mean, Sd) UCL	0.0536	99% Chebyshev(Mean, Sd) UCL	0.0644
Suggested UCL to Use			
95% Student's-t UCL	0.0406		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_nickel)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	10
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.042	Minimum Non-Detect	0.04
Maximum Detect	0.075	Maximum Non-Detect	0.04
Variance Detects	2.7300E-4	Percent Non-Detects	76.92%
Mean Detects	0.059	SD Detects	0.0165
Median Detects	0.06	CV Detects	0.28
Skewness Detects	-0.271	Kurtosis Detects	N/A
Mean of Logged Detects	-2.858	SD of Logged Detects	0.292
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	0.997	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0444	KM Standard Error of Mean	0.0035
90KM SD	0.0103	95% KM (BCA) UCL	N/A

	A	B	C	D	E	F	G	H	I	J	K	L
5461					95% KM (t) UCL	0.0506					95% KM (Percentile Bootstrap) UCL	N/A
5462					95% KM (z) UCL	0.0501					95% KM Bootstrap t UCL	N/A
5463					90% KM Chebyshev UCL	0.0549					95% KM Chebyshev UCL	0.0596
5464					97.5% KM Chebyshev UCL	0.0662					99% KM Chebyshev UCL	0.0792
5465												
5466	**Gamma GOF Tests on Detected Observations Only**											
5467					A-D Test Statistic	0.261	**Anderson-Darling GOF Test**					
5468					5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level					
5469					K-S Test Statistic	0.235	**Kolmogorov-Smirnov GOF**					
5470					5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level					
5471	**Detected Data Not Gamma Distributed at 5% Significance Level**											
5472												
5473	**Gamma Statistics on Detected Data Only**											
5474					k hat (MLE)	18.21					k star (bias corrected MLE)	N/A
5475					Theta hat (MLE)	0.00324					Theta star (bias corrected MLE)	N/A
5476					nu hat (MLE)	109.3					nu star (bias corrected)	N/A
5477					Mean (detects)	0.059						
5478												
5479	**Gamma ROS Statistics using Imputed Non-Detects**											
5480	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
5481	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
5482	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
5483	This is especially true when the sample size is small.											
5484	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
5485					Minimum	0.01					Mean	0.0228
5486					Maximum	0.075					Median	0.01
5487					SD	0.0221					CV	0.968
5488					k hat (MLE)	1.708					k star (bias corrected MLE)	1.365
5489					Theta hat (MLE)	0.0134					Theta star (bias corrected MLE)	0.0167
5490					nu hat (MLE)	44.41					nu star (bias corrected)	35.49
5491					Adjusted Level of Significance (β)	0.0301						
5492					Approximate Chi Square Value (35.49, α)	22.86					Adjusted Chi Square Value (35.49, β)	21.43
5493					95% Gamma Approximate UCL	0.0354					95% Gamma Adjusted UCL	N/A
5494												
5495	**Estimates of Gamma Parameters using KM Estimates**											
5496					Mean (KM)	0.0444					SD (KM)	0.0103
5497					Variance (KM)	1.0608E-4					SE of Mean (KM)	0.0035
5498					k hat (KM)	18.57					k star (KM)	14.34
5499					nu hat (KM)	482.8					nu star (KM)	372.7
5500					theta hat (KM)	0.00239					theta star (KM)	0.0031
5501					80% gamma percentile (KM)	0.0538					90% gamma percentile (KM)	0.0599
5502					95% gamma percentile (KM)	0.0653					99% gamma percentile (KM)	0.0761
5503												
5504	**Gamma Kaplan-Meier (KM) Statistics**											
5505					Approximate Chi Square Value (372.74, α)	329					Adjusted Chi Square Value (372.74, β)	323.1
5506					95% KM Approximate Gamma UCL	0.0503					95% KM Adjusted Gamma UCL	0.0512
5507												
5508	**Lognormal GOF Test on Detected Observations Only**											
5509					Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk GOF Test**					
5510					10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level					
5511					Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**					
5512					10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level					

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0258	Mean in Log Scale	-3.953
SD in Original Scale	0.0213	SD in Log Scale	0.805
95% t UCL (assumes normality of ROS data)	0.0363	95% Percentile Bootstrap UCL	0.0359
95% BCA Bootstrap UCL	0.0377	95% Bootstrap t UCL	0.0422
95% H-UCL (Log ROS)	0.0477		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.136	KM Geo Mean	0.0435
KM SD (logged)	0.19	95% Critical H Value (KM-Log)	1.823
KM Standard Error of Mean (logged)	0.0647	95% H-UCL (KM -Log)	0.0489
KM SD (logged)	0.19	95% Critical H Value (KM-Log)	1.823
KM Standard Error of Mean (logged)	0.0647		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.029	Mean in Log Scale	-3.669
SD in Original Scale	0.0184	SD in Log Scale	0.477
95% t UCL (Assumes normality)	0.0381	95% H-Stat UCL	0.0381

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0506		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_phosphorus)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	3990	Mean	5252
Maximum	7040	Median	4920
SD	1012	Std. Error of Mean	280.8
Coefficient of Variation	0.193	Skewness	0.612

Normal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5753	95% Adjusted-CLT UCL (Chen-1995)	5765
		95% Modified-t UCL (Johnson-1978)	5761
Gamma GOF Test			
A-D Test Statistic	0.376	**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	0.155	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	30.35	k star (bias corrected MLE)	23.4
Theta hat (MLE)	173	Theta star (bias corrected MLE)	224.4
nu hat (MLE)	789.2	nu star (bias corrected)	608.4
MLE Mean (bias corrected)	5252	MLE Sd (bias corrected)	1086
		Approximate Chi Square Value (0.05)	552.2
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	544.6
Assuming Gamma Distribution			
95% Approximate Gamma UCL	5787	95% Adjusted Gamma UCL	5868
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	8.292	Mean of logged Data	8.55
Maximum of Logged Data	8.859	SD of logged Data	0.188
Assuming Lognormal Distribution			
95% H-UCL	5804	90% Chebyshev (MVUE) UCL	6076
95% Chebyshev (MVUE) UCL	6449	97.5% Chebyshev (MVUE) UCL	6968
99% Chebyshev (MVUE) UCL	7986		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	5714	95% BCA Bootstrap UCL	5728
95% Standard Bootstrap UCL	5701	95% Bootstrap-t UCL	5856
95% Hall's Bootstrap UCL	5754	95% Percentile Bootstrap UCL	5710
90% Chebyshev(Mean, Sd) UCL	6095	95% Chebyshev(Mean, Sd) UCL	6476
97.5% Chebyshev(Mean, Sd) UCL	7006	99% Chebyshev(Mean, Sd) UCL	8046
Suggested UCL to Use			
95% Student's-t UCL	5753		

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

Result (forage fish_wb_potassium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	394	Mean	663.1
Maximum	1040	Median	701
SD	184.6	Std. Error of Mean	51.21
Coefficient of Variation	0.278	Skewness	0.249

Normal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	754.3	95% Adjusted-CLT UCL (Chen-1995)	751.1
		95% Modified-t UCL (Johnson-1978)	754.9

Gamma GOF Test

A-D Test Statistic	0.411	**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	0.218	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	13.53	k star (bias corrected MLE)	10.46
Theta hat (MLE)	49	Theta star (bias corrected MLE)	63.39
nu hat (MLE)	351.8	nu star (bias corrected)	272
MLE Mean (bias corrected)	663.1	MLE Sd (bias corrected)	205
		Approximate Chi Square Value (0.05)	234.8
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	229.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	768.1	95% Adjusted Gamma UCL	784.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics			
Minimum of Logged Data	5.976	Mean of logged Data	6.459
Maximum of Logged Data	6.947	SD of logged Data	0.289
Assuming Lognormal Distribution			
95% H-UCL	780.4	90% Chebyshev (MVUE) UCL	824.9
95% Chebyshev (MVUE) UCL	897.9	97.5% Chebyshev (MVUE) UCL	999.2
99% Chebyshev (MVUE) UCL	1198		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	747.3	95% BCA Bootstrap UCL	751.1
95% Standard Bootstrap UCL	746	95% Bootstrap-t UCL	756.9
95% Hall's Bootstrap UCL	757.6	95% Percentile Bootstrap UCL	749.9
90% Chebyshev(Mean, Sd) UCL	816.7	95% Chebyshev(Mean, Sd) UCL	886.3
97.5% Chebyshev(Mean, Sd) UCL	982.9	99% Chebyshev(Mean, Sd) UCL	1173
Suggested UCL to Use			
95% Student's-t UCL	754.3		
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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_selenium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.128	Mean	0.167
Maximum	0.225	Median	0.156
SD	0.0313	Std. Error of Mean	0.00869
Coefficient of Variation	0.188	Skewness	0.639
Normal GOF Test			
Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.182	95% Adjusted-CLT UCL (Chen-1995)	0.183
		95% Modified-t UCL (Johnson-1978)	0.183
Gamma GOF Test			
A-D Test Statistic	0.444	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level	

5721	K-S Test Statistic	0.162	**Kolmogorov-Smirnov Gamma GOF Test**	
5722	5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
5723	**Detected data appear Gamma Distributed at 5% Significance Level**			
5724				
5725	**Gamma Statistics**			
5726	k hat (MLE)	32.12	k star (bias corrected MLE)	24.76
5727	Theta hat (MLE)	0.00519	Theta star (bias corrected MLE)	0.00674
5728	nu hat (MLE)	835.1	nu star (bias corrected)	643.7
5729	MLE Mean (bias corrected)	0.167	MLE Sd (bias corrected)	0.0335
5730			Approximate Chi Square Value (0.05)	585.9
5731	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	578
5732				
5733	**Assuming Gamma Distribution**			
5734	95% Approximate Gamma UCL	0.183	95% Adjusted Gamma UCL	0.186
5735				
5736	**Lognormal GOF Test**			
5737	Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**	
5738	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
5739	Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**	
5740	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
5741	**Data appear Lognormal at 10% Significance Level**			
5742				
5743	**Lognormal Statistics**			
5744	Minimum of Logged Data	-2.056	Mean of logged Data	-1.807
5745	Maximum of Logged Data	-1.492	SD of logged Data	0.182
5746				
5747	**Assuming Lognormal Distribution**			
5748	95% H-UCL	0.184	90% Chebyshev (MVUE) UCL	0.192
5749	95% Chebyshev (MVUE) UCL	0.204	97.5% Chebyshev (MVUE) UCL	0.22
5750	99% Chebyshev (MVUE) UCL	0.251		
5751				
5752	**Nonparametric Distribution Free UCL Statistics**			
5753	**Data appear to follow a Discernible Distribution**			
5754				
5755	**Nonparametric Distribution Free UCLs**			
5756	95% CLT UCL	0.181	95% BCA Bootstrap UCL	0.181
5757	95% Standard Bootstrap UCL	0.18	95% Bootstrap-t UCL	0.185
5758	95% Hall's Bootstrap UCL	0.182	95% Percentile Bootstrap UCL	0.18
5759	90% Chebyshev(Mean, Sd) UCL	0.193	95% Chebyshev(Mean, Sd) UCL	0.205
5760	97.5% Chebyshev(Mean, Sd) UCL	0.221	99% Chebyshev(Mean, Sd) UCL	0.253
5761				
5762	**Suggested UCL to Use**			
5763	95% Student's-t UCL	0.182		
5764				
5765	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
5766	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
5767	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
5768				
5769	**Result (forage fish_wb_sodium)**			
5770				
5771	**General Statistics**			
5772	Total Number of Observations	13	Number of Distinct Observations	12

		Number of Missing Observations	0
Minimum	194	Mean	250.2
Maximum	350	Median	242
SD	46.02	Std. Error of Mean	12.76
Coefficient of Variation	0.184	Skewness	0.611
Normal GOF Test			
Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.115	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	272.9	95% Adjusted-CLT UCL (Chen-1995)	273.5
		95% Modified-t UCL (Johnson-1978)	273.3
Gamma GOF Test			
A-D Test Statistic	0.288	**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	0.137	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	33.04	k star (bias corrected MLE)	25.46
Theta hat (MLE)	7.572	Theta star (bias corrected MLE)	9.824
nu hat (MLE)	858.9	nu star (bias corrected)	662.1
MLE Mean (bias corrected)	250.2	MLE Sd (bias corrected)	49.57
		Approximate Chi Square Value (0.05)	603.4
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	595.4
Assuming Gamma Distribution			
95% Approximate Gamma UCL	274.5	95% Adjusted Gamma UCL	278.2
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	5.268	Mean of logged Data	5.507
Maximum of Logged Data	5.858	SD of logged Data	0.181
Assuming Lognormal Distribution			
95% H-UCL	275.3	90% Chebyshev (MVUE) UCL	287.9
95% Chebyshev (MVUE) UCL	305	97.5% Chebyshev (MVUE) UCL	328.7
99% Chebyshev (MVUE) UCL	375.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	271.1	95% BCA Bootstrap UCL	273.6
95% Standard Bootstrap UCL	271	95% Bootstrap-t UCL	276.2
95% Hall's Bootstrap UCL	278.1	95% Percentile Bootstrap UCL	272.1
90% Chebyshev(Mean, Sd) UCL	288.4	95% Chebyshev(Mean, Sd) UCL	305.8
97.5% Chebyshev(Mean, Sd) UCL	329.9	99% Chebyshev(Mean, Sd) UCL	377.1

Suggested UCL to Use

95% Student's-t UCL	272.9		

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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (forage fish_wb_strontium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	6.59	Mean	9.246
Maximum	15.2	Median	9.01
SD	2.287	Std. Error of Mean	0.634
Coefficient of Variation	0.247	Skewness	1.439

Normal GOF Test

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	10.38	95% Adjusted-CLT UCL (Chen-1995)	10.56
		95% Modified-t UCL (Johnson-1978)	10.42

Gamma GOF Test

A-D Test Statistic	0.306	**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	0.138	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	20.05	k star (bias corrected MLE)	15.48
Theta hat (MLE)	0.461	Theta star (bias corrected MLE)	0.597
nu hat (MLE)	521.3	nu star (bias corrected)	402.4
MLE Mean (bias corrected)	9.246	MLE Sd (bias corrected)	2.35
		Approximate Chi Square Value (0.05)	356.9

Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	350.8
Assuming Gamma Distribution			
95% Approximate Gamma UCL	10.42	95% Adjusted Gamma UCL	10.61
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.125	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.886	Mean of logged Data	2.199
Maximum of Logged Data	2.721	SD of logged Data	0.228
Assuming Lognormal Distribution			
95% H-UCL	10.45	90% Chebyshev (MVUE) UCL	11
95% Chebyshev (MVUE) UCL	11.79	97.5% Chebyshev (MVUE) UCL	12.9
99% Chebyshev (MVUE) UCL	15.08		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	10.29	95% BCA Bootstrap UCL	10.6
95% Standard Bootstrap UCL	10.27	95% Bootstrap-t UCL	10.75
95% Hall's Bootstrap UCL	11.72	95% Percentile Bootstrap UCL	10.34
90% Chebyshev(Mean, Sd) UCL	11.15	95% Chebyshev(Mean, Sd) UCL	12.01
97.5% Chebyshev(Mean, Sd) UCL	13.21	99% Chebyshev(Mean, Sd) UCL	15.56
Suggested UCL to Use			
95% Student's-t UCL	10.38		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_thallium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.00245	Mean	0.00473
Maximum	0.00816	Median	0.00476
SD	0.00169	Std. Error of Mean	4.6895E-4
Coefficient of Variation	0.357	Skewness	0.42
Normal GOF Test			
Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	

Row				
5929	Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**	
5930	1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
5931	**Data appear Normal at 1% Significance Level**			
5932				
5933	**Assuming Normal Distribution**			
5934	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
5935	95% Student's-t UCL	0.00557	95% Adjusted-CLT UCL (Chen-1995)	0.00556
5936			95% Modified-t UCL (Johnson-1978)	0.00558
5937				
5938	**Gamma GOF Test**			
5939	A-D Test Statistic	0.353	**Anderson-Darling Gamma GOF Test**	
5940	5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
5941	K-S Test Statistic	0.175	**Kolmogorov-Smirnov Gamma GOF Test**	
5942	5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level	
5943	**Detected data appear Gamma Distributed at 5% Significance Level**			
5944				
5945	**Gamma Statistics**			
5946	k hat (MLE)	8.348	k star (bias corrected MLE)	6.473
5947	Theta hat (MLE)	5.6668E-4	Theta star (bias corrected MLE)	7.3085E-4
5948	nu hat (MLE)	217.1	nu star (bias corrected)	168.3
5949	MLE Mean (bias corrected)	0.00473	MLE Sd (bias corrected)	0.00186
5950			Approximate Chi Square Value (0.05)	139.3
5951	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	135.5
5952				
5953	**Assuming Gamma Distribution**			
5954	95% Approximate Gamma UCL	0.00572	95% Adjusted Gamma UCL	0.00587
5955				
5956	**Lognormal GOF Test**			
5957	Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**	
5958	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
5959	Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**	
5960	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
5961	**Data appear Lognormal at 10% Significance Level**			
5962				
5963	**Lognormal Statistics**			
5964	Minimum of Logged Data	-6.012	Mean of logged Data	-5.415
5965	Maximum of Logged Data	-4.809	SD of logged Data	0.369
5966				
5967	**Assuming Lognormal Distribution**			
5968	95% H-UCL	0.00588	90% Chebyshev (MVUE) UCL	0.00621
5969	95% Chebyshev (MVUE) UCL	0.00688	97.5% Chebyshev (MVUE) UCL	0.00781
5970	99% Chebyshev (MVUE) UCL	0.00963		
5971				
5972	**Nonparametric Distribution Free UCL Statistics**			
5973	**Data appear to follow a Discernible Distribution**			
5974				
5975	**Nonparametric Distribution Free UCLs**			
5976	95% CLT UCL	0.0055	95% BCA Bootstrap UCL	0.00554
5977	95% Standard Bootstrap UCL	0.00548	95% Bootstrap-t UCL	0.00561
5978	95% Hall's Bootstrap UCL	0.0056	95% Percentile Bootstrap UCL	0.0055
5979	90% Chebyshev(Mean, Sd) UCL	0.00614	95% Chebyshev(Mean, Sd) UCL	0.00677
5980	97.5% Chebyshev(Mean, Sd) UCL	0.00766	99% Chebyshev(Mean, Sd) UCL	0.0094

Row	A	B	C	D	E	F	G	H	I	J	K	L
5981												
5982	Suggested UCL to Use											
5983					95% Student's-t UCL	0.00557						
5984												
5985	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
5986	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
5987	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
5988												
5989												
5990	Result (forage fish_wb_tin)											
5991												
5992	General Statistics											
5993					Total Number of Observations	13					Number of Distinct Observations	12
5994											Number of Missing Observations	0
5995					Minimum	0.05					Mean	0.112
5996					Maximum	0.142					Median	0.122
5997					SD	0.0281					Std. Error of Mean	0.0078
5998					Coefficient of Variation	0.251					Skewness	-1.2
5999												
6000	Normal GOF Test											
6001					Shapiro Wilk Test Statistic	0.868	Shapiro Wilk GOF Test					
6002					1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level					
6003					Lilliefors Test Statistic	0.18	Lilliefors GOF Test					
6004					1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level					
6005	Data appear Normal at 1% Significance Level											
6006												
6007	Assuming Normal Distribution											
6008	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
6009					95% Student's-t UCL	0.126					95% Adjusted-CLT UCL (Chen-1995)	0.122
6010											95% Modified-t UCL (Johnson-1978)	0.125
6011												
6012	Gamma GOF Test											
6013					A-D Test Statistic	0.947	Anderson-Darling Gamma GOF Test					
6014					5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level					
6015					K-S Test Statistic	0.213	Kolmogorov-Smirnov Gamma GOF Test					
6016					5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level					
6017	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
6018												
6019	Gamma Statistics											
6020					k hat (MLE)	13.15					k star (bias corrected MLE)	10.17
6021					Theta hat (MLE)	0.0085					Theta star (bias corrected MLE)	0.011
6022					nu hat (MLE)	342					nu star (bias corrected)	264.4
6023					MLE Mean (bias corrected)	0.112					MLE Sd (bias corrected)	0.0351
6024											Approximate Chi Square Value (0.05)	227.7
6025					Adjusted Level of Significance	0.0301					Adjusted Chi Square Value	222.9
6026												
6027	Assuming Gamma Distribution											
6028					95% Approximate Gamma UCL	0.13					95% Adjusted Gamma UCL	0.133
6029												
6030	Lognormal GOF Test											
6031					Shapiro Wilk Test Statistic	0.792	Shapiro Wilk Lognormal GOF Test					
6032					10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level					

	A–E	F	G–K	L
6033	Lilliefors Test Statistic	0.24	**Lilliefors Lognormal GOF Test**	
6034	10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level	
6035	**Data Not Lognormal at 10% Significance Level**			
6036				
6037	**Lognormal Statistics**			
6038	Minimum of Logged Data	-2.996	Mean of logged Data	-2.229
6039	Maximum of Logged Data	-1.952	SD of logged Data	0.311
6040				
6041	**Assuming Lognormal Distribution**			
6042	95% H-UCL	0.134	90% Chebyshev (MVUE) UCL	0.142
6043	95% Chebyshev (MVUE) UCL	0.155	97.5% Chebyshev (MVUE) UCL	0.174
6044	99% Chebyshev (MVUE) UCL	0.21		
6045				
6046	**Nonparametric Distribution Free UCL Statistics**			
6047	**Data appear to follow a Discernible Distribution**			
6048				
6049	**Nonparametric Distribution Free UCLs**			
6050	95% CLT UCL	0.125	95% BCA Bootstrap UCL	0.122
6051	95% Standard Bootstrap UCL	0.124	95% Bootstrap-t UCL	0.123
6052	95% Hall's Bootstrap UCL	0.122	95% Percentile Bootstrap UCL	0.124
6053	90% Chebyshev(Mean, Sd) UCL	0.135	95% Chebyshev(Mean, Sd) UCL	0.146
6054	97.5% Chebyshev(Mean, Sd) UCL	0.161	99% Chebyshev(Mean, Sd) UCL	0.189
6055				
6056	**Suggested UCL to Use**			
6057	95% Student's-t UCL	0.126		
6058				
6059	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
6060	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
6061	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
6062				
6063	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**			
6064	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**			
6065				
6066	**Result (forage fish_wb_uranium)**			
6067				
6068	**General Statistics**			
6069	Total Number of Observations	13	Number of Distinct Observations	10
6070	Number of Detects	9	Number of Non-Detects	4
6071	Number of Distinct Detects	9	Number of Distinct Non-Detects	1
6072	Minimum Detect	5.2000E-4	Minimum Non-Detect	4.0000E-4
6073	Maximum Detect	0.00227	Maximum Non-Detect	4.0000E-4
6074	Variance Detects	4.3725E-7	Percent Non-Detects	30.77%
6075	Mean Detects	0.00116	SD Detects	6.6125E-4
6076	Median Detects	0.001	CV Detects	0.572
6077	Skewness Detects	0.959	Kurtosis Detects	-0.336
6078	Mean of Logged Detects	-6.902	SD of Logged Detects	0.556
6079				
6080	**Normal GOF Test on Detects Only**			
6081	Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**	
6082	1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level	
6083	Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**	
6084	1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	9.2308E-4	KM Standard Error of Mean	1.8387E-4
90KM SD	6.2505E-4	95% KM (BCA) UCL	0.00124
95% KM (t) UCL	0.00125	95% KM (Percentile Bootstrap) UCL	0.00123
95% KM (z) UCL	0.00123	95% KM Bootstrap t UCL	0.00144
90% KM Chebyshev UCL	0.00147	95% KM Chebyshev UCL	0.00172
97.5% KM Chebyshev UCL	0.00207	99% KM Chebyshev UCL	0.00275

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.417	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.185	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.752	k star (bias corrected MLE)	2.575
Theta hat (MLE)	3.0802E-4	Theta star (bias corrected MLE)	4.4874E-4
nu hat (MLE)	67.53	nu star (bias corrected)	46.35
Mean (detects)	0.00116		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	5.2000E-4	Mean	0.00388
Maximum	0.01	Median	0.00127
SD	0.00428	CV	1.105
k hat (MLE)	0.908	k star (bias corrected MLE)	0.75
Theta hat (MLE)	0.00427	Theta star (bias corrected MLE)	0.00517
nu hat (MLE)	23.62	nu star (bias corrected)	19.5
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (19.50, α)	10.48	Adjusted Chi Square Value (19.50, β)	9.555
95% Gamma Approximate UCL	0.00721	95% Gamma Adjusted UCL	0.00791

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.2308E-4	SD (KM)	6.2505E-4
Variance (KM)	3.9068E-7	SE of Mean (KM)	1.8387E-4
k hat (KM)	2.181	k star (KM)	1.729
nu hat (KM)	56.71	nu star (KM)	44.95
theta hat (KM)	4.2324E-4	theta star (KM)	5.3389E-4
80% gamma percentile (KM)	0.00141	90% gamma percentile (KM)	0.00186
95% gamma percentile (KM)	0.00229	99% gamma percentile (KM)	0.00327

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (44.95, α)	30.57	Adjusted Chi Square Value (44.95, β)	28.89

95% KM Approximate Gamma UCL	0.00136	95% KM Adjusted Gamma UCL	0.00144
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.18	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	8.7829E-4	Mean in Log Scale	-7.338
SD in Original Scale	6.9322E-4	SD in Log Scale	0.835
95% t UCL (assumes normality of ROS data)	0.00122	95% Percentile Bootstrap UCL	0.0012
95% BCA Bootstrap UCL	0.00126	95% Bootstrap t UCL	0.00135
95% H-UCL (Log ROS)	0.00171		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-7.186	KM Geo Mean	7.5716E-4
KM SD (logged)	0.609	95% Critical H Value (KM-Log)	2.247
KM Standard Error of Mean (logged)	0.179	95% H-UCL (KM -Log)	0.00135
KM SD (logged)	0.609	95% Critical H Value (KM-Log)	2.247
KM Standard Error of Mean (logged)	0.179		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	8.6154E-4	Mean in Log Scale	-7.399
SD in Original Scale	7.0867E-4	SD in Log Scale	0.899
95% t UCL (Assumes normality)	0.00121	95% H-Stat UCL	0.00183
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00125		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_vanadium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	6
Number of Detects	6	Number of Non-Detects	7
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.021	Minimum Non-Detect	0.02
Maximum Detect	0.078	Maximum Non-Detect	0.02
Variance Detects	5.2670E-4	Percent Non-Detects	53.85%
Mean Detects	0.0415	SD Detects	0.0229
Median Detects	0.0315	CV Detects	0.553

6189	Skewness Detects	0.99	Kurtosis Detects	-0.669
6190	Mean of Logged Detects	-3.301	SD of Logged Detects	0.525
6191				
6192	**Normal GOF Test on Detects Only**			
6193	Shapiro Wilk Test Statistic	0.855	**Shapiro Wilk GOF Test**	
6194	1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
6195	Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**	
6196	1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	
6197	**Detected Data appear Normal at 1% Significance Level**			
6198	**Note GOF tests may be unreliable for small sample sizes**			
6199				
6200	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
6201	KM Mean	0.0299	KM Standard Error of Mean	0.00541
6202	90KM SD	0.0178	95% KM (BCA) UCL	0.0388
6203	95% KM (t) UCL	0.0396	95% KM (Percentile Bootstrap) UCL	0.0388
6204	95% KM (z) UCL	0.0388	95% KM Bootstrap t UCL	0.0552
6205	90% KM Chebyshev UCL	0.0462	95% KM Chebyshev UCL	0.0535
6206	97.5% KM Chebyshev UCL	0.0637	99% KM Chebyshev UCL	0.0838
6207				
6208	**Gamma GOF Tests on Detected Observations Only**			
6209	A-D Test Statistic	0.439	**Anderson-Darling GOF Test**	
6210	5% A-D Critical Value	0.699	Detected data appear Gamma Distributed at 5% Significance Level	
6211	K-S Test Statistic	0.27	**Kolmogorov-Smirnov GOF**	
6212	5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level	
6213	**Detected data appear Gamma Distributed at 5% Significance Level**			
6214	**Note GOF tests may be unreliable for small sample sizes**			
6215				
6216	**Gamma Statistics on Detected Data Only**			
6217	k hat (MLE)	4.356	k star (bias corrected MLE)	2.289
6218	Theta hat (MLE)	0.00953	Theta star (bias corrected MLE)	0.0181
6219	nu hat (MLE)	52.27	nu star (bias corrected)	27.47
6220	Mean (detects)	0.0415		
6221				
6222	**Gamma ROS Statistics using Imputed Non-Detects**			
6223	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
6224	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
6225	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
6226	This is especially true when the sample size is small.			
6227	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
6228	Minimum	0.01	Mean	0.0245
6229	Maximum	0.078	Median	0.01
6230	SD	0.0221	CV	0.899
6231	k hat (MLE)	1.839	k star (bias corrected MLE)	1.466
6232	Theta hat (MLE)	0.0133	Theta star (bias corrected MLE)	0.0167
6233	nu hat (MLE)	47.82	nu star (bias corrected)	38.12
6234	Adjusted Level of Significance (β)	0.0301		
6235	Approximate Chi Square Value (38.12, α)	24.98	Adjusted Chi Square Value (38.12, β)	23.47
6236	95% Gamma Approximate UCL	0.0374	95% Gamma Adjusted UCL	0.0398
6237				
6238	**Estimates of Gamma Parameters using KM Estimates**			
6239	Mean (KM)	0.0299	SD (KM)	0.0178
6240	Variance (KM)	3.1746E-4	SE of Mean (KM)	0.00541

k hat (KM)	2.821	k star (KM)	2.221
nu hat (KM)	73.33	nu star (KM)	57.74
theta hat (KM)	0.0106	theta star (KM)	0.0135
80% gamma percentile (KM)	0.0442	90% gamma percentile (KM)	0.0568
95% gamma percentile (KM)	0.0687	99% gamma percentile (KM)	0.0949
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (57.74, α)	41.28	Adjusted Chi Square Value (57.74, β)	39.3
95% KM Approximate Gamma UCL	0.0419	95% KM Adjusted Gamma UCL	0.044
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.247	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0234	Mean in Log Scale	-4.2
SD in Original Scale	0.0231	SD in Log Scale	1.011
95% t UCL (assumes normality of ROS data)	0.0348	95% Percentile Bootstrap UCL	0.0343
95% BCA Bootstrap UCL	0.0368	95% Bootstrap t UCL	0.043
95% H-UCL (Log ROS)	0.0577		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.63	KM Geo Mean	0.0265
KM SD (logged)	0.446	95% Critical H Value (KM-Log)	2.051
KM Standard Error of Mean (logged)	0.135	95% H-UCL (KM -Log)	0.0381
KM SD (logged)	0.446	95% Critical H Value (KM-Log)	2.051
KM Standard Error of Mean (logged)	0.135		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0245	Mean in Log Scale	-4.003
SD in Original Scale	0.0221	SD in Log Scale	0.757
95% t UCL (Assumes normality)	0.0354	95% H-Stat UCL	0.0415
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0396		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (forage fish_wb_zinc)			

	A–E	F	G–K	L
6293	**General Statistics**			
6294	Total Number of Observations	13	Number of Distinct Observations	13
6295			Number of Missing Observations	0
6296	Minimum	38.5	Mean	48.42
6297	Maximum	58.3	Median	47.9
6298	SD	6.453	Std. Error of Mean	1.79
6299	Coefficient of Variation	0.133	Skewness	0.0257
6300				
6301	**Normal GOF Test**			
6302	Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk GOF Test**	
6303	1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
6304	Lilliefors Test Statistic	0.102	**Lilliefors GOF Test**	
6305	1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
6306	**Data appear Normal at 1% Significance Level**			
6307				
6308	**Assuming Normal Distribution**			
6309	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
6310	95% Student's-t UCL	51.61	95% Adjusted-CLT UCL (Chen-1995)	51.37
6311			95% Modified-t UCL (Johnson-1978)	51.61
6312				
6313	**Gamma GOF Test**			
6314	A-D Test Statistic	0.207	**Anderson-Darling Gamma GOF Test**	
6315	5% A-D Critical Value	0.732	Detected data appear Gamma Distributed at 5% Significance Level	
6316	K-S Test Statistic	0.1	**Kolmogorov-Smirnov Gamma GOF Test**	
6317	5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
6318	**Detected data appear Gamma Distributed at 5% Significance Level**			
6319				
6320	**Gamma Statistics**			
6321	k hat (MLE)	60.25	k star (bias corrected MLE)	46.4
6322	Theta hat (MLE)	0.804	Theta star (bias corrected MLE)	1.043
6323	nu hat (MLE)	1567	nu star (bias corrected)	1206
6324	MLE Mean (bias corrected)	48.42	MLE Sd (bias corrected)	7.108
6325			Approximate Chi Square Value (0.05)	1127
6326	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	1116
6327				
6328	**Assuming Gamma Distribution**			
6329	95% Approximate Gamma UCL	51.84	95% Adjusted Gamma UCL	52.35
6330				
6331	**Lognormal GOF Test**			
6332	Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	
6333	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
6334	Lilliefors Test Statistic	0.0924	**Lilliefors Lognormal GOF Test**	
6335	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
6336	**Data appear Lognormal at 10% Significance Level**			
6337				
6338	**Lognormal Statistics**			
6339	Minimum of Logged Data	3.651	Mean of logged Data	3.871
6340	Maximum of Logged Data	4.066	SD of logged Data	0.135
6341				
6342	**Assuming Lognormal Distribution**			
6343	95% H-UCL	51.94	90% Chebyshev (MVUE) UCL	53.86
6344	95% Chebyshev (MVUE) UCL	56.33	97.5% Chebyshev (MVUE) UCL	59.75

	A–E	F	G–K	L
6345	99% Chebyshev (MVUE) UCL	66.48		
6346				
6347	**Nonparametric Distribution Free UCL Statistics**			
6348	**Data appear to follow a Discernible Distribution**			
6349				
6350	**Nonparametric Distribution Free UCLs**			
6351	95% CLT UCL	51.36	95% BCA Bootstrap UCL	51.31
6352	95% Standard Bootstrap UCL	51.26	95% Bootstrap-t UCL	51.67
6353	95% Hall's Bootstrap UCL	51.41	95% Percentile Bootstrap UCL	51.38
6354	90% Chebyshev(Mean, Sd) UCL	53.78	95% Chebyshev(Mean, Sd) UCL	56.22
6355	97.5% Chebyshev(Mean, Sd) UCL	59.59	99% Chebyshev(Mean, Sd) UCL	66.22
6356				
6357	**Suggested UCL to Use**			
6358	95% Student's-t UCL	51.61		
6359				
6360	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
6361	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
6362	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
6363				
6364	**Result (forage fish_wb_zirconium)**			
6365				
6366	**General Statistics**			
6367	Total Number of Observations	13	Number of Distinct Observations	1
6368	Number of Detects	0	Number of Non-Detects	13
6369	Number of Distinct Detects	0	Number of Distinct Non-Detects	1
6370				
6371	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**			
6372	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**			
6373	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**			
6374				
6375	**The data set for variable Result (forage fish_wb_zirconium) was not processed!**			
6376				
6377				

B.2.10 Aquatic Vegetation EPC ProUCL Output

UCL Statistics for Data Sets with Non-Detects			
User Selected Options			
Date/Time of Computation	ProUCL 5.2 3/18/2024 10:19:57 AM		
From File	WorkSheet.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		
Result (aluminum)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.45	Mean	85
Maximum	429	Median	32.7
SD	122.9	Std. Error of Mean	34.09
Coefficient of Variation	1.446	Skewness	2.052
Normal GOF Test			
Shapiro Wilk Test Statistic	0.733	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.246	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	145.8	95% Adjusted-CLT UCL (Chen-1995)	161.8
		95% Modified-t UCL (Johnson-1978)	149
Gamma GOF Test			
A-D Test Statistic	0.434	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.814	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.184	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.254	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.381	k star (bias corrected MLE)	0.345
Theta hat (MLE)	222.9	Theta star (bias corrected MLE)	246.7
nu hat (MLE)	9.915	nu star (bias corrected)	8.96
MLE Mean (bias corrected)	85	MLE Sd (bias corrected)	144.8
		Approximate Chi Square Value (0.05)	3.303
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	2.832
Assuming Gamma Distribution			
95% Approximate Gamma UCL	230.6	95% Adjusted Gamma UCL	269
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.891	Shapiro Wilk Lognormal GOF Test	

10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.799	Mean of logged Data	2.704
Maximum of Logged Data	6.061	SD of logged Data	2.507

Assuming Lognormal Distribution

95% H-UCL	24342	90% Chebyshev (MVUE) UCL	575.6
95% Chebyshev (MVUE) UCL	755.4	97.5% Chebyshev (MVUE) UCL	1005
99% Chebyshev (MVUE) UCL	1495		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	141.1	95% BCA Bootstrap UCL	161.8
95% Standard Bootstrap UCL	138.9	95% Bootstrap-t UCL	190.4
95% Hall's Bootstrap UCL	352.6	95% Percentile Bootstrap UCL	141.4
90% Chebyshev(Mean, Sd) UCL	187.3	95% Chebyshev(Mean, Sd) UCL	233.6
97.5% Chebyshev(Mean, Sd) UCL	297.9	99% Chebyshev(Mean, Sd) UCL	424.2

Suggested UCL to Use

95% Student's-t UCL	145.8		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (antimony)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	7
Number of Detects	7	Number of Non-Detects	6
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.0025	Minimum Non-Detect	0.002
Maximum Detect	0.0064	Maximum Non-Detect	0.002
Variance Detects	2.8081E-6	Percent Non-Detects	46.15%
Mean Detects	0.00401	SD Detects	0.00168
Median Detects	0.0033	CV Detects	0.417
Skewness Detects	0.865	Kurtosis Detects	-1.188
Mean of Logged Detects	-5.588	SD of Logged Detects	0.396

	A–E	F	G–K	L
105				
106	**Normal GOF Test on Detects Only**			
107	Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk GOF Test**	
108	1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	
109	Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**	
110	1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level	
111	**Detected Data appear Normal at 1% Significance Level**			
112	**Note GOF tests may be unreliable for small sample sizes**			
113				
114	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
115	KM Mean	0.00308	KM Standard Error of Mean	4.5476E-4
116	90KM SD	0.00152	95% KM (BCA) UCL	0.00375
117	95% KM (t) UCL	0.0039	95% KM (Percentile Bootstrap) UCL	0.00379
118	95% KM (z) UCL	0.00383	95% KM Bootstrap t UCL	0.0044
119	90% KM Chebyshev UCL	0.00445	95% KM Chebyshev UCL	0.00507
120	97.5% KM Chebyshev UCL	0.00592	99% KM Chebyshev UCL	0.00761
121				
122	**Gamma GOF Tests on Detected Observations Only**			
123	A-D Test Statistic	0.535	**Anderson-Darling GOF Test**	
124	5% A-D Critical Value	0.709	Detected data appear Gamma Distributed at 5% Significance Level	
125	K-S Test Statistic	0.223	**Kolmogorov-Smirnov GOF**	
126	5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level	
127	**Detected data appear Gamma Distributed at 5% Significance Level**			
128	**Note GOF tests may be unreliable for small sample sizes**			
129				
130	**Gamma Statistics on Detected Data Only**			
131	k hat (MLE)	7.335	k star (bias corrected MLE)	4.287
132	Theta hat (MLE)	5.4726E-4	Theta star (bias corrected MLE)	9.3642E-4
133	nu hat (MLE)	102.7	nu star (bias corrected)	60.02
134	Mean (detects)	0.00401		
135				
136	**Gamma ROS Statistics using Imputed Non-Detects**			
137	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
138	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
139	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
140	This is especially true when the sample size is small.			
141	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
142	Minimum	0.0025	Mean	0.00678
143	Maximum	0.01	Median	0.0064
144	SD	0.00332	CV	0.491
145	k hat (MLE)	3.731	k star (bias corrected MLE)	2.922
146	Theta hat (MLE)	0.00182	Theta star (bias corrected MLE)	0.00232
147	nu hat (MLE)	97.02	nu star (bias corrected)	75.96
148	Adjusted Level of Significance (β)	0.0301		
149	Approximate Chi Square Value (75.96, α)	56.89	Adjusted Chi Square Value (75.96, β)	54.54
150	95% Gamma Approximate UCL	0.00905	95% Gamma Adjusted UCL	0.00944
151				
152	**Estimates of Gamma Parameters using KM Estimates**			
153	Mean (KM)	0.00308	SD (KM)	0.00152
154	Variance (KM)	2.3044E-6	SE of Mean (KM)	4.5476E-4
155	k hat (KM)	4.129	k star (KM)	3.227
156	nu hat (KM)	107.4	nu star (KM)	83.91

theta hat (KM)	7.4706E-4	theta star (KM)	9.5574E-4
80% gamma percentile (KM)	0.00436	90% gamma percentile (KM)	0.00539
95% gamma percentile (KM)	0.00634	99% gamma percentile (KM)	0.0084
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (83.91, α)	63.8	Adjusted Chi Square Value (83.91, β)	61.31
95% KM Approximate Gamma UCL	0.00406	95% KM Adjusted Gamma UCL	0.00422
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00274	Mean in Log Scale	-6.112
SD in Original Scale	0.00187	SD in Log Scale	0.69
95% t UCL (assumes normality of ROS data)	0.00367	95% Percentile Bootstrap UCL	0.00361
95% BCA Bootstrap UCL	0.00373	95% Bootstrap t UCL	0.00402
95% H-UCL (Log ROS)	0.0045		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.877	KM Geo Mean	0.0028
KM SD (logged)	0.412	95% Critical H Value (KM-Log)	2.016
KM Standard Error of Mean (logged)	0.124	95% H-UCL (KM -Log)	0.00388
KM SD (logged)	0.412	95% Critical H Value (KM-Log)	2.016
KM Standard Error of Mean (logged)	0.124		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00262	Mean in Log Scale	-6.197
SD in Original Scale	0.00196	SD in Log Scale	0.74
95% t UCL (Assumes normality)	0.00359	95% H-Stat UCL	0.0045
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0039		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (arsenic)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	11
Number of Detects	11	Number of Non-Detects	2

	A–E	F	G–K	L
209	Number of Distinct Detects	10	Number of Distinct Non-Detects	1
210	Minimum Detect	0.0051	Minimum Non-Detect	0.004
211	Maximum Detect	0.306	Maximum Non-Detect	0.004
212	Variance Detects	0.0101	Percent Non-Detects	15.38%
213	Mean Detects	0.0779	SD Detects	0.1
214	Median Detects	0.0322	CV Detects	1.287
215	Skewness Detects	1.755	Kurtosis Detects	2.04
216	Mean of Logged Detects	-3.263	SD of Logged Detects	1.28
217				
218	**Normal GOF Test on Detects Only**			
219	Shapiro Wilk Test Statistic	0.716	**Shapiro Wilk GOF Test**	
220	1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level	
221	Lilliefors Test Statistic	0.335	**Lilliefors GOF Test**	
222	1% Lilliefors Critical Value	0.291	Detected Data Not Normal at 1% Significance Level	
223	**Detected Data Not Normal at 1% Significance Level**			
224				
225	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
226	KM Mean	0.0665	KM Standard Error of Mean	0.0267
227	90KM SD	0.0919	95% KM (BCA) UCL	0.111
228	95% KM (t) UCL	0.114	95% KM (Percentile Bootstrap) UCL	0.111
229	95% KM (z) UCL	0.11	95% KM Bootstrap t UCL	0.204
230	90% KM Chebyshev UCL	0.147	95% KM Chebyshev UCL	0.183
231	97.5% KM Chebyshev UCL	0.233	99% KM Chebyshev UCL	0.332
232				
233	**Gamma GOF Tests on Detected Observations Only**			
234	A-D Test Statistic	0.459	**Anderson-Darling GOF Test**	
235	5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level	
236	K-S Test Statistic	0.223	**Kolmogorov-Smirnov GOF**	
237	5% K-S Critical Value	0.264	Detected data appear Gamma Distributed at 5% Significance Level	
238	**Detected data appear Gamma Distributed at 5% Significance Level**			
239				
240	**Gamma Statistics on Detected Data Only**			
241	k hat (MLE)	0.832	k star (bias corrected MLE)	0.665
242	Theta hat (MLE)	0.0937	Theta star (bias corrected MLE)	0.117
243	nu hat (MLE)	18.29	nu star (bias corrected)	14.64
244	Mean (detects)	0.0779		
245				
246	**Gamma ROS Statistics using Imputed Non-Detects**			
247	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
248	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
249	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
250	This is especially true when the sample size is small.			
251	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
252	Minimum	0.0051	Mean	0.0674
253	Maximum	0.306	Median	0.0322
254	SD	0.095	CV	1.409
255	k hat (MLE)	0.772	k star (bias corrected MLE)	0.645
256	Theta hat (MLE)	0.0874	Theta star (bias corrected MLE)	0.105
257	nu hat (MLE)	20.07	nu star (bias corrected)	16.77
258	Adjusted Level of Significance (β)	0.0301		
259	Approximate Chi Square Value (16.77, α)	8.507	Adjusted Chi Square Value (16.77, β)	7.682
260	95% Gamma Approximate UCL	0.133	95% Gamma Adjusted UCL	0.147

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0665	SD (KM)	0.0919
Variance (KM)	0.00844	SE of Mean (KM)	0.0267
k hat (KM)	0.524	k star (KM)	0.454
nu hat (KM)	13.62	nu star (KM)	11.81
theta hat (KM)	0.127	theta star (KM)	0.146
80% gamma percentile (KM)	0.109	90% gamma percentile (KM)	0.183
95% gamma percentile (KM)	0.264	99% gamma percentile (KM)	0.465
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.81, α)	5.104	Adjusted Chi Square Value (11.81, β)	4.491
95% KM Approximate Gamma UCL	0.154	95% KM Adjusted Gamma UCL	0.175
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0662	Mean in Log Scale	-3.737
SD in Original Scale	0.0959	SD in Log Scale	1.651
95% t UCL (assumes normality of ROS data)	0.114	95% Percentile Bootstrap UCL	0.112
95% BCA Bootstrap UCL	0.126	95% Bootstrap t UCL	0.2
95% H-UCL (Log ROS)	0.644		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.61	KM Geo Mean	0.027
KM SD (logged)	1.388	95% Critical H Value (KM-Log)	3.562
KM Standard Error of Mean (logged)	0.404	95% H-UCL (KM -Log)	0.295
KM SD (logged)	1.388	95% Critical H Value (KM-Log)	3.562
KM Standard Error of Mean (logged)	0.404		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0662	Mean in Log Scale	-3.717
SD in Original Scale	0.0959	SD in Log Scale	1.611
95% t UCL (Assumes normality)	0.114	95% H-Stat UCL	0.568
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	0.204	95% Hall's Bootstrap	0.295
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (barium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.823	Mean	3.106
Maximum	11.4	Median	1.27
SD	3.257	Std. Error of Mean	0.903
Coefficient of Variation	1.049	Skewness	1.767

Normal GOF Test

Shapiro Wilk Test Statistic	0.736	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.716	95% Adjusted-CLT UCL (Chen-1995)	5.065
		95% Modified-t UCL (Johnson-1978)	4.79

Gamma GOF Test

A-D Test Statistic	0.916	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.268	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.241	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.379	k star (bias corrected MLE)	1.112
Theta hat (MLE)	2.252	Theta star (bias corrected MLE)	2.792
nu hat (MLE)	35.86	nu star (bias corrected)	28.92
MLE Mean (bias corrected)	3.106	MLE Sd (bias corrected)	2.945
		Approximate Chi Square Value (0.05)	17.64
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	16.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.09	95% Adjusted Gamma UCL	5.477

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.248	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.195	Mean of logged Data	0.729
Maximum of Logged Data	2.434	SD of logged Data	0.885

Assuming Lognormal Distribution

95% H-UCL	6.045	90% Chebyshev (MVUE) UCL	5.267
95% Chebyshev (MVUE) UCL	6.317	97.5% Chebyshev (MVUE) UCL	7.773
99% Chebyshev (MVUE) UCL	10.63		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.592	95% BCA Bootstrap UCL	5.036
95% Standard Bootstrap UCL	4.549	95% Bootstrap-t UCL	5.892
95% Hall's Bootstrap UCL	5.356	95% Percentile Bootstrap UCL	4.654
90% Chebyshev(Mean, Sd) UCL	5.816	95% Chebyshev(Mean, Sd) UCL	7.043
97.5% Chebyshev(Mean, Sd) UCL	8.747	99% Chebyshev(Mean, Sd) UCL	12.09

Suggested UCL to Use

95% Student's-t UCL	4.716		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (beryllium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	5
Number of Detects	5	Number of Non-Detects	8
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.0041	Minimum Non-Detect	0.002
Maximum Detect	0.0162	Maximum Non-Detect	0.002
Variance Detects	2.6897E-5	Percent Non-Detects	61.54%
Mean Detects	0.00698	SD Detects	0.00519
Median Detects	0.0052	CV Detects	0.743
Skewness Detects	2.167	Kurtosis Detects	4.755
Mean of Logged Detects	-5.123	SD of Logged Detects	0.573

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.645	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data Not Normal at 1% Significance Level

	A–E	F	G–K	L
417	Lilliefors Test Statistic	0.427	**Lilliefors GOF Test**	
418	1% Lilliefors Critical Value	0.396	Detected Data Not Normal at 1% Significance Level	
419	**Detected Data Not Normal at 1% Significance Level**			
420				
421	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
422	KM Mean	0.00392	KM Standard Error of Mean	0.00117
423	90KM SD	0.00376	95% KM (BCA) UCL	N/A
424	95% KM (t) UCL	0.00599	95% KM (Percentile Bootstrap) UCL	N/A
425	95% KM (z) UCL	0.00583	95% KM Bootstrap t UCL	N/A
426	90% KM Chebyshev UCL	0.00741	95% KM Chebyshev UCL	0.009
427	97.5% KM Chebyshev UCL	0.0112	99% KM Chebyshev UCL	0.0155
428				
429	**Gamma GOF Tests on Detected Observations Only**			
430	A-D Test Statistic	0.882	**Anderson-Darling GOF Test**	
431	5% A-D Critical Value	0.682	Detected Data Not Gamma Distributed at 5% Significance Level	
432	K-S Test Statistic	0.415	**Kolmogorov-Smirnov GOF**	
433	5% K-S Critical Value	0.359	Detected Data Not Gamma Distributed at 5% Significance Level	
434	**Detected Data Not Gamma Distributed at 5% Significance Level**			
435				
436	**Gamma Statistics on Detected Data Only**			
437	k hat (MLE)	3.314	k star (bias corrected MLE)	1.459
438	Theta hat (MLE)	0.00211	Theta star (bias corrected MLE)	0.00478
439	nu hat (MLE)	33.14	nu star (bias corrected)	14.59
440	Mean (detects)	0.00698		
441				
442	**Gamma ROS Statistics using Imputed Non-Detects**			
443	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
444	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
445	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
446	This is especially true when the sample size is small.			
447	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
448	Minimum	0.0041	Mean	0.00884
449	Maximum	0.0162	Median	0.01
450	SD	0.00336	CV	0.38
451	k hat (MLE)	6.765	k star (bias corrected MLE)	5.255
452	Theta hat (MLE)	0.00131	Theta star (bias corrected MLE)	0.00168
453	nu hat (MLE)	175.9	nu star (bias corrected)	136.6
454	Adjusted Level of Significance (β)	0.0301		
455	Approximate Chi Square Value (136.64, α)	110.6	Adjusted Chi Square Value (136.64, β)	107.3
456	95% Gamma Approximate UCL	0.0109	95% Gamma Adjusted UCL	0.0113
457				
458	**Estimates of Gamma Parameters using KM Estimates**			
459	Mean (KM)	0.00392	SD (KM)	0.00376
460	Variance (KM)	1.4146E-5	SE of Mean (KM)	0.00117
461	k hat (KM)	1.084	k star (KM)	0.885
462	nu hat (KM)	28.18	nu star (KM)	23.01
463	theta hat (KM)	0.00361	theta star (KM)	0.00442
464	80% gamma percentile (KM)	0.00636	90% gamma percentile (KM)	0.00929
465	95% gamma percentile (KM)	0.0123	99% gamma percentile (KM)	0.0192
466				
467	**Gamma Kaplan-Meier (KM) Statistics**			
468	Approximate Chi Square Value (23.01, α)	13.1	Adjusted Chi Square Value (23.01, β)	12.04

95% KM Approximate Gamma UCL	0.00688	95% KM Adjusted Gamma UCL	0.00748

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.381	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00336	Mean in Log Scale	-6.27
SD in Original Scale	0.00425	SD in Log Scale	1.125
95% t UCL (assumes normality of ROS data)	0.00546	95% Percentile Bootstrap UCL	0.00534
95% BCA Bootstrap UCL	0.00637	95% Bootstrap t UCL	0.00753
95% H-UCL (Log ROS)	0.00966		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.795	KM Geo Mean	0.00304
KM SD (logged)	0.619	95% Critical H Value (KM-Log)	2.26
KM Standard Error of Mean (logged)	0.192	95% H-UCL (KM -Log)	0.00552
KM SD (logged)	0.619	95% Critical H Value (KM-Log)	2.26
KM Standard Error of Mean (logged)	0.192		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0033	Mean in Log Scale	-6.221
SD in Original Scale	0.00426	SD in Log Scale	0.962
95% t UCL (Assumes normality)	0.00541	95% H-Stat UCL	0.00684

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

Suggested UCL to Use

95% KM (t) UCL	0.00599		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (bismuth)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	5
Number of Detects	5	Number of Non-Detects	8
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.0022	Minimum Non-Detect	0.002
Maximum Detect	0.006	Maximum Non-Detect	0.002
Variance Detects	2.9580E-6	Percent Non-Detects	61.54%
Mean Detects	0.00346	SD Detects	0.00172
Median Detects	0.0024	CV Detects	0.497
Skewness Detects	1.009	Kurtosis Detects	-0.986

Mean of Logged Detects	-5.758	SD of Logged Detects	0.467
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level	
Detected Data appear Normal at 1% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00256	KM Standard Error of Mean	3.6882E-4
90KM SD	0.00119	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00322	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00317	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00367	95% KM Chebyshev UCL	0.00417
97.5% KM Chebyshev UCL	0.00486	99% KM Chebyshev UCL	0.00623
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.612	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.68	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.349	**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			
Note GOF tests may be unreliable for small sample sizes			
Gamma Statistics on Detected Data Only			
k hat (MLE)	5.618	k star (bias corrected MLE)	2.381
Theta hat (MLE)	6.1583E-4	Theta star (bias corrected MLE)	0.00145
nu hat (MLE)	56.18	nu star (bias corrected)	23.81
Mean (detects)	0.00346		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.0022	Mean	0.00748
Maximum	0.01	Median	0.01
SD	0.00346	CV	0.462
k hat (MLE)	3.411	k star (bias corrected MLE)	2.675
Theta hat (MLE)	0.00219	Theta star (bias corrected MLE)	0.0028
nu hat (MLE)	88.68	nu star (bias corrected)	69.55
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (69.55, α)	51.35	Adjusted Chi Square Value (69.55, β)	49.13
95% Gamma Approximate UCL	0.0101	95% Gamma Adjusted UCL	0.0106
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00256	SD (KM)	0.00119
Variance (KM)	1.4147E-6	SE of Mean (KM)	3.6882E-4
k hat (KM)	4.638	k star (KM)	3.619

nu hat (KM)	120.6	nu star (KM)	94.1
theta hat (KM)	5.5228E-4	theta star (KM)	7.0778E-4
80% gamma percentile (KM)	0.00357	90% gamma percentile (KM)	0.00437
95% gamma percentile (KM)	0.0051	99% gamma percentile (KM)	0.00668
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (94.10, α)	72.72	Adjusted Chi Square Value (94.10, β)	70.05
95% KM Approximate Gamma UCL	0.00331	95% KM Adjusted Gamma UCL	0.00344
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.321	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data Not Lognormal at 10% Significance Level	
Detected Data appear Approximate Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00178	Mean in Log Scale	-6.749
SD in Original Scale	0.00173	SD in Log Scale	0.967
95% t UCL (assumes normality of ROS data)	0.00263	95% Percentile Bootstrap UCL	0.00259
95% BCA Bootstrap UCL	0.00278	95% Bootstrap t UCL	0.00325
95% H-UCL (Log ROS)	0.00408		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.039	KM Geo Mean	0.00238
KM SD (logged)	0.341	95% Critical H Value (KM-Log)	1.946
KM Standard Error of Mean (logged)	0.106	95% H-UCL (KM -Log)	0.00306
KM SD (logged)	0.341	95% Critical H Value (KM-Log)	1.946
KM Standard Error of Mean (logged)	0.106		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00195	Mean in Log Scale	-6.466
SD in Original Scale	0.00159	SD in Log Scale	0.642
95% t UCL (Assumes normality)	0.00273	95% H-Stat UCL	0.00292
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.00322		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (boron)			
General Statistics			

	A–E	F	G–K	L
625	Total Number of Observations	13	Number of Distinct Observations	13
626			Number of Missing Observations	0
627	Minimum	0.57	Mean	2.02
628	Maximum	5.36	Median	1.7
629	SD	1.555	Std. Error of Mean	0.431
630	Coefficient of Variation	0.77	Skewness	1.587
631				
632	**Normal GOF Test**			
633	Shapiro Wilk Test Statistic	0.773	**Shapiro Wilk GOF Test**	
634	1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
635	Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**	
636	1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
637	**Data appear Approximate Normal at 1% Significance Level**			
638				
639	**Assuming Normal Distribution**			
640	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
641	95% Student's-t UCL	2.789	95% Adjusted-CLT UCL (Chen-1995)	2.932
642			95% Modified-t UCL (Johnson-1978)	2.82
643				
644	**Gamma GOF Test**			
645	A-D Test Statistic	0.53	**Anderson-Darling Gamma GOF Test**	
646	5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level	
647	K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**	
648	5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level	
649	**Detected data appear Gamma Distributed at 5% Significance Level**			
650				
651	**Gamma Statistics**			
652	k hat (MLE)	2.349	k star (bias corrected MLE)	1.858
653	Theta hat (MLE)	0.86	Theta star (bias corrected MLE)	1.087
654	nu hat (MLE)	61.06	nu star (bias corrected)	48.3
655	MLE Mean (bias corrected)	2.02	MLE Sd (bias corrected)	1.482
656			Approximate Chi Square Value (0.05)	33.35
657	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	31.59
658				
659	**Assuming Gamma Distribution**			
660	95% Approximate Gamma UCL	2.926	95% Adjusted Gamma UCL	3.089
661				
662	**Lognormal GOF Test**			
663	Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**	
664	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
665	Lilliefors Test Statistic	0.137	**Lilliefors Lognormal GOF Test**	
666	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
667	**Data appear Lognormal at 10% Significance Level**			
668				
669	**Lognormal Statistics**			
670	Minimum of Logged Data	-0.562	Mean of logged Data	0.475
671	Maximum of Logged Data	1.679	SD of logged Data	0.683
672				
673	**Assuming Lognormal Distribution**			
674	95% H-UCL	3.225	90% Chebyshev (MVUE) UCL	3.168
675	95% Chebyshev (MVUE) UCL	3.703	97.5% Chebyshev (MVUE) UCL	4.445
676	99% Chebyshev (MVUE) UCL	5.902		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.729	95% BCA Bootstrap UCL	2.932
95% Standard Bootstrap UCL	2.707	95% Bootstrap-t UCL	3.54
95% Hall's Bootstrap UCL	7.162	95% Percentile Bootstrap UCL	2.768
90% Chebyshev(Mean, Sd) UCL	3.314	95% Chebyshev(Mean, Sd) UCL	3.9
97.5% Chebyshev(Mean, Sd) UCL	4.713	99% Chebyshev(Mean, Sd) UCL	6.311

Suggested UCL to Use

95% Student's-t UCL	2.789		

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cadmium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0018	Mean	0.0174
Maximum	0.0435	Median	0.0138
SD	0.0154	Std. Error of Mean	0.00427
Coefficient of Variation	0.883	Skewness	0.836

Normal GOF Test

Shapiro Wilk Test Statistic	0.837	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.025	95% Adjusted-CLT UCL (Chen-1995)	0.0255
		95% Modified-t UCL (Johnson-1978)	0.0252

Gamma GOF Test

A-D Test Statistic	0.476	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.242	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.233	k star (bias corrected MLE)	1
Theta hat (MLE)	0.0141	Theta star (bias corrected MLE)	0.0174
nu hat (MLE)	32.06	nu star (bias corrected)	25.99
MLE Mean (bias corrected)	0.0174	MLE Sd (bias corrected)	0.0174
		Approximate Chi Square Value (0.05)	15.37
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	14.22

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0294	95% Adjusted Gamma UCL	0.0318

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.32	Mean of logged Data	-4.508
Maximum of Logged Data	-3.135	SD of logged Data	1.078

Assuming Lognormal Distribution

95% H-UCL	0.0499	90% Chebyshev (MVUE) UCL	0.0365
95% Chebyshev (MVUE) UCL	0.0447	97.5% Chebyshev (MVUE) UCL	0.056
99% Chebyshev (MVUE) UCL	0.0782		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0244	95% BCA Bootstrap UCL	0.025
95% Standard Bootstrap UCL	0.0242	95% Bootstrap-t UCL	0.0272
95% Hall's Bootstrap UCL	0.024	95% Percentile Bootstrap UCL	0.0242
90% Chebyshev(Mean, Sd) UCL	0.0302	95% Chebyshev(Mean, Sd) UCL	0.036
97.5% Chebyshev(Mean, Sd) UCL	0.0441	99% Chebyshev(Mean, Sd) UCL	0.0599

Suggested UCL to Use

95% Student's-t UCL	0.025		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (calcium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	581	Mean	1703
Maximum	2450	Median	1930
SD	629.8	Std. Error of Mean	174.7

	A–E	F	G–K	L
781	Coefficient of Variation	0.37	Skewness	-0.6
782				
783	**Normal GOF Test**			
784	Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**	
785	1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
786	Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**	
787	1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
788	**Data appear Normal at 1% Significance Level**			
789				
790	**Assuming Normal Distribution**			
791	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
792	95% Student's-t UCL	2014	95% Adjusted-CLT UCL (Chen-1995)	1959
793			95% Modified-t UCL (Johnson-1978)	2009
794				
795	**Gamma GOF Test**			
796	A-D Test Statistic	0.686	**Anderson-Darling Gamma GOF Test**	
797	5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
798	K-S Test Statistic	0.212	**Kolmogorov-Smirnov Gamma GOF Test**	
799	5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level	
800	**Detected data appear Gamma Distributed at 5% Significance Level**			
801				
802	**Gamma Statistics**			
803	k hat (MLE)	6.034	k star (bias corrected MLE)	4.693
804	Theta hat (MLE)	282.2	Theta star (bias corrected MLE)	362.9
805	nu hat (MLE)	156.9	nu star (bias corrected)	122
806	MLE Mean (bias corrected)	1703	MLE Sd (bias corrected)	786
807			Approximate Chi Square Value (0.05)	97.5
808	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	94.38
809				
810	**Assuming Gamma Distribution**			
811	95% Approximate Gamma UCL	2131	95% Adjusted Gamma UCL	2201
812				
813	**Lognormal GOF Test**			
814	Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk Lognormal GOF Test**	
815	10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level	
816	Lilliefors Test Statistic	0.213	**Lilliefors Lognormal GOF Test**	
817	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
818	**Data appear Approximate Lognormal at 10% Significance Level**			
819				
820	**Lognormal Statistics**			
821	Minimum of Logged Data	6.365	Mean of logged Data	7.355
822	Maximum of Logged Data	7.804	SD of logged Data	0.466
823				
824	**Assuming Lognormal Distribution**			
825	95% H-UCL	2303	90% Chebyshev (MVUE) UCL	2411
826	95% Chebyshev (MVUE) UCL	2721	97.5% Chebyshev (MVUE) UCL	3151
827	99% Chebyshev (MVUE) UCL	3997		
828				
829	**Nonparametric Distribution Free UCL Statistics**			
830	**Data appear to follow a Discernible Distribution**			
831				
832	**Nonparametric Distribution Free UCLs**			

95% CLT UCL	1990	95% BCA Bootstrap UCL	1956
95% Standard Bootstrap UCL	1988	95% Bootstrap-t UCL	1983
95% Hall's Bootstrap UCL	1953	95% Percentile Bootstrap UCL	1979
90% Chebyshev(Mean, Sd) UCL	2227	95% Chebyshev(Mean, Sd) UCL	2464
97.5% Chebyshev(Mean, Sd) UCL	2793	99% Chebyshev(Mean, Sd) UCL	3441
Suggested UCL to Use			
95% Student's-t UCL	2014		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
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.			
Result (chromium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.02	Mean	0.292
Maximum	1.05	Median	0.098
SD	0.369	Std. Error of Mean	0.102
Coefficient of Variation	1.263	Skewness	1.436
Normal GOF Test			
Shapiro Wilk Test Statistic	0.741	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.266	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.475	95% Adjusted-CLT UCL (Chen-1995)	0.504
		95% Modified-t UCL (Johnson-1978)	0.482
Gamma GOF Test			
A-D Test Statistic	0.579	**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	0.185	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.73	k star (bias corrected MLE)	0.613
Theta hat (MLE)	0.401	Theta star (bias corrected MLE)	0.477
nu hat (MLE)	18.97	nu star (bias corrected)	15.93
MLE Mean (bias corrected)	0.292	MLE Sd (bias corrected)	0.373
		Approximate Chi Square Value (0.05)	7.911

	A–E	F	G–K	L
885	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	7.119
886				
887	**Assuming Gamma Distribution**			
888	95% Approximate Gamma UCL	0.589	95% Adjusted Gamma UCL	0.654
889				
890	**Lognormal GOF Test**			
891	Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk Lognormal GOF Test**	
892	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
893	Lilliefors Test Statistic	0.149	**Lilliefors Lognormal GOF Test**	
894	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
895	**Data appear Lognormal at 10% Significance Level**			
896				
897	**Lognormal Statistics**			
898	Minimum of Logged Data	-3.912	Mean of logged Data	-2.053
899	Maximum of Logged Data	0.0488	SD of logged Data	1.391
900				
901	**Assuming Lognormal Distribution**			
902	95% H-UCL	1.414	90% Chebyshev (MVUE) UCL	0.68
903	95% Chebyshev (MVUE) UCL	0.853	97.5% Chebyshev (MVUE) UCL	1.093
904	99% Chebyshev (MVUE) UCL	1.565		
905				
906	**Nonparametric Distribution Free UCL Statistics**			
907	**Data appear to follow a Discernible Distribution**			
908				
909	**Nonparametric Distribution Free UCLs**			
910	95% CLT UCL	0.461	95% BCA Bootstrap UCL	0.491
911	95% Standard Bootstrap UCL	0.453	95% Bootstrap-t UCL	0.623
912	95% Hall's Bootstrap UCL	0.529	95% Percentile Bootstrap UCL	0.458
913	90% Chebyshev(Mean, Sd) UCL	0.6	95% Chebyshev(Mean, Sd) UCL	0.739
914	97.5% Chebyshev(Mean, Sd) UCL	0.932	99% Chebyshev(Mean, Sd) UCL	1.311
915				
916	**Suggested UCL to Use**			
917	95% Student's-t UCL	0.475		
918				
919	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**			
920	**Please verify the data were collected from random locations.**			
921	**If the data were collected using judgmental or other non-random methods,**			
922	**then contact a statistician to correctly calculate UCLs.**			
923				
924	When a data set follows an approximate distribution passing only one of the GOF tests,			
925	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
926				
927	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
928	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
929	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
930				
931	**Result (cobalt)**			
932				
933	**General Statistics**			
934	Total Number of Observations	13	Number of Distinct Observations	13
935	Number of Detects	12	Number of Non-Detects	1
936	Number of Distinct Detects	12	Number of Distinct Non-Detects	1

Minimum Detect	0.0064	Minimum Non-Detect	0.004
Maximum Detect	0.413	Maximum Non-Detect	0.004
Variance Detects	0.0184	Percent Non-Detects	7.692%
Mean Detects	0.119	SD Detects	0.136
Median Detects	0.0408	CV Detects	1.139
Skewness Detects	1.144	Kurtosis Detects	0.241
Mean of Logged Detects	-2.896	SD of Logged Detects	1.389

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.11	KM Standard Error of Mean	0.0372
90KM SD	0.128	95% KM (BCA) UCL	0.172
95% KM (t) UCL	0.176	95% KM (Percentile Bootstrap) UCL	0.17
95% KM (z) UCL	0.171	95% KM Bootstrap t UCL	0.203
90% KM Chebyshev UCL	0.222	95% KM Chebyshev UCL	0.272
97.5% KM Chebyshev UCL	0.342	99% KM Chebyshev UCL	0.48

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.545	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.203	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.255	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)	0.777	k star (bias corrected MLE)	0.638
Theta hat (MLE)	0.153	Theta star (bias corrected MLE)	0.186
nu hat (MLE)	18.65	nu star (bias corrected)	15.32
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	0.0064	Mean	0.111
Maximum	0.413	Median	0.0327
SD	0.133	CV	1.205
k hat (MLE)	0.728	k star (bias corrected MLE)	0.612
Theta hat (MLE)	0.152	Theta star (bias corrected MLE)	0.181
nu hat (MLE)	18.94	nu star (bias corrected)	15.9
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (15.90, α)	7.892	Adjusted Chi Square Value (15.90, β)	7.101
95% Gamma Approximate UCL	0.223	95% Gamma Adjusted UCL	0.248

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.11	SD (KM)	0.128
Variance (KM)	0.0165	SE of Mean (KM)	0.0372
k hat (KM)	0.736	k star (KM)	0.617
nu hat (KM)	19.12	nu star (KM)	16.04
theta hat (KM)	0.15	theta star (KM)	0.178
80% gamma percentile (KM)	0.182	90% gamma percentile (KM)	0.285
95% gamma percentile (KM)	0.392	99% gamma percentile (KM)	0.652

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.04, α)	7.993	Adjusted Chi Square Value (16.04, β)	7.197
95% KM Approximate Gamma UCL	0.221	95% KM Adjusted Gamma UCL	0.246

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.11	Mean in Log Scale	-3.156
SD in Original Scale	0.134	SD in Log Scale	1.628
95% t UCL (assumes normality of ROS data)	0.176	95% Percentile Bootstrap UCL	0.172
95% BCA Bootstrap UCL	0.183	95% Bootstrap t UCL	0.196
95% H-UCL (Log ROS)	1.06		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.098	KM Geo Mean	0.0452
KM SD (logged)	1.457	95% Critical H Value (KM-Log)	3.698
KM Standard Error of Mean (logged)	0.422	95% H-UCL (KM -Log)	0.618
KM SD (logged)	1.457	95% Critical H Value (KM-Log)	3.698
KM Standard Error of Mean (logged)	0.422		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.11	Mean in Log Scale	-3.151
SD in Original Scale	0.134	SD in Log Scale	1.617
95% t UCL (Assumes normality)	0.176	95% H-Stat UCL	1.023

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.176

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (copper)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.141	Mean	1.065
Maximum	3.32	Median	0.58
SD	1.002	Std. Error of Mean	0.278
Coefficient of Variation	0.941	Skewness	1.124

Normal GOF Test

Shapiro Wilk Test Statistic	0.837	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.56	95% Adjusted-CLT UCL (Chen-1995)	1.614
		95% Modified-t UCL (Johnson-1978)	1.574

Gamma GOF Test

A-D Test Statistic	0.486	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.196	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.242	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.262	k star (bias corrected MLE)	1.022
Theta hat (MLE)	0.844	Theta star (bias corrected MLE)	1.042
nu hat (MLE)	32.82	nu star (bias corrected)	26.58
MLE Mean (bias corrected)	1.065	MLE Sd (bias corrected)	1.053
		Approximate Chi Square Value (0.05)	15.82
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	14.65

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.788	95% Adjusted Gamma UCL	1.931

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics			
Minimum of Logged Data	-1.959	Mean of logged Data	-0.383
Maximum of Logged Data	1.2	SD of logged Data	1.016
Assuming Lognormal Distribution			
95% H-UCL	2.658	90% Chebyshev (MVUE) UCL	2.07
95% Chebyshev (MVUE) UCL	2.518	97.5% Chebyshev (MVUE) UCL	3.139
99% Chebyshev (MVUE) UCL	4.359		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.522	95% BCA Bootstrap UCL	1.617
95% Standard Bootstrap UCL	1.512	95% Bootstrap-t UCL	1.735
95% Hall's Bootstrap UCL	1.575	95% Percentile Bootstrap UCL	1.537
90% Chebyshev(Mean, Sd) UCL	1.898	95% Chebyshev(Mean, Sd) UCL	2.276
97.5% Chebyshev(Mean, Sd) UCL	2.8	99% Chebyshev(Mean, Sd) UCL	3.829
Suggested UCL to Use			
95% Student's-t UCL	1.56		
When a data set follows an approximate distribution passing only one of the GOF tests,			
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (iron)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	1.6	Mean	209.8
Maximum	828	Median	58.9
SD	287.3	Std. Error of Mean	79.7
Coefficient of Variation	1.37	Skewness	1.382
Normal GOF Test			
Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	351.9	95% Adjusted-CLT UCL (Chen-1995)	373.5
		95% Modified-t UCL (Johnson-1978)	356.9

Gamma GOF Test

A-D Test Statistic	0.424	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.807	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.183	**Kolmogorov-Smirnov Gamma GOF Test**	
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

k hat (MLE)	0.413	k star (bias corrected MLE)	0.369
Theta hat (MLE)	508.5	Theta star (bias corrected MLE)	569.1
nu hat (MLE)	10.73	nu star (bias corrected)	9.586
MLE Mean (bias corrected)	209.8	MLE Sd (bias corrected)	345.6
		Approximate Chi Square Value (0.05)	3.684
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	3.181

Assuming Gamma Distribution

95% Approximate Gamma UCL	545.9	95% Adjusted Gamma UCL	632.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.47	Mean of logged Data	3.759
Maximum of Logged Data	6.719	SD of logged Data	2.281

Assuming Lognormal Distribution

95% H-UCL	20458	90% Chebyshev (MVUE) UCL	1074
95% Chebyshev (MVUE) UCL	1401	97.5% Chebyshev (MVUE) UCL	1856
99% Chebyshev (MVUE) UCL	2749		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	340.9	95% BCA Bootstrap UCL	364
95% Standard Bootstrap UCL	337.2	95% Bootstrap-t UCL	448.4
95% Hall's Bootstrap UCL	397.1	95% Percentile Bootstrap UCL	340.6
90% Chebyshev(Mean, Sd) UCL	448.9	95% Chebyshev(Mean, Sd) UCL	557.2
97.5% Chebyshev(Mean, Sd) UCL	707.5	99% Chebyshev(Mean, Sd) UCL	1003

Suggested UCL to Use

95% Student's-t UCL	351.9		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

	A–E	F	G–K	L
1197	When a data set follows an approximate distribution passing only one of the GOF tests,			
1198	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL			
1199				
1200	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1201	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1202	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1203				
1204	**Result (lead)**			
1205				
1206	**General Statistics**			
1207	Total Number of Observations	13	Number of Distinct Observations	12
1208	Number of Detects	11	Number of Non-Detects	2
1209	Number of Distinct Detects	11	Number of Distinct Non-Detects	1
1210	Minimum Detect	0.0068	Minimum Non-Detect	0.004
1211	Maximum Detect	0.57	Maximum Non-Detect	0.004
1212	Variance Detects	0.0378	Percent Non-Detects	15.38%
1213	Mean Detects	0.159	SD Detects	0.194
1214	Median Detects	0.107	CV Detects	1.222
1215	Skewness Detects	1.489	Kurtosis Detects	1.174
1216	Mean of Logged Detects	-2.722	SD of Logged Detects	1.569
1217				
1218	**Normal GOF Test on Detects Only**			
1219	Shapiro Wilk Test Statistic	0.774	**Shapiro Wilk GOF Test**	
1220	1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level	
1221	Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**	
1222	1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level	
1223	**Detected Data appear Approximate Normal at 1% Significance Level**			
1224				
1225	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1226	KM Mean	0.135	KM Standard Error of Mean	0.0522
1227	90KM SD	0.18	95% KM (BCA) UCL	0.224
1228	95% KM (t) UCL	0.228	95% KM (Percentile Bootstrap) UCL	0.223
1229	95% KM (z) UCL	0.221	95% KM Bootstrap t UCL	0.34
1230	90% KM Chebyshev UCL	0.292	95% KM Chebyshev UCL	0.363
1231	97.5% KM Chebyshev UCL	0.461	99% KM Chebyshev UCL	0.655
1232				
1233	**Gamma GOF Tests on Detected Observations Only**			
1234	A-D Test Statistic	0.325	**Anderson-Darling GOF Test**	
1235	5% A-D Critical Value	0.767	Detected data appear Gamma Distributed at 5% Significance Level	
1236	K-S Test Statistic	0.168	**Kolmogorov-Smirnov GOF**	
1237	5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level	
1238	**Detected data appear Gamma Distributed at 5% Significance Level**			
1239				
1240	**Gamma Statistics on Detected Data Only**			
1241	k hat (MLE)	0.685	k star (bias corrected MLE)	0.559
1242	Theta hat (MLE)	0.232	Theta star (bias corrected MLE)	0.285
1243	nu hat (MLE)	15.08	nu star (bias corrected)	12.3
1244	Mean (detects)	0.159		
1245				
1246	**Gamma ROS Statistics using Imputed Non-Detects**			
1247	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1248	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			

For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.0068	Mean	0.136
Maximum	0.57	Median	0.0503
SD	0.186	CV	1.367
k hat (MLE)	0.606	k star (bias corrected MLE)	0.517
Theta hat (MLE)	0.225	Theta star (bias corrected MLE)	0.263
nu hat (MLE)	15.75	nu star (bias corrected)	13.45
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (13.45, α)	6.197	Adjusted Chi Square Value (13.45, β)	5.51
95% Gamma Approximate UCL	0.296	95% Gamma Adjusted UCL	0.332
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.135	SD (KM)	0.18
Variance (KM)	0.0322	SE of Mean (KM)	0.0522
k hat (KM)	0.568	k star (KM)	0.488
nu hat (KM)	14.76	nu star (KM)	12.69
theta hat (KM)	0.238	theta star (KM)	0.277
80% gamma percentile (KM)	0.222	90% gamma percentile (KM)	0.368
95% gamma percentile (KM)	0.524	99% gamma percentile (KM)	0.909
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (12.69, α)	5.685	Adjusted Chi Square Value (12.69, β)	5.032
95% KM Approximate Gamma UCL	0.302	95% KM Adjusted Gamma UCL	0.341
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.93	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.135	Mean in Log Scale	-3.298
SD in Original Scale	0.187	SD in Log Scale	2.013
95% t UCL (assumes normality of ROS data)	0.227	95% Percentile Bootstrap UCL	0.225
95% BCA Bootstrap UCL	0.246	95% Bootstrap t UCL	0.335
95% H-UCL (Log ROS)	4.65		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.153	KM Geo Mean	0.0427
KM SD (logged)	1.707	95% Critical H Value (KM-Log)	4.155
KM Standard Error of Mean (logged)	0.497	95% H-UCL (KM -Log)	1.421
KM SD (logged)	1.707	95% Critical H Value (KM-Log)	4.155
KM Standard Error of Mean (logged)	0.497		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.135	Mean in Log Scale	-3.26
SD in Original Scale	0.187	SD in Log Scale	1.942
95% t UCL (Assumes normality)	0.227	95% H-Stat UCL	3.451

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 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.228

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,

it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lithium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	8
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.15	Minimum Non-Detect	0.1
Maximum Detect	0.6	Maximum Non-Detect	0.1
Variance Detects	0.0314	Percent Non-Detects	61.54%
Mean Detects	0.292	SD Detects	0.177
Median Detects	0.24	CV Detects	0.607
Skewness Detects	1.922	Kurtosis Detects	4.015
Mean of Logged Detects	-1.349	SD of Logged Detects	0.513

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.372	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.174	KM Standard Error of Mean	0.042
90KM SD	0.136	95% KM (BCA) UCL	0.239
95% KM (t) UCL	0.249	95% KM (Percentile Bootstrap) UCL	0.242
95% KM (z) UCL	0.243	95% KM Bootstrap t UCL	0.273
90% KM Chebyshev UCL	0.3	95% KM Chebyshev UCL	0.357
97.5% KM Chebyshev UCL	0.436	99% KM Chebyshev UCL	0.592

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.499	**Anderson-Darling GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
1353					5% A-D Critical Value	0.681	Detected data appear Gamma Distributed at 5% Significance Level					
1354					K-S Test Statistic	0.331	**Kolmogorov-Smirnov GOF**					
1355					5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level					
1356	**Detected data appear Gamma Distributed at 5% Significance Level**											
1357	**Note GOF tests may be unreliable for small sample sizes**											
1358												
1359	**Gamma Statistics on Detected Data Only**											
1360					k hat (MLE)	4.413					k star (bias corrected MLE)	1.899
1361					Theta hat (MLE)	0.0662					Theta star (bias corrected MLE)	0.154
1362					nu hat (MLE)	44.13					nu star (bias corrected)	18.99
1363					Mean (detects)	0.292						
1364												
1365	**Gamma ROS Statistics using Imputed Non-Detects**											
1366	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1367	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1368	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1369	This is especially true when the sample size is small.											
1370	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1371					Minimum	0.01					Mean	0.118
1372					Maximum	0.6					Median	0.01
1373					SD	0.176					CV	1.483
1374					k hat (MLE)	0.518					k star (bias corrected MLE)	0.45
1375					Theta hat (MLE)	0.229					Theta star (bias corrected MLE)	0.263
1376					nu hat (MLE)	13.47					nu star (bias corrected)	11.69
1377					Adjusted Level of Significance (β)	0.0301						
1378					Approximate Chi Square Value (11.69, α)	5.026					Adjusted Chi Square Value (11.69, β)	4.419
1379					95% Gamma Approximate UCL	0.276					95% Gamma Adjusted UCL	0.313
1380												
1381	**Estimates of Gamma Parameters using KM Estimates**											
1382					Mean (KM)	0.174					SD (KM)	0.136
1383					Variance (KM)	0.0184					SE of Mean (KM)	0.042
1384					k hat (KM)	1.645					k star (KM)	1.316
1385					nu hat (KM)	42.76					nu star (KM)	34.22
1386					theta hat (KM)	0.106					theta star (KM)	0.132
1387					80% gamma percentile (KM)	0.273					90% gamma percentile (KM)	0.374
1388					95% gamma percentile (KM)	0.473					99% gamma percentile (KM)	0.699
1389												
1390	**Gamma Kaplan-Meier (KM) Statistics**											
1391					Approximate Chi Square Value (34.22, α)	21.84					Adjusted Chi Square Value (34.22, β)	20.44
1392					95% KM Approximate Gamma UCL	0.272					95% KM Adjusted Gamma UCL	0.291
1393												
1394	**Lognormal GOF Test on Detected Observations Only**											
1395					Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk GOF Test**					
1396					10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level					
1397					Lilliefors Test Statistic	0.299	**Lilliefors GOF Test**					
1398					10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level					
1399	**Detected Data appear Lognormal at 10% Significance Level**											
1400	**Note GOF tests may be unreliable for small sample sizes**											
1401												
1402	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1403					Mean in Original Scale	0.144					Mean in Log Scale	-2.444
1404					SD in Original Scale	0.161					SD in Log Scale	1.069

95% t UCL (assumes normality of ROS data)	0.223	95% Percentile Bootstrap UCL	0.219
95% BCA Bootstrap UCL	0.247	95% Bootstrap t UCL	0.281
95% H-UCL (Log ROS)	0.384		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.936	KM Geo Mean	0.144
KM SD (logged)	0.545	95% Critical H Value (KM-Log)	2.165
KM Standard Error of Mean (logged)	0.169	95% H-UCL (KM -Log)	0.235
KM SD (logged)	0.545	95% Critical H Value (KM-Log)	2.165
KM Standard Error of Mean (logged)	0.169		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.143	Mean in Log Scale	-2.362
SD in Original Scale	0.16	SD in Log Scale	0.885
95% t UCL (Assumes normality)	0.222	95% H-Stat UCL	0.275

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

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.249		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (magnesium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	118	Mean	368.9
Maximum	946	Median	338
SD	207.7	Std. Error of Mean	57.6
Coefficient of Variation	0.563	Skewness	1.807

Normal GOF Test

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	471.6	95% Adjusted-CLT UCL (Chen-1995)	494.5
		95% Modified-t UCL (Johnson-1978)	476.4

Gamma GOF Test

1457	A-D Test Statistic	0.263	**Anderson-Darling Gamma GOF Test**	
1458	5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level	
1459	K-S Test Statistic	0.138	**Kolmogorov-Smirnov Gamma GOF Test**	
1460	5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level	
1461	**Detected data appear Gamma Distributed at 5% Significance Level**			
1462				
1463	**Gamma Statistics**			
1464	k hat (MLE)	4.049	k star (bias corrected MLE)	3.166
1465	Theta hat (MLE)	91.11	Theta star (bias corrected MLE)	116.5
1466	nu hat (MLE)	105.3	nu star (bias corrected)	82.32
1467	MLE Mean (bias corrected)	368.9	MLE Sd (bias corrected)	207.3
1468			Approximate Chi Square Value (0.05)	62.41
1469	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	59.94
1470				
1471	**Assuming Gamma Distribution**			
1472	95% Approximate Gamma UCL	486.6	95% Adjusted Gamma UCL	506.6
1473				
1474	**Lognormal GOF Test**			
1475	Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**	
1476	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
1477	Lilliefors Test Statistic	0.137	**Lilliefors Lognormal GOF Test**	
1478	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
1479	**Data appear Lognormal at 10% Significance Level**			
1480				
1481	**Lognormal Statistics**			
1482	Minimum of Logged Data	4.771	Mean of logged Data	5.782
1483	Maximum of Logged Data	6.852	SD of logged Data	0.528
1484				
1485	**Assuming Lognormal Distribution**			
1486	95% H-UCL	517.4	90% Chebyshev (MVUE) UCL	535.3
1487	95% Chebyshev (MVUE) UCL	610.8	97.5% Chebyshev (MVUE) UCL	715.6
1488	99% Chebyshev (MVUE) UCL	921.5		
1489				
1490	**Nonparametric Distribution Free UCL Statistics**			
1491	**Data appear to follow a Discernible Distribution**			
1492				
1493	**Nonparametric Distribution Free UCLs**			
1494	95% CLT UCL	463.7	95% BCA Bootstrap UCL	490.8
1495	95% Standard Bootstrap UCL	460.2	95% Bootstrap-t UCL	517.7
1496	95% Hall's Bootstrap UCL	945	95% Percentile Bootstrap UCL	465.4
1497	90% Chebyshev(Mean, Sd) UCL	541.7	95% Chebyshev(Mean, Sd) UCL	620
1498	97.5% Chebyshev(Mean, Sd) UCL	728.6	99% Chebyshev(Mean, Sd) UCL	942
1499				
1500	**Suggested UCL to Use**			
1501	95% Student's-t UCL	471.6		
1502				
1503	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1504	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1505	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1506				
1507				
1508	**Result (manganese)**			

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	4.97	Mean	68.04
Maximum	234	Median	50
SD	60.84	Std. Error of Mean	16.87
Coefficient of Variation	0.894	Skewness	1.954
Normal GOF Test			
Shapiro Wilk Test Statistic	0.799	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.233	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Approximate Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	98.12	95% Adjusted-CLT UCL (Chen-1995)	105.6
		95% Modified-t UCL (Johnson-1978)	99.64
Gamma GOF Test			
A-D Test Statistic	0.293	**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	0.146	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.558	k star (bias corrected MLE)	1.249
Theta hat (MLE)	43.69	Theta star (bias corrected MLE)	54.46
nu hat (MLE)	40.5	nu star (bias corrected)	32.49
MLE Mean (bias corrected)	68.04	MLE Sd (bias corrected)	60.87
		Approximate Chi Square Value (0.05)	20.46
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	19.11
Assuming Gamma Distribution			
95% Approximate Gamma UCL	108.1	95% Adjusted Gamma UCL	115.7
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.197	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.603	Mean of logged Data	3.866
Maximum of Logged Data	5.455	SD of logged Data	0.953
Assuming Lognormal Distribution			
95% H-UCL	161.2	90% Chebyshev (MVUE) UCL	132.9

95% Chebyshev (MVUE) UCL	160.6	97.5% Chebyshev (MVUE) UCL	199.1
99% Chebyshev (MVUE) UCL	274.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	95.8	95% BCA Bootstrap UCL	106.2
95% Standard Bootstrap UCL	95.02	95% Bootstrap-t UCL	127.5
95% Hall's Bootstrap UCL	246.6	95% Percentile Bootstrap UCL	97.04
90% Chebyshev(Mean, Sd) UCL	118.7	95% Chebyshev(Mean, Sd) UCL	141.6
97.5% Chebyshev(Mean, Sd) UCL	173.4	99% Chebyshev(Mean, Sd) UCL	235.9

Suggested UCL to Use

95% Student's-t UCL	98.12		

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution 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 using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (mercury)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	7
Number of Detects	8	Number of Non-Detects	5
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.0013	Minimum Non-Detect	0.001
Maximum Detect	0.0072	Maximum Non-Detect	0.001
Variance Detects	3.8470E-6	Percent Non-Detects	38.46%
Mean Detects	0.00239	SD Detects	0.00196
Median Detects	0.0018	CV Detects	0.822
Skewness Detects	2.731	Kurtosis Detects	7.597
Mean of Logged Detects	-6.207	SD of Logged Detects	0.538

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.545	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.453	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.00185	KM Standard Error of Mean	4.7134E-4
90KM SD	0.00159	95% KM (BCA) UCL	0.00276
95% KM (t) UCL	0.00269	95% KM (Percentile Bootstrap) UCL	0.00272
95% KM (z) UCL	0.00263	95% KM Bootstrap t UCL	0.00426
90% KM Chebyshev UCL	0.00327	95% KM Chebyshev UCL	0.00391
97.5% KM Chebyshev UCL	0.0048	99% KM Chebyshev UCL	0.00654

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.385	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.721	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.419	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.296	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)	3.104	k star (bias corrected MLE)	2.023
Theta hat (MLE)	7.6918E-4	Theta star (bias corrected MLE)	0.00118
nu hat (MLE)	49.66	nu star (bias corrected)	32.37
Mean (detects)	0.00239		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.00532
Maximum	0.01	Median	0.002
SD	0.00414	CV	0.778
k hat (MLE)	1.559	k star (bias corrected MLE)	1.25
Theta hat (MLE)	0.00341	Theta star (bias corrected MLE)	0.00425
nu hat (MLE)	40.53	nu star (bias corrected)	32.51
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (32.51, α)	20.48	Adjusted Chi Square Value (32.51, β)	19.12
95% Gamma Approximate UCL	0.00844	95% Gamma Adjusted UCL	0.00904

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00185	SD (KM)	0.00159
Variance (KM)	2.5271E-6	SE of Mean (KM)	4.7134E-4
k hat (KM)	1.36	k star (KM)	1.097
nu hat (KM)	35.36	nu star (KM)	28.53
theta hat (KM)	0.00136	theta star (KM)	0.00169
80% gamma percentile (KM)	0.00296	90% gamma percentile (KM)	0.00417
95% gamma percentile (KM)	0.00537	99% gamma percentile (KM)	0.00815

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.53, α)	17.34	Adjusted Chi Square Value (28.53, β)	16.11
95% KM Approximate Gamma UCL	0.00305	95% KM Adjusted Gamma UCL	0.00328

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.697	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.381	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0017	Mean in Log Scale	-6.695
SD in Original Scale	0.00176	SD in Log Scale	0.789

95% t UCL (assumes normality of ROS data)	0.00257	95% Percentile Bootstrap UCL	0.00253
95% BCA Bootstrap UCL	0.00303	95% Bootstrap t UCL	0.00363
95% H-UCL (Log ROS)	0.00298		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.477	KM Geo Mean	0.00154
KM SD (logged)	0.521	95% Critical H Value (KM-Log)	2.137
KM Standard Error of Mean (logged)	0.155	95% H-UCL (KM -Log)	0.00243
KM SD (logged)	0.521	95% Critical H Value (KM-Log)	2.137
KM Standard Error of Mean (logged)	0.155		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00166	Mean in Log Scale	-6.743
SD in Original Scale	0.00178	SD in Log Scale	0.817
95% t UCL (Assumes normality)	0.00254	95% H-Stat UCL	0.003
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			
Suggested UCL to Use			
95% KM (t) UCL	0.00269		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (molybdenum)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	0.0042	Mean	0.257
Maximum	1.34	Median	0.104
SD	0.429	Std. Error of Mean	0.119
Coefficient of Variation	1.671	Skewness	2.154
Normal GOF Test			
Shapiro Wilk Test Statistic	0.599	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.403	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Data Not Normal at 1% Significance Level	
Data Not Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.469	95% Adjusted-CLT UCL (Chen-1995)	0.529
		95% Modified-t UCL (Johnson-1978)	0.481
Gamma GOF Test			

	A	B	C	D	E	F	G	H	I	J	K	L
1717					A-D Test Statistic	0.658	**Anderson-Darling Gamma GOF Test**					
1718					5% A-D Critical Value	0.788	Detected data appear Gamma Distributed at 5% Significance Level					
1719					K-S Test Statistic	0.234	**Kolmogorov-Smirnov Gamma GOF Test**					
1720					5% K-S Critical Value	0.25	Detected data appear Gamma Distributed at 5% Significance Level					
1721	**Detected data appear Gamma Distributed at 5% Significance Level**											
1722												
1723	**Gamma Statistics**											
1724					k hat (MLE)	0.52					k star (bias corrected MLE)	0.451
1725					Theta hat (MLE)	0.494					Theta star (bias corrected MLE)	0.569
1726					nu hat (MLE)	13.51					nu star (bias corrected)	11.73
1727					MLE Mean (bias corrected)	0.257					MLE Sd (bias corrected)	0.382
1728											Approximate Chi Square Value (0.05)	5.047
1729					Adjusted Level of Significance	0.0301					Adjusted Chi Square Value	4.439
1730												
1731	**Assuming Gamma Distribution**											
1732					95% Approximate Gamma UCL	0.597					95% Adjusted Gamma UCL	0.678
1733												
1734	**Lognormal GOF Test**											
1735					Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**					
1736					10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level					
1737					Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**					
1738					10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level					
1739	**Data appear Lognormal at 10% Significance Level**											
1740												
1741	**Lognormal Statistics**											
1742					Minimum of Logged Data	-5.473					Mean of logged Data	-2.575
1743					Maximum of Logged Data	0.293					SD of logged Data	1.761
1744												
1745	**Assuming Lognormal Distribution**											
1746					95% H-UCL	3.118					90% Chebyshev (MVUE) UCL	0.745
1747					95% Chebyshev (MVUE) UCL	0.954					97.5% Chebyshev (MVUE) UCL	1.245
1748					99% Chebyshev (MVUE) UCL	1.815						
1749												
1750	**Nonparametric Distribution Free UCL Statistics**											
1751	**Data appear to follow a Discernible Distribution**											
1752												
1753	**Nonparametric Distribution Free UCLs**											
1754					95% CLT UCL	0.453					95% BCA Bootstrap UCL	0.526
1755					95% Standard Bootstrap UCL	0.446					95% Bootstrap-t UCL	1.427
1756					95% Hall's Bootstrap UCL	1.8					95% Percentile Bootstrap UCL	0.457
1757					90% Chebyshev(Mean, Sd) UCL	0.614					95% Chebyshev(Mean, Sd) UCL	0.776
1758					97.5% Chebyshev(Mean, Sd) UCL	1					99% Chebyshev(Mean, Sd) UCL	1.441
1759												
1760	**Suggested UCL to Use**											
1761					95% Adjusted Gamma UCL	0.678						
1762												
1763	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
1764	**Please verify the data were collected from random locations.**											
1765	**If the data were collected using judgmental or other non-random methods,**											
1766	**then contact a statistician to correctly calculate UCLs.**											
1767												
1768	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (nickel)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	4
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.042	Minimum Non-Detect	0.04
Maximum Detect	0.939	Maximum Non-Detect	0.04
Variance Detects	0.107	Percent Non-Detects	30.77%
Mean Detects	0.332	SD Detects	0.327
Median Detects	0.237	CV Detects	0.985
Skewness Detects	1.015	Kurtosis Detects	-0.317
Mean of Logged Detects	-1.62	SD of Logged Detects	1.135

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.242	KM Standard Error of Mean	0.0851
90KM SD	0.289	95% KM (BCA) UCL	0.379
95% KM (t) UCL	0.394	95% KM (Percentile Bootstrap) UCL	0.377
95% KM (z) UCL	0.382	95% KM Bootstrap t UCL	0.49
90% KM Chebyshev UCL	0.497	95% KM Chebyshev UCL	0.613
97.5% KM Chebyshev UCL	0.774	99% KM Chebyshev UCL	1.089

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.36	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.208	**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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.107	k star (bias corrected MLE)	0.812
Theta hat (MLE)	0.3	Theta star (bias corrected MLE)	0.408
nu hat (MLE)	19.92	nu star (bias corrected)	14.61
Mean (detects)	0.332		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

Row				
1821	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1822	Minimum	0.01	Mean	0.233
1823	Maximum	0.939	Median	0.088
1824	SD	0.308	CV	1.325
1825	k hat (MLE)	0.576	k star (bias corrected MLE)	0.494
1826	Theta hat (MLE)	0.404	Theta star (bias corrected MLE)	0.471
1827	nu hat (MLE)	14.97	nu star (bias corrected)	12.85
1828	Adjusted Level of Significance (β)	0.0301		
1829	Approximate Chi Square Value (12.85, α)	5.79	Adjusted Chi Square Value (12.85, β)	5.13
1830	95% Gamma Approximate UCL	0.516	95% Gamma Adjusted UCL	0.583
1831				
1832	**Estimates of Gamma Parameters using KM Estimates**			
1833	Mean (KM)	0.242	SD (KM)	0.289
1834	Variance (KM)	0.0838	SE of Mean (KM)	0.0851
1835	k hat (KM)	0.698	k star (KM)	0.588
1836	nu hat (KM)	18.15	nu star (KM)	15.3
1837	theta hat (KM)	0.346	theta star (KM)	0.411
1838	80% gamma percentile (KM)	0.399	90% gamma percentile (KM)	0.632
1839	95% gamma percentile (KM)	0.876	99% gamma percentile (KM)	1.469
1840				
1841	**Gamma Kaplan-Meier (KM) Statistics**			
1842	Approximate Chi Square Value (15.30, α)	7.469	Adjusted Chi Square Value (15.30, β)	6.703
1843	95% KM Approximate Gamma UCL	0.495	95% KM Adjusted Gamma UCL	0.552
1844				
1845	**Lognormal GOF Test on Detected Observations Only**			
1846	Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
1847	10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level	
1848	Lilliefors Test Statistic	0.174	**Lilliefors GOF Test**	
1849	10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level	
1850	**Detected Data appear Lognormal at 10% Significance Level**			
1851	**Note GOF tests may be unreliable for small sample sizes**			
1852				
1853	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1854	Mean in Original Scale	0.234	Mean in Log Scale	-2.511
1855	SD in Original Scale	0.308	SD in Log Scale	1.708
1856	95% t UCL (assumes normality of ROS data)	0.386	95% Percentile Bootstrap UCL	0.38
1857	95% BCA Bootstrap UCL	0.409	95% Bootstrap t UCL	0.472
1858	95% H-UCL (Log ROS)	2.707		
1859				
1860	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1861	KM Mean (logged)	-2.112	KM Geo Mean	0.121
1862	KM SD (logged)	1.157	95% Critical H Value (KM-Log)	3.126
1863	KM Standard Error of Mean (logged)	0.34	95% H-UCL (KM -Log)	0.671
1864	KM SD (logged)	1.157	95% Critical H Value (KM-Log)	3.126
1865	KM Standard Error of Mean (logged)	0.34		
1866				
1867	**DL/2 Statistics**			
1868	**DL/2 Normal**		**DL/2 Log-Transformed**	
1869	Mean in Original Scale	0.236	Mean in Log Scale	-2.325
1870	SD in Original Scale	0.306	SD in Log Scale	1.439
1871	95% t UCL (Assumes normality)	0.387	95% H-Stat UCL	1.263
1872	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.394	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (phosphorus)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	38.7	Mean	200.5
Maximum	509	Median	133
SD	140.9	Std. Error of Mean	39.07
Coefficient of Variation	0.702	Skewness	0.986

Normal GOF Test

Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	270.2	95% Adjusted-CLT UCL (Chen-1995)	276.2
		95% Modified-t UCL (Johnson-1978)	272

Gamma GOF Test

A-D Test Statistic	0.249	**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	0.17	**Kolmogorov-Smirnov Gamma GOF Test**
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

k hat (MLE)	2.188	k star (bias corrected MLE)	1.734
Theta hat (MLE)	91.65	Theta star (bias corrected MLE)	115.6
nu hat (MLE)	56.89	nu star (bias corrected)	45.1
MLE Mean (bias corrected)	200.5	MLE Sd (bias corrected)	152.3
		Approximate Chi Square Value (0.05)	30.69
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	29.01

Assuming Gamma Distribution

95% Approximate Gamma UCL	294.7	95% Adjusted Gamma UCL	311.8

Row				
1925	**Lognormal GOF Test**			
1926	Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**	
1927	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
1928	Lilliefors Test Statistic	0.124	**Lilliefors Lognormal GOF Test**	
1929	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
1930	**Data appear Lognormal at 10% Significance Level**			
1931				
1932	**Lognormal Statistics**			
1933	Minimum of Logged Data	3.656	Mean of logged Data	5.055
1934	Maximum of Logged Data	6.232	SD of logged Data	0.763
1935				
1936	**Assuming Lognormal Distribution**			
1937	95% H-UCL	361.4	90% Chebyshev (MVUE) UCL	341
1938	95% Chebyshev (MVUE) UCL	402.9	97.5% Chebyshev (MVUE) UCL	488.8
1939	99% Chebyshev (MVUE) UCL	657.6		
1940				
1941	**Nonparametric Distribution Free UCL Statistics**			
1942	**Data appear to follow a Discernible Distribution**			
1943				
1944	**Nonparametric Distribution Free UCLs**			
1945	95% CLT UCL	264.8	95% BCA Bootstrap UCL	272.4
1946	95% Standard Bootstrap UCL	262.1	95% Bootstrap-t UCL	288.1
1947	95% Hall's Bootstrap UCL	277.8	95% Percentile Bootstrap UCL	266.6
1948	90% Chebyshev(Mean, Sd) UCL	317.8	95% Chebyshev(Mean, Sd) UCL	370.8
1949	97.5% Chebyshev(Mean, Sd) UCL	444.5	99% Chebyshev(Mean, Sd) UCL	589.3
1950				
1951	**Suggested UCL to Use**			
1952	95% Student's-t UCL	270.2		
1953				
1954	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1955	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1956	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1957				
1958				
1959	**Result (potassium)**			
1960				
1961	**General Statistics**			
1962	Total Number of Observations	13	Number of Distinct Observations	13
1963			Number of Missing Observations	0
1964	Minimum	375	Mean	2231
1965	Maximum	5180	Median	1710
1966	SD	1344	Std. Error of Mean	372.7
1967	Coefficient of Variation	0.602	Skewness	1.159
1968				
1969	**Normal GOF Test**			
1970	Shapiro Wilk Test Statistic	0.862	**Shapiro Wilk GOF Test**	
1971	1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
1972	Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**	
1973	1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
1974	**Data appear Normal at 1% Significance Level**			
1975				
1976	**Assuming Normal Distribution**			

	A–E	F	G–K	L
1977	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1978	95% Student's-t UCL	2895	95% Adjusted-CLT UCL (Chen-1995)	2972
1979			95% Modified-t UCL (Johnson-1978)	2915
1980				
1981	**Gamma GOF Test**			
1982	A-D Test Statistic	0.568	**Anderson-Darling Gamma GOF Test**	
1983	5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
1984	K-S Test Statistic	0.173	**Kolmogorov-Smirnov Gamma GOF Test**	
1985	5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level	
1986	**Detected data appear Gamma Distributed at 5% Significance Level**			
1987				
1988	**Gamma Statistics**			
1989	k hat (MLE)	3.018	k star (bias corrected MLE)	2.373
1990	Theta hat (MLE)	739.2	Theta star (bias corrected MLE)	940.2
1991	nu hat (MLE)	78.48	nu star (bias corrected)	61.7
1992	MLE Mean (bias corrected)	2231	MLE Sd (bias corrected)	1448
1993			Approximate Chi Square Value (0.05)	44.64
1994	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	42.57
1995				
1996	**Assuming Gamma Distribution**			
1997	95% Approximate Gamma UCL	3084	95% Adjusted Gamma UCL	3234
1998				
1999	**Lognormal GOF Test**			
2000	Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk Lognormal GOF Test**	
2001	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
2002	Lilliefors Test Statistic	0.209	**Lilliefors Lognormal GOF Test**	
2003	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
2004	**Data appear Lognormal at 10% Significance Level**			
2005				
2006	**Lognormal Statistics**			
2007	Minimum of Logged Data	5.927	Mean of logged Data	7.536
2008	Maximum of Logged Data	8.553	SD of logged Data	0.655
2009				
2010	**Assuming Lognormal Distribution**			
2011	95% H-UCL	3590	90% Chebyshev (MVUE) UCL	3569
2012	95% Chebyshev (MVUE) UCL	4154	97.5% Chebyshev (MVUE) UCL	4966
2013	99% Chebyshev (MVUE) UCL	6561		
2014				
2015	**Nonparametric Distribution Free UCL Statistics**			
2016	**Data appear to follow a Discernible Distribution**			
2017				
2018	**Nonparametric Distribution Free UCLs**			
2019	95% CLT UCL	2844	95% BCA Bootstrap UCL	2940
2020	95% Standard Bootstrap UCL	2810	95% Bootstrap-t UCL	3175
2021	95% Hall's Bootstrap UCL	3200	95% Percentile Bootstrap UCL	2842
2022	90% Chebyshev(Mean, Sd) UCL	3349	95% Chebyshev(Mean, Sd) UCL	3856
2023	97.5% Chebyshev(Mean, Sd) UCL	4559	99% Chebyshev(Mean, Sd) UCL	5940
2024				
2025	**Suggested UCL to Use**			
2026	95% Student's-t UCL	2895		
2027				
2028	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (selenium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	5
Number of Detects	5	Number of Non-Detects	8
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.014	Minimum Non-Detect	0.01
Maximum Detect	0.035	Maximum Non-Detect	0.01
Variance Detects	7.4200E-5	Percent Non-Detects	61.54%
Mean Detects	0.0198	SD Detects	0.00861
Median Detects	0.016	CV Detects	0.435
Skewness Detects	2.087	Kurtosis Detects	4.473
Mean of Logged Detects	-3.982	SD of Logged Detects	0.363

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.702	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.383	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.0138	KM Standard Error of Mean	0.00209
90KM SD	0.00675	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0175	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0172	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.02	95% KM Chebyshev UCL	0.0229
97.5% KM Chebyshev UCL	0.0268	99% KM Chebyshev UCL	0.0346

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.765	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.679	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.363	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.358	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)	8.54	k star (bias corrected MLE)	3.549
Theta hat (MLE)	0.00232	Theta star (bias corrected MLE)	0.00558
nu hat (MLE)	85.4	nu star (bias corrected)	35.49
Mean (detects)	0.0198		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.0138
Maximum	0.035	Median	0.01
SD	0.00703	CV	0.51
k hat (MLE)	6.406	k star (bias corrected MLE)	4.979
Theta hat (MLE)	0.00215	Theta star (bias corrected MLE)	0.00277
nu hat (MLE)	166.6	nu star (bias corrected)	129.4
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (129.45, α)	104.2	Adjusted Chi Square Value (129.45, β)	100.9
95% Gamma Approximate UCL	0.0171	95% Gamma Adjusted UCL	0.0177
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0138	SD (KM)	0.00675
Variance (KM)	4.5562E-5	SE of Mean (KM)	0.00209
k hat (KM)	4.161	k star (KM)	3.252
nu hat (KM)	108.2	nu star (KM)	84.56
theta hat (KM)	0.00331	theta star (KM)	0.00423
80% gamma percentile (KM)	0.0195	90% gamma percentile (KM)	0.024
95% gamma percentile (KM)	0.0282	99% gamma percentile (KM)	0.0374
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (84.56, α)	64.36	Adjusted Chi Square Value (84.56, β)	61.86
95% KM Approximate Gamma UCL	0.0181	95% KM Adjusted Gamma UCL	0.0188
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.339	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0113	Mean in Log Scale	-4.722
SD in Original Scale	0.00875	SD in Log Scale	0.725
95% t UCL (assumes normality of ROS data)	0.0157	95% Percentile Bootstrap UCL	0.0154
95% BCA Bootstrap UCL	0.0165	95% Bootstrap t UCL	0.0177
95% H-UCL (Log ROS)	0.0191		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.365	KM Geo Mean	0.0127
KM SD (logged)	0.364	95% Critical H Value (KM-Log)	1.967
KM Standard Error of Mean (logged)	0.113	95% H-UCL (KM -Log)	0.0167
KM SD (logged)	0.364	95% Critical H Value (KM-Log)	1.967
KM Standard Error of Mean (logged)	0.113		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0107	Mean in Log Scale	-4.792
SD in Original Scale	0.00899	SD in Log Scale	0.699
95% t UCL (Assumes normality)	0.0151	95% H-Stat UCL	0.0171
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0175		

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

Result (sodium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	28.5	Mean	152.2
Maximum	734	Median	66.8
SD	202.8	Std. Error of Mean	56.24
Coefficient of Variation	1.333	Skewness	2.465

Normal GOF Test

Shapiro Wilk Test Statistic	0.611	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.344	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	252.4	95% Adjusted-CLT UCL (Chen-1995)	285.8
		95% Modified-t UCL (Johnson-1978)	258.8

Gamma GOF Test

A-D Test Statistic	1.202	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.29	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.242	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.135	k star (bias corrected MLE)	0.924
Theta hat (MLE)	134	Theta star (bias corrected MLE)	164.6
nu hat (MLE)	29.51	nu star (bias corrected)	24.04
MLE Mean (bias corrected)	152.2	MLE Sd (bias corrected)	158.2
		Approximate Chi Square Value (0.05)	13.88
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	12.79

Assuming Gamma Distribution

95% Approximate Gamma UCL	263.6	95% Adjusted Gamma UCL	286

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk Lognormal GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
2185					10% Shapiro Wilk Critical Value	0.889	Data Not Lognormal at 10% Significance Level					
2186					Lilliefors Test Statistic	0.232	**Lilliefors Lognormal GOF Test**					
2187					10% Lilliefors Critical Value	0.215	Data Not Lognormal at 10% Significance Level					
2188	**Data Not Lognormal at 10% Significance Level**											
2189												
2190	**Lognormal Statistics**											
2191					Minimum of Logged Data	3.35					Mean of logged Data	4.524
2192					Maximum of Logged Data	6.599					SD of logged Data	0.928
2193												
2194	**Assuming Lognormal Distribution**											
2195					95% H-UCL	294					90% Chebyshev (MVUE) UCL	247.8
2196					95% Chebyshev (MVUE) UCL	298.6					97.5% Chebyshev (MVUE) UCL	369.1
2197					99% Chebyshev (MVUE) UCL	507.6						
2198												
2199	**Nonparametric Distribution Free UCL Statistics**											
2200	**Data do not follow a Discernible Distribution**											
2201												
2202	**Nonparametric Distribution Free UCLs**											
2203					95% CLT UCL	244.7					95% BCA Bootstrap UCL	285
2204					95% Standard Bootstrap UCL	239.8					95% Bootstrap-t UCL	590.6
2205					95% Hall's Bootstrap UCL	675.6					95% Percentile Bootstrap UCL	248.1
2206					90% Chebyshev(Mean, Sd) UCL	320.9					95% Chebyshev(Mean, Sd) UCL	397.3
2207					97.5% Chebyshev(Mean, Sd) UCL	503.4					99% Chebyshev(Mean, Sd) UCL	711.7
2208												
2209	**Suggested UCL to Use**											
2210					95% Student's-t UCL	252.4						
2211												
2212	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**											
2213	**Please verify the data were collected from random locations.**											
2214	**If the data were collected using judgmental or other non-random methods,**											
2215	**then contact a statistician to correctly calculate UCLs.**											
2216												
2217	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2218	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2219	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2220												
2221												
2222	**Result (strontium)**											
2223												
2224	**General Statistics**											
2225					Total Number of Observations	13					Number of Distinct Observations	13
2226											Number of Missing Observations	0
2227					Minimum	0.996					Mean	3.082
2228					Maximum	5.59					Median	2.84
2229					SD	1.445					Std. Error of Mean	0.401
2230					Coefficient of Variation	0.469					Skewness	0.419
2231												
2232	**Normal GOF Test**											
2233					Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**					
2234					1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level					
2235					Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**					
2236					1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level					

2237	**Data appear Normal at 1% Significance Level**			
2238				
2239	**Assuming Normal Distribution**			
2240	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
2241	95% Student's-t UCL	3.796	95% Adjusted-CLT UCL (Chen-1995)	3.791
2242			95% Modified-t UCL (Johnson-1978)	3.804
2243				
2244	**Gamma GOF Test**			
2245	A-D Test Statistic	0.154	**Anderson-Darling Gamma GOF Test**	
2246	5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level	
2247	K-S Test Statistic	0.104	**Kolmogorov-Smirnov Gamma GOF Test**	
2248	5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level	
2249	**Detected data appear Gamma Distributed at 5% Significance Level**			
2250				
2251	**Gamma Statistics**			
2252	k hat (MLE)	4.608	k star (bias corrected MLE)	3.596
2253	Theta hat (MLE)	0.669	Theta star (bias corrected MLE)	0.857
2254	nu hat (MLE)	119.8	nu star (bias corrected)	93.5
2255	MLE Mean (bias corrected)	3.082	MLE Sd (bias corrected)	1.625
2256			Approximate Chi Square Value (0.05)	72.2
2257	Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	69.54
2258				
2259	**Assuming Gamma Distribution**			
2260	95% Approximate Gamma UCL	3.991	95% Adjusted Gamma UCL	4.144
2261				
2262	**Lognormal GOF Test**			
2263	Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**	
2264	10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
2265	Lilliefors Test Statistic	0.089	**Lilliefors Lognormal GOF Test**	
2266	10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
2267	**Data appear Lognormal at 10% Significance Level**			
2268				
2269	**Lognormal Statistics**			
2270	Minimum of Logged Data	-0.00401	Mean of logged Data	1.013
2271	Maximum of Logged Data	1.721	SD of logged Data	0.512
2272				
2273	**Assuming Lognormal Distribution**			
2274	95% H-UCL	4.301	90% Chebyshev (MVUE) UCL	4.466
2275	95% Chebyshev (MVUE) UCL	5.082	97.5% Chebyshev (MVUE) UCL	5.937
2276	99% Chebyshev (MVUE) UCL	7.616		
2277				
2278	**Nonparametric Distribution Free UCL Statistics**			
2279	**Data appear to follow a Discernible Distribution**			
2280				
2281	**Nonparametric Distribution Free UCLs**			
2282	95% CLT UCL	3.741	95% BCA Bootstrap UCL	3.739
2283	95% Standard Bootstrap UCL	3.732	95% Bootstrap-t UCL	3.878
2284	95% Hall's Bootstrap UCL	3.806	95% Percentile Bootstrap UCL	3.728
2285	90% Chebyshev(Mean, Sd) UCL	4.284	95% Chebyshev(Mean, Sd) UCL	4.829
2286	97.5% Chebyshev(Mean, Sd) UCL	5.585	99% Chebyshev(Mean, Sd) UCL	7.07
2287				
2288	**Suggested UCL to Use**			

95% Student's-t UCL	3.796		

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

Result (thallium)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	2
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	8.2000E-4	Minimum Non-Detect	4.0000E-4
Maximum Detect	0.0415	Maximum Non-Detect	4.0000E-4
Variance Detects	1.9780E-4	Percent Non-Detects	15.38%
Mean Detects	0.0112	SD Detects	0.0141
Median Detects	0.00702	CV Detects	1.251
Skewness Detects	1.78	Kurtosis Detects	1.841
Mean of Logged Detects	-5.106	SD of Logged Detects	1.174

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.68	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

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

KM Mean	0.00958	KM Standard Error of Mean	0.00376
90KM SD	0.0129	95% KM (BCA) UCL	0.0162
95% KM (t) UCL	0.0163	95% KM (Percentile Bootstrap) UCL	0.0157
95% KM (z) UCL	0.0158	95% KM Bootstrap t UCL	0.0337
90% KM Chebyshev UCL	0.0209	95% KM Chebyshev UCL	0.026
97.5% KM Chebyshev UCL	0.0331	99% KM Chebyshev UCL	0.047

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.616	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.263	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)	0.94	k star (bias corrected MLE)	0.745
Theta hat (MLE)	0.012	Theta star (bias corrected MLE)	0.0151
nu hat (MLE)	20.69	nu star (bias corrected)	16.38
Mean (detects)	0.0112		

Gamma ROS Statistics using Imputed Non-Detects

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

This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	8.2000E-4	Mean	0.0111
Maximum	0.0415	Median	0.0073
SD	0.0128	CV	1.162
k hat (MLE)	1.091	k star (bias corrected MLE)	0.89
Theta hat (MLE)	0.0101	Theta star (bias corrected MLE)	0.0124
nu hat (MLE)	28.36	nu star (bias corrected)	23.15
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (23.15, α)	13.2	Adjusted Chi Square Value (23.15, β)	12.14
95% Gamma Approximate UCL	0.0194	95% Gamma Adjusted UCL	0.0211
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00958	SD (KM)	0.0129
Variance (KM)	1.6746E-4	SE of Mean (KM)	0.00376
k hat (KM)	0.548	k star (KM)	0.472
nu hat (KM)	14.24	nu star (KM)	12.28
theta hat (KM)	0.0175	theta star (KM)	0.0203
80% gamma percentile (KM)	0.0157	90% gamma percentile (KM)	0.0262
95% gamma percentile (KM)	0.0375	99% gamma percentile (KM)	0.0655
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (12.28, α)	5.414	Adjusted Chi Square Value (12.28, β)	4.78
95% KM Approximate Gamma UCL	0.0217	95% KM Adjusted Gamma UCL	0.0246
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00957	Mean in Log Scale	-5.534
SD in Original Scale	0.0135	SD in Log Scale	1.501
95% t UCL (assumes normality of ROS data)	0.0162	95% Percentile Bootstrap UCL	0.016
95% BCA Bootstrap UCL	0.018	95% Bootstrap t UCL	0.0328
95% H-UCL (Log ROS)	0.0629		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.524	KM Geo Mean	0.00399
KM SD (logged)	1.422	95% Critical H Value (KM-Log)	3.629
KM Standard Error of Mean (logged)	0.414	95% H-UCL (KM -Log)	0.0486
KM SD (logged)	1.422	95% Critical H Value (KM-Log)	3.629
KM Standard Error of Mean (logged)	0.414		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00954	Mean in Log Scale	-5.631
SD in Original Scale	0.0135	SD in Log Scale	1.67
95% t UCL (Assumes normality)	0.0162	95% H-Stat UCL	0.104
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	0.0337	95% Hall's Bootstrap	0.0486

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tin)

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	1
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.023	Minimum Non-Detect	0.02
Maximum Detect	0.092	Maximum Non-Detect	0.02
Variance Detects	6.4239E-4	Percent Non-Detects	7.692%
Mean Detects	0.0518	SD Detects	0.0253
Median Detects	0.0485	CV Detects	0.49
Skewness Detects	0.409	Kurtosis Detects	-1.288
Mean of Logged Detects	-3.078	SD of Logged Detects	0.514

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

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

KM Mean	0.0493	KM Standard Error of Mean	0.00718
90KM SD	0.0248	95% KM (BCA) UCL	0.0615
95% KM (t) UCL	0.0621	95% KM (Percentile Bootstrap) UCL	0.0616
95% KM (z) UCL	0.0611	95% KM Bootstrap t UCL	0.0632
90% KM Chebyshev UCL	0.0709	95% KM Chebyshev UCL	0.0806
97.5% KM Chebyshev UCL	0.0942	99% KM Chebyshev UCL	0.121

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.499	**Anderson-Darling 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 GOF**
5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

	A–E	F	G–K	L
2445	**Gamma Statistics on Detected Data Only**			
2446	k hat (MLE)	4.429	k star (bias corrected MLE)	3.377
2447	Theta hat (MLE)	0.0117	Theta star (bias corrected MLE)	0.0153
2448	nu hat (MLE)	106.3	nu star (bias corrected)	81.06
2449	Mean (detects)	0.0518		
2450				
2451	**Gamma ROS Statistics using Imputed Non-Detects**			
2452	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2453	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2454	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2455	This is especially true when the sample size is small.			
2456	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2457	Minimum	0.01	Mean	0.0485
2458	Maximum	0.092	Median	0.041
2459	SD	0.0269	CV	0.554
2460	k hat (MLE)	3.089	k star (bias corrected MLE)	2.428
2461	Theta hat (MLE)	0.0157	Theta star (bias corrected MLE)	0.02
2462	nu hat (MLE)	80.32	nu star (bias corrected)	63.12
2463	Adjusted Level of Significance (β)	0.0301		
2464	Approximate Chi Square Value (63.12, α)	45.85	Adjusted Chi Square Value (63.12, β)	43.75
2465	95% Gamma Approximate UCL	0.0668	95% Gamma Adjusted UCL	0.07
2466				
2467	**Estimates of Gamma Parameters using KM Estimates**			
2468	Mean (KM)	0.0493	SD (KM)	0.0248
2469	Variance (KM)	6.1514E-4	SE of Mean (KM)	0.00718
2470	k hat (KM)	3.952	k star (KM)	3.092
2471	nu hat (KM)	102.8	nu star (KM)	80.38
2472	theta hat (KM)	0.0125	theta star (KM)	0.0159
2473	80% gamma percentile (KM)	0.0701	90% gamma percentile (KM)	0.0869
2474	95% gamma percentile (KM)	0.103	99% gamma percentile (KM)	0.137
2475				
2476	**Gamma Kaplan-Meier (KM) Statistics**			
2477	Approximate Chi Square Value (80.38, α)	60.72	Adjusted Chi Square Value (80.38, β)	58.29
2478	95% KM Approximate Gamma UCL	0.0653	95% KM Adjusted Gamma UCL	0.068
2479				
2480	**Lognormal GOF Test on Detected Observations Only**			
2481	Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**	
2482	10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level	
2483	Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
2484	10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level	
2485	**Detected Data appear Lognormal at 10% Significance Level**			
2486				
2487	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2488	Mean in Original Scale	0.0488	Mean in Log Scale	-3.174
2489	SD in Original Scale	0.0265	SD in Log Scale	0.601
2490	95% t UCL (assumes normality of ROS data)	0.0619	95% Percentile Bootstrap UCL	0.061
2491	95% BCA Bootstrap UCL	0.0612	95% Bootstrap t UCL	0.0635
2492	95% H-UCL (Log ROS)	0.0739		
2493				
2494	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2495	KM Mean (logged)	-3.143	KM Geo Mean	0.0432
2496	KM SD (logged)	0.522	95% Critical H Value (KM-Log)	2.138

KM Standard Error of Mean (logged)	0.151	95% H-UCL (KM -Log)	0.0683
KM SD (logged)	0.522	95% Critical H Value (KM-Log)	2.138
KM Standard Error of Mean (logged)	0.151		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0485	Mean in Log Scale	-3.196
SD in Original Scale	0.0269	SD in Log Scale	0.649
95% t UCL (Assumes normality)	0.0618	95% H-Stat UCL	0.0777
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0621		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (uranium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	4
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	4.1000E-4	Minimum Non-Detect	4.0000E-4
Maximum Detect	0.122	Maximum Non-Detect	4.0000E-4
Variance Detects	0.00148	Percent Non-Detects	30.77%
Mean Detects	0.0205	SD Detects	0.0385
Median Detects	0.0105	CV Detects	1.878
Skewness Detects	2.885	Kurtosis Detects	8.495
Mean of Logged Detects	-5.044	SD of Logged Detects	1.721
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.524	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.438	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0143	KM Standard Error of Mean	0.00928
90KM SD	0.0316	95% KM (BCA) UCL	0.0326
95% KM (t) UCL	0.0308	95% KM (Percentile Bootstrap) UCL	0.0319
95% KM (z) UCL	0.0296	95% KM Bootstrap t UCL	0.0827
90% KM Chebyshev UCL	0.0422	95% KM Chebyshev UCL	0.0548
97.5% KM Chebyshev UCL	0.0723	99% KM Chebyshev UCL	0.107
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.596	**Anderson-Darling GOF Test**	

	A–E	F	G–K	L
2549	5% A-D Critical Value	0.767	Detected data appear Gamma Distributed at 5% Significance Level	
2550	K-S Test Statistic	0.28	**Kolmogorov-Smirnov GOF**	
2551	5% K-S Critical Value	0.293	Detected data appear Gamma Distributed at 5% Significance Level	
2552	**Detected data appear Gamma Distributed at 5% Significance Level**			
2553	**Note GOF tests may be unreliable for small sample sizes**			
2554				
2555	**Gamma Statistics on Detected Data Only**			
2556	k hat (MLE)	0.543	k star (bias corrected MLE)	0.436
2557	Theta hat (MLE)	0.0377	Theta star (bias corrected MLE)	0.047
2558	nu hat (MLE)	9.772	nu star (bias corrected)	7.848
2559	Mean (detects)	0.0205		
2560				
2561	**Gamma ROS Statistics using Imputed Non-Detects**			
2562	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2563	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2564	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2565	This is especially true when the sample size is small.			
2566	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2567	Minimum	4.1000E-4	Mean	0.0173
2568	Maximum	0.122	Median	0.01
2569	SD	0.0318	CV	1.843
2570	k hat (MLE)	0.71	k star (bias corrected MLE)	0.598
2571	Theta hat (MLE)	0.0243	Theta star (bias corrected MLE)	0.0289
2572	nu hat (MLE)	18.47	nu star (bias corrected)	15.54
2573	Adjusted Level of Significance (β)	0.0301		
2574	Approximate Chi Square Value (15.54, α)	7.639	Adjusted Chi Square Value (15.54, β)	6.863
2575	95% Gamma Approximate UCL	0.0351	95% Gamma Adjusted UCL	0.0391
2576				
2577	**Estimates of Gamma Parameters using KM Estimates**			
2578	Mean (KM)	0.0143	SD (KM)	0.0316
2579	Variance (KM)	9.9591E-4	SE of Mean (KM)	0.00928
2580	k hat (KM)	0.205	k star (KM)	0.209
2581	nu hat (KM)	5.34	nu star (KM)	5.441
2582	theta hat (KM)	0.0696	theta star (KM)	0.0683
2583	80% gamma percentile (KM)	0.0193	90% gamma percentile (KM)	0.0433
2584	95% gamma percentile (KM)	0.0728	99% gamma percentile (KM)	0.154
2585				
2586	**Gamma Kaplan-Meier (KM) Statistics**			
2587	Approximate Chi Square Value (5.44, α)	1.361	Adjusted Chi Square Value (5.44, β)	1.094
2588	95% KM Approximate Gamma UCL	0.0572	95% KM Adjusted Gamma UCL	0.0711
2589				
2590	**Lognormal GOF Test on Detected Observations Only**			
2591	Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**	
2592	10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level	
2593	Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**	
2594	10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level	
2595	**Detected Data appear Lognormal at 10% Significance Level**			
2596	**Note GOF tests may be unreliable for small sample sizes**			
2597				
2598	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2599	Mean in Original Scale	0.0142	Mean in Log Scale	-6.335
2600	SD in Original Scale	0.0329	SD in Log Scale	2.509

95% t UCL (assumes normality of ROS data)	0.0305	95% Percentile Bootstrap UCL	0.0313
95% BCA Bootstrap UCL	0.0415	95% Bootstrap t UCL	0.0833
95% H-UCL (Log ROS)	2.929		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.899	KM Geo Mean	0.00274
KM SD (logged)	1.863	95% Critical H Value (KM-Log)	4.472
KM Standard Error of Mean (logged)	0.548	95% H-UCL (KM -Log)	0.172
KM SD (logged)	1.863	95% Critical H Value (KM-Log)	4.472
KM Standard Error of Mean (logged)	0.548		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0142	Mean in Log Scale	-6.112
SD in Original Scale	0.0329	SD in Log Scale	2.182
95% t UCL (Assumes normality)	0.0305	95% H-Stat UCL	0.635
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	0.0827	95% Hall's Bootstrap	0.172
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (vanadium)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	9
Number of Detects	8	Number of Non-Detects	5
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.026	Minimum Non-Detect	0.02
Maximum Detect	1.26	Maximum Non-Detect	0.02
Variance Detects	0.166	Percent Non-Detects	38.46%
Mean Detects	0.412	SD Detects	0.408
Median Detects	0.346	CV Detects	0.991
Skewness Detects	1.411	Kurtosis Detects	2.123
Mean of Logged Detects	-1.453	SD of Logged Detects	1.292
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

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

KM Mean	0.261	KM Standard Error of Mean	0.105
90KM SD	0.355	95% KM (BCA) UCL	0.433
95% KM (t) UCL	0.449	95% KM (Percentile Bootstrap) UCL	0.433
95% KM (z) UCL	0.434	95% KM Bootstrap t UCL	0.589
90% KM Chebyshev UCL	0.577	95% KM Chebyshev UCL	0.72
97.5% KM Chebyshev UCL	0.918	99% KM Chebyshev UCL	1.308

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.211	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**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

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.018	k star (bias corrected MLE)	0.719
Theta hat (MLE)	0.405	Theta star (bias corrected MLE)	0.572
nu hat (MLE)	16.28	nu star (bias corrected)	11.51
Mean (detects)	0.412		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when 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	0.257
Maximum	1.26	Median	0.07
SD	0.372	CV	1.447
k hat (MLE)	0.488	k star (bias corrected MLE)	0.426
Theta hat (MLE)	0.528	Theta star (bias corrected MLE)	0.604
nu hat (MLE)	12.68	nu star (bias corrected)	11.08
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (11.08, α)	4.63	Adjusted Chi Square Value (11.08, β)	4.052
95% Gamma Approximate UCL	0.616	95% Gamma Adjusted UCL	0.704

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.261	SD (KM)	0.355
Variance (KM)	0.126	SE of Mean (KM)	0.105
k hat (KM)	0.541	k star (KM)	0.468
nu hat (KM)	14.07	nu star (KM)	12.16
theta hat (KM)	0.482	theta star (KM)	0.558
80% gamma percentile (KM)	0.427	90% gamma percentile (KM)	0.716
95% gamma percentile (KM)	1.027	99% gamma percentile (KM)	1.797

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.16, α)	5.332	Adjusted Chi Square Value (12.16, β)	4.703

95% KM Approximate Gamma UCL	0.596	95% KM Adjusted Gamma UCL	0.675
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.258	Mean in Log Scale	-2.751
SD in Original Scale	0.372	SD in Log Scale	2.045
95% t UCL (assumes normality of ROS data)	0.441	95% Percentile Bootstrap UCL	0.435
95% BCA Bootstrap UCL	0.492	95% Bootstrap t UCL	0.573
95% H-UCL (Log ROS)	9.367		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.399	KM Geo Mean	0.0908
KM SD (logged)	1.527	95% Critical H Value (KM-Log)	3.833
KM Standard Error of Mean (logged)	0.453	95% H-UCL (KM -Log)	1.577
KM SD (logged)	1.527	95% Critical H Value (KM-Log)	3.833
KM Standard Error of Mean (logged)	0.453		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.257	Mean in Log Scale	-2.665
SD in Original Scale	0.372	SD in Log Scale	1.877
95% t UCL (Assumes normality)	0.441	95% H-Stat UCL	4.643
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.449		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (zinc)			
General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	1.84	Mean	6.861
Maximum	19	Median	5.75
SD	5.192	Std. Error of Mean	1.44
Coefficient of Variation	0.757	Skewness	1.225

Normal GOF Test			
Shapiro Wilk Test Statistic	0.864	Shapiro Wilk GOF Test	
1% Shapiro Wilk Critical Value	0.814	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.197	Lilliefors GOF Test	
1% Lilliefors Critical Value	0.271	Data appear Normal at 1% Significance Level	
Data appear Normal at 1% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	9.427	95% Adjusted-CLT UCL (Chen-1995)	9.752
		95% Modified-t UCL (Johnson-1978)	9.509
Gamma GOF Test			
A-D Test Statistic	0.402	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.204	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.109	k star (bias corrected MLE)	1.673
Theta hat (MLE)	3.253	Theta star (bias corrected MLE)	4.1
nu hat (MLE)	54.83	nu star (bias corrected)	43.51
MLE Mean (bias corrected)	6.861	MLE Sd (bias corrected)	5.304
		Approximate Chi Square Value (0.05)	29.38
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	27.74
Assuming Gamma Distribution			
95% Approximate Gamma UCL	10.16	95% Adjusted Gamma UCL	10.76
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Lognormal GOF Test	
10% Shapiro Wilk Critical Value	0.889	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.197	Lilliefors Lognormal GOF Test	
10% Lilliefors Critical Value	0.215	Data appear Lognormal at 10% Significance Level	
Data appear Lognormal at 10% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	0.61	Mean of logged Data	1.67
Maximum of Logged Data	2.944	SD of logged Data	0.747
Assuming Lognormal Distribution			
95% H-UCL	11.88	90% Chebyshev (MVUE) UCL	11.31
95% Chebyshev (MVUE) UCL	13.34	97.5% Chebyshev (MVUE) UCL	16.15
99% Chebyshev (MVUE) UCL	21.66		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution			
Nonparametric Distribution Free UCLs			
95% CLT UCL	9.229	95% BCA Bootstrap UCL	9.414
95% Standard Bootstrap UCL	9.13	95% Bootstrap-t UCL	10.39

2809	95% Hall's Bootstrap UCL	10	95% Percentile Bootstrap UCL	9.18
2810	90% Chebyshev(Mean, Sd) UCL	11.18	95% Chebyshev(Mean, Sd) UCL	13.14
2811	97.5% Chebyshev(Mean, Sd) UCL	15.85	99% Chebyshev(Mean, Sd) UCL	21.19
2812				
2813	**Suggested UCL to Use**			
2814	95% Student's-t UCL	9.427		
2815				
2816	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
2817	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
2818	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
2819				
2820	**Result (zirconium)**			
2821				
2822	**General Statistics**			
2823	Total Number of Observations	13	Number of Distinct Observations	8
2824	Number of Detects	7	Number of Non-Detects	6
2825	Number of Distinct Detects	7	Number of Distinct Non-Detects	1
2826	Minimum Detect	0.047	Minimum Non-Detect	0.04
2827	Maximum Detect	0.501	Maximum Non-Detect	0.04
2828	Variance Detects	0.0243	Percent Non-Detects	46.15%
2829	Mean Detects	0.171	SD Detects	0.156
2830	Median Detects	0.13	CV Detects	0.911
2831	Skewness Detects	1.967	Kurtosis Detects	4.274
2832	Mean of Logged Detects	-2.055	SD of Logged Detects	0.797
2833				
2834	**Normal GOF Test on Detects Only**			
2835	Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**	
2836	1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	
2837	Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**	
2838	1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level	
2839	**Detected Data appear Normal at 1% Significance Level**			
2840	**Note GOF tests may be unreliable for small sample sizes**			
2841				
2842	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2843	KM Mean	0.111	KM Standard Error of Mean	0.0373
2844	90KM SD	0.125	95% KM (BCA) UCL	0.173
2845	95% KM (t) UCL	0.177	95% KM (Percentile Bootstrap) UCL	0.173
2846	95% KM (z) UCL	0.172	95% KM Bootstrap t UCL	0.248
2847	90% KM Chebyshev UCL	0.223	95% KM Chebyshev UCL	0.273
2848	97.5% KM Chebyshev UCL	0.344	99% KM Chebyshev UCL	0.482
2849				
2850	**Gamma GOF Tests on Detected Observations Only**			
2851	A-D Test Statistic	0.356	**Anderson-Darling GOF Test**	
2852	5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level	
2853	K-S Test Statistic	0.2	**Kolmogorov-Smirnov GOF**	
2854	5% K-S Critical Value	0.316	Detected data appear Gamma Distributed at 5% Significance Level	
2855	**Detected data appear Gamma Distributed at 5% Significance Level**			
2856	**Note GOF tests may be unreliable for small sample sizes**			
2857				
2858	**Gamma Statistics on Detected Data Only**			
2859	k hat (MLE)	1.872	k star (bias corrected MLE)	1.165
2860	Theta hat (MLE)	0.0914	Theta star (bias corrected MLE)	0.147

nu hat (MLE)	26.21	nu star (bias corrected)	16.31
Mean (detects)	0.171		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when 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	0.0968
Maximum	0.501	Median	0.047
SD	0.138	CV	1.43
k hat (MLE)	0.677	k star (bias corrected MLE)	0.572
Theta hat (MLE)	0.143	Theta star (bias corrected MLE)	0.169
nu hat (MLE)	17.6	nu star (bias corrected)	14.87
Adjusted Level of Significance (β)	0.0301		
Approximate Chi Square Value (14.87, α)	7.174	Adjusted Chi Square Value (14.87, β)	6.426
95% Gamma Approximate UCL	0.201	95% Gamma Adjusted UCL	0.224
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.111	SD (KM)	0.125
Variance (KM)	0.0155	SE of Mean (KM)	0.0373
k hat (KM)	0.789	k star (KM)	0.658
nu hat (KM)	20.52	nu star (KM)	17.12
theta hat (KM)	0.14	theta star (KM)	0.168
80% gamma percentile (KM)	0.182	90% gamma percentile (KM)	0.282
95% gamma percentile (KM)	0.385	99% gamma percentile (KM)	0.633
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (17.12, α)	8.757	Adjusted Chi Square Value (17.12, β)	7.918
95% KM Approximate Gamma UCL	0.216	95% KM Adjusted Gamma UCL	0.239
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0991	Mean in Log Scale	-3.131
SD in Original Scale	0.137	SD in Log Scale	1.412
95% t UCL (assumes normality of ROS data)	0.167	95% Percentile Bootstrap UCL	0.164
95% BCA Bootstrap UCL	0.196	95% Bootstrap t UCL	0.232
95% H-UCL (Log ROS)	0.515		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.592	KM Geo Mean	0.0748
KM SD (logged)	0.793	95% Critical H Value (KM-Log)	2.51
KM Standard Error of Mean (logged)	0.238	95% H-UCL (KM -Log)	0.182
KM SD (logged)	0.793	95% Critical H Value (KM-Log)	2.51

	A	B	C	D	E	F	G	H	I	J	K	L
2913	KM Standard Error of Mean (logged)					0.238						
2914												
2915	**DL/2 Statistics**											
2916	**DL/2 Normal**						**DL/2 Log-Transformed**					
2917	Mean in Original Scale					0.101	Mean in Log Scale					-2.912
2918	SD in Original Scale					0.135	SD in Log Scale					1.116
2919	95% t UCL (Assumes normality)					0.168	95% H-Stat UCL					0.271
2920	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2921												
2922	**Nonparametric Distribution Free UCL Statistics**											
2923	**Detected Data appear Normal Distributed at 1% Significance Level**											
2924												
2925	**Suggested UCL to Use**											
2926	95% KM (t) UCL					0.177						
2927												
2928	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2929	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
2930	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2931												

Appendix C Example Calculations and Uptake Factors

Example calculations for exposure point concentrations (EPCs), human health exposures and human health and ecological health risks are provided below. The Baseline Case and Baseline Plus Project Case EPCs are summarized in Section 6.0. The receptor characteristics for humans and ecological receptors are provided in Sections 7.0 and Section 8.0, respectively. The toxicological reference values (TRVs) used for the assessment of human exposures are provided in Section 7.0 and the TRVs for ecological receptors are provided in **Appendix F**.

Exposure Point Concentrations

CALCULATION OF EXPOSURE POINT CONCENTRATION IN SOIL

WORKED EXAMPLE FOR BASELINE PLUS PROJECT SCENARIO ARSENIC CONCENTRATIONS IN SOIL

(1) ***Calculate Total Deposition Rate of Arsenic at Each Receptor Location***

Total deposition rate is the sum of 3 times the yearly deposition rate during the Project construction phase and 40 times the yearly deposition rate during the Project operations phase.

Where:

Estimated Deposition Rate of Arsenic at Receptor Location #1 from Project Construction Phase (3 years of Deposition)	=	1.65E-05 g/m^2/year x 3 years	=	4.95E-05 g/m^2
Estimated Deposition Rate of Arsenic at Receptor Location #1 from Project Operations Phase (40 years of Deposition)	=	7.75E-05 g/m^2/year x 40 years	=	3.10E-03 g/m^2

Result:

Total Deposition Rate of Arsenic at Receptor Location #1 (Construction and Operations Phases)	=	3.15E-03 g/m^2

(2) ***Take the 95th Percentile of the Total Deposition Rates of Arsenic during the Project from Among the Receptor Locations***

95th Percentile of the Total Deposition Rates of Arsenic among Receptor Locations	=	1.42E-02 g/m^2

(3) ***Calculate the Concentration of Arsenic due to Deposition. Assume a 1 m x 1 m plot and a 0.14 m mixing depth.***

Where:

95th Percentile of Total Deposition Rates of Arsenic among Receptor Locations	=	1.42E-02 g/m^2 or 1.42E+01 mg/m^2
Weight of Top 2 cm per 1 m^2 Area of Soil	=	Weight of the surface horizon of 1 m^2 area of untilled soil that is assumed to be mixed with arsenic deposited during Project construction and operations
	=	*Area of Soil Plot x Mixing Depth of Metals in Soil x Soil Bulk Density*
Area of Soil Plot	=	1 m^2
Mixing Depth Thickness	=	14 cm or 0.14 m
Soil Bulk Density	=	1,200 kg/m^3

Results:

Weight of Top 2 cm per 1 m^2 Area of Soil	=	0.14 m x 1,200 kg/m^3 = 1.68E+02 kg/m^2
Concentration of Arsenic in Soil due to Deposition	=	(1.42E+01 mg/m^2) / (1.68E+02 kg/m^2) = 8.43E-02 mg/kg

(4) ***Calculation of Baseline Plus Project Scenario Exposure Point Concentration of Arsenic in Soil***

Baseline Plus Project Scenario Concentration of Arsenic = *Baseline Concentration of Arsenic* + *Concentration of Arsenic Due to Deposition*

Where:

Baseline Concentration of Arsenic (Measured Concentration)	=	2.70E+00 mg/kg
Concentration of Arsenic in Soil Due to Deposition	=	8.43E-02 mg/kg

Result:

Baseline Plus Project Scenario Concentration of Arsenic in Soil	=	2.78E+00 mg/kg

CALCULATION OF EXPOSURE POINT CONCENTRATION IN SEDIMENT

WORKED EXAMPLE FOR ARSENIC CONCENTRATIONS IN SEDIMENT (PROJECT PLUS BASELINE SCENARIO) – JOCKO CREEK WATERSHED

$$EPC_{sed\ (predicted)} = EPC_{sed\ (baseline)} + \Delta EPC_{sed}$$

And:

$$\Delta EPC_{sed} = \Delta EPC_{sw} \times KD_{site\ specific}$$

$$\Delta EPC_{sw} = EPC_{sw\ (future)} - EPC_{sw\ (baseline)}$$

$$KD_{site\ specific} = \frac{FOC \times KD_{literature}}{FOC_{shallow}}$$

Where:

$FOC_{shallow}$	:	Fraction of organic carbon in shallow sediment (mg/kg)	=	2.00E-01 mg/kg
FOC	:	Fraction of organic carbon in sediment (mg/kg)	=	1.28E-01 mg/kg
$KD_{literature}$	:	Partition coefficient from surface water to sediment (Sheppard et al. 2010) (L/kg)	=	1.40E+03 L/kg
$EPC_{sw\ (predicted)}$	:	Exposure Point Concentration of arsenic in surface water for the Jocko Creek Watershed (Baseline Plus Project Scenario) (mg/L)	=	7.09E-04 mg/L
$EPC_{sw\ (baseline)}$	:	Measured Exposure Point Concentration of arsenic in water for the Jocko Creek Watershed (Baseline Scenario) (mg/L)	=	7.00E-04 mg/L
$EPC_{sed\ (baseline)}$	:	Measured Exposure Point Concentration of arsenic in sediment for the Jocko Creek Watershed (Baseline Scenario) (mg/kg)	=	4.00E+00 mg/kg

Result:

$KD_{site\ specific}$	:	Partition coefficient from surface water to sediment (L/kg)	=	8.97E+02 L/kg
ΔEPC_{sw}	:	Estimated change of arsenic Exposure Point Concentration in surface water between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) (mg/L)	=	8.75-06 mg/L
ΔEPC_{sed}	:	Estimated change of arsenic Exposure Point Concentration in sediment between Baseline and Baseline Plus Project Scenarios (i.e., Project Alone Scenario) (mg/kg)	=	7.84E-03 mg/kg
$EPC_{sed\ (future)}$	:	Estimated arsenic Exposure Point Concentration in sediment (Baseline Plus Project Scenario) (mg/kg)	=	4.01E+00 mg/kg

CALCULATION OF EXPOSURE POINT CONCENTRATION IN FISH FOR HUMAN CONSUMPTION

WORKED EXAMPLE FOR EXPOSURE POINT CONCENTRATION IN FISH AND THE PROPORTIONING APPROACH

Calculation of Estimated Baseline Plus Project Scenario Arsenic Concentration in Angling Fish Tissue Using Estimated Baseline Plus Project Case Arsenic Concentration in Water in the Jocko Creek Watershed

$$EPC_{Angling\ Fish\ (Baseline\ Plus\ Project)} = Expected\ Magnitude\ Change \times EPC_{Angling\ Fish(Measured\ Baseline)}$$

$$Expected\ Magnitude\ Change = \frac{Modelled\ Conc._{Angling\ Fish(Baseline\ Plus\ Project)}}{Modelled\ Conc._{Angling\ Fish(Baseline)}}$$

$$Modelled\ Conc._{(Baseline\ Plus\ Project)} = EPC_{Water\ (Baseline\ Plus\ Project)} \times UP_{Angling\ Fish(Baseline\ Plus\ Project)}$$

$$Modelled\ Conc._{(Baseline)} = EPC_{Water\ (Baseline)} \times UP_{Angling\ Fish(Baseline)}$$

Where:

$EPC_{Angling\ Fish\ (Measured\ Baseline)}$	:	Measured Exposure Point Concentration of Arsenic in Angling Fish Tissue (muscle) under Baseline conditions (mg/kg wet weight)	=	7.20E-02 mg/kg wet weight
$EPC_{Water\ (Baseline)}$	:	Baseline Exposure Point Concentration of Arsenic in Surface Water (Jocko Creek Watershed) (mg/L)	=	7.00E-04 mg/L
$EPC_{Water\ (Baseline\ Plus\ Project)}$	:	Modelled Baseline Plus Project Exposure Point Concentration of Arsenic in Surface Water (Jocko Creek Watershed) (mg/L)	=	7.09E-04 mg/L
$UP_{Angling\ Fish\ (Baseline)}$	:	Uptake Factor for Arsenic Uptake in Angling Fish from Surface Water under Baseline conditions (mg/kg wet-tissue / mg/L water)	=	5.0E+01 mg/kg-wet tissue/ mg/L-water wet tissue
$UP_{Angling\ Fish\ (Baseline\ Plus\ Project)}$	:	Uptake Factor for Arsenic uptake in Angling Fish from Surface Water under Baseline Plus Project Case Conditions (mg/kg wet-tissue / mg/L water)	=	5.0E+01 mg/kg-wet tissue/ mg/L-water wet tissue

Results:

$Modelled\ Conc._{(Baseline\ Plus\ Project)}$	:	Modelled Concentration of Arsenic in Angling Fish Tissue under Baseline Plus Project conditions based on uptake from predicted Surface Water (Jocko Creek Watershed) (mg/kg wet weight)	=	3.55E-02 mg/kg wet weight

$Modelled\ Conc._{(Baseline)}$	:	Modelled Concentration of Arsenic in Angling Fish Tissue under Baseline conditions based on uptake from measured Surface Water (Jocko Creek Watershed) (mg/kg wet weight)	=	3.50E-02 mg/kg wet weight
$Expected\ Magnitude\ Change$	:	Expected Magnitude of Change in Arsenic Concentrations in Fish Based on Estimated Change in Arsenic Concentrations in Water (unitless)	=	1.01E+00
$EPC_{Angling\ Fish\ (Baseline\ Plus\ Project)}$	:	Estimated Exposure Point Concentration of Arsenic in Fish Tissue based on Baseline Plus Project Case conditions (mg/kg wet weight)	=	7.29E-02 mg/kg wet weight

CALCULATION OF EXPOSURE POINT CONCENTRATION IN MOOSE MEAT

Calculation for the concentration of arsenic in moose tissue from the consumption of plants (terrestrial and aquatic), soil, sediment, and water under Baseline Plus Project conditions in the Jocko Creek watershed:

$$C_{moose} = \left(\sum\left(F_{foodi} \times Q_{foodi(moose)} \times C_{foodi}\right) + \left(Fs \times Q_{s(moose)} \times Cs \times Bs\right) + \left(F_W \times Qw(moose) \times Cw\right) + \left(F_{sed} \times Q_{sed(moose)} \times C_{sed}\right)\right) \times Ba_{moose} \times MF$$

And:

$$Ba_{moose} = \frac{L_{moose\%}}{L_{beef\%}} \times Ba_{beef}$$

Where:

Ba_{beef}	:	Arsenic biotransfer factor for beef (day/kg FW tissue)	=	2.00E-03 day/kg wet weight tissue
$L_{beef\%}$	:	Lipid content in beef cattle (%)	=	19%
$L_{moose\%}$	:	Lipid content in moose (%)	=	1%
MF	:	Metabolism Factor (unitless)	=	1.00E+00
i	:	Index of food types consumed by the moose	=	*i*=1 (aquatic plants) *i*=2 (terrestrial plants)
F_{foodi}	:	Fraction of plant types (terrestrial and aquatic) ingested by the moose (unitless)	=	1.00E+00
Q_{food1}	:	Quantity of aquatic plants eaten by the moose per day (kg dry weight plant / day)	=	6.39E+00 kg/day
C_{food1}	:	Concentration of arsenic in aquatic plants eaten by the moose (mg/kg dry weight)	=	3.00E-01 mg/kg
Q_{food2}	:	Quantity of terrestrial plants eaten by the moose per day (kg dry weight plant / day)	=	2.56E+01 kg/day
C_{food2}	:	Concentration of arsenic in terrestrial plants eaten by the moose (mg/kg dry weight)	=	8.60E-03 mg/kg

F_s	:	Fraction of soil contaminated and ingested by the moose from the area (unitless)	= 1.00E+00
$Q_{s(moose)}$	:	Quantity of soil eaten by the moose each day (kg/day)	= 1.20E-01 kg/day
Bs	:	Soil bioavailability factor (unitless)	= 1.00E+00
Cs	:	Soil arsenic concentration over exposure duration (modelled soil EPC under the Baseline Plus Project scenario) (mg/kg soil)	= 2.78E+00 mg/kg
F_W	:	Fraction of water contaminated and ingested by the moose in the area (unitless)	= 1.00E+00
Qw	:	Quantity of water taken up by the moose per day (L/day)	= 2.16E+01 L/day
Cw	:	Arsenic concentration in water (modelled surface water EPC from the Jocko Creek watershed under the Baseline Plus Project scenario) (mg/L)	= 7.09E-04 mg/L
F_{sed}	:	Fraction of sediment contaminated and ingested by the moose (unitless)	= 1.00E+00
Q_{sed}	:	Quantity of sediment eaten by the moose per day (kg dry weight/day)	= 2.60E-02 kg/day
C_{sed}	:	Arsenic concentration in sediment (modelled sediment EPC from the Jocko Creek watershed under the Baseline Plus Project scenario) (mg/kg)	= 4.01E+00 mg/kg

Results:

Ba_{moose}	:	Arsenic biotransfer factor for moose (day/kg wet weight tissue)	= 1.05E-04 day/kg
C_{moose}	:	Arsenic concentration in moose meat in the Jocko Creek Watershed under Baseline Plus Project Case conditions (mg Arsenic/kg wet weight tissue)	= 2.7E-04 mg/kg wet weight tissue

CALCULATION OF EXPOSURE POINT CONCENTRATION IN TERRESTRIAL PLANTS

Calculation for the concentration of arsenic in terrestrial plants under Baseline Plus Project conditions:

$$C_{plant} = C_{plant(uptake)} + C_{plant(deposition)}$$

$$C_{plant(uptake)} = Expected\ Magnitude\ Change \times EPC_{Plant(Measured\ Baseline)}$$

$$Expected\ Magnitude\ Change = \frac{Modelled\ Conc._{Plant(Baseline\ Plus\ Project)}}{Modelled\ Conc._{Plant(Baseline)}}$$

$$Modelled\ Conc._{\substack{Plant\\(Baseline\\Plus\ Project)}} = EPC_{Soil\ (Baseline\ Plus\ Project)} \times UP_{soil\ to\ plant}$$

$$Modelled\ Conc._{\substack{Plant\\(Baseline)}} = EPC_{Soil\ (Baseline)} \times UP_{soil\ to\ plant}$$

$$C_{plant\ (deposition)} = \frac{1000 \times Dytotal \times Rp_i \times \left[1.0 - e^{(-kp \times Tp_i)}\right]}{Yp_i \times kp} \times SC$$

Where:

$EPC_{Plant(Measured\ Baseline)}$	:	Measured Exposure Point Concentration of arsenic in terrestrial plants under Baseline conditions (mg/kg wet weight)	=	2.90E-02 mg/kg wet weight
$EPC_{Soil\ (Baseline\ Plus\ Project)}$	:	Modelled concentration of arsenic in soil under Baseline Plus Project Conditions (mg/kg)	=	2.78E+00 mg/kg
$EPC_{Soil\ (Baseline)}$	:	Measured Exposure Point Concentration of arsenic in soil under Baseline Conditions (mg/kg)	=	2.70E+00 mg/kg
$UP_{soil\ to\ plant}$	:	Uptake factor from soil to plants (Bechtel Jacobs (1998), in US EPA (2007)) (mg/kg-dry plant / mg/kg-dry soil)	=	3.8E-02 mg/kg-dry plant / mg/kg-dry soil
1000	:	Unit conversion factor		
$Dytotal$	:	Modelled yearly total deposition of arsenic (g/m^2-year)	=	3.41E-04 g/m^2-year
Rp_i	:	Interception fraction of the edible portion of plant tissue (unitless) (US EPA 2005)	=	9.82E-01
kp	:	Plant surface loss coefficient (1/y) (US EPA 2005)	=	1.8E+01 y^{-1}
Tp_i	:	Length of plant's exposure to deposition per harvest of the edible portion (y) (US EPA 2005)	=	1.64E-01 y
Yp_i	:	Yield or standing crop biomass of edible portion (kg dry weight/m^2) (US EPA 2005)	=	2.24E+00 kg dry weight/m^2

SC	:	Solids content of terrestrial plants based on mean measured moisture content in baseline scenario data (unitless)	=	0.2526
Results:				
$Modelled\ Conc._{\substack{Plant \\ \left(\substack{Baseline \\ Plus\ Project}\right)}}$	:	Modelled concentration of arsenic in terrestrial plant tissue under Baseline Plus Project conditions based on uptake from soil (mg/kg wet weight)	=	1.06E-01
$Modelled\ Conc._{\substack{Plant \\ (Baseline)}}$	:	Modelled concentration of arsenic in terrestrial plant tissue under Baseline conditions based on uptake from soil (mg/kg wet weight)	=	1.03E-01
$Expected\ Magnitude\ Change$	:	Expected magnitude of change in arsenic concentrations in terrestrial plants based on estimated change in arsenic concentrations in soil (unitless)	=	1.03E+00
$C_{plant(uptake)}$	:	Predicted concentration of arsenic in plants due to uptake from soil (mg/kg dry weight)	=	3.0E-02 mg/kg dry weight
$C_{plant(deposition)}$	:	Predicted concentration of arsenic in plants due to direct deposition (mg/kg dry weight)	=	2.0E-03 mg/kg dry weight
C_{plant}	=	Predicted concentration of arsenic in uncovered plants under Baseline Plus Project scenario (mg/kg dry weight)	=	3.2E-02 mg/kg dry weight

Human Health

CALCULATION OF HEALTH RISKS FROM INHALATION

WORKED EXAMPLE FOR EXPOSURE RATIOS

Calculation of Exposure Ratio for 1-hour NO_2 exposures at the Modelled Mine Boundary for Baseline Plus Project During Construction

$$\text{Exposure Ratio (ER) (unitless)} = \frac{\text{Modelled Air Concentration } (\mu g/m^3)}{\text{EL, TC, or RSC } (\mu g/m^3)}$$

Where:

Modelled Air Concentration (µg/m³)	:	Maximum estimated ground level concentration of NO_2 (1-hour) along modelled mine boundary during Construction (Baseline plus Project) ($\mu g/m^3$)	=	1.4E+02 $\mu g/m^3$
Exposure limit (EL), Tolerable Concentration (TC), or Risk Specific Concentration (RSC) (µg/m³)	:	Exposure Limit for 1-hour NO_2 ($\mu g/m^3$)	=	2.0E+02 $\mu g/m^3$

Result:

ER	:	Exposure Ratio for 1-hour NO_2 inhalation exposures at the Modelled Mine Boundary for Baseline Plus Project During Construction Assuming No Plume Depletion	=	7.0E-01

WORKED EXAMPLE FOR INCREMENTAL LIFETIME CANCER RISK (ILCR)

Calculation of ILCR at the Modelled Mine Boundary Due to Exposure to Chrysotile Asbestos During Construction at Receptor Location R9 Assuming No Plume Depletion

$$ILCR = Air\ Concentration\ (fibres/cm^3) \times Fraction\ of\ Time\ Exposed\ \times IUR\ (fibres/cm^3)^{-1}$$

Where:

$Air\ Concentration\ (fibres/cm^3)$	:	Modelled annual ground level concentration of chrysotile asbestos at Receptor Location R9 during Construction (Project Alone) assuming no plume depletion (fibres/cm^3)	=	3.4E-05 fibres/cm^3
$Fraction\ of\ Time\ Exposed$	:	Duration of exposure for construction phase (Years)/Lifetime (years)	=	3/80 = 3.75E-02
$IUR\ (fibres/cm^3)^{-1}$	:	Inhalation Unit Risk for chrysotile asbestos	=	1.6E-01 (fibres/cm^3)$^{-1}$

Result:

$ILCR$	:	Incremental lifetime cancer risk	=	2.0E-07

WORKED EXAMPLE FOR ADDITIONAL LUNG CANCER MORTALITY (ALCM) DUE TO EXPOSURE TO DIESEL PARTICULATE MATTER (DPM)

Calculation of ALCM at the Modelled Mine Boundary Due to Exposure to DPM During Construction Assuming No Plume Depletion

$$ALCM = \left[{(e^{\beta \cdot Exposure)} - 1)} \Big/ {e^{\beta \cdot Expsoure}} \right] \cdot Baseline\ rate\ \cdot years$$

Where:

β	:	The slope coefficient for the relationship between the pooled hazard ratio for lung cancer mortality in the Canadian population (1.127 (95% CI: 1.085, 1.170)) per 10 µg/m^3 increase in long-term exposure to ambient $PM_{2.5}$ (Health Canada 2022[1])	=	1.196E-02
$Exposure$	:	Modelled annual ground level concentration of DPM along modelled mine boundary during Construction (Project Alone) assuming no plume depletion (µg/m^3)	=	2.6E-02 µg/m^3
$Baseline\ rate$	:	The 2021 Canadian age standardized mortality rate for lung cancer per 100,000 population (Health Canada 2022)[1]		45.5 per 100,000
$Years$	:	Duration of Project Construction (years)	=	3 years

Result:

$ALCM$	:	Additional lung cancer mortality (per 100,000 population)	=	0.04 per 100,000

[1] Health Canada. 2022. Lung cancer and ambient PM2.5 in Canada: a systematic review and meta-analysis. Health Canada.

CALCULATION OF EXPOSURE ESTIMATES FROM ORAL, DERMAL AND PARTICULATE INHALATION PATHWAYS

WORKED EXAMPLE FOR NON-CARCINOGENIC EXPOSURE FOR AN INDIGENOUS TODDLER RECEPTOR TO ARSENIC, NORTH DRIFTWOOD RIVER (TMF PONDS), BASELINE SCENARIO

(1) Calculation of Exposure Estimate for Incidental Ingestion of Soil

$$Exposure\ Estimate_{Ingestion} = \frac{C_{soil} \times IR_{soil} \times CF \times RAF_{Oral} \times D_2 \times D_3}{BW}$$

Where:

C_{soil}	:	Baseline arsenic concentration in soil (mg/kg)	=	2.7E+00 mg/kg
IR_{soil}	:	Soil ingestion rate (g/day)	=	8.0E-02 g/day
CF	:	Conversion factor (kg to g)	=	1E-03 kg/g
RAF_{Oral}	:	Relative absorption factor from the gastrointestinal tract (unitless)	=	1.0E+00
D_2	:	Days per week exposed (7) / 7 days (unitless)	=	1.0
D_3	:	Weeks per year exposed (52) / 52 weeks (unitless)	=	1.0
BW	:	Average body weight of receptor (kg)	=	1.65E+01 kg

Result:

Exposure estimate for ingestion (mg/kg/day)	=	1.3E-05 mg/kg/day

(2) Calculation of Exposure Estimate for Dermal Contact with Soil

$$Exposure\ Estimate_{Dermal} = \frac{[(C_{\mathrm{soil}} \times SA_H \times SL_H) + (C_{\mathrm{soil}} \times SA_O \times SL_O) \times nEV \times RAF_{Derm} \times CF \times D_2 \times D_3}{BW}$$

Where:

C_{soil}	:	Baseline arsenic concentration in soil (mg/kg)	= 2.7E+00 mg/kg
SA_H	:	Surface area of hands exposed for soil loading (cm^2)	= 4.3E+02 cm^2
SL_H	:	Soil loading rate to exposed skin of hands (g/cm^2)	= 1.0E-04 g/cm^2
SA_O	:	Surface area exposed other than hands (cm^2)	= 2.58E+03 cm^2
SL_O	:	Soil loading rate to exposed skin other than hands (g/cm^2)	= 1.0E-05 g/cm^2
nEV	:	number of dermal exposure events/day (assumed to be 1 event/day)	= 1.0
RAF_{Derm}	:	Relative dermal absorption factor (unitless)	= 3.00E-02
CF	:	Conversion factor (kg to g)	= 1.00E-03 kg/g
D_2	:	Days per week exposed (7) / 7 days	= 1.0
D_3	:	Weeks per year exposed (52) / 52 weeks	= 1.0
BW	:	Average body weight of receptor (kg)	= 1.65E+01 kg

Result:

Exposure estimate for dermal contact (mg/kg/day) = 3.4E-07 mg/kg/day

(3) Calculation of Exposure Estimate for Particulate Inhalation of Soil

$$Exposure\ Estimate_{Particulate\ Inhalation} = \frac{C_{soil} \times P_{Air} \times IR_A \times RAF_{Inh} \times D_2 \times D_3}{BW}$$

Where:

C_{soil}	:	Baseline arsenic concentration in soil (mg/kg)	= 2.7E+00 mg/kg
P_{Air}	:	Particulate concentration in air (kg/m^3)	= 7.6E-10 kg/m^3
IR_A	:	Receptor air intake (inhalation) rate (m^3/day)	= 8.3E+00 m^3/day
RAF_{Inh}	:	Relative absorption factor by inhalation (unitless)	= 1.0
D_2	:	Days per week exposed (7) / 7 days	= 1.0
D_3	:	Weeks per year exposed (52) / 52 weeks	= 1.0
BW	:	Average body weight of receptor (kg)	= 1.65E+01 kg

Result:

Exposure estimate for inhalation of particulate (mg/kg/day) = 1.0E-09 mg/kg/day

(4) Calculation of Exposure Estimate for Consumption of Fish

$$Exposure\ Estimate_{Fish} = \frac{C_{Fish} \times IR_{Fish} \times CF \times RAF_{Oral} \times D_2 \times D_3}{BW}$$

Where:

C_{Fish}	:	Baseline arsenic concentration in fish (mg/kg)	=	7.2E-02 mg/kg
IR_{Fish}	:	Ingestion rate of local fish (g/day)	=	1.8E+01 g/day
CF	:	Conversion factor (kg to g)	=	1E-03 kg/g
RAF_{Oral}	:	Relative absorption factor from the gastrointestinal tract (unitless)	=	1.0E+00
D_2	:	Days per week exposed (7) / 7 days (unitless)	=	1.0
D_3	:	Weeks per year exposed (52) / 52 weeks (unitless)	=	1.0
BW	:	Average body weight of receptor (kg)	=	1.65E+01 kg

Result:

Exposure estimate for ingestion of fish (mg/kg/day)	=	7.7E-05 mg/kg/day

(5) Calculation of Exposure Estimate for Consumption of Wild Meat

$$Exposure\ Estimate_{Wild\ Meat} = \frac{C_{Wild\ Meat} \times IR_{Wild\ Meat} \times CF \times RAF_{Oral} \times D_2 \times D_3}{BW}$$

Where:

$C_{Wild\ Meat}$	:	Maximum baseline arsenic concentration in moose, deer, rabbit, beaver, grouse, duck or goose (mg/kg)	=	Various (see Table 6-16 to Table 6-22)
$IR_{Wild\ Meat}$	:	Ingestion rate of local moose, deer, rabbit, beaver, grouse, duck or goose (g/day)	=	Various (see Table 7-6)
CF	:	Conversion factor (kg to g)	=	1E-03 kg/g
RAF_{Oral}	:	Relative absorption factor from the gastrointestinal tract (unitless)	=	1.0E+00
D_2	:	Days per week exposed (7) / 7 days (unitless)	=	1.0
D_3	:	Weeks per year exposed (52) / 52 weeks (unitless)	=	1.0
BW	:	Average body weight of receptor (kg)	=	1.65E+01 kg

Result:

Exposure estimate for ingestion of moose (mg/kg/day)	=	8.5E-07 mg/kg/day
Exposure estimate for ingestion of deer (mg/kg/day)	=	2.1E-08 mg/kg/day
Exposure estimate for ingestion of rabbit (mg/kg/day)	=	2.1E-09 mg/kg/day
Exposure estimate for ingestion of beaver (mg/kg/day)	=	2.0E-09 mg/kg/day
Exposure estimate for ingestion of grouse (mg/kg/day)	=	1.7E-10 mg/kg/day
Exposure estimate for ingestion of duck (mg/kg/day)	=	1.5E-07 mg/kg/day
Exposure estimate for ingestion of goose (mg/kg/day)	=	3.3E-08 mg/kg/day
Total exposure estimate for ingestion of wild meat (mg/kg/day)	=	1.1E-06 mg/kg/day

(6) Calculation of Exposure Estimate for Consumption of Wild Vegetation

$$Exposure\ Estimate_{Wild\ Veg} = \frac{C_{Wild\ Veg} \times IR_{Wild\ Veg} \times CF \times RAF_{Oral} \times D_2 \times D_3}{BW}$$

Where:

$C_{Wild\ Veg}$	:	Baseline arsenic concentration in berries or aquatic vegetation (cattails) (mg/kg)	=	Various (see Table 6-12 and Table 6-32)
$IR_{Wild\ Veg}$	:	Ingestion rate of local berries or aquatic vegetation (g/day)	=	Various (see Table 7-6)
CF	:	Conversion factor (kg to g)	=	1E-03 kg/g
RAF_{Oral}	:	Relative absorption factor from the gastrointestinal tract (unitless)	=	1.0E+00
D_2	:	Days per week exposed (7) / 7 days (unitless)	=	1.0
D_3	:	Weeks per year exposed (52) / 52 weeks (unitless)	=	1.0
BW	:	Average body weight of receptor (kg)	=	1.65E+01 kg

Result:

Exposure estimate for ingestion of berries (mg/kg/day)	=	1.4E-05 mg/kg/day
Exposure estimate for ingestion of aquatic vegetation (cattails) (mg/kg/day)	=	4.7E-06 mg/kg/day
Total exposure estimate for ingestion of wild vegetation (mg/kg/day)	=	1.9E-05 mg/kg/day

(7) Calculation of Exposure Estimate for Ingestion of Contaminated Drinking Water

$$Exposure\ Estimate_{DW} = \frac{C_W \times IR_W \times RAF_{Oral} \times D_2 \times D_3}{BW}$$

Where:

C_w	:	Baseline arsenic concentration in surface water (as drinking water) (mg/L)	=	6.0E-04 mg/L
IR_w	:	Drinking water ingestion rate (L/day)	=	6.0E-01 L/day
RAF_{Oral}	:	Relative absorption factor from the gastrointestinal tract (unitless)	=	1.0E+00
D_2	:	Days per week exposed (7) / 7 days (unitless)	=	1.0
D_3	:	Weeks per year exposed (52) / 52 weeks (unitless)	=	1.0
BW	:	Average body weight of receptor (kg)	=	1.65E+01 kg

Result:

Exposure estimate for DW ingestion (mg/kg/day)	=	2.2E-05 mg/kg/day

WORKED EXAMPLE FOR CARCINOGENIC EXPOSURE FOR AN INDIGENOUS RECEPTOR TO ARSENIC, NORTH DRIFTWOOD RIVER (TMF PONDS), BASELINE SCENARIO

Calculation of Lifetime Average Daily Dose (LADD) of Arsenic for Soil Ingestion

$$LADD_{Soil\ Ingestion} = \sum\left(\frac{ED_i}{LE} \times Exposure\ Estimate_{Soil,i}\right)$$

Where:

ED_i	:	Exposure duration for lifestage i (years) (where lifestage i is infant, toddler, child, teen or adult)	=	Various (see Appendix E)
LE	:	Life expectancy (years)	=	80 years
Exposure Estimate $_{Soil,i}$	:	Exposure Estimate for soil ingestion for lifestage i (mg/kg-day) (where lifestage i is infant, toddler, child, teen or adult)	=	6.6E-06 mg/kg/day (infant) 1.3E-05 mg/kg/day (toddler) 1.6E-06 mg/kg/day (child) 9.0E-07 mg/kg/day (teen) 7.6E-07 mg/kg/day (adult)

Result:

Lifetime Average Daily Dose (mg/kg/day)	=	1.6E-06 mg/kg/day

CALCULATION OF HEALTH RISKS FROM INGESTION OF SOIL

WORKED EXAMPLE FOR NON-CARCINOGENIC HEALTH RISKS FOR AN INDIGENOUS TODDLER RECEPTOR TO ARSENIC, NORTH DRIFTWOOD RIVER (TMF PONDS), BASELINE SCENARIO

$$HQ_{Total\ Soil} = HQ_{Ingestion} + HQ_{Dermal} + HQ_{Particulate}$$

And:

$$HQ_{Ingestion} = \frac{Exposure\ Estimate_{Ingestion}}{TRV}$$

$$HQ_{Dermal} = \frac{Exposure\ Estimate_{Dermal}}{TRV}$$

$$HQ_{Particulate} = \frac{Exposure\ Estimate_{Particulate\ Inhalation}}{TRV}$$

Where:

TRV	:	Toxicological reference value for arsenic (mg/kg/day)	=	3.0E-04 mg/kg/day
Exposure $Estimate_{Ingestion}$	:	Exposure estimate for ingestion (mg/kg/day)	=	1.3E-05 mg/kg/day
Exposure $Estimate_{Dermal}$	:	Exposure estimate for dermal contact (mg/kg/day)	=	3.4E-07 mg/kg/day
Exposure $Estimate_{Particulate\ Inhalation}$	:	Exposure estimate for particulate inhalation (mg/kg/day)	=	1.0E-09 mg/kg/day

Results:

$HQ_{Ingestion}$	:	Hazard quotient for arsenic through incidental soil ingestion (unitless)	=	4E-02
HQ_{Dermal}	:	Hazard quotient for arsenic through dermal contact (unitless)	=	1E-03
$HQ_{Inhalation}$	:	Hazard quotient for arsenic through particulate inhalation (unitless)	=	3E-06
$HQ_{Total\ Soil}$	:	Hazard quotient for arsenic through incidental ingestion, dermal contact, particulate inhalation (unitless)	=	4E-02

CALCULATION OF HEALTH RISKS FROM TOTAL EXPOSURE – SOIL, FOOD, WATER

WORKED EXAMPLE FOR NON-CARCINOGENIC HEALTH RISKS FOR AN INDIGENOUS TODDLER RECEPTOR TO ARSENIC, NORTH DRIFTWOOD RIVER (TMF PONDS), BASELINE SCENARIO

$$HQ_{Total} = HQ_{Total\ Soil} + HQ_{Fish} + HQ_{Wild\ Meat} + HQ_{Wild\ Veg} + HQ_{DW}$$

And:

$$HQ_{Fish} = \frac{Exposure\ Estimate_{Fish}}{TRV}$$

$$HQ_{Wild\ Meat} = \frac{Exposure\ Estimate_{Wild\ Meat}}{TRV}$$

$$HQ_{WIld\ Veg} = \frac{Exposure\ Estimate_{WIld\ Veg}}{TRV}$$

$$HQ_{DW} = \frac{Exposure\ Estimate_{DW}}{TRV}$$

Where:

TRV	:	Toxicological reference value for arsenic (mg/kg/day)	=	3.0E-04 mg/kg/day
$HQ_{Total\ Soil}$	:	Hazard quotient for arsenic through incidental ingestion, dermal contact, particulate inhalation (unitless)	=	4E-02
Exposure $Estimate_{Fish}$	:	Exposure estimate for ingestion of fish (mg/kg/day)	=	7.7E-05 mg/kg/day
Exposure $Estimate_{Wild\ Meat}$	:	Total exposure estimate for ingestion of wild meat (mg/kg/day)	=	1.1E-06 mg/kg/day
Exposure $Estimate_{Wild\ Veg}$	:	Total exposure estimate for ingestion of wild vegetation (mg/kg/day)	=	1.8E-05 mg/kg/day
Exposure $Estimate_{DW}$	:	Exposure estimate for DW ingestion (mg/kg/day)	=	2.2E-05 mg/kg/day

Results:

HQ_{Fish}	:	Hazard quotient for arsenic through ingestion of fish (unitless)	=	3E-01
$HQ_{Wild\ Meat}$	:	Hazard quotient for arsenic through ingestion of wild meat (unitless)	=	4E-03
$HQ_{Wild\ Veg}$	:	Hazard quotient for arsenic through ingestion of wild vegetation (unitless)	=	6E-02
HQ_{DW}	:	Hazard quotient for arsenic through ingestion of surface water as drinking water (unitless)	=	7E-02
HQ_{Total}	:	Hazard quotient for arsenic through total exposure (soil, food, water) (unitless)	=	4E-01

CALCULATION OF INCREMENTAL LIFETIME CANCER RISK (ILCR) FROM INGESTION OF SOIL

WORKED EXAMPLE FOR CARCINOGENIC HEALTH RISKS FOR AN INDIGENOUS RECEPTOR TO ARSENIC, NORTH DRIFTWOOD RIVER (TMF PONDS), BASELINE SCENARIO

$$ILCR_{Ingestion} = LADD_{Soil\ Ingestion} \times SF_{Oral}$$

Where:

$LADD_{Ingestion}$	:	Calculated lifetime average daily dose (mg/kg/day)	=	1.6E-06 mg/kg/day
SF_{Oral}	:	Oral Slope Factor $(mg/kg/day)^{-1}$	=	1.8E+00 $(mg/kg/day)^{-1}$

Result:

$ILCR_{Ingestion}$	:	Incremental Lifetime Cancer Risk (unitless)	=	3E-06

Ecological Health

ECOLOGICAL RISK ASSESSMENT CALCULATIONS
HQ Worked Example

CALCULATION OF HEALTH RISKS FROM INGESTION OF SOIL

Health Risks to the Northern River Otter exposed to arsenic in soil (Baseline Plus Project Scenario – Jocko Creek watershed):

Calculation of Average Daily Dose from Ingestion of Soil

$$ADD = IF \times AF \times EPC_{arsenic}$$

Where:

ADD	=	Average daily dose of arsenic from soil ingestion (mg/kg body weight/day)
IF	=	Intake factor (kg soil/kg body weight/day) (see equation below)
AF	=	Absorption Factor for arsenic from the gastrointestinal tract (unitless)
$EPC_{arsenic}$	=	Exposure point concentration for arsenic in soil (mg/kg dw soil)

And:

$$IF = \frac{(IR \times f_{site})}{BW}$$

Where:

IR	=	Soil Ingestion Rate (kg dw/day)
f_{site}	=	Fraction of time the Northern River Otter spends at the site
BW	=	Average body weight of the Northern River Otter (kg)

Values:

IR	=	2.9E-04 kg dw/day
f_{site}	=	100% (assumed to spend 100% of time at the site)
BW	=	7.5 kg
IF	=	3.8E-05 kg soil/kg body weight/day
AF	=	1 (assumed 100% absorption)
$EPC_{arsenic}$	=	2.78E+00 mg/kg dw
ADD	=	1.1E-04 mg/kg body weight/day

Calculation of Hazard Quotient from Ingestion of Soil

$$HQ_{soil} = \frac{ADD}{TRV}$$

Where:

ADD	=	Average daily dose of arsenic from soil ingestion (mg/kg body weight/day)
TRV	=	Oral Toxicity Reference Value (mg/kg body weight/day)
HQ_{soil}	=	Hazard Quotient for soil ingestion (unitless)

Values:

ADD	=	1.1E-04 mg/kg body weight/day
TRV	=	1.0E+00 mg/kg body weight/day
HQ_{soil}	=	1.0E-04

CALCULATION OF HEALTH RISKS FROM INGESTION OF SMALL MAMMALS

Health Risks to the Northern River Otter exposed to arsenic in small mammals (Baseline Plus Project Scenario – Jocko Creek watershed):

Calculation of Average Daily Dose from Ingestion of Small Mammals

$$ADD = IF \text{ x } AF \text{ x } EPC_{\,arsenic}$$

Where:

ADD	=	Average daily dose of arsenic from small mammal ingestion (mg/kg body weight/day)
IF	=	Intake factor (kg small mammal/kg body weight/day) (see equation below)
AF	=	Absorption Factor for arsenic from the gastrointestinal tract (unitless)
$EPC_{arsenic}$	=	Exposure point concentration for arsenic in small mammals (mg/kg ww)

And:

$$IF = \frac{(IR \text{ x } f_{\,site})}{BW}$$

Where:

IR	=	Small Mammal Ingestion Rate (kg ww/day)
f_{site}	=	Fraction of time the Northern River Otter spends at the site
BW	=	Average body weight of the Northern River Otter (kg)

Values:

IR	=	4.5E-02 kg ww/day
f_{site}	=	100% (assumed to spend 100% of time at the site)
BW	=	7.5 kg
IF	=	6.0E-03 kg small mammal/kg body weight/day
AF	=	1 (assumed 100% absorption)
$EPC_{arsenic}$	=	5.8E-03 mg/kg ww
ADD	=	3.5E-05 mg/kg body weight/day

Calculation of Hazard Quotient from Ingestion of Small Mammals

$$HQ_{\text{small mammals}} = \frac{ADD}{TRV}$$

Where:

ADD	=	Average daily dose of arsenic from small mammal ingestion (mg/kg body weight/day)
TRV	=	Oral Toxicity Reference Value (mg/kg body weight/day)
$HQ_{\text{small mammal}}$	=	Hazard Quotient for small mammal ingestion (unitless)

Values:

ADD	=	3.5E-05 mg/kg body weight/day
TRV	=	1.0E+00 mg/kg body weight/day
$HQ_{\text{small mammal}}$	=	3.3E-05

CALCULATION OF HEALTH RISKS FROM INGESTION OF WATER

Health Risks to the Northern River Otter exposed to arsenic in water (Baseline Plus Project Scenario – Jocko Creek watershed):

Calculation of Average Daily Dose from Ingestion of Water

$$ADD = IF \times AF \times EPC_{arsenic}$$

Where:

ADD	=	Average daily dose of arsenic from water ingestion (mg/kg body weight/day)
IF	=	Intake factor (L water/kg body weight/day) (see equation below)
AF	=	Absorption Factor for arsenic from the gastrointestinal tract (unitless)
$EPC_{arsenic}$	=	Exposure point concentration for arsenic in water (mg/L water)

And:

$$IF = \frac{(IR \times f_{site})}{BW}$$

Where:

IR	=	Water Ingestion Rate (L/day)
f_{site}	=	Fraction of time the Northern River Otter spends at the site
BW	=	Average body weight of the Northern River Otter (kg)

Values:

IR	=	6.1E-01 L/day
f_{site}	=	100% (assumed to spend 100% of time at the site)
BW	=	7.5 kg
IF	=	8.1E-02 L/kg body weight/day
AF	=	1 (assumed 100% absorption)
$EPC_{arsenic}$	=	7.09E-04 mg/L
ADD	=	5.7E-05 mg/kg body weight/day

Calculation of Hazard Quotient from Ingestion of Water

$$HQ_{water} = \frac{ADD}{TRV}$$

Where:

ADD	=	Average daily dose of arsenic from water ingestion (mg/kg body weight/day)
TRV	=	Oral Toxicity Reference Value (mg/kg body weight/day)
HQ_{water}	=	Hazard Quotient for water ingestion (unitless)

Values:

ADD	=	5.7E-05 mg/kg body weight/day
TRV	=	1.0E+00 mg/kg body weight/day
HQ_{water}	=	5.5E-05

CALCULATION OF HEALTH RISKS FROM INGESTION OF SEDIMENT

HQ Worked Example

Health Risks to the Northern River Otter Exposed to Arsenic in Sediment (Baseline Plus Project Scenario – Jocko Creek watershed):

Calculation of Average Daily Dose from Ingestion of Sediment

$$ADD = IF \times AF \times EPC_{arsenic}$$

Where:

ADD	=	Average daily dose of arsenic from sediment ingestion (mg/kg body weight/day)
IF	=	Intake factor (kg sediment/kg body weight/day) (see equation below)
AF	=	Absorption Factor for arsenic from the gastrointestinal tract (unitless)
$EPC_{arsenic}$	=	Exposure point concentration for in sediment (mg/kg dw)

And:

$$IF = \frac{(IR \times f_{site})}{BW}$$

Where:

IR	=	Sediment Ingestion Rate (kg dw/day)
f_{site}	=	Fraction of time the Northern River Otter spends at the site
BW	=	Average body weight of the Northern River Otter (kg)

Values:

IR	=	4.2E-03 kg dw/day
f_{site}	=	100% (assumed to spend 100% of time at the site)
BW	=	7.5 kg
IF	=	5.6E-04 kg sediment/kg body weight/day
AF	=	1 (assumed 100% absorption)
$EPC_{arsenic}$	=	4.01E+00 mg/kg dw
ADD	=	2.3E-03 mg/kg body weight/day

Calculation of Hazard Quotient from Ingestion of Sediment

$$HQ_{sediment} = \frac{ADD}{TRV}$$

Where:

ADD	=	Average daily dose of arsenic from sediment ingestion (mg/kg body weight/day)
TRV	=	Oral Toxicity Reference Value (mg/kg body weight/day)
HQ sediment	=	Hazard Quotient for sediment ingestion (dimensionless)

Values:

ADD	=	2.3E-03 mg/kg body weight/day
TRV	=	1.0E+00 mg/kg body weight/day
HQ sediment	=	2.2E-03

CALCULATION OF HEALTH RISKS FROM INGESTION OF BENTHIC INVERTEBRATE

HQ Worked Example

Health Risks to the River Otter Exposed to Arsenic in Benthic Invertebrate (Baseline Plus Project Scenario – Jocko Creek watershed):

Calculation of Average Daily Dose from Ingestion of Benthic Invertebrate

$$ADD_{arsenic} = IF \times AF \times EPC_{arsenic}$$

Where:

ADD	=	Average daily dose of arsenic from benthic invertebrate ingestion (mg/kg body weight/day)
IF	=	Intake factor (kg benthic invertebrate/kg body weight/day) (see equation below)
AF	=	Absorption Factor for arsenic from the gastrointestinal tract (unitless)
$EPC_{arsenic}$	=	Exposure point concentration for arsenic in benthic invertebrate (mg/kg ww)

And:

$$IF = \frac{(IR \times f_{site})}{BW}$$

Where:

IR	=	Benthic invertebrate Ingestion Rate (kg ww/day)
f_{site}	=	Fraction of time the Northern River Otter spends at the site
BW	=	Average body weight of the Northern River Otter (kg)

Values:

IR	=	1.3E-01 kg ww/day
f_{site}	=	100% (assumed to spend 100% of time at the site)
BW	=	7.5 kg
IF	=	1.8E-02 kg benthic invertebrate/kg body weight/day
AF	=	1 (assumed 100% absorption)
$EPC_{arsenic}$	=	1.45E+00 mg/kg ww
ADD	=	2.6E-02 mg/kg body weight/day

Calculation of Hazard Quotient from Ingestion of Benthic Invertebrate

$$HQ_{\text{benthic invertebrates}} = \frac{ADD}{TRV}$$

Where:

ADD_{arsenic}	=	Average daily dose of arsenic from benthic invertebrate ingestion (mg/kg body weight/day)
TRV	=	Oral Toxicity Reference Value (mg/kg body weight/day)
$HQ_{\text{benthic invertebrate}}$	=	Hazard Quotient for benthic invertebrate ingestion (dimensionless)

Values:

ADD	=	2.6E-02 mg/kg body weight/day
TRV	=	1.0E+00 mg/kg body weight/day
$HQ_{\text{benthic invertebrate}}$	=	2.5E-02

CALCULATION OF HEALTH RISKS FROM INGESTION OF FISH

HQ Worked Example

Health Risks to the Northern River Otter Exposed to Arsenic in Fish (Baseline Plus Project Scenario – Jocko Creek watershed):

Calculation of Average Daily Dose from Ingestion of Fish

$$ADD_{arsenic} = IF \times AF \times EPC_{arsenic}$$

Where:

ADD	=	Average daily dose of arsenic from fish ingestion (mg/kg body weight/day)
IF	=	Intake factor (kg fish/kg body weight/day) (see equation below)
AF	=	Absorption Factor for arsenic from the gastrointestinal tract (unitless)
$EPC_{arsenic}$	=	Exposure point concentration for in forage fish (mg/kg tissue)

And:

$$IF = \frac{(IR \times f_{site})}{BW}$$

Where:

IR	=	Fish Ingestion Rate (kg ww/day)
f_{site}	=	Fraction of time the Northern River Otter spends at the site
BW	=	Average body weight of the Northern River Otter (kg)

Values:

IR	=	7.1E-01 kg ww/day
f_{site}	=	100% (assumed to spend 100% of time at the site)
BW	=	7.5 kg
IF	=	9.5E-02 kg fish/kg body weight/day
AF	=	1 (assumed 100% absorption)
$EPC_{arsenic}$	=	2.25E-02 mg/kg
ADD	=	2.1E-03 mg/kg body weight/day

Calculation of Hazard Quotient from Ingestion of Fish

$$HQ_{fish} = \frac{ADD}{TRV}$$

Where:

ADD	=	Average daily dose of arsenic from fish ingestion (mg/kg body weight/day)
TRV	=	Oral Toxicity Reference Value (mg/kg body weight/day)
HQ_{fish}	=	Hazard Quotient for fish ingestion (unitless)

Values:

ADD	=	2.1E-03 mg/kg body weight/day
TRV	=	1.0E+00 mg/kg body weight/day
HQ_{fish}	=	2.1E-03

CALCULATION OF TOTAL HEALTH RISKS FROM ALL EXPOSURE PATHWAYS

HQ Worked Example

Total Health Risks to the Northern River Otter exposed to arsenic in surface soil, small mammals, surface water, freshwater sediment, freshwater benthic invertebrate, and freshwater fish (Baseline Plus Project Scenario Case – Jocko Creek watershed):

$$HQ_{total} = HQ_{soil} + HQ_{small\ mammal} + HQ_{water} + HQ_{sediment} + HQ_{benthic\ invertebrate} + HQ_{fish}$$

Where:

HQ_{total}	=	Total Hazard Quotient (unitless)
HQ_{soil}	=	Hazard Quotient for soil ingestion (unitless)
$HQ_{small\ mammal}$	=	Hazard Quotient for small mammal ingestion (unitless)
HQ_{water}	=	Hazard Quotient for water ingestion (unitless)
$HQ_{sediment}$	=	Hazard Quotient for sediment ingestion (unitless)
$HQ_{benthic\ invertebrate}$	=	Hazard Quotient for benthic invertebrate ingestion (unitless)
HQ_{fish}	=	Hazard Quotient for fish ingestion (unitless)

Values:

HQ_{soil}	=	1.0E-04
$HQ_{small\ mammal}$	=	3.3E-05
HQ_{water}	=	5.5E-05
$HQ_{sediment}$	=	2.2E-03
$HQ_{benthic\ invertebrate}$	=	2.5E-02
HQ_{fish}	=	2.1E-03
HQ_{total}	=	2.9E-02

Soil to Plant Updake Factors (Baseline Case)

Constituent	Soil Conc. (mg/kg)	UP_{SP} Uptake Factor: Soil to Plant (mg/kg-dry plant / mg/kg-dry soil)	Uptake Factor Reference	Soil to Plant Bioavailability Factor (Unitless)[b]	Plant Metabolic Factor (Unitless)[b]	Terrestrial Plant Dry Weight to Wet Weight Conversion Factor	Soil to Plant Uptake Factor (mg/kg-wet plant / mg/kg-dry soil)
Antimony	2.3E-01	3.9E-02[a]	US EPA (2007)	1.0E+00	1.0E+00	0.15	5.9E-03
Arsenic	2.7E+00	3.8E-02	Bechtel Jacobs (1998), in US EPA (2007)	1.0E+00	1.0E+00	0.15	5.6E-03
Barium	5.0E+01	1.6E-01	US EPA Eco-SSL (2005a)	1.0E+00	1.0E+00	0.15	2.3E-02
Beryllium	3.5E-01	7.7E-01[a]	US EPA (2007)	1.0E+00	1.0E+00	0.15	1.2E-01
Cadmium	5.2E-01	8.4E-01[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	1.3E-01
Chromium (Total)	2.6E+01	4.1E-02	Bechtel Jacobs (1998), in US EPA Eco-SSL (2007)	1.0E+00	1.0E+00	0.15	6.2E-03
Cobalt	6.0E+00	7.5E-03	Bechtel Jacobs (1998), in US EPA (2005b)	1.0E+00	1.0E+00	0.15	1.1E-03
Copper	2.2E+01	3.0E-01[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	4.5E-02
Lead	1.5E+01	8.1E-02[a]	Bechtel Jacobs (1998), in US EPA (2007)	1.0E+00	1.0E+00	0.15	1.2E-02
Manganese	3.8E+02	7.9E-02	US EPA Eco-SSL (2007)	1.0E+00	1.0E+00	0.15	1.2E-02
Mercury	9.6E-02	1.1E+00[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	1.6E-01
Methyl Mercury	--- n/a ---	1.4E-01	US EPA (1999), App C, Table C2	1.0E+00	1.0E+00	0.15	2.1E-02
Molybdenum	5.9E-01	2.4E-01	Geometric mean, various sources[c]	1.0E+00	1.0E+00	0.15	3.6E-02
Nickel	1.6E+01	5.4E-02[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	8.1E-03
Selenium	5.7E-01	4.8E-01[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	7.2E-02
Silver	5.0E-01	1.4E-02	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	2.1E-03
Thallium	1.1E-01	2.5E-03	Geometric mean, various sources[c]	1.0E+00	1.0E+00	0.15	3.7E-04
Uranium	1.1E+00	1.2E-02[a]	Sheppard and Evenden (1988a)	1.0E+00	1.0E+00	0.15	1.7E-03
Vanadium	2.3E+01	4.9E-03	Bechtel Jacobs (1998), in US EPA EcoSSL (2005b)	1.0E+00	1.0E+00	0.15	7.3E-04
Zinc	6.7E+01	7.4E-01[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.15	1.1E-01

Notes:

[a] Dependent on soil concentration (mg/kg) and a non-linear relationship.

[b] Conservative default.

[c] Calculated as the mean of UP_{SP} values from various sources (Baes III, et al. 1984), (Sheppard and Evenden 1988b), (Sheppard and Evenden 1990), International Atomic Energy Agency (IAEA 1994), (Davis, et al. 1993), (Zach, et al. 1988), (Torres and Johnson 2001), (EcoMatters, Stantec and C. Wren and Associates 2004).

See final page for references.

Soil to Invertebrate Updake Factors (Baseline Case)

Constituent	Soil Conc. (mg/kg)	UP_{SI} Uptake Factor: Soil to Invertebrate (mg/kg-dry tissue / mg/kg-dry soil)	Uptake Factor Reference	Soil to Invertebrate Bioavailability Factor (Unitless)[b]	Soil Invertebrate Metabolic Factor (Unitless)[b]	Earthworm Dry Weight to Wet Weight Conversion Factor	Soil to Invertebrate Uptake Factor (mg/kg-wet tissue / mg/kg-dry soil)
Antimony	2.3E-01	1.0E+00	Conservative Default - US EPA (2005c)	1.0E+00	1.0E+00	0.16	1.6E-01
Arsenic	2.7E+00	1.8E-01[a]	Sample et al. (1998a) - Table 12	1.0E+00	1.0E+00	0.16	2.9E-02
Barium	5.0E+01	9.1E-02	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	1.5E-02
Beryllium	3.5E-01	4.5E-02	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	7.2E-03
Cadmium	5.2E-01	9.5E+00[a]	Sample et al. (1998a) - Table 12	1.0E+00	1.0E+00	0.16	1.5E+00
Chromium (Total)	2.6E+01	3.1E-01	Sample et al. (1998a) - Table 11	1.0E+00	1.0E+00	0.16	4.9E-02
Cobalt	6.0E+00	1.2E-01	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	2.0E-02
Copper	2.2E+01	5.5E-01[a]	Sample et al. (1998a) - Table 12	1.0E+00	1.0E+00	0.16	8.8E-02
Lead	1.5E+01	4.8E-01[a]	Sample et al. (1998a) - Table 12	1.0E+00	1.0E+00	0.16	7.6E-02
Manganese	3.8E+02	6.7E-02[a]	Sample et al. (1998a) - Table 12	1.0E+00	1.0E+00	0.16	1.1E-02
Mercury	9.6E-02	1.7E+00	Sample et al. (1998a) - Table 11	1.0E+00	1.0E+00	0.16	2.7E-01
Methyl Mercury	--- n/a ---	5.3E+01[a]	US EPA (1999), App C, Table C2	1.0E+00	1.0E+00	0.16	8.5E+00
Molybdenum	5.9E-01	9.5E-01	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	1.5E-01
Nickel	1.6E+01	1.1E+00	Sample et al. (1998a) - Table 11	1.0E+00	1.0E+00	0.16	1.7E-01
Selenium	5.7E-01	9.9E-01	Sample et al. (1998a) - Table 11	1.0E+00	1.0E+00	0.16	1.6E-01
Silver	5.0E-01	2.0E+00	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	3.3E-01
Thallium	1.1E-01	4.7E-02	Jacques Whitford Limited (2008)	1.0E+00	1.0E+00	0.16	7.5E-03
Uranium	1.1E+00	3.3E-02	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	5.3E-03
Vanadium	2.3E+01	4.2E-02	Sample et al. (1998a), App A, Table C1	1.0E+00	1.0E+00	0.16	6.7E-03
Zinc	6.7E+01	5.1E+00[a]	Sample et al. (1998a) - Table 12	1.0E+00	1.0E+00	0.16	8.1E-01

Notes:
[a] Dependent on soil concentration (mg/kg) and a non-linear relationship.
[b] Conservative default.
See final page for references.

Soil to Terrestrial Prey Updake Factors (Baseline Case)

Constituent	Soil Conc. (mg/kg)	UP_{SA} Uptake Factor: Soil to Terrestrial Prey (mg/kg-dry animal / mg/kg-dry soil)	Uptake Factor Reference	Dry Weight to Wet Weight Conversion Factor	Soil to Terrestrial Prey Uptake Factor (mg/kg-wet tissue / mg/kg-dry soil)
Antimony	2.3E-01	2.0E-03[a]	US EPA Eco SSL 2005c: assumes diet of 100% plants	0.32	6.3E-04
Arsenic	2.7E+00	6.6E-03[a]	Sample et al. (1998b) - Table 8	0.32	2.1E-03
Barium	5.0E+01	7.0E-02[a]	Sample et al. (1998b) - Table 7	0.32	2.2E-02
Beryllium	3.5E-01	3.9E-02[a]	US EPA Eco SSL 2005c: assumes diet of 100% plants	0.32	1.2E-02
Cadmium	5.2E-01	9.1E-01[a]	Sample et al. (1998b) - Table 8	0.32	2.9E-01
Chromium (Total)	2.6E+01	9.8E-02[a]	Sample et al. (1998b) - Table 8	0.32	3.1E-02
Cobalt	6.0E+00	2.2E-02[a]	Sample et al. (1998b) - Table 8	0.32	7.0E-03
Copper	2.2E+01	5.5E-01[a]	Sample et al. (1998b) - Table 8	0.32	1.8E-01
Lead	1.5E+01	2.4E-01[a]	Sample et al. (1998b) - Table 8	0.32	7.6E-02
Manganese	3.8E+02	2.1E-02[a]	US EPA Eco-SSL (2007)	0.32	6.6E-03
Mercury	9.6E-02	1.2E-01[a]	Sample et al. (1998b) - Table 7	0.32	4.0E-02
Methyl Mercury	--- n/a ---	1.0E+00	Sample et al. (1998b) - Table 7	0.32	3.3E-01
Molybdenum	5.9E-01	2.2E-01	Jacques Whitford Limited (2008)	0.32	7.0E-02
Nickel	1.6E+01	1.8E-01[a]	Sample et al. (1998b) - Table 8	0.32	5.7E-02
Selenium	5.7E-01	9.4E-01[a]	Sample et al. (1998b) - Table 8	0.32	3.0E-01
Silver	5.0E-01	4.0E-03[a]	Sample et al. (1998b) - Table C1	0.32	1.3E-03
Thallium	1.1E-01	1.1E-01	Sample et al. (1998b) - Table 7	0.32	3.6E-02
Uranium	1.1E+00	2.3E-03	Jacques Whitford Limited (2008)	0.32	7.4E-04
Vanadium	2.3E+01	1.2E-02	USEPA 2007	0.32	3.9E-03
Zinc	6.7E+01	1.8E+00[a]	Sample et al. (1998b) - Table 8	0.32	5.7E-01

Notes:
[a] Dependent on soil concentration (mg/kg) and a non-linear relationship.
[b] Conservative default.
See final page for references.

Freshwater Sediment to Aquatic Plant Uptake Factors (North Driftwood River (TMF Ponds) - Baseline Case)

Constituent	Sediment Conc. (mg/kg)	UP_{SAP}(fw) Uptake Factor: Freshwater Sediment to Aquatic Plant (mg/kg-dry tissue/ mg/kg-dry sed)	Uptake Factor Reference	Sediment to Aquatic Plant Bioavailability Factor (Unitless)[b]	Aquatic Plant Metabolic Factor (Unitless)[b]	Aquatic Plant Dry Weight to Wet Weight Conversion Factor	Uptake Factor: Freshwater Sediment to Aquatic Plant (mg/kg-wet tissue/ mg/kgdry sed)
Antimony	2.0E-01	5.1E-03[a]	From UPsp	1.0E+00	1.0E+00	0.13	5.1E-03
Arsenic	4.0E+00	4.9E-03	Bechtel Jacobs (1998), in US EPA EcoSSL (2005a)	1.0E+00	1.0E+00	0.13	4.9E-03
Barium	8.8E+01	2.0E-02	From UPsp	1.0E+00	1.0E+00	0.13	2.0E-02
Beryllium	4.2E-01	9.6E-02[a]	US EPA EcoSSL (2005a)	1.0E+00	1.0E+00	0.13	9.6E-02
Cadmium	8.5E-01	8.7E-02[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	8.7E-02
Chromium (Total)	3.2E+01	5.3E-03	Bechtel Jacobs (1998), in US EPA Eco-SSL (2005a)	1.0E+00	1.0E+00	0.13	5.3E-03
Cobalt	8.3E+00	9.8E-04	From UPsp	1.0E+00	1.0E+00	0.13	9.8E-04
Copper	2.0E+01	4.1E-02[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	4.1E-02
Lead	2.2E+01	8.9E-03[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	8.9E-03
Manganese	7.0E+02	1.0E-02	US EPA Eco-SSL (2007)	1.0E+00	1.0E+00	0.13	1.0E-02
Mercury	9.5E-02	1.4E-01[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	1.4E-01
Methyl Mercury	--- n/a ---	1.8E-02	US EPA (1999), App C, Table C2	1.0E+00	1.0E+00	0.13	1.8E-02
Molybdenum	7.9E-01	3.1E-02	From UPsp	1.0E+00	1.0E+00	0.13	3.1E-02
Nickel	2.0E+01	6.6E-03[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	6.6E-03
Selenium	7.0E-01	6.4E-02[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	6.4E-02
Silver	1.2E-01	1.8E-03	From UPsp	1.0E+00	1.0E+00	0.13	1.8E-03
Thallium	1.5E-01	3.2E-04	From UPsp	1.0E+00	1.0E+00	0.13	3.2E-04
Uranium	1.3E+00	1.3E-03[a]	From UPsp	1.0E+00	1.0E+00	0.13	1.3E-03
Vanadium	2.8E+01	6.3E-04	Bechtel Jacobs (1998), in US EPA EcoSSL (2005a)	1.0E+00	1.0E+00	0.13	6.3E-04
Zinc	1.1E+02	7.8E-02[a]	Bechtel Jacobs (1998)	1.0E+00	1.0E+00	0.13	7.8E-02

Notes:
[a] Non-linear relationship dependent on sediment concentration.
[b] Conservative default.
See final page for references.

Freshwater Sediment to Benthic Invertebrate Uptake Factors (North Driftwood River (TMF Ponds) - Baseline Case)

Constituent	Sediment Conc. (mg/kg)	Benthic Invertebrate Dry Weight to Wet Weight Conversion Factor	$UP_{SBI}(fw)$ Uptake Factor: Freshwater Sediment to Benthic Invertebrate (mg/kg-wet tissue/ mg/kg-dry sed)	Reference for Uptake Factor
Antimony	2.0E-01	0.24	7.2E-03	Modified from Haus et al. 2007
Arsenic	4.0E+00	0.24	3.6E-01[a]	ORNL 1998 (all data)
Barium	8.8E+01	0.24	1.4E-01	Modified from Hamilton et al. 2002 and Garn et al. 2001
Beryllium	4.2E-01	0.24	1.3E-01	Modified from Hamilton et al. 2002 and Garn et al. 2001
Cadmium	8.5E-01	0.24	1.2E+00[a]	ORNL 1998 (all data)
Chromium (Total)	3.2E+01	0.24	1.8E-01[a]	ORNL 1998 (all data)
Cobalt	8.3E+00	0.24	2.4E-03	Garn et al. 2001
Copper	2.0E+01	0.24	1.6E+00[a]	ORNL 1998 (Non-depurated data)
Lead	2.2E+01	0.24	9.1E-02[a]	ORNL 1998 (all data)
Manganese	7.0E+02	0.24	1.5E-01	Modified from Hamilton et al. 2002 and Garn et al. 2001
Mercury	9.5E-02	0.24	1.2E-01	Modified from multiple sources
Methyl Mercury	--- n/a ---	0.24	4.5E+00	Modified from Grapentine et al. 2003
Molybdenum	7.9E-01	0.24	5.2E-01	Modified from Hamilton et al. 2002 and Garn et al. 2001
Nickel	2.0E+01	0.24	1.4E-01[a]	ORNL 1998 (Depurated data)
Selenium	7.0E-01	0.24	6.3E-01	Welsh and Maughan 1993
Silver	1.2E-01	0.24	7.8E-02	Average of freshwater snails UF from Ramskov 2015
Thallium	1.5E-01	0.24	2.0E-01	Average from Dumas 2008, Fratinni 2005 and Borgman 1998
Uranium	1.3E+00	0.24	1.7E-02	Garn et al. 2001
Vanadium	2.8E+01	0.24	1.8E-02	Modified from multiple sources
Zinc	1.1E+02	0.24	1.5E+00[a]	ORNL 1998 (all data)

Notes:
[a] Non-linear relationship dependent on sediment concentration.
See final page for references.

Surface Water to Freshwater Fish Uptake Factors (North Driftwood River (TMF Ponds) - Baseline Case)

Constituent	Surface Water Conc. (mg/L)	$UP_{WF}(fw)$ Uptake Factor: Surface Water to Freshwater Fish (mg/kg-wet tissue/ mg/L-water)	Reference for Uptake Factor
Antimony	1.0E-04	2.0E+02	Canadian Standards Association 1987
Arsenic	6.0E-04	5.0E+01	Based on Trophic Level 3 fish (upper end of range of 19 to 96) from: US EPA. 2003. Technical summary of information available on the bioaccumulation of arsenic in aquatic organisms. Report No. EPA-822-R-03-032 and Lijzen et al. 2001.
Barium	8.3E-03	1.0E+01	Canadian Standards Association 1987
Beryllium	2.0E-05	1.0E+02	IAEA 1994
Cadmium	2.0E-05	4.9E+03[a]	McGeer et al. 2003 (Salmonids)
Chromium (Total)	1.3E-03	2.0E+02	Canadian Standards Association 1987 and Lijzen et al. 2001
Cobalt	3.0E-04	1.0E+02	Canadian Standards Association 1987
Copper	1.2E-03	9.9E+02[a]	McGeer et al. 2003 (Salmonids)
Lead	2.8E-04	2.4E+02[a]	McGeer et al. 2003
Manganese	6.7E-02	3.4E+01	Based on upper end of range of 18 to 34.3 from Nussey et al. 1999
Mercury	1.6E-05	7.2E+02[a]	McGeer et al. 2003
Methyl Mercury	--- n/a ---	7.4E+02[a]	McGeer et al. 2003 (Salmonids)
Molybdenum	5.0E-05	1.0E+01	Canadian Standards Association 1987
Nickel	8.0E-04	3.6E+02[a]	McGeer et al. 2003
Selenium	1.3E-04	1.7E+02	Davis et al. 1993
Silver	1.0E-05	8.3E+03[a]	McGeer et al. 2003
Thallium	1.0E-05	4.6E+02	Calculated from measured baseline data
Uranium	3.0E-05	5.0E+01	Davis et al. 1993
Vanadium	7.0E-04	5.8E+01[a]	Based on regression derived from Table 2 of Holdway et al. 1982
Zinc	6.0E-03	5.9E+03[a]	McGeer et al. 2003 (Salmonids)

Notes:
[a] Non-linear relationship dependent on sediment concentration.
See final page for references.

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Appendix D Low Toxicity and Ubiquitous Elements

Appendix D Low-Toxicity and Ubiquitous Elements

The following parameters were not considered to pose a risk for one or both of the following reasons: 1) these parameters are ubiquitous, naturally occurring elements that, in some cases, play a role in the proper function of biological systems; 2) these parameters are generally not regarded as being particularly toxic. These parameters are not included in the screening tables and are not evaluated in the HHERA. Further support for not evaluating these elements is provided below.

D.1 Aluminum

Aluminum is the most common metal in the Earth's crust, with an average concentration of 82,300 mg/kg (Haynes, 2014). Due to its properties, it is commonly used for kitchen utensils, building decorations, and many industrial applications (Haynes, 2014). Aluminum salts are also commonly used as active ingredients of antacids (Garg, Narang, & Taneja, 2022). In terms of toxicity, occupational exposures in the aluminum production industry have been found by IARC to be carcinogenic to humans (IARC, 1987), but the causative agents in these exposures are thought to be pitch volatiles, and not aluminum itself (IARC, 1987). Health Canada states that no consistent, convincing evidence exists that aluminum in drinking water causes adverse health effects (Health Canada, 1998). No studies could be located involving dermal exposure of humans or animals to aluminum, and no toxicity reference value (TRV) could be found in Health Canada documents, FCSAP ERA documents, on the US EPA's Integrated Risk Information System (US EPA IRIS), or in the US EPA Ecological Soil Screening (Eco-SSL) documents. Given the lack of toxicity information available for exposures in environmental media, a quantitative evaluation of aluminum is considered unfeasible. Furthermore, since aluminum is very common in the environment, it is not expected to pose excess risk through evaluated exposure pathways. Health risks due to exposure to aluminum are therefore not anticipated; therefore, it has not been carried forward as a COPC in this assessment.

D.2 Bismuth

Bismuth is considered a rare metal that is found in the Earth's crust at an average concentration of 0.0085 mg/kg (Haynes, 2014). With its low solubility, it is considered non-toxic and is widely used in the pharmaceutical and cosmetic industry. It is the principal ingredient in the manufacture of an antiacid medication called Pepto-Bismol. Most bismuth compounds are insoluble and poorly absorbed from the gastrointestinal (GI) tract or when applied to the skin, even if the skin is abraded or burned (Goyer & Clarkson, 2001). The *Migratory Birds Regulations* definition of "non-toxic shot" includes gun shots made of up to 100% bismuth (Government of Canada, 1994), as opposed to "toxic shot" materials such as lead which "can harm wildlife and human health" (Government of Canada, 2022). The low toxicity of bismuth has also allowed it to be used as a replacement for lead in soldering, plumbing fittings for drinking water systems and in food processing equipment (Suzuki & Matano, 2001). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Given its low solubility and low toxicity, bismuth is expected to pose a negligible risk; therefore, it has not been carried forward as a COPC in this assessment.

D.3 Boron

Boron is a naturally occurring element that is found in the earth's crust at an average concentration of 10 mg/kg (Haynes, 2014). It is typically found in forms that are chemically bound to oxygen, in alkali or alkaline earth borates, or as boric acid (Institute for Evaluating Health Risks, 1997; US EPA, 1987). Boron does not undergo biodegradation in the environment but may change its chemical form according to environmental conditions such as pH and moisture levels (ATSDR, 1992). Boron compounds are also extensively used in the manufacture of borosilicate glasses (Haynes, 2014). Humans are commonly exposed to boron through ingestion of fruits and vegetables that naturally contain boron, or through the use of consumer products (cosmetics, medicines, insecticides) (Naghii & Samman, The boron content of selected foods and the estimation of its daily intake among free-living subjects, 1996a; ATSDR, 1992; US DHHS, 2024). Boron can also be added to dietary supplements (US DHHS, 2024). However, studies have shown that dermal absorption of boron through intact skin is negligible (ATSDR, 2010; Hostýnek, Hinz, Lorence, Price, & Guy, 1993). Although humans may ingest boron through the consumption of plants, available guidelines are generally protective of plant health and are based on hot water soluble boron, rather than total boron concentrations (MOE, 2011). Boron is readily absorbed within the gastrointestinal tract following oral ingestion (Schou, Jansen, & Aggerbeck, 1984; Vanderpool, Hof, & Johnson, 1994), and is primarily found in the form of undissociated boric acid in the soft tissues of the body (Naghii & Samman, 1996b; Ku, et al., 1991). Boric acid can exit the body through the excretion of urine or be cleared from plasma with a half-life of 21 hours (Jansen, Andersen, & Schou, 1984). Toxicological information available through the US EPA IRIS for boron and compounds mainly relate to boric acid and to borax (US EPA, 2024). No TRV could be found for boron in Health Canada documents, FCSAP ERA documents, or in the US EPA Eco-SSL documents. Given the minimal amount of time that boron compounds remain in the human body, boron is expected to pose a negligible risk; therefore, it has not been carried forward as a COPC in this assessment.

D.4 Calcium

Calcium is considered ubiquitous, with an average concentration of 41,500 mg/kg (Haynes, 2014) in the Earth's crust. Calcium is an essential mineral for living organisms, and one of the major components of bone in animals: in humans, over 99% of the calcium stored in the human body is found in the skeletal system (IOM, 1997). Calcium serves many functions in living organisms, but in the human body, its other major roles are the mediation of vascular contraction, vasodilation, muscle contraction, nerve transmission, and glandular secretion (IOM, 1997). Several foods naturally contain high quantity of calcium, including diary products and some vegetables. In addition, calcium is sometimes added to beverages, tofu, and cereals (US DHHS, 2024). Calcium is also added to many dietary supplements, including multivitamins/minerals (US DHHS, 2024) and calcium salts are commonly used as active ingredients of antacids (Garg et al. 2022). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Given its essentiality and its common occurrence in the environment, calcium in environmental media is therefore not expected to contribute to excess health risks and a quantitative assessment of the risk due to calcium is therefore considered unnecessary.

D.5 Iron

Iron is also considered ubiquitous and is one of the most common metals in the Earth's crust with an average concentration of 56,300 mg/kg (Haynes, 2014). Iron is an essential nutrient which aids in the formation of haemoglobin, whose primary function is to transport oxygen in red blood cells. Anaemia is a deficiency condition that results from insufficient nutrient intake and can cause adverse health effects such as decreased cognitive performance and growth in children (WHO, 2006). As such, iron is added to many dietary supplements, including multivitamins/minerals. Iron is also naturally found in several food items such as seafood, poultry, some beans and vegetables, as well as nuts and dried fruits. Iron is also sometimes added to some foods such as cereals and breads (US DHHS, 2024). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Given that iron is an essential nutrient and a naturally occurring metal, iron was excluded as a potential source of health risk based upon its ubiquitous environmental nature and essential nutritional value, and a quantitative assessment of risk due to iron is therefore considered unnecessary.

D.6 Lithium

Lithium is naturally occurring element in nature that exists in the Earth's crust at an average concentration of 20 mg/kg (Haynes, 2014). It is a component in several minerals including silicates, micas and phosphates, and is mined to produce various lithium mineral products (Moores, 2007). Lithium is used in several industries, including production of batteries, electronics, glasses, and ceramics (Haynes, 2014; Kjølholt, Stuer-Lauridsen, Skibsted Mogensen, & Havelund, 2003). Lithium can be found in most organs and tissues of the human body and is consumed through food sources such as grains and vegetables (Schrauzer, 2002). Lithium is not expected to bioaccumulate in the food chain and toxicity to ecological receptors is considered low (Schrauzer, 2002). Lithium is mildly toxic through oral intake; however, since the primary target is the central nervous system, lithium has been used therapeutically for protein transport in the treatment of mental health disorders (Kjølholt, Stuer-Lauridsen, Skibsted Mogensen, & Havelund, 2003). Chemically, lithium closely resembles sodium (Habashi, 1997). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Given that lithium is a naturally occurring element and is not expected to bioaccumulate through the food chain, as well as its low toxicity to human health and ecological receptors, it has not been carried forward as a COPC in this assessment.

D.7 Magnesium

Magnesium is considered ubiquitous and makes up an average of 23,300 mg/kg of the Earth's crust (Haynes, 2014). Magnesium is expected to be present in its ionic form in groundwater (Haynes, 2014). Magnesium is an essential mineral for living organisms; the average adult human body contains about 25 g of magnesium (IOM, 1997). It is a required cofactor for various enzymes and plays a role in both anaerobic and aerobic energy generation in the body, as part of the glycolysis and oxidative phosphorylation processes (IOM, 1997). It is also a fundamental component of chlorophyll in green plants (Haynes, 2014). Magnesium is naturally found in several food items such as dairy products, legumes, nuts, seeds, whole grains, and some vegetables. Magnesium is sometimes added to some foods such as cereals as well as many dietary supplements, including multivitamins/minerals (US DHHS, 2024). Magnesium salts are also commonly used as active ingredients of antacids (Garg et al. 2022). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Because it is essential for life, and because it occurs commonly, magnesium is not expected to pose excess health risks to receptors, and a quantitative assessment of risk due to magnesium is therefore considered unnecessary.

D.8 Phosphorous

With an average concentration of 1,050 mg/kg in the Earth's crust, phosphorus in nature is most commonly found as phosphate (PO_4^{3-}) (Haynes, 2014), and is therefore assumed to be present in this form in the soil, sediment, and water. Phosphorus, as phosphate, is an essential constituent of plant and animal tissues, where it plays several roles, including pH maintenance, catalytic protein activation, and energy transfer and temporary storage (IOM, 1997). Phosphorus itself makes up 0.65% to 1.1% of adult human body weight (IOM, 1997). Phosphorus is naturally found in several food items such as dairy products, grain products, meat, poultry, eggs, fish, some nuts and seeds, some legumes, as well as some vegetables. Phosphorus compounds additives are also sometimes found in processed foods and phosphorus can also be added to dietary supplements, including multivitamins/minerals (US DHHS, 2024). Toxicological information is available through the US EPA IRIS for white phosphorus (US EPA, 2024). However, it is noted that white phosphorus is a form of elemental phosphorus, which is highly reactive and is not found free in nature (Haynes, 2014). No TRV could be found in Health Canada documents, FCSAP ERA documents, or in the US EPA Eco-SSL documents. Given its essentiality to life, and its relative abundance in the Earth's crust, phosphorus in the soil or water is not expected to pose excess risk to receptors, and a quantitative evaluation of risk for phosphorus is therefore considered unnecessary.

D.9 Potassium

Potassium is also abundant in the Earth's crust at an average concentration of 20,900 mg/kg (Haynes, 2014). Potassium ions are required for plant growth (Haynes, 2014), and for normal cellular function in both plants and animals (IOM, 2005). Potassium is naturally found in several food items such as dairy products, meat, poultry, fish, some legumes, as well as some vegetables and fruits. Potassium is also an ingredient of salt substitutes of table salt, which is generally made up of sodium chloride. Potassium is also added to many dietary supplements, including multivitamins/minerals (US DHHS, 2024). Toxicological information is available through the US EPA IRIS for potassium cyanide and potassium silver cyanide (US EPA, 2024). In both cases, toxicological information and TRVs are based on the cyanide moiety (instead of potassium), specifically hydrogen cyanide and cyanide salts. No TRV could be found in Health Canada documents, FCSAP ERA documents, or in the US EPA Eco-SSL documents. Given its ubiquity and its essentiality to life, it is therefore reasonable to conclude that potassium in the soil or water is not expected to result in excess risk to receptors, and a quantitative evaluation of risk due to potassium is therefore considered unnecessary.

D.10 Sodium

Sodium is considered ubiquitous and makes up an average of 23,600 mg/kg of the Earth's crust (Haynes, 2014). Sodium is not considered a toxic element (Health Canada, 1992). Sodium ions are essential to life, as they are required in living organisms to maintain extracellular fluid volume and serum osmolality (IOM, 2005). Sodium compounds are notably used in several industries, including the manufacturing of paper, glass, soap, and textile (Haynes, 2014). Sodium compounds are used in large quantities as part of water treatment technologies (Health Canada, 1992). Sodium salts are also commonly used as active ingredients of antacids (Garg, Narang, & Taneja, 2022). Toxicological information is available through the US EPA IRIS for several sodium salts and compounds (US EPA, 2024); however, toxicological information and TRVs are either associated to the specific salt or compound and associated with the other components making up the salt or compound (for example sodium cyanide). No TRV could be found in Health Canada documents, FCSAP ERA documents, or in the US EPA Eco-SSL documents. Given its ubiquity combined with its essentiality to life, it is not expected that sodium in soil or water will pose excess risk to receptors, and a quantitative assessment of risk due to sodium is therefore considered unnecessary.

D.11 Strontium

Strontium is a naturally occurring element in nature that exists in the Earth's crust at an average concentration of 370 mg/kg (Haynes, 2014). Strontium can be found in four stable, non-radioactive isotopes (^{84}Sr, ^{86}Sr, ^{87}Sr, and ^{88}Sr) and two radioactive forms (^{90}Sr and ^{89}Sr) (ATSDR, 2004). Humans are exposed to strontium primarily through oral ingestion of fruits and vegetables or through drinking water, but inhalation is possible (ATSDR, 2004). It is not readily absorbed through intact skin but may be absorbed through abrasions or wounds. Although strontium comprises 4.6 ppm by weight of the human body, it is not considered an essential component of biological processes (ATSDR, 2004). Toxicological information is available through the US EPA IRIS for strontium (US EPA, 2024); however, the ATSDR (2004) indicates that there is no conclusive evidence that strontium is toxic to humans, but epidemiological results indicate that the oral toxicity observed at high doses in juvenile laboratory animals may be relevant to human receptors under special circumstances. Stable strontium is considered to be of relatively low toxicity and behaves chemically like calcium (ATSDR, 2004). No TRV could be found in Health Canada documents, FCSAP ERA documents, or in the US EPA Eco-SSL documents. Given its common occurrence in nature, and the limited evidence of its toxicity to human health, strontium is not expected to contribute to unacceptable health risks. Therefore, it has not been carried forward as a COPC.

D.12 Tin

Tin is a naturally occurring element in nature that exists in the Earth's crust at an average concentration of 2.3 mg/kg (Haynes, 2014) and is widely distributed in marine and land plants and animals (Schafer & Femfert, 1984). Alloys of tin are very important in various manufacturing industries, including the manufacturing of tin cans for food preservation (Haynes, 2014). Inorganic tin compounds have low solubility, poor absorption, low accumulation in tissues, and rapid excretion (Eisler, 1989). Approximately 5 percent of inorganic tin salts are absorbed in human gastrointestinal tracts (Winship, 1988). Consequently, toxicological risks from these compounds are low. Studies investigating the mutagenicity of metallic tin and its compounds also had negative test results (Winship, 1988). Tin has not been shown to be an essential element for humans, and tin deficiency that is observed in mammals has not been demonstrated in humans (Cima, 2011; Winship, 1988). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Given the low solubility of inorganic tin compounds and its low toxicity, tin is not expected to pose unacceptable risk; therefore, it has not been carried forward as a COPC in this assessment.

D.13 Titanium

Titanium exists in the Earth's crust at an average concentration of 5,650 mg/kg (Haynes, 2014). It does not exist in its metallic state in nature but is found instead in ionic compounds such as titanium dioxide (WHO, 1982). Titanium has not been shown to be essential to life but has a wide variety of uses in consumer products, including food additives, as a material for implants and prostheses, and several dermal applications (WHO, 1982). For instance, titanium dioxide is used in cosmetics, sunscreen, and anti- acne ointments, among other uses, with no reported adverse effects. Titanium tetrachloride, on the other hand, is corrosive, and irritates the skin, eyes, mucous membranes, and the lungs on exposure (ATSDR, 1997); however this compound is not found in the environment (ATSDR, 1997). No TRV could be found in Health Canada documents, FCSAP ERA documents, on the US EPA IRIS, or in the US EPA Eco-SSL documents. Given its uses as an inert material, it is not expected that titanium will pose excess risk to receptors and a quantitative evaluation of risk due to titanium is therefore considered unnecessary.

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Appendix E HHRA Input and Output

Table E-1, Appendix E. Human Health Screening - Soil

Parameter	CCME CSQG (mg/kg)	MECP S1 (mg/kg)	Baseline Plus Project Scenario
			Concentration (mg/kg)
Antimony	n/v	7.5	0.24
Arsenic	12	n/a	2.8
Barium	6800	n/a	53
Beryllium	75	n/a	0.36
Cadmium	1.4	n/a	0.52
Chromium (Total)	220	n/a	44
Cobalt	n/v	22	7.7
Copper	1100	n/a	23
Lead	140	n/a	15
Manganese	n/v	n/v	394
Mercury	6.6	n/a	0.096
Molybdenum	n/v	110	0.6
Nickel	200	n/a	44
Selenium	80	n/a	0.57
Silver	n/v	77	0.5
Thallium	1	n/a	0.11
Tungsten	n/v	n/v	1.5
Uranium	23	n/a	1.1
Vanadium	n/v	39	25
Zinc	10000	n/a	68

Notes

CCME CSQG	Canadian Council of Ministers of the Environment (2024). Soil Quality Guidelines - Direct Contact. Agricultural Land Use.
MECP	MECP (2011a). Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition. Agricultural Land Use. Lowest of medium/fine and coarse.
S1	S1 is a soil component value protective of an exposure scenario where children and pregnant women are present.
n/v	No value.
n/a	Not applicable - federal guideline available.
NC	Not calculated.

Table E-2, Appendix E. Human Health Screening - Surface Water

Parameter	GCDWQ (mg/L)	MECP GW1 (mg/L)	Point of Full Mixing – TMF Seepage and Runoff Collection Ponds	Point of Full Mixing – Collection Pond 2	Point of Full Mixing – Collection Pond 1	Point of Full Mixing – Collection Pond 3	JC1 Pourpoint
			Baseline Plus Project Scenario	Baseline Plus Project Scenario	Baseline Plus Project Scenario	Baseline Plus Project Scenario	Baseline Plus Project Scenario
			Concentration (mg/L)	Concentration (mg/L)	Concentration (mg/L)	Concentration (mg/L)	Concentration (mg/L)
Antimony	0.006	n/a	0.00039	0.00035	0.00016	0.00013	0.00018
Arsenic	0.01	n/a	0.0046	0.0045	0.0018	0.0010	0.00071
Barium	2	n/a	0.0086	0.013	0.011	0.008	0.0073
Beryllium	n/v	0.004	0.00035	0.00024	2.0E-05	2.0E-05	2.0E-05
Cadmium	0.007	n/a	2.0E-05	2.1E-05	3.9E-05	3.9E-05	4.2E-05
Chromium (Total)	0.05	n/a	0.0057	0.0056	0.0024	0.0014	0.0013
Cobalt	n/v	0.003	0.00081	0.00079	0.00042	0.00032	0.00021
Copper	2	n/a	0.0036	0.0035	0.0022	0.0018	0.0023
Lead	0.005	n/a	0.00044	0.00047	0.00052	0.00047	0.00041
Manganese	0.12	n/a	0.067	0.067	0.068	0.068	0.040
Molybdenum	n/v	0.07	0.0037	0.0033	0.0011	0.00029	0.00064
Nickel	n/v	0.1	0.011	0.010	0.0034	0.0014	0.0012
Selenium	0.05	n/a	0.00079	0.00075	0.00028	0.00016	0.00025
Silver	None Required	n/a	1.0E-05	1.0E-05	1.0E-05	1.0E-05	1.0E-05
Thallium	n/v	0.002	1.0E-05	1.0E-05	1.0E-05	1.0E-05	1.1E-05
Tungsten	n/v	n/v	0.00084	0.00080	0.00036	0.00017	0.00025
Uranium	0.02	n/a	0.0040	0.0039	0.0010	0.00016	4.0E-05
Vanadium	n/v	0.0062	0.006	0.0059	0.0023	0.0012	0.00080
Zinc	n/v	5	0.014	0.014	0.0088	0.0072	0.0080

Notes

GCDWQ	Health Canada (2024). Guidelines for Canadian Drinking Water Quality (GCDWQ).
MECP GW1	MECP (2011a). Groundwater Components for Potable Water Scenario. GW1.
n/v	No value.
n/a	Not applicable - federal guideline available.
NC	Not calculated.

Table E-3, Appendix E. Human Health Screening - Sediment

Parameter	CCME CSQG (mg/kg)	MECP S1 (mg/kg)	Point of Full Mixing – TMF Seepage and Runoff Collection Ponds	Point of Full Mixing – Collection Pond 2	Point of Full Mixing – Collection Pond 1	Point of Full Mixing – Collection Pond 3	JC1 Pourpoint
			Baseline Plus Project Scenario	Baseline Plus Project Scenario	Baseline Plus Project Scenario	Baseline Plus Project Scenario	Baseline Plus Project Scenario
			Concentration (mg/kg)	Concentration (mg/kg)	Concentration (mg/kg)	Concentration (mg/kg)	Concentration (mg/kg)
Antimony	n/v	7.5	0.49	0.45	0.17	0.14	0.28
Arsenic	12	n/a	7.6	7.5	3.6	3.0	4.0
Barium	6800	n/a	88	93	74	71	88
Beryllium	75	n/a	1.2	1.0	0.4	0.40	0.42
Cadmium	14	n/a	0.85	0.85	0.76	0.76	0.85
Chromium (Total)	220	n/a	35	35	32	31	32
Cobalt	n/v	22	13	13	9.7	8.9	8.4
Copper	1100	n/a	28	28	13	12	20
Lead	140	n/a	23	23	15	15	22
Manganese	n/v	n/v	700	700	920	920	702
Molybdenum	n/v	110	2.2	2.1	0.82	0.57	1.0
Nickel	200	n/a	105	97	33	20	23
Selenium	80	n/a	0.71	0.71	0.78	0.78	0.70
Silver	n/v	77	0.12	0.12	0.10	0.10	0.12
Thallium	1	n/a	0.15	0.15	0.13	0.13	0.16
Tungsten	n/v	n/v	NC	NC	NC	NC	NC
Uranium	23	n/a	13	13	3.4	1.4	1.3
Vanadium	n/v	39	**47**	**46**	30	27	28
Zinc	10000	n/a	111	111	80	80	110

Notes

47	Concentration is greater than a federal or provincial human health-based guideline.
CCME CSQG	Canadian Council of Ministers of the Environment (2024). Soil Quality Guidelines - Direct Contact. Residential/Parkland Land Use.
MECP	MECP (2011a). Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition. S1 - Residential. Lowest of medium/fine and coarse.
S1	S1 is a soil component value protective of an exposure scenario where children and pregnant women are present.
n/v	No value.
n/a	Not applicable - federal guideline available.
NC	Not calculated.

Table E-4, Appendix E. Human Receptor Characteristics

Parameter	Units	Infant	Toddler	Child	Teen	Adult	Reference/Explanation
General Receptor Characteristics – applies to each receptor group							
Age Range	-	0 to < 6 m	6 m to < 5 yrs	5 to < 12 yrs	12 to < 20 yrs	≥ 20yrs	(Health Canada 2021a)
Years within an Age Group	years	0.5	4.5	7	8	60	
Body Weight	kg	8.2	16.5	32.9	59.7	70.7	
Soil Ingestion Rate	g/day	0.02	0.08	0.02	0.02	0.02	
Inhalation Rate	m^3/day	2.2	8.3	14.5	15.6	16.6	
Drinking Water Consumption Rate	L/day	0.3	0.6	0.8	1	1.5	
Skin Surface Area – applies to each receptor group							
Hands	cm^2	320	430	590	800	890	(Health Canada 2021a)
Upper & Lower Arms	cm^2	550	890	1480	2230	2500	
Upper & Lower Legs	cm^2	910	1690	3070	4970	5720	
Total	cm^2	1780	3010	5140	8000	9110	
Soil Loading to Skin							
Hands	g/cm^2	1.00E-04	1.00E-04	1.00E-04	1.00E-04	1.00E-04	(Health Canada 2021a)
Other Surfaces	g/cm^2	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	

Table E-5, Appendix E. Dermal Absorption Factors

Chemical Of Potential Concern	Dermal Absorption Factor (unitless)	Reference
Antimony	0.1	MECP 2011b
Arsenic	0.03	Health Canada 2021b
Barium	0.1	Health Canada 2021b
Beryllium	0.1	Health Canada 2021b
Cadmium	0.01	Health Canada 2021b
Chromium (Total)	0.1	Health Canada 2021b
Cobalt	0.01	MECP 2011b
Copper	0.06	Health Canada 2021b
Lead	0.006	Health Canada 2021b
Manganese	0.01	MECP 2011b
Mercury	1	Health Canada 2021b
Methyl Mercury	0.06	Health Canada 2021b
Molybdenum	0.01	MECP 2011b
Nickel	0.09	Health Canada 2021b
Selenium	0.01	Health Canada 2021b
Silver	0.01	MECP 2011b
Thallium	0.01	MECP 2011b
Uranium	0.1	Health Canada 2021b
Vanadium	0.01	MECP 2011b
Zinc	0.1	Health Canada 2021b

Exposure Estimates for an Indigenous Receptor Infant at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	2.6E-05	---	---	3.3E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	2.7E-04	---	---	4.2E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.5E-06	---	---	2.8E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	7.3E-06	---	---	2.2E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	8.4E-05	---	---	1.5E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.5E-05	---	---	5.2E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	1.4E-03	---	---	2.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	3.3E-05	---	---	8.0E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	7.0E-06	---	---	8.4E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	2.9E-05	---	---	8.7E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.9E-04	---	---	4.9E-04

Exposure Estimates for an Indigenous Receptor Infant at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	2.9E-06	---	---	2.9E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	3.2E-07	---	---	5.4E-07
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.1E-06	---	---	1.0E-05
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	0.0E+00	---	---	2.4E-08
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	0.0E+00	---	---	3.8E-09
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	0.0E+00	---	---	5.5E-05
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	5.4E-07	---	---	4.7E-06
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	0.0E+00	---	---	4.0E-06
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	0.0E+00	---	---	1.1E-07
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	2.3E-05	---	---	5.9E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	2.2E-05	---	---	2.2E-05
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	1.2E-05	---	---	9.6E-05
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	2.1E-06	---	---	2.1E-06
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	3.6E-08	---	---	3.9E-08
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	0.0E+00	---	---	1.6E-08
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	0.0E+00	---	---	4.0E-06
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	0.0E+00	---	---	3.1E-06

Exposure Estimates for an Indigenous Receptor Infant at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	6.6E-06	---	---	7.3E-06
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	2.6E-05	---	---	3.3E-05
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	2.7E-04	---	---	4.3E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.5E-06	---	---	2.8E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	4.8E-05	---	---	1.8E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	7.9E-06	---	---	2.7E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	8.4E-05	---	---	1.5E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.5E-05	---	---	5.2E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	1.5E-03	---	---	2.5E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	2.3E-05	---	---	2.5E-05
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	4.5E-05	---	---	1.8E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	9.0E-06	---	---	1.0E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	4.0E-07	---	---	6.8E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	2.9E-05	---	---	9.1E-05
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	2.9E-04	---	---	5.0E-04

Exposure Estimates for an Indigenous Receptor Infant at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	2.2E-05	---	---	2.9E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	3.0E-04	---	---	4.5E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.3E-07	---	---	2.0E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	4.4E-05	---	---	1.1E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.0E-05	---	---	4.7E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	2.9E-05	---	---	7.6E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.8E-06	---	---	6.2E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.1E-06	---	---	4.4E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	2.6E-05	---	---	8.3E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.2E-04	---	---	4.2E-04

Exposure Estimates for an Indigenous Receptor Infant at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	9.0E-06	---	---	9.0E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	1.4E-04	---	---	1.4E-04
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.8E-04	---	---	1.9E-04
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	8.2E-06	---	---	8.2E-06
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	4.4E-08	---	---	4.7E-08
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	1.6E-04	---	---	2.1E-04
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	1.8E-05	---	---	2.2E-05
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	8.6E-05	---	---	9.0E-05
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	6.8E-06	---	---	7.0E-06
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	1.2E-04	---	---	1.2E-04
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	3.4E-04	---	---	4.2E-04
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	2.3E-05	---	---	2.3E-05
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	0.0E+00	---	---	2.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	1.4E-04	---	---	1.4E-04
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	1.9E-04	---	---	1.9E-04
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	2.9E-04	---	---	3.0E-04

Exposure Estimates for an Indigenous Receptor Infant at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	1.3E-05	---	---	1.3E-05
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	1.7E-04	---	---	1.7E-04
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	4.9E-04	---	---	6.4E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	8.9E-06	---	---	1.0E-05
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.8E-07	---	---	2.1E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	2.0E-04	---	---	3.4E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	2.9E-05	---	---	4.8E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	1.3E-04	---	---	1.9E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	1.2E-04	---	---	1.2E-04
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	3.7E-04	---	---	5.0E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	2.8E-05	---	---	2.9E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	1.4E-04	---	---	1.5E-04
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	2.2E-04	---	---	2.8E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	5.1E-04	---	---	7.2E-04

Exposure Estimates for an Indigenous Receptor Infant at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	2.2E-05	---	---	2.9E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	3.0E-04	---	---	4.5E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.3E-07	---	---	2.0E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	4.4E-05	---	---	1.1E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.0E-05	---	---	4.7E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	2.9E-05	---	---	7.6E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.8E-06	---	---	6.2E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.1E-06	---	---	4.4E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	2.6E-05	---	---	8.3E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.2E-04	---	---	4.2E-04

Exposure Estimates for an Indigenous Receptor Infant at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	1.0E-05	---	---	1.0E-05
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	1.5E-04	---	---	1.5E-04
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.3E-05	---	---	2.2E-05
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	1.2E-05	---	---	1.2E-05
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	9.9E-09	---	---	1.4E-08
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	1.6E-04	---	---	2.2E-04
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	1.9E-05	---	---	2.3E-05
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	8.7E-05	---	---	9.1E-05
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	6.0E-06	---	---	6.1E-06
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	1.3E-04	---	---	1.3E-04
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	3.7E-04	---	---	4.6E-04
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	2.4E-05	---	---	2.4E-05
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	0.0E+00	---	---	2.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	1.4E-04	---	---	1.4E-04
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	1.9E-04	---	---	2.0E-04
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	2.9E-04	---	---	3.0E-04

Exposure Estimates for an Indigenous Receptor Infant at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	1.4E-05	---	---	1.5E-05
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	1.7E-04	---	---	1.8E-04
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	3.2E-04	---	---	4.8E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	1.3E-05	---	---	1.4E-05
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.4E-07	---	---	2.0E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	2.1E-04	---	---	3.4E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	3.0E-05	---	---	4.9E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	1.3E-04	---	---	2.0E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.6E-05	---	---	5.3E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	1.4E-04	---	---	1.4E-04
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	4.0E-04	---	---	5.3E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	2.9E-05	---	---	3.0E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	1.5E-04	---	---	1.5E-04
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	2.2E-04	---	---	2.8E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	5.1E-04	---	---	7.2E-04

Exposure Estimates for an Indigenous Receptor Infant at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	3.3E-05	---	---	4.0E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	2.7E-04	---	---	4.2E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	6.2E-05	---	---	1.2E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.5E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	3.7E-05	---	---	8.4E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.4E-06	---	---	5.8E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	4.0E-05	---	---	9.7E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.6E-04	---	---	4.6E-04

Exposure Estimates for an Indigenous Receptor Infant at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	2.4E-06	---	---	2.4E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	3.4E-05	---	---	3.4E-05
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.4E-04	---	---	1.5E-04
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	0.0E+00	---	---	2.4E-08
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	0.0E+00	---	---	3.8E-09
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	3.9E-05	---	---	9.5E-05
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	4.5E-06	---	---	8.7E-06
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	1.9E-05	---	---	2.3E-05
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	2.0E-06	---	---	2.1E-06
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	3.9E-05	---	---	3.9E-05
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	8.8E-05	---	---	1.7E-04
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	5.9E-06	---	---	5.9E-06
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	0.0E+00	---	---	2.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	3.5E-05	---	---	3.5E-05
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	4.5E-05	---	---	4.9E-05
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	6.5E-05	---	---	6.9E-05

Exposure Estimates for an Indigenous Receptor Infant at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	6.0E-06	---	---	6.7E-06
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	6.7E-05	---	---	7.4E-05
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	4.2E-04	---	---	5.8E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	8.7E-05	---	---	2.2E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	1.6E-05	---	---	3.5E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	8.1E-05	---	---	1.5E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.9E-05	---	---	5.6E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.5E-03	---	---	3.5E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	4.1E-05	---	---	4.2E-05
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	1.2E-04	---	---	2.6E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	1.0E-05	---	---	1.2E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	3.7E-05	---	---	4.0E-05
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	8.5E-05	---	---	1.5E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	3.2E-04	---	---	5.3E-04

Exposure Estimates for an Indigenous Receptor Infant at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	3.3E-05	---	---	4.0E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	2.7E-04	---	---	4.2E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	6.2E-05	---	---	1.2E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.5E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	3.7E-05	---	---	8.4E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.4E-06	---	---	5.8E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	4.0E-05	---	---	9.7E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.6E-04	---	---	4.6E-04

Exposure Estimates for an Indigenous Receptor Infant at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	1.1E-06	---	---	1.1E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	4.4E-06	---	---	4.6E-06
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.9E-05	---	---	2.8E-05
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	0.0E+00	---	---	2.4E-08
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	0.0E+00	---	---	3.8E-09
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	4.8E-06	---	---	6.0E-05
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	7.0E-07	---	---	4.8E-06
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	2.2E-06	---	---	6.2E-06
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	5.1E-09	---	---	1.2E-07
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	8.8E-06	---	---	8.8E-06
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	1.5E-05	---	---	9.8E-05
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	1.4E-06	---	---	1.4E-06
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	7.0E-09	---	---	9.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	4.4E-06	---	---	4.4E-06
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	5.5E-06	---	---	9.5E-06
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	7.3E-06	---	---	1.0E-05

Exposure Estimates for an Indigenous Receptor Infant at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	4.8E-06	---	---	5.5E-06
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	3.7E-05	---	---	4.5E-05
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	2.9E-04	---	---	4.5E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	5.2E-05	---	---	1.9E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	1.2E-05	---	---	3.1E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	6.4E-05	---	---	1.3E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.5E-03	---	---	3.5E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	1.1E-05	---	---	1.2E-05
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	5.1E-05	---	---	1.8E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	5.7E-06	---	---	7.2E-06
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.5E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	5.8E-06	---	---	9.1E-06
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	4.5E-05	---	---	1.1E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	2.6E-04	---	---	4.7E-04

Exposure Estimates for a Recreational Receptor Infant at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	2.6E-05	---	---	3.3E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	2.7E-04	---	---	4.2E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.5E-06	---	---	2.8E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	7.3E-06	---	---	2.2E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	8.4E-05	---	---	1.5E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.5E-05	---	---	5.2E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	1.4E-03	---	---	2.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	3.3E-05	---	---	8.0E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	7.0E-06	---	---	8.4E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	2.9E-05	---	---	8.7E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.9E-04	---	---	4.9E-04

Exposure Estimates for a Recreational Receptor Infant at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	2.9E-06	---	---	2.9E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	3.2E-07	---	---	5.4E-07
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.1E-06	---	---	1.0E-05
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	0.0E+00	---	---	2.4E-08
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	0.0E+00	---	---	3.8E-09
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	0.0E+00	---	---	5.5E-05
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	5.4E-07	---	---	4.7E-06
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	0.0E+00	---	---	4.0E-06
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	0.0E+00	---	---	1.1E-07
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	2.3E-05	---	---	5.9E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	2.2E-05	---	---	2.2E-05
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	1.2E-05	---	---	9.6E-05
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	2.1E-06	---	---	2.1E-06
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	3.6E-08	---	---	3.9E-08
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	0.0E+00	---	---	1.6E-08
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	0.0E+00	---	---	4.0E-06
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	0.0E+00	---	---	3.1E-06

Exposure Estimates for a Recreational Receptor Infant at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	6.6E-06	---	---	7.3E-06
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	2.6E-05	---	---	3.3E-05
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	2.7E-04	---	---	4.3E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.5E-06	---	---	2.8E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	4.8E-05	---	---	1.8E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	7.9E-06	---	---	2.7E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	8.4E-05	---	---	1.5E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.5E-05	---	---	5.2E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	1.5E-03	---	---	2.5E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	2.3E-05	---	---	2.5E-05
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	4.5E-05	---	---	1.8E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	9.0E-06	---	---	1.0E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	4.0E-07	---	---	6.8E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	2.9E-05	---	---	9.1E-05
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	2.9E-04	---	---	5.0E-04

Exposure Estimates for a Recreational Receptor Infant at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	2.2E-05	---	---	2.9E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	3.0E-04	---	---	4.5E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.3E-07	---	---	2.0E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	4.4E-05	---	---	1.1E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.0E-05	---	---	4.7E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	2.9E-05	---	---	7.6E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.8E-06	---	---	6.2E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.1E-06	---	---	4.4E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	2.6E-05	---	---	8.3E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.2E-04	---	---	4.2E-04

Exposure Estimates for a Recreational Receptor Infant at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	9.0E-06	---	---	9.0E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	1.4E-04	---	---	1.4E-04
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.8E-04	---	---	1.9E-04
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	8.2E-06	---	---	8.2E-06
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	4.4E-08	---	---	4.7E-08
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	1.6E-04	---	---	2.1E-04
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	1.8E-05	---	---	2.2E-05
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	8.6E-05	---	---	9.0E-05
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	6.8E-06	---	---	7.0E-06
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	1.2E-04	---	---	1.2E-04
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	3.4E-04	---	---	4.2E-04
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	2.3E-05	---	---	2.3E-05
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	0.0E+00	---	---	2.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	1.4E-04	---	---	1.4E-04
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	1.9E-04	---	---	1.9E-04
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	2.9E-04	---	---	3.0E-04

Exposure Estimates for a Recreational Receptor Infant at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	1.3E-05	---	---	1.3E-05
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	1.7E-04	---	---	1.7E-04
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	4.9E-04	---	---	6.4E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	8.9E-06	---	---	1.0E-05
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.8E-07	---	---	2.1E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	2.0E-04	---	---	3.4E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	2.9E-05	---	---	4.8E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	1.3E-04	---	---	1.9E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	1.2E-04	---	---	1.2E-04
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	3.7E-04	---	---	5.0E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	2.8E-05	---	---	2.9E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	1.4E-04	---	---	1.5E-04
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	2.2E-04	---	---	2.8E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	5.1E-04	---	---	7.2E-04

Exposure Estimates for a Recreational Receptor Infant at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	2.2E-05	---	---	2.9E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	3.0E-04	---	---	4.5E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.3E-07	---	---	2.0E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	4.4E-05	---	---	1.1E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.0E-05	---	---	4.7E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	2.9E-05	---	---	7.6E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.8E-06	---	---	6.2E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.1E-06	---	---	4.4E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	2.6E-05	---	---	8.3E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.2E-04	---	---	4.2E-04

Exposure Estimates for a Recreational Receptor Infant at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	1.0E-05	---	---	1.0E-05
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	1.5E-04	---	---	1.5E-04
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.3E-05	---	---	2.2E-05
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	1.2E-05	---	---	1.2E-05
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	9.9E-09	---	---	1.4E-08
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	1.6E-04	---	---	2.2E-04
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	1.9E-05	---	---	2.3E-05
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	8.7E-05	---	---	9.1E-05
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	6.0E-06	---	---	6.1E-06
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	1.3E-04	---	---	1.3E-04
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	3.7E-04	---	---	4.6E-04
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	2.4E-05	---	---	2.4E-05
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	0.0E+00	---	---	2.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	1.4E-04	---	---	1.4E-04
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	1.9E-04	---	---	2.0E-04
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	2.9E-04	---	---	3.0E-04

Exposure Estimates for a Recreational Receptor Infant at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	1.4E-05	---	---	1.5E-05
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	1.7E-04	---	---	1.8E-04
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	3.2E-04	---	---	4.8E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	1.3E-05	---	---	1.4E-05
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	7.4E-07	---	---	2.0E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	2.1E-04	---	---	3.4E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	3.0E-05	---	---	4.9E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	1.3E-04	---	---	2.0E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.6E-05	---	---	5.3E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.4E-03	---	---	3.4E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	1.4E-04	---	---	1.4E-04
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	4.0E-04	---	---	5.3E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	2.9E-05	---	---	3.0E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	1.5E-04	---	---	1.5E-04
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	2.2E-04	---	---	2.8E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	5.1E-04	---	---	7.2E-04

Exposure Estimates for a Recreational Receptor Infant at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	3.3E-05	---	---	4.0E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	2.7E-04	---	---	4.2E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	6.2E-05	---	---	1.2E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.5E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	3.7E-05	---	---	8.4E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.4E-06	---	---	5.8E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	4.0E-05	---	---	9.7E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.6E-04	---	---	4.6E-04

Exposure Estimates for a Recreational Receptor Infant at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	2.4E-06	---	---	2.4E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	3.4E-05	---	---	3.4E-05
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.4E-04	---	---	1.5E-04
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	0.0E+00	---	---	2.4E-08
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	0.0E+00	---	---	3.8E-09
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	3.9E-05	---	---	9.5E-05
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	4.5E-06	---	---	8.7E-06
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	1.9E-05	---	---	2.3E-05
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	2.0E-06	---	---	2.1E-06
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	3.9E-05	---	---	3.9E-05
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	8.8E-05	---	---	1.7E-04
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	5.9E-06	---	---	5.9E-06
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	0.0E+00	---	---	2.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	3.5E-05	---	---	3.5E-05
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	4.5E-05	---	---	4.9E-05
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	6.5E-05	---	---	6.9E-05

Exposure Estimates for a Recreational Receptor Infant at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	6.0E-06	---	---	6.7E-06
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	6.7E-05	---	---	7.4E-05
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	4.2E-04	---	---	5.8E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	8.7E-05	---	---	2.2E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	1.6E-05	---	---	3.5E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	8.1E-05	---	---	1.5E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.9E-05	---	---	5.6E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.5E-03	---	---	3.5E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	4.1E-05	---	---	4.2E-05
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	1.2E-04	---	---	2.6E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	1.0E-05	---	---	1.2E-05
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	3.7E-05	---	---	4.0E-05
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	8.5E-05	---	---	1.5E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	3.2E-04	---	---	5.3E-04

Exposure Estimates for a Recreational Receptor Infant at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.6E-07	1.3E-07	4.7E-11	---	---	---	3.7E-06	---	---	4.4E-06
Arsenic	6.6E-06	4.6E-07	5.5E-10	---	---	---	3.3E-05	---	---	4.0E-05
Barium	1.2E-04	2.8E-05	1.0E-08	---	---	---	2.7E-04	---	---	4.2E-04
Beryllium	8.5E-07	2.0E-07	7.1E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	6.3E-05	1.5E-05	5.3E-09	---	---	---	4.8E-05	---	---	1.3E-04
Cobalt	1.5E-05	3.4E-07	1.2E-09	---	---	---	1.1E-05	---	---	2.6E-05
Copper	5.4E-05	7.5E-06	4.5E-09	---	---	---	6.2E-05	---	---	1.2E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.3E-04	2.2E-05	7.7E-08	---	---	---	2.5E-03	---	---	3.4E-03
Molybdenum	1.4E-06	3.4E-08	1.2E-10	---	---	---	1.8E-06	---	---	3.3E-06
Nickel	3.9E-05	8.2E-06	3.3E-09	---	---	---	3.7E-05	---	---	8.4E-05
Selenium	1.4E-06	3.2E-08	1.2E-10	---	---	---	4.4E-06	---	---	5.8E-06
Silver	1.2E-06	2.8E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.2E-11	---	---	---	3.7E-07	---	---	6.4E-07
Uranium	2.7E-06	6.3E-07	2.2E-10	---	---	---	1.5E-06	---	---	4.8E-06
Vanadium	5.6E-05	1.3E-06	4.7E-09	---	---	---	4.0E-05	---	---	9.7E-05
Zinc	1.6E-04	3.8E-05	1.4E-08	---	---	---	2.6E-04	---	---	4.6E-04

Exposure Estimates for a Recreational Receptor Infant at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.5E-08	3.4E-09	1.2E-12	---	---	---	1.1E-06	---	---	1.1E-06
Arsenic	2.1E-07	1.4E-08	1.7E-11	---	---	---	4.4E-06	---	---	4.6E-06
Barium	7.6E-06	1.8E-06	6.3E-10	---	---	---	1.9E-05	---	---	2.8E-05
Beryllium	1.9E-08	4.5E-09	1.6E-12	---	---	---	0.0E+00	---	---	2.4E-08
Cadmium	3.7E-09	8.6E-11	3.1E-13	---	---	---	0.0E+00	---	---	3.8E-09
Chromium (Total)	4.5E-05	1.0E-05	3.8E-09	---	---	---	4.8E-06	---	---	6.0E-05
Cobalt	4.0E-06	9.4E-08	3.4E-10	---	---	---	7.0E-07	---	---	4.8E-06
Copper	3.5E-06	4.9E-07	2.9E-10	---	---	---	2.2E-06	---	---	6.2E-06
Lead	1.1E-07	1.6E-09	9.5E-12	---	---	---	5.1E-09	---	---	1.2E-07
Manganese	3.5E-05	8.2E-07	2.9E-09	---	---	---	0.0E+00	---	---	3.6E-05
Molybdenum	3.1E-08	7.2E-10	2.6E-12	---	---	---	8.8E-06	---	---	8.8E-06
Nickel	6.9E-05	1.4E-05	5.8E-09	---	---	---	1.5E-05	---	---	9.8E-05
Selenium	1.0E-08	2.4E-10	8.6E-13	---	---	---	1.4E-06	---	---	1.4E-06
Silver	8.5E-09	2.0E-10	7.1E-13	---	---	---	0.0E+00	---	---	8.7E-09
Thallium	2.5E-09	5.8E-11	2.1E-13	---	---	---	7.0E-09	---	---	9.6E-09
Uranium	1.3E-08	3.0E-09	1.1E-12	---	---	---	4.4E-06	---	---	4.4E-06
Vanadium	3.9E-06	9.0E-08	3.2E-10	---	---	---	5.5E-06	---	---	9.5E-06
Zinc	2.5E-06	5.8E-07	2.1E-10	---	---	---	7.3E-06	---	---	1.0E-05

Exposure Estimates for a Recreational Receptor Infant at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	5.8E-07	1.3E-07	4.8E-11	---	---	---	4.8E-06	---	---	5.5E-06
Arsenic	6.8E-06	4.7E-07	5.7E-10	---	---	---	3.7E-05	---	---	4.5E-05
Barium	1.3E-04	3.0E-05	1.1E-08	---	---	---	2.9E-04	---	---	4.5E-04
Beryllium	8.7E-07	2.0E-07	7.3E-11	---	---	---	7.3E-07	---	---	1.8E-06
Cadmium	1.3E-06	3.0E-08	1.1E-10	---	---	---	1.4E-06	---	---	2.7E-06
Chromium (Total)	1.1E-04	2.5E-05	9.1E-09	---	---	---	5.2E-05	---	---	1.9E-04
Cobalt	1.9E-05	4.4E-07	1.6E-09	---	---	---	1.2E-05	---	---	3.1E-05
Copper	5.7E-05	8.0E-06	4.8E-09	---	---	---	6.4E-05	---	---	1.3E-04
Lead	3.7E-05	5.1E-07	3.1E-09	---	---	---	1.7E-05	---	---	5.4E-05
Manganese	9.6E-04	2.2E-05	8.0E-08	---	---	---	2.5E-03	---	---	3.5E-03
Molybdenum	1.5E-06	3.4E-08	1.2E-10	---	---	---	1.1E-05	---	---	1.2E-05
Nickel	1.1E-04	2.3E-05	9.0E-09	---	---	---	5.1E-05	---	---	1.8E-04
Selenium	1.4E-06	3.3E-08	1.2E-10	---	---	---	5.7E-06	---	---	7.2E-06
Silver	1.2E-06	2.9E-08	1.0E-10	---	---	---	3.7E-07	---	---	1.6E-06
Thallium	2.7E-07	6.3E-09	2.3E-11	---	---	---	3.7E-07	---	---	6.5E-07
Uranium	2.7E-06	6.3E-07	2.3E-10	---	---	---	5.8E-06	---	---	9.1E-06
Vanadium	6.0E-05	1.4E-06	5.0E-09	---	---	---	4.5E-05	---	---	1.1E-04
Zinc	1.7E-04	3.9E-05	1.4E-08	---	---	---	2.6E-04	---	---	4.7E-04

Exposure Estimates for an Indigenous Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	2.3E-06	2.5E-08	3.6E-06	3.6E-06	---	---	1.1E-05
Arsenic	1.3E-05	3.4E-07	1.0E-09	7.7E-05	1.1E-06	1.8E-05	2.5E-05	---	---	1.4E-04
Barium	2.4E-04	2.1E-05	1.9E-08	5.0E-05	2.7E-06	3.7E-03	2.7E-04	---	---	4.3E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	2.1E-06	4.2E-08	3.6E-06	7.3E-07	---	---	8.3E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.2E-06	2.4E-08	3.9E-05	1.5E-06	---	---	4.4E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	3.8E-05	1.1E-05	1.2E-04	4.7E-05	---	---	3.6E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	4.3E-06	1.0E-05	3.6E-05	7.3E-06	---	---	8.7E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.7E-04	9.1E-05	1.8E-03	8.4E-05	---	---	2.3E-03
Lead	7.3E-05	3.8E-07	5.7E-09	9.7E-06	2.8E-07	2.7E-05	1.5E-05	---	---	1.3E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	6.4E-04	1.2E-04	9.6E-02	1.4E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	4.3E-06	2.5E-05	1.4E-03	1.8E-06	---	---	1.4E-03
Nickel	7.8E-05	6.0E-06	6.1E-09	4.3E-05	1.5E-05	2.8E-04	3.3E-05	---	---	4.6E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	1.3E-04	2.8E-07	1.8E-05	6.9E-06	---	---	1.6E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.2E-07	6.0E-06	3.6E-07	---	---	9.8E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	4.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	9.5E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	4.3E-07	3.6E-08	1.9E-06	1.5E-06	---	---	9.6E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	2.1E-05	6.1E-06	8.8E-05	2.9E-05	---	---	2.6E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	5.2E-03	2.9E-06	5.4E-03	2.9E-04	---	---	1.1E-02

Exposure Estimates for an Indigenous Receptor Toddler at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	1.9E-06	4.3E-09	3.3E-07	2.9E-06	---	---	5.1E-06
Arsenic	4.1E-07	1.1E-08	3.2E-11	9.6E-07	1.7E-08	1.9E-06	3.2E-07	---	---	3.6E-06
Barium	1.5E-05	1.3E-06	1.2E-09	2.0E-07	1.4E-07	2.7E-04	1.1E-06	---	---	2.9E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	0.0E+00	8.2E-10	2.1E-07	0.0E+00	---	---	2.5E-07
Cadmium	7.3E-09	6.3E-11	5.8E-13	0.0E+00	5.3E-11	1.3E-07	0.0E+00	---	---	1.4E-07
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	0.0E+00	8.8E-06	3.7E-04	0.0E+00	---	---	4.8E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	3.2E-07	3.1E-06	3.6E-05	5.4E-07	---	---	4.8E-05
Copper	7.0E-06	3.6E-07	5.5E-10	0.0E+00	4.6E-06	1.4E-04	0.0E+00	---	---	1.5E-04
Lead	2.2E-07	1.2E-09	1.8E-11	0.0E+00	1.1E-09	8.4E-07	0.0E+00	---	---	1.1E-06
Manganese	7.0E-05	6.0E-07	5.5E-09	1.0E-05	3.0E-06	2.4E-03	2.3E-05	---	---	2.5E-03
Molybdenum	6.2E-08	5.3E-10	4.9E-12	5.0E-05	1.8E-06	9.6E-05	2.1E-05	---	---	1.7E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	1.6E-05	2.3E-05	9.4E-04	1.2E-05	---	---	1.1E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	3.8E-05	2.3E-09	1.9E-07	2.1E-06	---	---	4.1E-05
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	1.1E-09	8.5E-08	0.0E+00	---	---	1.0E-07
Thallium	5.0E-09	4.3E-11	3.9E-13	4.1E-07	9.8E-08	8.0E-08	3.6E-08	---	---	6.3E-07
Uranium	2.6E-08	2.2E-09	2.0E-12	0.0E+00	8.7E-11	9.9E-08	0.0E+00	---	---	1.3E-07
Vanadium	7.7E-06	6.6E-08	6.1E-10	0.0E+00	3.4E-07	3.2E-05	0.0E+00	---	---	4.0E-05
Zinc	4.9E-06	4.2E-07	3.9E-10	0.0E+00	2.4E-08	7.8E-05	0.0E+00	---	---	8.3E-05

Exposure Estimates for an Indigenous Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	4.2E-06	2.9E-08	3.9E-06	6.5E-06	---	---	1.6E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	7.8E-05	1.1E-06	2.0E-05	2.6E-05	---	---	1.4E-04
Barium	2.6E-04	2.2E-05	2.0E-08	5.0E-05	2.9E-06	4.0E-03	2.7E-04	---	---	4.6E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	2.1E-06	4.3E-08	3.8E-06	7.3E-07	---	---	8.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.2E-06	2.4E-08	3.9E-05	1.5E-06	---	---	4.4E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	3.8E-05	1.9E-05	5.0E-04	4.7E-05	---	---	8.3E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	4.6E-06	1.3E-05	7.1E-05	7.8E-06	---	---	1.3E-04
Copper	1.1E-04	5.9E-06	9.0E-09	1.7E-04	9.6E-05	2.0E-03	8.4E-05	---	---	2.5E-03
Lead	7.3E-05	3.8E-07	5.8E-09	9.7E-06	2.8E-07	2.8E-05	1.5E-05	---	---	1.3E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	6.5E-04	1.2E-04	9.8E-02	1.5E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	5.4E-05	2.7E-05	1.4E-03	2.3E-05	---	---	1.6E-03
Nickel	2.1E-04	1.7E-05	1.7E-08	5.9E-05	3.8E-05	1.2E-03	4.5E-05	---	---	1.6E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	1.7E-04	2.9E-07	1.8E-05	9.0E-06	---	---	2.0E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.2E-07	6.1E-06	3.6E-07	---	---	9.8E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	4.6E-06	2.5E-06	2.1E-06	4.0E-07	---	---	1.0E-05
Uranium	5.4E-06	4.6E-07	4.2E-10	4.3E-07	3.6E-08	2.0E-06	1.5E-06	---	---	9.7E-06
Vanadium	1.2E-04	1.0E-06	9.4E-09	2.1E-05	6.5E-06	1.2E-04	2.9E-05	---	---	3.0E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	5.2E-03	2.9E-06	5.5E-03	2.9E-04	---	---	1.1E-02

Exposure Estimates for an Indigenous Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	2.3E-06	2.5E-08	3.6E-06	3.6E-06	---	---	1.1E-05
Arsenic	1.3E-05	3.4E-07	1.0E-09	7.7E-05	1.1E-06	1.8E-05	2.2E-05	---	---	1.3E-04
Barium	2.4E-04	2.1E-05	1.9E-08	5.0E-05	2.7E-06	3.7E-03	3.0E-04	---	---	4.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	2.1E-06	4.2E-08	3.6E-06	7.3E-07	---	---	8.3E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.2E-06	2.4E-08	3.9E-05	7.3E-07	---	---	4.3E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	3.8E-05	1.1E-05	1.2E-04	4.7E-05	---	---	3.6E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	4.3E-06	1.0E-05	3.6E-05	1.1E-05	---	---	9.0E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.7E-04	9.1E-05	1.8E-03	4.4E-05	---	---	2.3E-03
Lead	7.3E-05	3.8E-07	5.7E-09	9.7E-06	2.8E-07	2.7E-05	1.0E-05	---	---	1.2E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	6.4E-04	1.2E-04	9.6E-02	2.4E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	4.3E-06	2.5E-05	1.4E-03	1.8E-06	---	---	1.4E-03
Nickel	7.8E-05	6.0E-06	6.1E-09	4.3E-05	1.5E-05	2.8E-04	2.9E-05	---	---	4.5E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	1.3E-04	2.8E-07	1.8E-05	4.7E-06	---	---	1.5E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.2E-07	6.0E-06	3.6E-07	---	---	9.8E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	4.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	9.5E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	4.3E-07	3.6E-08	1.9E-06	1.1E-06	---	---	9.2E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	2.1E-05	6.1E-06	8.8E-05	2.5E-05	---	---	2.5E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	5.2E-03	2.9E-06	5.4E-03	2.2E-04	---	---	1.1E-02

Exposure Estimates for an Indigenous Receptor Toddler at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	5.8E-06	1.2E-08	6.5E-07	9.0E-06	---	---	1.5E-05
Arsenic	4.1E-07	1.1E-08	3.2E-11	5.0E-04	7.2E-07	6.0E-06	1.4E-04	---	---	6.5E-04
Barium	1.5E-05	1.3E-06	1.2E-09	3.0E-05	1.9E-07	2.8E-04	1.8E-04	---	---	5.1E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	2.4E-05	3.0E-08	6.8E-07	8.1E-06	---	---	3.3E-05
Cadmium	7.3E-09	6.3E-11	5.8E-13	7.0E-08	6.4E-11	1.3E-07	4.3E-08	---	---	2.5E-07
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	1.3E-04	9.2E-06	3.7E-04	1.6E-04	---	---	7.6E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	7.0E-06	5.7E-06	3.9E-05	1.8E-05	---	---	7.8E-05
Copper	7.0E-06	3.6E-07	5.5E-10	3.3E-04	1.3E-05	1.7E-04	8.5E-05	---	---	6.1E-04
Lead	2.2E-07	1.2E-09	1.8E-11	6.5E-06	8.7E-09	1.4E-06	6.8E-06	---	---	1.5E-05
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	2.9E-06	2.2E-03	0.0E+00	---	---	2.3E-03
Molybdenum	6.2E-08	5.3E-10	4.9E-12	2.8E-04	8.0E-06	4.2E-04	1.2E-04	---	---	8.3E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	4.9E-04	4.9E-05	1.0E-03	3.3E-04	---	---	2.0E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	6.1E-04	9.4E-09	2.2E-07	2.3E-05	---	---	6.4E-04
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	1.1E-09	8.5E-08	0.0E+00	---	---	1.0E-07
Thallium	5.0E-09	4.3E-11	3.9E-13	0.0E+00	3.8E-09	2.3E-08	0.0E+00	---	---	3.2E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	5.5E-05	2.6E-07	1.3E-06	1.4E-04	---	---	2.0E-04
Vanadium	7.7E-06	6.6E-08	6.1E-10	1.6E-04	2.9E-06	3.5E-05	1.9E-04	---	---	3.9E-04
Zinc	4.9E-06	4.2E-07	3.9E-10	7.0E-03	3.9E-08	9.4E-05	2.9E-04	---	---	7.4E-03

Exposure Estimates for an Indigenous Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	8.1E-06	3.7E-08	4.2E-06	1.3E-05	---	---	2.6E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	5.8E-04	1.8E-06	2.4E-05	1.6E-04	---	---	7.8E-04
Barium	2.6E-04	2.2E-05	2.0E-08	8.0E-05	2.9E-06	4.0E-03	4.8E-04	---	---	4.9E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	2.6E-05	7.1E-08	4.2E-06	8.8E-06	---	---	4.1E-05
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.2E-06	2.4E-08	3.9E-05	7.7E-07	---	---	4.3E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	1.6E-04	2.0E-05	5.0E-04	2.0E-04	---	---	1.1E-03
Cobalt	3.7E-05	3.2E-07	2.9E-09	1.1E-05	1.6E-05	7.5E-05	2.9E-05	---	---	1.7E-04
Copper	1.1E-04	5.9E-06	9.0E-09	5.0E-04	1.0E-04	2.0E-03	1.3E-04	---	---	2.9E-03
Lead	7.3E-05	3.8E-07	5.8E-09	1.6E-05	2.9E-07	2.9E-05	1.7E-05	---	---	1.4E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	6.4E-04	1.2E-04	9.8E-02	2.4E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.8E-04	3.3E-05	1.8E-03	1.2E-04	---	---	2.2E-03
Nickel	2.1E-04	1.7E-05	1.7E-08	5.3E-04	6.4E-05	1.3E-03	3.6E-04	---	---	2.5E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	7.4E-04	2.9E-07	1.8E-05	2.7E-05	---	---	7.9E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.2E-07	6.1E-06	3.6E-07	---	---	9.8E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	4.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	9.5E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	5.5E-05	3.0E-07	3.1E-06	1.4E-04	---	---	2.1E-04
Vanadium	1.2E-04	1.0E-06	9.4E-09	1.8E-04	9.0E-06	1.2E-04	2.1E-04	---	---	6.5E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	1.2E-02	2.9E-06	5.5E-03	5.1E-04	---	---	1.9E-02

Exposure Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	2.3E-06	2.5E-08	3.6E-06	3.6E-06	---	---	1.1E-05
Arsenic	1.3E-05	3.4E-07	1.0E-09	7.7E-05	1.1E-06	1.8E-05	2.2E-05	---	---	1.3E-04
Barium	2.4E-04	2.1E-05	1.9E-08	5.0E-05	2.7E-06	3.7E-03	3.0E-04	---	---	4.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	2.1E-06	4.2E-08	3.6E-06	7.3E-07	---	---	8.3E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.2E-06	2.4E-08	3.9E-05	7.3E-07	---	---	4.3E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	3.8E-05	1.1E-05	1.2E-04	4.7E-05	---	---	3.6E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	4.3E-06	1.0E-05	3.6E-05	1.1E-05	---	---	9.0E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.7E-04	9.1E-05	1.8E-03	4.4E-05	---	---	2.3E-03
Lead	7.3E-05	3.8E-07	5.7E-09	9.7E-06	2.8E-07	2.7E-05	1.0E-05	---	---	1.2E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	6.4E-04	1.2E-04	9.6E-02	2.4E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	4.3E-06	2.5E-05	1.4E-03	1.8E-06	---	---	1.4E-03
Nickel	7.8E-05	6.0E-06	6.1E-09	4.3E-05	1.5E-05	2.8E-04	2.9E-05	---	---	4.5E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	1.3E-04	2.8E-07	1.8E-05	4.7E-06	---	---	1.5E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.2E-07	6.0E-06	3.6E-07	---	---	9.8E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	4.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	9.5E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	4.3E-07	3.6E-08	1.9E-06	1.1E-06	---	---	9.2E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	2.1E-05	6.1E-06	8.8E-05	2.5E-05	---	---	2.5E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	5.2E-03	2.9E-06	5.4E-03	2.2E-04	---	---	1.1E-02

Exposure Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	6.7E-06	1.4E-08	7.2E-07	1.0E-05	---	---	1.8E-05
Arsenic	4.1E-07	1.1E-08	3.2E-11	5.1E-04	7.4E-07	6.1E-06	1.5E-04	---	---	6.6E-04
Barium	1.5E-05	1.3E-06	1.2E-09	2.1E-06	1.4E-07	2.7E-04	1.3E-05	---	---	3.0E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	3.6E-05	4.4E-08	9.2E-07	1.2E-05	---	---	4.9E-05
Cadmium	7.3E-09	6.3E-11	5.8E-13	1.6E-08	5.6E-11	1.3E-07	9.8E-09	---	---	1.6E-07
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	1.3E-04	9.2E-06	3.7E-04	1.6E-04	---	---	7.7E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	7.2E-06	5.8E-06	3.9E-05	1.8E-05	---	---	7.9E-05
Copper	7.0E-06	3.6E-07	5.5E-10	3.4E-04	1.4E-05	1.7E-04	8.7E-05	---	---	6.2E-04
Lead	2.2E-07	1.2E-09	1.8E-11	5.7E-06	7.8E-09	1.3E-06	6.0E-06	---	---	1.3E-05
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	2.9E-06	2.2E-03	0.0E+00	---	---	2.3E-03
Molybdenum	6.2E-08	5.3E-10	4.9E-12	3.1E-04	8.9E-06	4.7E-04	1.3E-04	---	---	9.2E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	5.4E-04	5.2E-05	1.0E-03	3.7E-04	---	---	2.1E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	6.5E-04	9.8E-09	2.2E-07	2.4E-05	---	---	6.7E-04
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	1.1E-09	8.5E-08	0.0E+00	---	---	1.0E-07
Thallium	5.0E-09	4.3E-11	3.9E-13	0.0E+00	3.8E-09	2.3E-08	0.0E+00	---	---	3.2E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	5.6E-05	2.7E-07	1.3E-06	1.4E-04	---	---	2.0E-04
Vanadium	7.7E-06	6.6E-08	6.1E-10	1.6E-04	3.0E-06	3.5E-05	1.9E-04	---	---	4.0E-04
Zinc	4.9E-06	4.2E-07	3.9E-10	7.0E-03	3.9E-08	9.4E-05	2.9E-04	---	---	7.4E-03

Exposure Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	9.0E-06	3.9E-08	4.3E-06	1.4E-05	---	---	2.9E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	5.9E-04	1.8E-06	2.5E-05	1.7E-04	---	---	8.0E-04
Barium	2.6E-04	2.2E-05	2.0E-08	5.2E-05	2.9E-06	4.0E-03	3.1E-04	---	---	4.7E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	3.8E-05	8.6E-08	4.5E-06	1.3E-05	---	---	5.7E-05
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.2E-06	2.4E-08	3.9E-05	7.4E-07	---	---	4.3E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	1.7E-04	2.0E-05	5.0E-04	2.1E-04	---	---	1.1E-03
Cobalt	3.7E-05	3.2E-07	2.9E-09	1.1E-05	1.6E-05	7.5E-05	2.9E-05	---	---	1.7E-04
Copper	1.1E-04	5.9E-06	9.0E-09	5.1E-04	1.0E-04	2.0E-03	1.3E-04	---	---	2.9E-03
Lead	7.3E-05	3.8E-07	5.8E-09	1.5E-05	2.9E-07	2.9E-05	1.6E-05	---	---	1.3E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	6.4E-04	1.2E-04	9.8E-02	2.4E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	3.2E-04	3.4E-05	1.8E-03	1.3E-04	---	---	2.3E-03
Nickel	2.1E-04	1.7E-05	1.7E-08	5.9E-04	6.7E-05	1.3E-03	4.0E-04	---	---	2.6E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	7.8E-04	2.9E-07	1.8E-05	2.9E-05	---	---	8.3E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.2E-07	6.1E-06	3.6E-07	---	---	9.8E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	4.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	9.5E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	5.6E-05	3.0E-07	3.2E-06	1.4E-04	---	---	2.1E-04
Vanadium	1.2E-04	1.0E-06	9.4E-09	1.8E-04	9.1E-06	1.2E-04	2.2E-04	---	---	6.5E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	1.2E-02	2.9E-06	5.5E-03	5.1E-04	---	---	1.9E-02

Exposure Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	2.1E-06	2.5E-08	3.6E-06	3.6E-06	---	---	1.1E-05
Arsenic	1.3E-05	3.4E-07	1.0E-09	3.6E-05	1.0E-06	1.8E-05	3.3E-05	---	---	1.0E-04
Barium	2.4E-04	2.1E-05	1.9E-08	2.2E-05	2.7E-06	3.7E-03	2.7E-04	---	---	4.3E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	2.1E-06	4.2E-08	3.6E-06	7.3E-07	---	---	8.3E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	3.1E-06	2.4E-08	3.9E-05	1.4E-06	---	---	4.6E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	2.5E-05	1.1E-05	1.2E-04	4.7E-05	---	---	3.4E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	4.3E-06	1.0E-05	3.6E-05	1.1E-05	---	---	9.0E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.8E-04	8.9E-05	1.8E-03	6.2E-05	---	---	2.3E-03
Lead	7.3E-05	3.8E-07	5.7E-09	4.3E-06	2.6E-07	2.7E-05	1.7E-05	---	---	1.2E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	1.5E-04	1.2E-04	9.6E-02	2.5E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	4.3E-06	2.5E-05	1.4E-03	1.8E-06	---	---	1.4E-03
Nickel	7.8E-05	6.0E-06	6.1E-09	4.3E-05	1.5E-05	2.8E-04	3.6E-05	---	---	4.6E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	2.9E-04	2.9E-07	1.8E-05	4.4E-06	---	---	3.2E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.1E-07	5.7E-06	3.6E-07	---	---	9.7E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	2.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	7.6E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	4.3E-07	3.6E-08	1.9E-06	1.5E-06	---	---	9.6E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	2.1E-05	6.1E-06	8.8E-05	4.0E-05	---	---	2.7E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	9.5E-03	2.8E-06	5.4E-03	2.5E-04	---	---	1.6E-02

Exposure Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	1.4E-06	4.2E-09	3.4E-07	2.3E-06	---	---	4.1E-06
Arsenic	4.1E-07	1.1E-08	3.2E-11	3.7E-05	1.9E-07	2.9E-06	3.4E-05	---	---	7.4E-05
Barium	1.5E-05	1.3E-06	1.2E-09	1.2E-05	1.9E-07	2.8E-04	1.4E-04	---	---	4.5E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	0.0E+00	8.2E-10	2.1E-07	0.0E+00	---	---	2.5E-07
Cadmium	7.3E-09	6.3E-11	5.8E-13	0.0E+00	5.3E-11	1.3E-07	0.0E+00	---	---	1.4E-07
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	2.0E-05	8.9E-06	3.7E-04	3.9E-05	---	---	5.4E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	1.8E-06	3.5E-06	3.6E-05	4.5E-06	---	---	5.4E-05
Copper	7.0E-06	3.6E-07	5.5E-10	5.3E-05	7.0E-06	1.5E-04	1.9E-05	---	---	2.3E-04
Lead	2.2E-07	1.2E-09	1.8E-11	4.9E-07	3.4E-09	1.0E-06	2.0E-06	---	---	3.7E-06
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	2.9E-06	2.2E-03	0.0E+00	---	---	2.3E-03
Molybdenum	6.2E-08	5.3E-10	4.9E-12	9.1E-05	3.4E-06	1.8E-04	3.9E-05	---	---	3.2E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	1.0E-04	2.8E-05	9.5E-04	8.7E-05	---	---	1.3E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	3.9E-04	3.4E-09	1.9E-07	5.9E-06	---	---	4.0E-04
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	1.1E-09	8.5E-08	0.0E+00	---	---	1.0E-07
Thallium	5.0E-09	4.3E-11	3.9E-13	0.0E+00	3.8E-09	2.3E-08	0.0E+00	---	---	3.2E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	1.0E-05	6.0E-08	3.7E-07	3.5E-05	---	---	4.6E-05
Vanadium	7.7E-06	6.6E-08	6.1E-10	2.4E-05	8.4E-07	3.3E-05	4.5E-05	---	---	1.1E-04
Zinc	4.9E-06	4.2E-07	3.9E-10	2.4E-03	2.7E-08	8.2E-05	6.5E-05	---	---	2.6E-03

Exposure Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	3.5E-06	2.9E-08	3.9E-06	6.0E-06	---	---	1.5E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	7.3E-05	1.2E-06	2.1E-05	6.7E-05	---	---	1.8E-04
Barium	2.6E-04	2.2E-05	2.0E-08	3.4E-05	2.9E-06	4.0E-03	4.2E-04	---	---	4.8E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	2.1E-06	4.2E-08	3.8E-06	7.3E-07	---	---	8.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	3.1E-06	2.4E-08	3.9E-05	1.4E-06	---	---	4.6E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	4.5E-05	2.0E-05	5.0E-04	8.6E-05	---	---	8.8E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	6.0E-06	1.4E-05	7.2E-05	1.5E-05	---	---	1.4E-04
Copper	1.1E-04	5.9E-06	9.0E-09	2.3E-04	9.6E-05	2.0E-03	8.0E-05	---	---	2.5E-03
Lead	7.3E-05	3.8E-07	5.8E-09	4.8E-06	2.7E-07	2.8E-05	1.9E-05	---	---	1.3E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	1.5E-04	1.2E-04	9.8E-02	2.5E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	9.5E-05	2.8E-05	1.5E-03	4.0E-05	---	---	1.7E-03
Nickel	2.1E-04	1.7E-05	1.7E-08	1.4E-04	4.3E-05	1.2E-03	1.2E-04	---	---	1.8E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	6.8E-04	2.9E-07	1.8E-05	1.0E-05	---	---	7.1E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.1E-07	5.8E-06	3.6E-07	---	---	9.7E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	2.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	7.6E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	1.1E-05	9.5E-08	2.3E-06	3.6E-05	---	---	5.5E-05
Vanadium	1.2E-04	1.0E-06	9.4E-09	4.6E-05	7.0E-06	1.2E-04	8.5E-05	---	---	3.8E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	1.2E-02	2.8E-06	5.5E-03	3.2E-04	---	---	1.8E-02

Exposure Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	2.1E-06	2.5E-08	3.6E-06	3.6E-06	---	---	1.1E-05
Arsenic	1.3E-05	3.4E-07	1.0E-09	3.6E-05	1.0E-06	1.8E-05	3.3E-05	---	---	1.0E-04
Barium	2.4E-04	2.1E-05	1.9E-08	2.2E-05	2.7E-06	3.7E-03	2.7E-04	---	---	4.3E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	2.1E-06	4.2E-08	3.6E-06	7.3E-07	---	---	8.3E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	3.1E-06	2.4E-08	3.9E-05	1.4E-06	---	---	4.6E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	2.5E-05	1.1E-05	1.2E-04	4.7E-05	---	---	3.4E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	4.3E-06	1.0E-05	3.6E-05	1.1E-05	---	---	9.0E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.8E-04	8.9E-05	1.8E-03	6.2E-05	---	---	2.3E-03
Lead	7.3E-05	3.8E-07	5.7E-09	4.3E-06	2.6E-07	2.7E-05	1.7E-05	---	---	1.2E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	1.5E-04	1.2E-04	9.6E-02	2.5E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	4.3E-06	2.5E-05	1.4E-03	1.8E-06	---	---	1.4E-03
Nickel	7.8E-05	6.0E-06	6.1E-09	4.3E-05	1.5E-05	2.8E-04	3.6E-05	---	---	4.6E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	2.9E-04	2.9E-07	1.8E-05	4.4E-06	---	---	3.2E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.1E-07	5.7E-06	3.6E-07	---	---	9.7E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	2.2E-06	2.4E-06	2.0E-06	3.6E-07	---	---	7.6E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	4.3E-07	3.6E-08	1.9E-06	1.5E-06	---	---	9.6E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	2.1E-05	6.1E-06	8.8E-05	4.0E-05	---	---	2.7E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	9.5E-03	2.8E-06	5.4E-03	2.5E-04	---	---	1.6E-02

Exposure Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	6.4E-07	2.4E-09	2.6E-07	1.1E-06	---	---	2.0E-06
Arsenic	4.1E-07	1.1E-08	3.2E-11	4.8E-06	3.8E-08	2.0E-06	4.4E-06	---	---	1.2E-05
Barium	1.5E-05	1.3E-06	1.2E-09	1.6E-06	1.4E-07	2.7E-04	1.9E-05	---	---	3.1E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	0.0E+00	8.2E-10	2.1E-07	0.0E+00	---	---	2.5E-07
Cadmium	7.3E-09	6.3E-11	5.8E-13	0.0E+00	5.3E-11	1.3E-07	0.0E+00	---	---	1.4E-07
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	2.5E-06	8.8E-06	3.7E-04	4.7E-06	---	---	4.9E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	2.7E-07	3.1E-06	3.6E-05	6.9E-07	---	---	4.8E-05
Copper	7.0E-06	3.6E-07	5.5E-10	6.2E-06	4.9E-06	1.4E-04	2.2E-06	---	---	1.6E-04
Lead	2.2E-07	1.2E-09	1.8E-11	1.3E-09	1.1E-09	8.4E-07	5.1E-09	---	---	1.1E-06
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	2.9E-06	2.2E-03	0.0E+00	---	---	2.3E-03
Molybdenum	6.2E-08	5.3E-10	4.9E-12	2.1E-05	1.1E-06	6.0E-05	8.8E-06	---	---	9.1E-05
Nickel	1.4E-04	1.1E-05	1.1E-08	1.7E-05	2.3E-05	9.4E-04	1.5E-05	---	---	1.1E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	9.0E-05	2.0E-09	1.9E-07	1.3E-06	---	---	9.1E-05
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	1.1E-09	8.5E-08	0.0E+00	---	---	1.0E-07
Thallium	5.0E-09	4.3E-11	3.9E-13	4.3E-08	2.0E-08	3.3E-08	7.0E-09	---	---	1.1E-07
Uranium	2.6E-08	2.2E-09	2.0E-12	1.3E-06	7.5E-09	1.3E-07	4.3E-06	---	---	5.8E-06
Vanadium	7.7E-06	6.6E-08	6.1E-10	2.9E-06	4.0E-07	3.2E-05	5.5E-06	---	---	4.9E-05
Zinc	4.9E-06	4.2E-07	3.9E-10	2.7E-04	2.4E-08	7.8E-05	7.3E-06	---	---	3.6E-04

Exposure Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	2.8E-06	2.7E-08	3.8E-06	4.7E-06	---	---	1.3E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	4.1E-05	1.1E-06	2.0E-05	3.7E-05	---	---	1.1E-04
Barium	2.6E-04	2.2E-05	2.0E-08	2.4E-05	2.9E-06	4.0E-03	2.9E-04	---	---	4.6E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	2.1E-06	4.2E-08	3.8E-06	7.3E-07	---	---	8.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	3.1E-06	2.4E-08	3.9E-05	1.4E-06	---	---	4.6E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	2.7E-05	1.9E-05	5.0E-04	5.2E-05	---	---	8.3E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	4.5E-06	1.3E-05	7.1E-05	1.2E-05	---	---	1.4E-04
Copper	1.1E-04	5.9E-06	9.0E-09	1.8E-04	9.3E-05	2.0E-03	6.4E-05	---	---	2.4E-03
Lead	7.3E-05	3.8E-07	5.8E-09	4.3E-06	2.6E-07	2.8E-05	1.7E-05	---	---	1.2E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	1.5E-04	1.2E-04	9.8E-02	2.5E-03	---	---	1.0E-01
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.5E-05	2.6E-05	1.4E-03	1.1E-05	---	---	1.5E-03
Nickel	2.1E-04	1.7E-05	1.7E-08	6.0E-05	3.8E-05	1.2E-03	5.1E-05	---	---	1.6E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	3.8E-04	2.9E-07	1.8E-05	5.7E-06	---	---	4.1E-04
Silver	2.4E-06	2.1E-08	1.9E-10	8.9E-05	1.1E-07	5.8E-06	3.6E-07	---	---	9.7E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	2.3E-06	2.5E-06	2.0E-06	3.7E-07	---	---	7.7E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	1.7E-06	4.3E-08	2.0E-06	5.8E-06	---	---	1.5E-05
Vanadium	1.2E-04	1.0E-06	9.4E-09	2.4E-05	6.5E-06	1.2E-04	4.5E-05	---	---	3.2E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	9.8E-03	2.8E-06	5.5E-03	2.6E-04	---	---	1.6E-02

Exposure Estimates for a Recreational Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	1.3E-06	6.8E-09	8.2E-07	3.6E-06	---	---	7.0E-06
Arsenic	1.3E-05	3.4E-07	1.0E-09	4.4E-05	3.0E-07	4.6E-06	2.5E-05	---	---	8.7E-05
Barium	2.4E-04	2.1E-05	1.9E-08	2.8E-05	7.4E-07	8.4E-04	2.7E-04	---	---	1.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	1.2E-06	1.2E-08	8.2E-07	7.3E-07	---	---	4.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	6.7E-07	7.0E-09	8.7E-06	1.5E-06	---	---	1.3E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	2.2E-05	3.1E-06	3.0E-05	4.7E-05	---	---	2.4E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	2.4E-06	2.7E-06	8.5E-06	7.3E-06	---	---	5.0E-05
Copper	1.1E-04	5.5E-06	8.4E-09	9.7E-05	2.6E-05	4.1E-04	8.4E-05	---	---	7.3E-04
Lead	7.3E-05	3.8E-07	5.7E-09	5.5E-06	7.8E-08	7.0E-06	1.5E-05	---	---	1.0E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	3.6E-04	3.1E-05	2.6E-02	1.4E-03	---	---	3.0E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.4E-06	6.7E-06	3.2E-04	1.8E-06	---	---	3.4E-04
Nickel	7.8E-05	6.0E-06	6.1E-09	2.4E-05	4.2E-06	6.3E-05	3.3E-05	---	---	2.1E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	7.3E-05	8.1E-08	4.1E-06	6.9E-06	---	---	8.7E-05
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.2E-08	1.6E-06	3.6E-07	---	---	5.5E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	2.4E-06	6.6E-07	5.9E-07	3.6E-07	---	---	4.5E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	2.4E-07	9.6E-09	4.2E-07	1.5E-06	---	---	7.9E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	1.2E-05	1.7E-06	2.0E-05	2.9E-05	---	---	1.7E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	3.0E-03	8.4E-07	1.4E-03	2.9E-04	---	---	5.0E-03

Exposure Estimates for a Recreational Receptor Toddler at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	1.1E-06	1.1E-09	9.1E-08	2.9E-06	---	---	4.1E-06
Arsenic	4.1E-07	1.1E-08	3.2E-11	5.5E-07	4.6E-09	4.2E-07	3.2E-07	---	---	1.7E-06
Barium	1.5E-05	1.3E-06	1.2E-09	1.1E-07	3.6E-08	5.9E-05	1.1E-06	---	---	7.7E-05
Beryllium	3.8E-08	3.3E-09	3.0E-12	0.0E+00	2.2E-10	4.6E-08	0.0E+00	---	---	8.8E-08
Cadmium	7.3E-09	6.3E-11	5.8E-13	0.0E+00	1.4E-11	2.8E-08	0.0E+00	---	---	3.6E-08
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	0.0E+00	2.4E-06	8.4E-05	0.0E+00	---	---	1.8E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	1.8E-07	8.3E-07	8.0E-06	5.4E-07	---	---	1.8E-05
Copper	7.0E-06	3.6E-07	5.5E-10	0.0E+00	1.2E-06	3.0E-05	0.0E+00	---	---	3.9E-05
Lead	2.2E-07	1.2E-09	1.8E-11	0.0E+00	3.0E-10	1.9E-07	0.0E+00	---	---	4.2E-07
Manganese	7.0E-05	6.0E-07	5.5E-09	5.7E-06	8.0E-07	5.3E-04	2.3E-05	---	---	6.3E-04
Molybdenum	6.2E-08	5.3E-10	4.9E-12	2.9E-05	4.8E-07	2.9E-05	2.1E-05	---	---	8.0E-05
Nickel	1.4E-04	1.1E-05	1.1E-08	9.1E-06	6.1E-06	2.1E-04	1.2E-05	---	---	3.8E-04
Selenium	2.1E-08	1.8E-10	1.6E-12	2.2E-05	6.1E-10	4.3E-08	2.1E-06	---	---	2.4E-05
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	2.9E-10	1.9E-08	0.0E+00	---	---	3.6E-08
Thallium	5.0E-09	4.3E-11	3.9E-13	2.3E-07	2.6E-08	2.4E-08	3.6E-08	---	---	3.2E-07
Uranium	2.6E-08	2.2E-09	2.0E-12	0.0E+00	2.3E-11	2.2E-08	0.0E+00	---	---	5.1E-08
Vanadium	7.7E-06	6.6E-08	6.1E-10	0.0E+00	9.2E-08	7.2E-06	0.0E+00	---	---	1.5E-05
Zinc	4.9E-06	4.2E-07	3.9E-10	0.0E+00	6.4E-09	1.7E-05	0.0E+00	---	---	2.2E-05

Exposure Estimates for a Recreational Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	2.4E-06	7.9E-09	9.1E-07	6.5E-06	---	---	1.1E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	4.4E-05	3.0E-07	5.0E-06	2.6E-05	---	---	8.9E-05
Barium	2.6E-04	2.2E-05	2.0E-08	2.9E-05	7.8E-07	9.0E-04	2.7E-04	---	---	1.5E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	1.2E-06	1.2E-08	8.6E-07	7.3E-07	---	---	4.7E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	6.7E-07	7.1E-09	8.7E-06	1.5E-06	---	---	1.3E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	2.2E-05	5.4E-06	1.1E-04	4.7E-05	---	---	4.2E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	2.6E-06	3.5E-06	1.6E-05	7.8E-06	---	---	6.8E-05
Copper	1.1E-04	5.9E-06	9.0E-09	9.7E-05	2.7E-05	4.4E-04	8.4E-05	---	---	7.7E-04
Lead	7.3E-05	3.8E-07	5.8E-09	5.5E-06	7.9E-08	7.2E-06	1.5E-05	---	---	1.0E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	3.7E-04	3.2E-05	2.6E-02	1.5E-03	---	---	3.0E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	3.1E-05	7.2E-06	3.5E-04	2.3E-05	---	---	4.2E-04
Nickel	2.1E-04	1.7E-05	1.7E-08	3.3E-05	1.0E-05	2.7E-04	4.5E-05	---	---	5.9E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	9.4E-05	8.1E-08	4.1E-06	9.0E-06	---	---	1.1E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.2E-08	1.6E-06	3.6E-07	---	---	5.5E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	2.6E-06	6.8E-07	6.1E-07	4.0E-07	---	---	4.8E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	2.4E-07	9.6E-09	4.5E-07	1.5E-06	---	---	8.0E-06
Vanadium	1.2E-04	1.0E-06	9.4E-09	1.2E-05	1.8E-06	2.7E-05	2.9E-05	---	---	1.9E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	3.0E-03	8.5E-07	1.4E-03	2.9E-04	---	---	5.0E-03

Exposure Estimates for a Recreational Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	1.3E-06	6.8E-09	8.2E-07	3.6E-06	---	---	7.0E-06
Arsenic	1.3E-05	3.4E-07	1.0E-09	4.4E-05	3.0E-07	4.6E-06	2.2E-05	---	---	8.4E-05
Barium	2.4E-04	2.1E-05	1.9E-08	2.8E-05	7.4E-07	8.4E-04	3.0E-04	---	---	1.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	1.2E-06	1.2E-08	8.2E-07	7.3E-07	---	---	4.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	6.7E-07	7.0E-09	8.7E-06	7.3E-07	---	---	1.3E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	2.2E-05	3.1E-06	3.0E-05	4.7E-05	---	---	2.4E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	2.4E-06	2.7E-06	8.5E-06	1.1E-05	---	---	5.4E-05
Copper	1.1E-04	5.5E-06	8.4E-09	9.7E-05	2.6E-05	4.1E-04	4.4E-05	---	---	6.9E-04
Lead	7.3E-05	3.8E-07	5.7E-09	5.5E-06	7.8E-08	7.0E-06	1.0E-05	---	---	9.6E-05
Manganese	1.8E-03	1.6E-05	1.5E-07	3.6E-04	3.1E-05	2.6E-02	2.4E-03	---	---	3.1E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.4E-06	6.7E-06	3.2E-04	1.8E-06	---	---	3.4E-04
Nickel	7.8E-05	6.0E-06	6.1E-09	2.4E-05	4.2E-06	6.3E-05	2.9E-05	---	---	2.0E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	7.3E-05	8.1E-08	4.1E-06	4.7E-06	---	---	8.4E-05
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.2E-08	1.6E-06	3.6E-07	---	---	5.5E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	2.4E-06	6.6E-07	5.9E-07	3.6E-07	---	---	4.5E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	2.4E-07	9.6E-09	4.2E-07	1.1E-06	---	---	7.6E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	1.2E-05	1.7E-06	2.0E-05	2.5E-05	---	---	1.7E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	3.0E-03	8.4E-07	1.4E-03	2.2E-04	---	---	4.9E-03

Exposure Estimates for a Recreational Receptor Toddler at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	3.3E-06	3.2E-09	2.0E-07	9.0E-06	---	---	1.2E-05
Arsenic	4.1E-07	1.1E-08	3.2E-11	2.8E-04	2.0E-07	1.8E-06	1.4E-04	---	---	4.3E-04
Barium	1.5E-05	1.3E-06	1.2E-09	1.7E-05	5.1E-08	6.3E-05	1.8E-04	---	---	2.8E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	1.4E-05	8.2E-09	2.0E-07	8.1E-06	---	---	2.2E-05
Cadmium	7.3E-09	6.3E-11	5.8E-13	4.0E-08	1.8E-11	3.0E-08	4.3E-08	---	---	1.2E-07
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	7.2E-05	2.5E-06	8.5E-05	1.6E-04	---	---	4.1E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	4.0E-06	1.5E-06	9.1E-06	1.8E-05	---	---	4.1E-05
Copper	7.0E-06	3.6E-07	5.5E-10	1.9E-04	3.8E-06	4.2E-05	8.5E-05	---	---	3.3E-04
Lead	2.2E-07	1.2E-09	1.8E-11	3.7E-06	2.5E-09	3.8E-07	6.8E-06	---	---	1.1E-05
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	7.7E-07	4.8E-04	0.0E+00	---	---	5.6E-04
Molybdenum	6.2E-08	5.3E-10	4.9E-12	1.6E-04	2.1E-06	1.4E-04	1.2E-04	---	---	4.2E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	2.8E-04	1.3E-05	2.3E-04	3.3E-04	---	---	1.0E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	3.5E-04	2.6E-09	5.2E-08	2.3E-05	---	---	3.7E-04
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	2.9E-10	1.9E-08	0.0E+00	---	---	3.6E-08
Thallium	5.0E-09	4.3E-11	3.9E-13	0.0E+00	1.0E-09	5.2E-09	0.0E+00	---	---	1.1E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	3.1E-05	7.0E-08	4.1E-07	1.4E-04	---	---	1.7E-04
Vanadium	7.7E-06	6.6E-08	6.1E-10	9.0E-05	7.8E-07	8.3E-06	1.9E-04	---	---	3.0E-04
Zinc	4.9E-06	4.2E-07	3.9E-10	4.0E-03	1.1E-08	2.2E-05	2.9E-04	---	---	4.3E-03

Exposure Estimates for a Recreational Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	4.6E-06	9.9E-09	1.0E-06	1.3E-05	---	---	1.9E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	3.3E-04	5.0E-07	6.3E-06	1.6E-04	---	---	5.1E-04
Barium	2.6E-04	2.2E-05	2.0E-08	4.6E-05	7.9E-07	9.0E-04	4.8E-04	---	---	1.7E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	1.5E-05	2.0E-08	1.0E-06	8.8E-06	---	---	2.6E-05
Cadmium	2.5E-06	2.2E-08	2.0E-10	7.1E-07	7.1E-09	8.7E-06	7.7E-07	---	---	1.3E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	9.4E-05	5.6E-06	1.1E-04	2.0E-04	---	---	6.5E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	6.4E-06	4.3E-06	1.8E-05	2.9E-05	---	---	9.5E-05
Copper	1.1E-04	5.9E-06	9.0E-09	2.9E-04	3.0E-05	4.5E-04	1.3E-04	---	---	1.0E-03
Lead	7.3E-05	3.8E-07	5.8E-09	9.2E-06	8.1E-08	7.4E-06	1.7E-05	---	---	1.1E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	3.6E-04	3.2E-05	2.6E-02	2.4E-03	---	---	3.1E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	1.6E-04	8.8E-06	4.6E-04	1.2E-04	---	---	7.5E-04
Nickel	2.1E-04	1.7E-05	1.7E-08	3.0E-04	1.7E-05	2.9E-04	3.6E-04	---	---	1.2E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	4.2E-04	8.3E-08	4.1E-06	2.7E-05	---	---	4.6E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.2E-08	1.6E-06	3.6E-07	---	---	5.5E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	2.4E-06	6.6E-07	6.0E-07	3.6E-07	---	---	4.5E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	3.1E-05	7.9E-08	8.4E-07	1.4E-04	---	---	1.8E-04
Vanadium	1.2E-04	1.0E-06	9.4E-09	1.0E-04	2.4E-06	2.8E-05	2.1E-04	---	---	4.7E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	6.9E-03	8.5E-07	1.4E-03	5.1E-04	---	---	9.2E-03

Exposure Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	1.3E-06	6.8E-09	8.2E-07	3.6E-06	---	---	7.0E-06
Arsenic	1.3E-05	3.4E-07	1.0E-09	4.4E-05	3.0E-07	4.6E-06	2.2E-05	---	---	8.4E-05
Barium	2.4E-04	2.1E-05	1.9E-08	2.8E-05	7.4E-07	8.4E-04	3.0E-04	---	---	1.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	1.2E-06	1.2E-08	8.2E-07	7.3E-07	---	---	4.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	6.7E-07	7.0E-09	8.7E-06	7.3E-07	---	---	1.3E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	2.2E-05	3.1E-06	3.0E-05	4.7E-05	---	---	2.4E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	2.4E-06	2.7E-06	8.5E-06	1.1E-05	---	---	5.4E-05
Copper	1.1E-04	5.5E-06	8.4E-09	9.7E-05	2.6E-05	4.1E-04	4.4E-05	---	---	6.9E-04
Lead	7.3E-05	3.8E-07	5.7E-09	5.5E-06	7.8E-08	7.0E-06	1.0E-05	---	---	9.6E-05
Manganese	1.8E-03	1.6E-05	1.5E-07	3.6E-04	3.1E-05	2.6E-02	2.4E-03	---	---	3.1E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.4E-06	6.7E-06	3.2E-04	1.8E-06	---	---	3.4E-04
Nickel	7.8E-05	6.0E-06	6.1E-09	2.4E-05	4.2E-06	6.3E-05	2.9E-05	---	---	2.0E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	7.3E-05	8.1E-08	4.1E-06	4.7E-06	---	---	8.4E-05
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.2E-08	1.6E-06	3.6E-07	---	---	5.5E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	2.4E-06	6.6E-07	5.9E-07	3.6E-07	---	---	4.5E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	2.4E-07	9.6E-09	4.2E-07	1.1E-06	---	---	7.6E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	1.2E-05	1.7E-06	2.0E-05	2.5E-05	---	---	1.7E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	3.0E-03	8.4E-07	1.4E-03	2.2E-04	---	---	4.9E-03

Exposure Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	3.8E-06	3.6E-09	2.2E-07	1.0E-05	---	---	1.4E-05
Arsenic	4.1E-07	1.1E-08	3.2E-11	2.9E-04	2.1E-07	1.8E-06	1.5E-04	---	---	4.4E-04
Barium	1.5E-05	1.3E-06	1.2E-09	1.2E-06	3.7E-08	5.9E-05	1.3E-05	---	---	8.9E-05
Beryllium	3.8E-08	3.3E-09	3.0E-12	2.0E-05	1.2E-08	2.8E-07	1.2E-05	---	---	3.3E-05
Cadmium	7.3E-09	6.3E-11	5.8E-13	9.0E-09	1.5E-11	2.9E-08	9.8E-09	---	---	5.5E-08
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	7.4E-05	2.5E-06	8.5E-05	1.6E-04	---	---	4.2E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	4.1E-06	1.6E-06	9.2E-06	1.8E-05	---	---	4.1E-05
Copper	7.0E-06	3.6E-07	5.5E-10	1.9E-04	3.8E-06	4.2E-05	8.7E-05	---	---	3.3E-04
Lead	2.2E-07	1.2E-09	1.8E-11	3.2E-06	2.2E-09	3.6E-07	6.0E-06	---	---	9.8E-06
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	7.7E-07	4.8E-04	0.0E+00	---	---	5.6E-04
Molybdenum	6.2E-08	5.3E-10	4.9E-12	1.8E-04	2.4E-06	1.5E-04	1.3E-04	---	---	4.7E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	3.1E-04	1.4E-05	2.3E-04	3.7E-04	---	---	1.1E-03
Selenium	2.1E-08	1.8E-10	1.6E-12	3.7E-04	2.7E-09	5.3E-08	2.4E-05	---	---	3.9E-04
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	2.9E-10	1.9E-08	0.0E+00	---	---	3.6E-08
Thallium	5.0E-09	4.3E-11	3.9E-13	0.0E+00	1.0E-09	5.2E-09	0.0E+00	---	---	1.1E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	3.2E-05	7.1E-08	4.2E-07	1.4E-04	---	---	1.8E-04
Vanadium	7.7E-06	6.6E-08	6.1E-10	9.2E-05	7.9E-07	8.3E-06	1.9E-04	---	---	3.0E-04
Zinc	4.9E-06	4.2E-07	3.9E-10	4.0E-03	1.1E-08	2.2E-05	2.9E-04	---	---	4.3E-03

Exposure Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	5.1E-06	1.0E-08	1.0E-06	1.4E-05	---	---	2.1E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	3.3E-04	5.0E-07	6.4E-06	1.7E-04	---	---	5.2E-04
Barium	2.6E-04	2.2E-05	2.0E-08	3.0E-05	7.8E-07	9.0E-04	3.1E-04	---	---	1.5E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	2.2E-05	2.4E-08	1.1E-06	1.3E-05	---	---	3.7E-05
Cadmium	2.5E-06	2.2E-08	2.0E-10	6.8E-07	7.1E-09	8.7E-06	7.4E-07	---	---	1.3E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	9.5E-05	5.6E-06	1.1E-04	2.1E-04	---	---	6.6E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	6.5E-06	4.3E-06	1.8E-05	2.9E-05	---	---	9.5E-05
Copper	1.1E-04	5.9E-06	9.0E-09	2.9E-04	3.0E-05	4.5E-04	1.3E-04	---	---	1.0E-03
Lead	7.3E-05	3.8E-07	5.8E-09	8.8E-06	8.1E-08	7.4E-06	1.6E-05	---	---	1.1E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	3.6E-04	3.2E-05	2.6E-02	2.4E-03	---	---	3.1E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	1.8E-04	9.0E-06	4.8E-04	1.3E-04	---	---	8.0E-04
Nickel	2.1E-04	1.7E-05	1.7E-08	3.3E-04	1.8E-05	2.9E-04	4.0E-04	---	---	1.3E-03
Selenium	2.8E-06	2.4E-08	2.2E-10	4.4E-04	8.3E-08	4.1E-06	2.9E-05	---	---	4.8E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.2E-08	1.6E-06	3.6E-07	---	---	5.5E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	2.4E-06	6.6E-07	6.0E-07	3.6E-07	---	---	4.5E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	3.2E-05	8.1E-08	8.4E-07	1.4E-04	---	---	1.8E-04
Vanadium	1.2E-04	1.0E-06	9.4E-09	1.0E-04	2.5E-06	2.8E-05	2.2E-04	---	---	4.7E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	6.9E-03	8.5E-07	1.4E-03	5.1E-04	---	---	9.2E-03

Exposure Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	1.2E-06	6.7E-09	8.2E-07	3.6E-06	---	---	6.9E-06
Arsenic	1.3E-05	3.4E-07	1.0E-09	2.0E-05	2.9E-07	4.6E-06	3.3E-05	---	---	7.1E-05
Barium	2.4E-04	2.1E-05	1.9E-08	1.3E-05	7.3E-07	8.4E-04	2.7E-04	---	---	1.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	1.2E-06	1.1E-08	8.2E-07	7.3E-07	---	---	4.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.8E-06	6.9E-09	8.7E-06	1.4E-06	---	---	1.4E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	1.4E-05	3.0E-06	3.0E-05	4.7E-05	---	---	2.3E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	2.4E-06	2.7E-06	8.5E-06	1.1E-05	---	---	5.4E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.0E-04	2.5E-05	4.1E-04	6.2E-05	---	---	7.1E-04
Lead	7.3E-05	3.8E-07	5.7E-09	2.4E-06	7.3E-08	7.0E-06	1.7E-05	---	---	1.0E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	8.4E-05	3.1E-05	2.6E-02	2.5E-03	---	---	3.0E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.4E-06	6.7E-06	3.2E-04	1.8E-06	---	---	3.4E-04
Nickel	7.8E-05	6.0E-06	6.1E-09	2.4E-05	4.1E-06	6.3E-05	3.6E-05	---	---	2.1E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	1.7E-04	8.3E-08	4.1E-06	4.4E-06	---	---	1.8E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.0E-08	1.4E-06	3.6E-07	---	---	5.5E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	1.3E-06	6.5E-07	5.9E-07	3.6E-07	---	---	3.4E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	2.4E-07	9.5E-09	4.2E-07	1.5E-06	---	---	7.9E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	1.2E-05	1.7E-06	2.0E-05	4.0E-05	---	---	1.9E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	5.4E-03	8.2E-07	1.4E-03	2.5E-04	---	---	7.4E-03

Exposure Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	7.8E-07	1.1E-09	9.4E-08	2.3E-06	---	---	3.3E-06
Arsenic	4.1E-07	1.1E-08	3.2E-11	2.1E-05	5.3E-08	7.7E-07	3.4E-05	---	---	5.6E-05
Barium	1.5E-05	1.3E-06	1.2E-09	6.7E-06	5.0E-08	6.3E-05	1.4E-04	---	---	2.3E-04
Beryllium	3.8E-08	3.3E-09	3.0E-12	0.0E+00	2.2E-10	4.6E-08	0.0E+00	---	---	8.8E-08
Cadmium	7.3E-09	6.3E-11	5.8E-13	0.0E+00	1.4E-11	2.8E-08	0.0E+00	---	---	3.6E-08
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	1.1E-05	2.4E-06	8.4E-05	3.9E-05	---	---	2.3E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	1.0E-06	9.4E-07	8.2E-06	4.5E-06	---	---	2.3E-05
Copper	7.0E-06	3.6E-07	5.5E-10	3.0E-05	1.9E-06	3.4E-05	1.9E-05	---	---	9.1E-05
Lead	2.2E-07	1.2E-09	1.8E-11	2.8E-07	9.4E-10	2.5E-07	2.0E-06	---	---	2.7E-06
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	7.7E-07	4.8E-04	0.0E+00	---	---	5.6E-04
Molybdenum	6.2E-08	5.3E-10	4.9E-12	5.2E-05	9.2E-07	5.9E-05	3.9E-05	---	---	1.5E-04
Nickel	1.4E-04	1.1E-05	1.1E-08	5.8E-05	7.6E-06	2.1E-04	8.7E-05	---	---	5.1E-04
Selenium	2.1E-08	1.8E-10	1.6E-12	2.2E-04	9.3E-10	4.4E-08	5.9E-06	---	---	2.3E-04
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	2.9E-10	1.9E-08	0.0E+00	---	---	3.6E-08
Thallium	5.0E-09	4.3E-11	3.9E-13	0.0E+00	1.0E-09	5.2E-09	0.0E+00	---	---	1.1E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	5.8E-06	1.6E-08	1.1E-07	3.5E-05	---	---	4.1E-05
Vanadium	7.7E-06	6.6E-08	6.1E-10	1.4E-05	2.2E-07	7.4E-06	4.5E-05	---	---	7.4E-05
Zinc	4.9E-06	4.2E-07	3.9E-10	1.4E-03	7.4E-09	1.8E-05	6.5E-05	---	---	1.5E-03

Exposure Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	2.0E-06	7.8E-09	9.1E-07	6.0E-06	---	---	1.0E-05
Arsenic	1.3E-05	3.5E-07	1.1E-09	4.2E-05	3.4E-07	5.3E-06	6.7E-05	---	---	1.3E-04
Barium	2.6E-04	2.2E-05	2.0E-08	1.9E-05	7.8E-07	9.0E-04	4.2E-04	---	---	1.6E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	1.2E-06	1.2E-08	8.6E-07	7.3E-07	---	---	4.7E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.8E-06	6.9E-09	8.7E-06	1.4E-06	---	---	1.4E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	2.5E-05	5.4E-06	1.1E-04	8.6E-05	---	---	4.6E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	3.4E-06	3.7E-06	1.7E-05	1.5E-05	---	---	7.7E-05
Copper	1.1E-04	5.9E-06	9.0E-09	1.3E-04	2.7E-05	4.4E-04	8.0E-05	---	---	8.0E-04
Lead	7.3E-05	3.8E-07	5.8E-09	2.7E-06	7.4E-08	7.3E-06	1.9E-05	---	---	1.0E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	8.4E-05	3.2E-05	2.6E-02	2.5E-03	---	---	3.1E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	5.4E-05	7.6E-06	3.8E-04	4.0E-05	---	---	4.9E-04
Nickel	2.1E-04	1.7E-05	1.7E-08	8.2E-05	1.2E-05	2.8E-04	1.2E-04	---	---	7.3E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	3.9E-04	8.4E-08	4.1E-06	1.0E-05	---	---	4.0E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.1E-08	1.5E-06	3.6E-07	---	---	5.5E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	1.3E-06	6.5E-07	6.0E-07	3.6E-07	---	---	3.4E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	6.1E-06	2.5E-08	5.4E-07	3.6E-05	---	---	4.9E-05
Vanadium	1.2E-04	1.0E-06	9.4E-09	2.6E-05	1.9E-06	2.7E-05	8.5E-05	---	---	2.6E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	6.8E-03	8.3E-07	1.4E-03	3.2E-04	---	---	8.8E-03

Exposure Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.6E-08	8.8E-11	1.2E-06	6.7E-09	8.2E-07	3.6E-06	---	---	6.9E-06
Arsenic	1.3E-05	3.4E-07	1.0E-09	2.0E-05	2.9E-07	4.6E-06	3.3E-05	---	---	7.1E-05
Barium	2.4E-04	2.1E-05	1.9E-08	1.3E-05	7.3E-07	8.4E-04	2.7E-04	---	---	1.4E-03
Beryllium	1.7E-06	1.5E-07	1.3E-10	1.2E-06	1.1E-08	8.2E-07	7.3E-07	---	---	4.6E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.8E-06	6.9E-09	8.7E-06	1.4E-06	---	---	1.4E-05
Chromium (Total)	1.3E-04	1.1E-05	9.9E-09	1.4E-05	3.0E-06	3.0E-05	4.7E-05	---	---	2.3E-04
Cobalt	2.9E-05	2.5E-07	2.3E-09	2.4E-06	2.7E-06	8.5E-06	1.1E-05	---	---	5.4E-05
Copper	1.1E-04	5.5E-06	8.4E-09	1.0E-04	2.5E-05	4.1E-04	6.2E-05	---	---	7.1E-04
Lead	7.3E-05	3.8E-07	5.7E-09	2.4E-06	7.3E-08	7.0E-06	1.7E-05	---	---	1.0E-04
Manganese	1.8E-03	1.6E-05	1.5E-07	8.4E-05	3.1E-05	2.6E-02	2.5E-03	---	---	3.0E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	2.4E-06	6.7E-06	3.2E-04	1.8E-06	---	---	3.4E-04
Nickel	7.8E-05	6.0E-06	6.1E-09	2.4E-05	4.1E-06	6.3E-05	3.6E-05	---	---	2.1E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	1.7E-04	8.3E-08	4.1E-06	4.4E-06	---	---	1.8E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.0E-08	1.4E-06	3.6E-07	---	---	5.5E-05
Thallium	5.3E-07	4.6E-09	4.2E-11	1.3E-06	6.5E-07	5.9E-07	3.6E-07	---	---	3.4E-06
Uranium	5.3E-06	4.6E-07	4.2E-10	2.4E-07	9.5E-09	4.2E-07	1.5E-06	---	---	7.9E-06
Vanadium	1.1E-04	9.6E-07	8.8E-09	1.2E-05	1.7E-06	2.0E-05	4.0E-05	---	---	1.9E-04
Zinc	3.2E-04	2.8E-05	2.6E-08	5.4E-03	8.2E-07	1.4E-03	2.5E-04	---	---	7.4E-03

Exposure Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.9E-08	2.5E-09	2.3E-12	3.7E-07	6.3E-10	6.6E-08	1.1E-06	---	---	1.6E-06
Arsenic	4.1E-07	1.1E-08	3.2E-11	2.7E-06	1.0E-08	4.6E-07	4.4E-06	---	---	8.0E-06
Barium	1.5E-05	1.3E-06	1.2E-09	8.8E-07	3.8E-08	6.0E-05	1.9E-05	---	---	9.6E-05
Beryllium	3.8E-08	3.3E-09	3.0E-12	0.0E+00	2.2E-10	4.6E-08	0.0E+00	---	---	8.8E-08
Cadmium	7.3E-09	6.3E-11	5.8E-13	0.0E+00	1.4E-11	2.8E-08	0.0E+00	---	---	3.6E-08
Chromium (Total)	8.9E-05	7.7E-06	7.0E-09	1.4E-06	2.4E-06	8.4E-05	4.7E-06	---	---	1.9E-04
Cobalt	8.0E-06	6.9E-08	6.3E-10	1.5E-07	8.3E-07	8.0E-06	6.9E-07	---	---	1.8E-05
Copper	7.0E-06	3.6E-07	5.5E-10	3.5E-06	1.3E-06	3.1E-05	2.2E-06	---	---	4.5E-05
Lead	2.2E-07	1.2E-09	1.8E-11	7.2E-10	3.0E-10	1.9E-07	5.1E-09	---	---	4.2E-07
Manganese	7.0E-05	6.0E-07	5.5E-09	0.0E+00	7.7E-07	4.8E-04	0.0E+00	---	---	5.6E-04
Molybdenum	6.2E-08	5.3E-10	4.9E-12	1.2E-05	3.0E-07	1.7E-05	8.8E-06	---	---	3.8E-05
Nickel	1.4E-04	1.1E-05	1.1E-08	9.7E-06	6.1E-06	2.1E-04	1.5E-05	---	---	3.9E-04
Selenium	2.1E-08	1.8E-10	1.6E-12	5.1E-05	5.3E-10	4.2E-08	1.3E-06	---	---	5.2E-05
Silver	1.7E-08	1.5E-10	1.3E-12	0.0E+00	2.9E-10	1.9E-08	0.0E+00	---	---	3.6E-08
Thallium	5.0E-09	4.3E-11	3.9E-13	2.4E-08	5.5E-09	8.6E-09	7.0E-09	---	---	5.0E-08
Uranium	2.6E-08	2.2E-09	2.0E-12	7.2E-07	2.0E-09	3.4E-08	4.3E-06	---	---	5.1E-06
Vanadium	7.7E-06	6.6E-08	6.1E-10	1.7E-06	1.1E-07	7.2E-06	5.5E-06	---	---	2.2E-05
Zinc	4.9E-06	4.2E-07	3.9E-10	1.5E-04	6.5E-09	1.7E-05	7.3E-06	---	---	1.8E-04

Exposure Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.1E-06	9.8E-08	9.0E-11	1.6E-06	7.3E-09	8.8E-07	4.7E-06	---	---	8.4E-06
Arsenic	1.3E-05	3.5E-07	1.1E-09	2.3E-05	3.0E-07	5.0E-06	3.7E-05	---	---	7.9E-05
Barium	2.6E-04	2.2E-05	2.0E-08	1.4E-05	7.7E-07	9.0E-04	2.9E-04	---	---	1.5E-03
Beryllium	1.7E-06	1.5E-07	1.4E-10	1.2E-06	1.2E-08	8.6E-07	7.3E-07	---	---	4.7E-06
Cadmium	2.5E-06	2.2E-08	2.0E-10	1.8E-06	6.9E-09	8.7E-06	1.4E-06	---	---	1.4E-05
Chromium (Total)	2.2E-04	1.9E-05	1.7E-08	1.5E-05	5.4E-06	1.1E-04	5.2E-05	---	---	4.2E-04
Cobalt	3.7E-05	3.2E-07	2.9E-09	2.6E-06	3.6E-06	1.6E-05	1.2E-05	---	---	7.2E-05
Copper	1.1E-04	5.9E-06	9.0E-09	1.0E-04	2.6E-05	4.4E-04	6.4E-05	---	---	7.5E-04
Lead	7.3E-05	3.8E-07	5.8E-09	2.4E-06	7.4E-08	7.2E-06	1.7E-05	---	---	1.0E-04
Manganese	1.9E-03	1.6E-05	1.5E-07	8.4E-05	3.2E-05	2.6E-02	2.5E-03	---	---	3.1E-02
Molybdenum	2.9E-06	2.5E-08	2.3E-10	1.4E-05	7.0E-06	3.4E-04	1.1E-05	---	---	3.7E-04
Nickel	2.1E-04	1.7E-05	1.7E-08	3.4E-05	1.0E-05	2.7E-04	5.1E-05	---	---	6.0E-04
Selenium	2.8E-06	2.4E-08	2.2E-10	2.2E-04	8.3E-08	4.1E-06	5.7E-06	---	---	2.3E-04
Silver	2.4E-06	2.1E-08	1.9E-10	5.0E-05	3.1E-08	1.5E-06	3.6E-07	---	---	5.5E-05
Thallium	5.4E-07	4.6E-09	4.2E-11	1.3E-06	6.6E-07	6.0E-07	3.7E-07	---	---	3.5E-06
Uranium	5.4E-06	4.6E-07	4.2E-10	9.6E-07	1.2E-08	4.6E-07	5.8E-06	---	---	1.3E-05
Vanadium	1.2E-04	1.0E-06	9.4E-09	1.4E-05	1.8E-06	2.7E-05	4.5E-05	---	---	2.1E-04
Zinc	3.3E-04	2.8E-05	2.6E-08	5.6E-03	8.3E-07	1.4E-03	2.6E-04	---	---	7.5E-03

Exposure Estimates for an Indigenous Receptor Child at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	1.89E-06	1.80E-08	2.11E-06	2.43E-06	---	---	6.66E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	6.19E-05	7.57E-07	1.13E-05	1.70E-05	---	---	9.29E-05
Barium	3.04E-05	1.59E-05	1.67E-08	4.04E-05	1.96E-06	2.19E-03	1.78E-04	---	---	2.46E-03
Beryllium	2.13E-07	1.11E-07	1.17E-10	1.72E-06	3.00E-08	2.11E-06	4.86E-07	---	---	4.67E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	9.45E-07	1.72E-08	2.26E-05	1.02E-06	---	---	2.49E-05
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	3.09E-05	7.68E-06	7.53E-05	3.16E-05	---	---	1.70E-04
Cobalt	3.65E-06	1.91E-07	2.01E-09	3.44E-06	7.20E-06	2.15E-05	4.86E-06	---	---	4.09E-05
Copper	1.34E-05	4.19E-06	7.37E-09	1.37E-04	6.52E-05	1.07E-03	5.59E-05	---	---	1.35E-03
Lead	9.12E-06	2.86E-07	5.02E-09	7.82E-06	1.99E-07	1.72E-05	9.97E-06	---	---	4.46E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	5.15E-04	8.25E-05	6.21E-02	9.60E-04	---	---	6.39E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	3.44E-06	1.79E-05	8.16E-04	1.22E-06	---	---	8.39E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	3.44E-05	1.09E-05	1.65E-04	2.19E-05	---	---	2.47E-04
Selenium	3.47E-07	1.81E-08	1.91E-10	1.03E-04	2.03E-07	1.05E-05	4.62E-06	---	---	1.19E-04
Silver	3.04E-07	1.59E-08	1.67E-10	7.15E-05	8.33E-08	3.80E-06	2.43E-07	---	---	7.59E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	3.35E-06	1.75E-06	1.36E-06	2.43E-07	---	---	6.78E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	3.44E-07	2.56E-08	1.10E-06	9.73E-07	---	---	3.46E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	1.72E-05	4.41E-06	5.13E-05	1.95E-05	---	---	1.07E-04
Zinc	4.07E-05	2.13E-05	2.24E-08	4.21E-03	2.05E-06	3.36E-03	1.95E-04	---	---	7.83E-03

Exposure Estimates for an Indigenous Receptor Child at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	1.50E-06	3.07E-09	2.17E-07	1.93E-06	---	---	3.65E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	7.73E-07	1.22E-08	1.09E-06	2.13E-07	---	---	2.14E-06
Barium	1.88E-06	9.84E-07	1.04E-09	1.62E-07	9.71E-08	1.56E-04	7.14E-07	---	---	1.60E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	0.00E+00	5.90E-10	1.20E-07	0.00E+00	---	---	1.28E-07
Cadmium	9.16E-10	4.79E-11	5.05E-13	0.00E+00	3.84E-11	7.50E-08	0.00E+00	---	---	7.60E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	0.00E+00	6.28E-06	2.18E-04	0.00E+00	---	---	2.41E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	2.55E-07	2.20E-06	2.09E-05	3.61E-07	---	---	2.48E-05
Copper	8.76E-07	2.75E-07	4.83E-10	0.00E+00	3.30E-06	8.02E-05	0.00E+00	---	---	8.46E-05
Lead	2.82E-08	8.83E-10	1.55E-11	0.00E+00	8.00E-10	4.95E-07	0.00E+00	---	---	5.25E-07
Manganese	8.72E-06	4.56E-07	4.80E-09	8.12E-06	2.15E-06	1.38E-03	1.51E-05	---	---	1.41E-03
Molybdenum	7.72E-09	4.04E-10	4.26E-12	4.04E-05	1.29E-06	6.67E-05	1.43E-05	---	---	1.23E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	1.29E-05	1.62E-05	5.47E-04	8.21E-06	---	---	6.10E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	3.09E-05	1.62E-09	1.12E-07	1.38E-06	---	---	3.24E-05
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	7.55E-10	4.94E-08	0.00E+00	---	---	5.24E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	3.29E-07	7.02E-08	5.52E-08	2.39E-08	---	---	4.79E-07
Uranium	3.25E-09	1.70E-09	1.79E-12	0.00E+00	6.21E-11	5.83E-08	0.00E+00	---	---	6.33E-08
Vanadium	9.67E-07	5.05E-08	5.33E-10	0.00E+00	2.45E-07	1.88E-05	0.00E+00	---	---	2.00E-05
Zinc	6.19E-07	3.23E-07	3.41E-10	0.00E+00	1.71E-08	4.49E-05	0.00E+00	---	---	4.59E-05

Exposure Estimates for an Indigenous Receptor Child at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	3.39E-06	2.10E-08	2.33E-06	4.36E-06	---	---	1.03E-05
Arsenic	1.69E-06	2.65E-07	9.33E-10	6.26E-05	7.69E-07	1.24E-05	1.72E-05	---	---	9.50E-05
Barium	3.23E-05	1.69E-05	1.78E-08	4.05E-05	2.06E-06	2.35E-03	1.78E-04	---	---	2.62E-03
Beryllium	2.18E-07	1.14E-07	1.20E-10	1.72E-06	3.06E-08	2.23E-06	4.86E-07	---	---	4.80E-06
Cadmium	3.17E-07	1.66E-08	1.75E-10	9.45E-07	1.72E-08	2.27E-05	1.02E-06	---	---	2.50E-05
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	3.09E-05	1.40E-05	2.93E-04	3.16E-05	---	---	4.11E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	3.69E-06	9.41E-06	4.24E-05	5.22E-06	---	---	6.56E-05
Copper	1.43E-05	4.47E-06	7.85E-09	1.37E-04	6.85E-05	1.15E-03	5.59E-05	---	---	1.43E-03
Lead	9.15E-06	2.87E-07	5.04E-09	7.82E-06	2.00E-07	1.77E-05	9.97E-06	---	---	4.51E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	5.24E-04	8.47E-05	6.35E-02	9.76E-04	---	---	6.53E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	4.38E-05	1.92E-05	8.82E-04	1.55E-05	---	---	9.61E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	4.73E-05	2.71E-05	7.13E-04	3.01E-05	---	---	8.57E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	1.34E-04	2.05E-07	1.07E-05	6.00E-06	---	---	1.51E-04
Silver	3.06E-07	1.60E-08	1.69E-10	7.15E-05	8.40E-08	3.85E-06	2.43E-07	---	---	7.60E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	3.68E-06	1.82E-06	1.41E-06	2.67E-07	---	---	7.26E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	3.44E-07	2.57E-08	1.16E-06	9.73E-07	---	---	3.53E-06
Vanadium	1.49E-05	7.81E-07	8.24E-09	1.72E-05	4.65E-06	7.01E-05	1.95E-05	---	---	1.27E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	4.21E-03	2.07E-06	3.40E-03	1.95E-04	---	---	7.87E-03

Exposure Estimates for an Indigenous Receptor Child at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	1.89E-06	1.80E-08	2.11E-06	2.43E-06	---	---	6.66E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	6.19E-05	7.56E-07	1.13E-05	1.46E-05	---	---	9.05E-05
Barium	3.04E-05	1.59E-05	1.67E-08	4.04E-05	1.96E-06	2.19E-03	2.02E-04	---	---	2.48E-03
Beryllium	2.13E-07	1.11E-07	1.17E-10	1.72E-06	3.00E-08	2.11E-06	4.86E-07	---	---	4.67E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	9.45E-07	1.71E-08	2.26E-05	4.86E-07	---	---	2.44E-05
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	3.09E-05	7.68E-06	7.53E-05	3.16E-05	---	---	1.70E-04
Cobalt	3.65E-06	1.91E-07	2.01E-09	3.44E-06	7.21E-06	2.15E-05	7.29E-06	---	---	4.33E-05
Copper	1.34E-05	4.19E-06	7.37E-09	1.37E-04	6.52E-05	1.07E-03	2.92E-05	---	---	1.32E-03
Lead	9.12E-06	2.86E-07	5.02E-09	7.82E-06	1.99E-07	1.72E-05	6.81E-06	---	---	4.14E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	5.15E-04	8.26E-05	6.21E-02	1.62E-03	---	---	6.46E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	3.44E-06	1.79E-05	8.16E-04	1.22E-06	---	---	8.39E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	3.44E-05	1.09E-05	1.65E-04	1.95E-05	---	---	2.44E-04
Selenium	3.47E-07	1.81E-08	1.91E-10	1.03E-04	2.03E-07	1.05E-05	3.16E-06	---	---	1.17E-04
Silver	3.04E-07	1.59E-08	1.67E-10	7.15E-05	8.33E-08	3.80E-06	2.43E-07	---	---	7.59E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	3.35E-06	1.75E-06	1.36E-06	2.43E-07	---	---	6.78E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	3.44E-07	2.56E-08	1.10E-06	7.29E-07	---	---	3.22E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	1.72E-05	4.41E-06	5.13E-05	1.70E-05	---	---	1.05E-04
Zinc	4.07E-05	2.13E-05	2.24E-08	4.21E-03	2.05E-06	3.36E-03	1.46E-04	---	---	7.78E-03

Exposure Estimates for an Indigenous Receptor Child at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	4.66E-06	8.46E-09	4.50E-07	6.00E-06	---	---	1.11E-05
Arsenic	5.13E-08	8.04E-09	2.83E-11	4.03E-04	5.20E-07	4.11E-06	9.51E-05	---	---	5.03E-04
Barium	1.88E-06	9.84E-07	1.04E-09	2.41E-05	1.35E-07	1.65E-04	1.21E-04	---	---	3.13E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	1.92E-05	2.12E-08	4.67E-07	5.42E-06	---	---	2.51E-05
Cadmium	9.16E-10	4.79E-11	5.05E-13	5.62E-08	4.62E-11	7.79E-08	2.89E-08	---	---	1.64E-07
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	1.02E-04	6.63E-06	2.20E-04	1.04E-04	---	---	4.50E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	5.64E-06	4.10E-06	2.34E-05	1.20E-05	---	---	4.61E-05
Copper	8.76E-07	2.75E-07	4.83E-10	2.68E-04	9.64E-06	1.05E-04	5.69E-05	---	---	4.41E-04
Lead	2.82E-08	8.83E-10	1.55E-11	5.23E-06	6.26E-09	9.05E-07	4.55E-06	---	---	1.07E-05
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	2.05E-06	1.28E-03	0.00E+00	---	---	1.29E-03
Molybdenum	7.72E-09	4.04E-10	4.26E-12	2.24E-04	5.72E-06	3.08E-04	7.94E-05	---	---	6.18E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	3.95E-04	3.51E-05	5.91E-04	2.24E-04	---	---	1.27E-03
Selenium	2.57E-09	1.34E-10	1.42E-12	4.94E-04	6.72E-09	1.33E-07	1.51E-05	---	---	5.09E-04
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	7.55E-10	4.94E-08	0.00E+00	---	---	5.24E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	0.00E+00	2.75E-09	1.36E-08	0.00E+00	---	---	1.70E-08
Uranium	3.25E-09	1.70E-09	1.79E-12	4.41E-05	1.87E-07	9.12E-07	9.36E-05	---	---	1.39E-04
Vanadium	9.67E-07	5.05E-08	5.33E-10	1.27E-04	2.08E-06	2.11E-05	1.26E-04	---	---	2.78E-04
Zinc	6.19E-07	3.23E-07	3.41E-10	5.61E-03	2.79E-08	5.68E-05	1.95E-04	---	---	5.87E-03

Exposure Estimates for an Indigenous Receptor Child at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	6.55E-06	2.64E-08	2.56E-06	8.43E-06	---	---	1.78E-05
Arsenic	1.69E-06	2.65E-07	9.33E-10	4.65E-04	1.28E-06	1.55E-05	1.10E-04	---	---	5.93E-04
Barium	3.23E-05	1.69E-05	1.78E-08	6.45E-05	2.10E-06	2.36E-03	3.23E-04	---	---	2.79E-03
Beryllium	2.18E-07	1.14E-07	1.20E-10	2.09E-05	5.12E-08	2.58E-06	5.91E-06	---	---	2.97E-05
Cadmium	3.17E-07	1.66E-08	1.75E-10	1.00E-06	1.72E-08	2.27E-05	5.15E-07	---	---	2.46E-05
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	1.33E-04	1.43E-05	2.95E-04	1.36E-04	---	---	6.20E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	9.07E-06	1.13E-05	4.49E-05	1.93E-05	---	---	8.94E-05
Copper	1.43E-05	4.47E-06	7.85E-09	4.06E-04	7.48E-05	1.18E-03	8.61E-05	---	---	1.76E-03
Lead	9.15E-06	2.87E-07	5.04E-09	1.30E-05	2.05E-07	1.81E-05	1.14E-05	---	---	5.22E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	5.15E-04	8.46E-05	6.34E-02	1.62E-03	---	---	6.59E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	2.28E-04	2.36E-05	1.12E-03	8.06E-05	---	---	1.46E-03
Nickel	2.69E-05	1.27E-05	1.48E-08	4.30E-04	4.60E-05	7.57E-04	2.43E-04	---	---	1.52E-03
Selenium	3.49E-07	1.82E-08	1.92E-10	5.97E-04	2.09E-07	1.07E-05	1.83E-05	---	---	6.27E-04
Silver	3.06E-07	1.60E-08	1.69E-10	7.15E-05	8.40E-08	3.85E-06	2.43E-07	---	---	7.60E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	3.35E-06	1.75E-06	1.37E-06	2.43E-07	---	---	6.79E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	4.44E-05	2.12E-07	2.02E-06	9.43E-05	---	---	1.42E-04
Vanadium	1.49E-05	7.81E-07	8.24E-09	1.45E-04	6.48E-06	7.24E-05	1.43E-04	---	---	3.82E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	9.82E-03	2.08E-06	3.42E-03	3.40E-04	---	---	1.36E-02

Exposure Estimates for an Indigenous Receptor Child at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	1.89E-06	1.80E-08	2.11E-06	2.43E-06	---	---	6.66E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	6.19E-05	7.56E-07	1.13E-05	1.46E-05	---	---	9.05E-05
Barium	3.04E-05	1.59E-05	1.67E-08	4.04E-05	1.96E-06	2.19E-03	2.02E-04	---	---	2.48E-03
Beryllium	2.13E-07	1.11E-07	1.17E-10	1.72E-06	3.00E-08	2.11E-06	4.86E-07	---	---	4.67E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	9.45E-07	1.71E-08	2.26E-05	4.86E-07	---	---	2.44E-05
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	3.09E-05	7.68E-06	7.53E-05	3.16E-05	---	---	1.70E-04
Cobalt	3.65E-06	1.91E-07	2.01E-09	3.44E-06	7.21E-06	2.15E-05	7.29E-06	---	---	4.33E-05
Copper	1.34E-05	4.19E-06	7.37E-09	1.37E-04	6.52E-05	1.07E-03	2.92E-05	---	---	1.32E-03
Lead	9.12E-06	2.86E-07	5.02E-09	7.82E-06	1.99E-07	1.72E-05	6.81E-06	---	---	4.14E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	5.15E-04	8.26E-05	6.21E-02	1.62E-03	---	---	6.46E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	3.44E-06	1.79E-05	8.16E-04	1.22E-06	---	---	8.39E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	3.44E-05	1.09E-05	1.65E-04	1.95E-05	---	---	2.44E-04
Selenium	3.47E-07	1.81E-08	1.91E-10	1.03E-04	2.03E-07	1.05E-05	3.16E-06	---	---	1.17E-04
Silver	3.04E-07	1.59E-08	1.67E-10	7.15E-05	8.33E-08	3.80E-06	2.43E-07	---	---	7.59E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	3.35E-06	1.75E-06	1.36E-06	2.43E-07	---	---	6.78E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	3.44E-07	2.56E-08	1.10E-06	7.29E-07	---	---	3.22E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	1.72E-05	4.41E-06	5.13E-05	1.70E-05	---	---	1.05E-04
Zinc	4.07E-05	2.13E-05	2.24E-08	4.21E-03	2.05E-06	3.36E-03	1.46E-04	---	---	7.78E-03

Exposure Estimates for an Indigenous Receptor Child at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	5.40E-06	9.71E-09	5.04E-07	6.94E-06	---	---	1.29E-05
Arsenic	5.13E-08	8.04E-09	2.83E-11	4.12E-04	5.31E-07	4.18E-06	9.73E-05	---	---	5.14E-04
Barium	1.88E-06	9.84E-07	1.04E-09	1.67E-06	9.95E-08	1.57E-04	8.37E-06	---	---	1.70E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	2.88E-05	3.15E-08	6.41E-07	8.14E-06	---	---	3.76E-05
Cadmium	9.16E-10	4.79E-11	5.05E-13	1.27E-08	4.01E-11	7.57E-08	6.55E-09	---	---	9.60E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	1.04E-04	6.63E-06	2.20E-04	1.07E-04	---	---	4.54E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	5.82E-06	4.16E-06	2.34E-05	1.24E-05	---	---	4.68E-05
Copper	8.76E-07	2.75E-07	4.83E-10	2.74E-04	9.77E-06	1.06E-04	5.81E-05	---	---	4.48E-04
Lead	2.82E-08	8.83E-10	1.55E-11	4.60E-06	5.61E-09	8.56E-07	4.01E-06	---	---	9.50E-06
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	2.05E-06	1.28E-03	0.00E+00	---	---	1.29E-03
Molybdenum	7.72E-09	4.04E-10	4.26E-12	2.51E-04	6.35E-06	3.42E-04	8.87E-05	---	---	6.88E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	4.38E-04	3.73E-05	5.96E-04	2.48E-04	---	---	1.35E-03
Selenium	2.57E-09	1.34E-10	1.42E-12	5.24E-04	7.06E-09	1.34E-07	1.61E-05	---	---	5.40E-04
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	7.55E-10	4.94E-08	0.00E+00	---	---	5.24E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	0.00E+00	2.75E-09	1.36E-08	0.00E+00	---	---	1.70E-08
Uranium	3.25E-09	1.70E-09	1.79E-12	4.51E-05	1.91E-07	9.32E-07	9.58E-05	---	---	1.42E-04
Vanadium	9.67E-07	5.05E-08	5.33E-10	1.30E-04	2.12E-06	2.11E-05	1.29E-04	---	---	2.83E-04
Zinc	6.19E-07	3.23E-07	3.41E-10	5.61E-03	2.79E-08	5.68E-05	1.95E-04	---	---	5.87E-03

Exposure Estimates for an Indigenous Receptor Child at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	7.29E-06	2.77E-08	2.61E-06	9.37E-06	---	---	1.95E-05
Arsenic	1.69E-06	2.65E-07	9.33E-10	4.74E-04	1.29E-06	1.55E-05	1.12E-04	---	---	6.05E-04
Barium	3.23E-05	1.69E-05	1.78E-08	4.21E-05	2.06E-06	2.35E-03	2.10E-04	---	---	2.65E-03
Beryllium	2.18E-07	1.14E-07	1.20E-10	3.05E-05	6.15E-08	2.75E-06	8.63E-06	---	---	4.23E-05
Cadmium	3.17E-07	1.66E-08	1.75E-10	9.58E-07	1.72E-08	2.27E-05	4.93E-07	---	---	2.45E-05
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	1.35E-04	1.43E-05	2.95E-04	1.38E-04	---	---	6.24E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	9.26E-06	1.14E-05	4.50E-05	1.96E-05	---	---	9.01E-05
Copper	1.43E-05	4.47E-06	7.85E-09	4.11E-04	7.50E-05	1.18E-03	8.73E-05	---	---	1.77E-03
Lead	9.15E-06	2.87E-07	5.04E-09	1.24E-05	2.05E-07	1.81E-05	1.08E-05	---	---	5.09E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	5.15E-04	8.46E-05	6.34E-02	1.62E-03	---	---	6.59E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	2.54E-04	2.42E-05	1.16E-03	8.99E-05	---	---	1.53E-03
Nickel	2.69E-05	1.27E-05	1.48E-08	4.73E-04	4.82E-05	7.62E-04	2.67E-04	---	---	1.59E-03
Selenium	3.49E-07	1.82E-08	1.92E-10	6.27E-04	2.10E-07	1.07E-05	1.92E-05	---	---	6.58E-04
Silver	3.06E-07	1.60E-08	1.69E-10	7.15E-05	8.40E-08	3.85E-06	2.43E-07	---	---	7.60E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	3.35E-06	1.75E-06	1.37E-06	2.43E-07	---	---	6.79E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	4.55E-05	2.17E-07	2.04E-06	9.65E-05	---	---	1.45E-04
Vanadium	1.49E-05	7.81E-07	8.24E-09	1.47E-04	6.52E-06	7.24E-05	1.46E-04	---	---	3.88E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	9.82E-03	2.08E-06	3.42E-03	3.40E-04	---	---	1.36E-02

Exposure Estimates for an Indigenous Receptor Child at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	1.72E-06	1.77E-08	2.11E-06	2.43E-06	---	---	6.49E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	2.90E-05	7.34E-07	1.13E-05	2.19E-05	---	---	6.48E-05
Barium	3.04E-05	1.59E-05	1.67E-08	1.80E-05	1.95E-06	2.19E-03	1.82E-04	---	---	2.44E-03
Beryllium	2.13E-07	1.11E-07	1.17E-10	1.72E-06	2.99E-08	2.11E-06	4.86E-07	---	---	4.67E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	2.49E-06	1.69E-08	2.26E-05	9.48E-07	---	---	2.64E-05
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	1.98E-05	7.66E-06	7.53E-05	3.16E-05	---	---	1.58E-04
Cobalt	3.65E-06	1.91E-07	2.01E-09	3.44E-06	7.24E-06	2.15E-05	7.29E-06	---	---	4.33E-05
Copper	1.34E-05	4.19E-06	7.37E-09	1.42E-04	6.35E-05	1.07E-03	4.13E-05	---	---	1.34E-03
Lead	9.12E-06	2.86E-07	5.02E-09	3.44E-06	1.88E-07	1.72E-05	1.14E-05	---	---	4.17E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	1.19E-04	8.32E-05	6.21E-02	1.66E-03	---	---	6.42E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	3.44E-06	1.79E-05	8.16E-04	1.22E-06	---	---	8.39E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	3.44E-05	1.08E-05	1.65E-04	2.43E-05	---	---	2.49E-04
Selenium	3.47E-07	1.81E-08	1.91E-10	2.35E-04	2.06E-07	1.05E-05	2.92E-06	---	---	2.49E-04
Silver	3.04E-07	1.59E-08	1.67E-10	7.15E-05	7.92E-08	3.54E-06	2.43E-07	---	---	7.56E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	1.80E-06	1.75E-06	1.36E-06	2.43E-07	---	---	5.21E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	3.44E-07	2.55E-08	1.10E-06	9.73E-07	---	---	3.46E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	1.72E-05	4.40E-06	5.13E-05	2.65E-05	---	---	1.14E-04
Zinc	4.07E-05	2.13E-05	2.24E-08	7.65E-03	2.02E-06	3.36E-03	1.70E-04	---	---	1.12E-02

Exposure Estimates for an Indigenous Receptor Child at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	1.11E-06	3.04E-09	2.23E-07	1.57E-06	---	---	2.91E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	2.99E-05	1.37E-07	1.85E-06	2.26E-05	---	---	5.46E-05
Barium	1.88E-06	9.84E-07	1.04E-09	9.49E-06	1.34E-07	1.65E-04	9.59E-05	---	---	2.74E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	0.00E+00	5.90E-10	1.20E-07	0.00E+00	---	---	1.28E-07
Cadmium	9.16E-10	4.79E-11	5.05E-13	0.00E+00	3.84E-11	7.50E-08	0.00E+00	---	---	7.60E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	1.63E-05	6.35E-06	2.18E-04	2.60E-05	---	---	2.84E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	1.42E-06	2.51E-06	2.13E-05	3.02E-06	---	---	2.93E-05
Copper	8.76E-07	2.75E-07	4.83E-10	4.25E-05	5.03E-06	8.72E-05	1.24E-05	---	---	1.48E-04
Lead	2.82E-08	8.83E-10	1.55E-11	3.97E-07	2.41E-09	6.31E-07	1.32E-06	---	---	2.38E-06
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	2.05E-06	1.28E-03	0.00E+00	---	---	1.29E-03
Molybdenum	7.72E-09	4.04E-10	4.26E-12	7.31E-05	2.46E-06	1.32E-04	2.59E-05	---	---	2.33E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	8.25E-05	2.01E-05	5.57E-04	5.84E-05	---	---	7.43E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	3.15E-04	2.45E-09	1.14E-07	3.91E-06	---	---	3.19E-04
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	7.55E-10	4.94E-08	0.00E+00	---	---	5.24E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	0.00E+00	2.75E-09	1.36E-08	0.00E+00	---	---	1.70E-08
Uranium	3.25E-09	1.70E-09	1.79E-12	8.25E-06	4.27E-08	2.55E-07	2.33E-05	---	---	3.19E-05
Vanadium	9.67E-07	5.05E-08	5.33E-10	1.95E-05	6.00E-07	1.92E-05	3.02E-05	---	---	7.05E-05
Zinc	6.19E-07	3.23E-07	3.41E-10	1.96E-03	1.96E-08	4.78E-05	4.35E-05	---	---	2.05E-03

Exposure Estimates for an Indigenous Receptor Child at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	2.83E-06	2.08E-08	2.33E-06	4.00E-06	---	---	9.40E-06
Arsenic	1.69E-06	2.65E-07	9.33E-10	5.89E-05	8.71E-07	1.32E-05	4.45E-05	---	---	1.19E-04
Barium	3.23E-05	1.69E-05	1.78E-08	2.75E-05	2.08E-06	2.36E-03	2.78E-04	---	---	2.71E-03
Beryllium	2.18E-07	1.14E-07	1.20E-10	1.72E-06	3.05E-08	2.23E-06	4.86E-07	---	---	4.80E-06
Cadmium	3.17E-07	1.66E-08	1.75E-10	2.49E-06	1.69E-08	2.27E-05	9.48E-07	---	---	2.65E-05
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	3.60E-05	1.40E-05	2.94E-04	5.76E-05	---	---	4.43E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	4.86E-06	9.75E-06	4.28E-05	1.03E-05	---	---	7.26E-05
Copper	1.43E-05	4.47E-06	7.85E-09	1.84E-04	6.85E-05	1.16E-03	5.37E-05	---	---	1.49E-03
Lead	9.15E-06	2.87E-07	5.04E-09	3.83E-06	1.91E-07	1.78E-05	1.28E-05	---	---	4.41E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	1.19E-04	8.52E-05	6.34E-02	1.66E-03	---	---	6.55E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	7.65E-05	2.03E-05	9.48E-04	2.71E-05	---	---	1.07E-03
Nickel	2.69E-05	1.27E-05	1.48E-08	1.17E-04	3.09E-05	7.22E-04	8.27E-05	---	---	9.92E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	5.49E-04	2.09E-07	1.07E-05	6.83E-06	---	---	5.67E-04
Silver	3.06E-07	1.60E-08	1.69E-10	7.15E-05	8.00E-08	3.59E-06	2.43E-07	---	---	7.57E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	1.80E-06	1.75E-06	1.37E-06	2.43E-07	---	---	5.23E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	8.59E-06	6.82E-08	1.36E-06	2.43E-05	---	---	3.54E-05
Vanadium	1.49E-05	7.81E-07	8.24E-09	3.67E-05	5.00E-06	7.05E-05	5.67E-05	---	---	1.85E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	9.61E-03	2.04E-06	3.41E-03	2.14E-04	---	---	1.33E-02

Exposure Estimates for an Indigenous Receptor Child at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	1.72E-06	1.77E-08	2.11E-06	2.43E-06	---	---	6.49E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	2.90E-05	7.34E-07	1.13E-05	2.19E-05	---	---	6.48E-05
Barium	3.04E-05	1.59E-05	1.67E-08	1.80E-05	1.95E-06	2.19E-03	1.82E-04	---	---	2.44E-03
Beryllium	2.13E-07	1.11E-07	1.17E-10	1.72E-06	2.99E-08	2.11E-06	4.86E-07	---	---	4.67E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	2.49E-06	1.69E-08	2.26E-05	9.48E-07	---	---	2.64E-05
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	1.98E-05	7.66E-06	7.53E-05	3.16E-05	---	---	1.58E-04
Cobalt	3.65E-06	1.91E-07	2.01E-09	3.44E-06	7.24E-06	2.15E-05	7.29E-06	---	---	4.33E-05
Copper	1.34E-05	4.19E-06	7.37E-09	1.42E-04	6.35E-05	1.07E-03	4.13E-05	---	---	1.34E-03
Lead	9.12E-06	2.86E-07	5.02E-09	3.44E-06	1.88E-07	1.72E-05	1.14E-05	---	---	4.17E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	1.19E-04	8.32E-05	6.21E-02	1.66E-03	---	---	6.42E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	3.44E-06	1.79E-05	8.16E-04	1.22E-06	---	---	8.39E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	3.44E-05	1.08E-05	1.65E-04	2.43E-05	---	---	2.49E-04
Selenium	3.47E-07	1.81E-08	1.91E-10	2.35E-04	2.06E-07	1.05E-05	2.92E-06	---	---	2.49E-04
Silver	3.04E-07	1.59E-08	1.67E-10	7.15E-05	7.92E-08	3.54E-06	2.43E-07	---	---	7.56E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	1.80E-06	1.75E-06	1.36E-06	2.43E-07	---	---	5.21E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	3.44E-07	2.55E-08	1.10E-06	9.73E-07	---	---	3.46E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	1.72E-05	4.40E-06	5.13E-05	2.65E-05	---	---	1.14E-04
Zinc	4.07E-05	2.13E-05	2.24E-08	7.65E-03	2.02E-06	3.36E-03	1.70E-04	---	---	1.12E-02

Exposure Estimates for an Indigenous Receptor Child at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	5.18E-07	1.70E-09	1.61E-07	7.34E-07	---	---	1.42E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	3.86E-06	2.74E-08	1.18E-06	2.92E-06	---	---	8.04E-06
Barium	1.88E-06	9.84E-07	1.04E-09	1.25E-06	1.02E-07	1.57E-04	1.27E-05	---	---	1.74E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	0.00E+00	5.90E-10	1.20E-07	0.00E+00	---	---	1.28E-07
Cadmium	9.16E-10	4.79E-11	5.05E-13	0.00E+00	3.84E-11	7.50E-08	0.00E+00	---	---	7.60E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	1.98E-06	6.29E-06	2.18E-04	3.16E-06	---	---	2.47E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	2.18E-07	2.20E-06	2.09E-05	4.62E-07	---	---	2.48E-05
Copper	8.76E-07	2.75E-07	4.83E-10	5.00E-06	3.50E-06	8.10E-05	1.46E-06	---	---	9.21E-05
Lead	2.82E-08	8.83E-10	1.55E-11	1.02E-09	8.04E-10	4.95E-07	3.39E-09	---	---	5.30E-07
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	2.05E-06	1.28E-03	0.00E+00	---	---	1.29E-03
Molybdenum	7.72E-09	4.04E-10	4.26E-12	1.66E-05	8.03E-07	4.05E-05	5.86E-06	---	---	6.37E-05
Nickel	1.72E-05	8.09E-06	9.48E-09	1.37E-05	1.62E-05	5.47E-04	9.73E-06	---	---	6.12E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	7.23E-05	1.42E-09	1.10E-07	9.00E-07	---	---	7.33E-05
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	7.55E-10	4.94E-08	0.00E+00	---	---	5.24E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	3.45E-08	1.46E-08	2.09E-08	4.67E-09	---	---	7.53E-08
Uranium	3.25E-09	1.70E-09	1.79E-12	1.02E-06	5.35E-09	8.26E-08	2.89E-06	---	---	4.01E-06
Vanadium	9.67E-07	5.05E-08	5.33E-10	2.36E-06	2.88E-07	1.88E-05	3.65E-06	---	---	2.61E-05
Zinc	6.19E-07	3.23E-07	3.41E-10	2.19E-04	1.73E-08	4.53E-05	4.86E-06	---	---	2.70E-04

Exposure Estimates for an Indigenous Receptor Child at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	2.24E-06	1.94E-08	2.27E-06	3.17E-06	---	---	7.91E-06
Arsenic	1.69E-06	2.65E-07	9.33E-10	3.28E-05	7.61E-07	1.25E-05	2.48E-05	---	---	7.29E-05
Barium	3.23E-05	1.69E-05	1.78E-08	1.93E-05	2.05E-06	2.35E-03	1.95E-04	---	---	2.61E-03
Beryllium	2.18E-07	1.14E-07	1.20E-10	1.72E-06	3.05E-08	2.23E-06	4.86E-07	---	---	4.80E-06
Cadmium	3.17E-07	1.66E-08	1.75E-10	2.49E-06	1.69E-08	2.27E-05	9.48E-07	---	---	2.65E-05
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	2.17E-05	1.39E-05	2.93E-04	3.48E-05	---	---	4.05E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	3.65E-06	9.44E-06	4.24E-05	7.76E-06	---	---	6.82E-05
Copper	1.43E-05	4.47E-06	7.85E-09	1.47E-04	6.70E-05	1.15E-03	4.28E-05	---	---	1.43E-03
Lead	9.15E-06	2.87E-07	5.04E-09	3.44E-06	1.89E-07	1.77E-05	1.14E-05	---	---	4.22E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	1.19E-04	8.52E-05	6.34E-02	1.66E-03	---	---	6.55E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	2.00E-05	1.87E-05	8.56E-04	7.07E-06	---	---	9.02E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	4.81E-05	2.70E-05	7.13E-04	3.40E-05	---	---	8.62E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	3.07E-04	2.08E-07	1.07E-05	3.82E-06	---	---	3.22E-04
Silver	3.06E-07	1.60E-08	1.69E-10	7.15E-05	8.00E-08	3.59E-06	2.43E-07	---	---	7.57E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	1.83E-06	1.76E-06	1.38E-06	2.48E-07	---	---	5.29E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	1.37E-06	3.08E-08	1.19E-06	3.87E-06	---	---	7.47E-06
Vanadium	1.49E-05	7.81E-07	8.24E-09	1.95E-05	4.69E-06	7.01E-05	3.02E-05	---	---	1.40E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	7.87E-03	2.03E-06	3.41E-03	1.75E-04	---	---	1.15E-02

Exposure Estimates for a Recreational Receptor Child at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	9.36E-07	4.86E-09	4.89E-07	2.43E-06	---	---	4.07E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	3.06E-05	2.13E-07	2.86E-06	1.70E-05	---	---	5.26E-05
Barium	3.04E-05	1.59E-05	1.67E-08	2.00E-05	5.32E-07	4.94E-04	1.78E-04	---	---	7.39E-04
Beryllium	2.13E-07	1.11E-07	1.17E-10	8.51E-07	8.26E-09	4.89E-07	4.86E-07	---	---	2.16E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	4.68E-07	5.05E-09	5.12E-06	1.02E-06	---	---	6.95E-06
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	1.53E-05	2.19E-06	1.87E-05	3.16E-05	---	---	9.19E-05
Cobalt	3.65E-06	1.91E-07	2.01E-09	1.70E-06	1.95E-06	5.18E-06	4.86E-06	---	---	1.75E-05
Copper	1.34E-05	4.19E-06	7.37E-09	6.81E-05	1.86E-05	2.40E-04	5.59E-05	---	---	4.00E-04
Lead	9.12E-06	2.86E-07	5.02E-09	3.87E-06	5.62E-08	4.53E-06	9.97E-06	---	---	2.78E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	2.55E-04	2.22E-05	1.72E-02	9.60E-04	---	---	1.87E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	1.70E-06	4.78E-06	1.98E-04	1.22E-06	---	---	2.06E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	1.70E-05	2.99E-06	3.72E-05	2.19E-05	---	---	9.34E-05
Selenium	3.47E-07	1.81E-08	1.91E-10	5.11E-05	5.80E-08	2.44E-06	4.62E-06	---	---	5.85E-05
Silver	3.04E-07	1.59E-08	1.67E-10	3.54E-05	2.28E-08	1.01E-06	2.43E-07	---	---	3.70E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	1.66E-06	4.71E-07	4.11E-07	2.43E-07	---	---	2.86E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	1.70E-07	6.88E-09	2.50E-07	9.73E-07	---	---	2.42E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	8.51E-06	1.19E-06	1.15E-05	1.95E-05	---	---	5.54E-05
Zinc	4.07E-05	2.13E-05	2.24E-08	2.09E-03	6.04E-07	8.53E-04	1.95E-04	---	---	3.20E-03

Exposure Estimates for a Recreational Receptor Child at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	7.42E-07	8.23E-10	6.08E-08	1.93E-06	---	---	2.74E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	3.83E-07	3.30E-09	2.47E-07	2.13E-07	---	---	9.05E-07
Barium	1.88E-06	9.84E-07	1.04E-09	8.05E-08	2.60E-08	3.42E-05	7.14E-07	---	---	3.79E-05
Beryllium	4.81E-09	2.51E-09	2.65E-12	0.00E+00	1.59E-10	2.71E-08	0.00E+00	---	---	3.46E-08
Cadmium	9.16E-10	4.79E-11	5.05E-13	0.00E+00	1.04E-11	1.64E-08	0.00E+00	---	---	1.74E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	0.00E+00	1.69E-06	4.96E-05	0.00E+00	---	---	6.84E-05
Cobalt	1.01E-06	5.27E-08	5.56E-10	1.26E-07	5.93E-07	4.75E-06	3.61E-07	---	---	6.89E-06
Copper	8.76E-07	2.75E-07	4.83E-10	0.00E+00	8.83E-07	1.75E-05	0.00E+00	---	---	1.96E-05
Lead	2.82E-08	8.83E-10	1.55E-11	0.00E+00	2.16E-10	1.13E-07	0.00E+00	---	---	1.43E-07
Manganese	8.72E-06	4.56E-07	4.80E-09	4.02E-06	5.76E-07	3.12E-04	1.51E-05	---	---	3.41E-04
Molybdenum	7.72E-09	4.04E-10	4.26E-12	2.00E-05	3.46E-07	2.07E-05	1.43E-05	---	---	5.53E-05
Nickel	1.72E-05	8.09E-06	9.48E-09	6.39E-06	4.37E-06	1.22E-04	8.21E-06	---	---	1.67E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	1.53E-05	4.40E-10	2.49E-08	1.38E-06	---	---	1.67E-05
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	2.05E-10	1.11E-08	0.00E+00	---	---	1.36E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	1.63E-07	1.89E-08	1.70E-08	2.39E-08	---	---	2.24E-07
Uranium	3.25E-09	1.70E-09	1.79E-12	0.00E+00	1.67E-11	1.33E-08	0.00E+00	---	---	1.83E-08
Vanadium	9.67E-07	5.05E-08	5.33E-10	0.00E+00	6.60E-08	4.27E-06	0.00E+00	---	---	5.35E-06
Zinc	6.19E-07	3.23E-07	3.41E-10	0.00E+00	4.58E-09	9.86E-06	0.00E+00	---	---	1.08E-05

Exposure Estimates for a Recreational Receptor Child at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	1.68E-06	5.68E-09	5.49E-07	4.36E-06	---	---	6.81E-06
Arsenic	1.69E-06	2.65E-07	9.33E-10	3.10E-05	2.16E-07	3.11E-06	1.72E-05	---	---	5.35E-05
Barium	3.23E-05	1.69E-05	1.78E-08	2.01E-05	5.58E-07	5.28E-04	1.78E-04	---	---	7.76E-04
Beryllium	2.18E-07	1.14E-07	1.20E-10	8.51E-07	8.42E-09	5.16E-07	4.86E-07	---	---	2.19E-06
Cadmium	3.17E-07	1.66E-08	1.75E-10	4.68E-07	5.06E-09	5.14E-06	1.02E-06	---	---	6.97E-06
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	1.53E-05	3.89E-06	6.83E-05	3.16E-05	---	---	1.60E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	1.83E-06	2.54E-06	9.93E-06	5.22E-06	---	---	2.44E-05
Copper	1.43E-05	4.47E-06	7.85E-09	6.81E-05	1.95E-05	2.58E-04	5.59E-05	---	---	4.20E-04
Lead	9.15E-06	2.87E-07	5.04E-09	3.87E-06	5.65E-08	4.65E-06	9.97E-06	---	---	2.80E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	2.59E-04	2.28E-05	1.75E-02	9.76E-04	---	---	1.90E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	2.17E-05	5.13E-06	2.19E-04	1.55E-05	---	---	2.62E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	2.34E-05	7.36E-06	1.60E-04	3.01E-05	---	---	2.60E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	6.63E-05	5.85E-08	2.47E-06	6.00E-06	---	---	7.52E-05
Silver	3.06E-07	1.60E-08	1.69E-10	3.54E-05	2.30E-08	1.02E-06	2.43E-07	---	---	3.70E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	1.82E-06	4.90E-07	4.28E-07	2.67E-07	---	---	3.08E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	1.70E-07	6.90E-09	2.63E-07	9.73E-07	---	---	2.44E-06
Vanadium	1.49E-05	7.81E-07	8.24E-09	8.51E-06	1.26E-06	1.58E-05	1.95E-05	---	---	6.07E-05
Zinc	4.13E-05	2.16E-05	2.28E-08	2.09E-03	6.08E-07	8.63E-04	1.95E-04	---	---	3.21E-03

Exposure Estimates for a Recreational Receptor Child at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	9.36E-07	4.86E-09	4.89E-07	2.43E-06	---	---	4.07E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	3.06E-05	2.13E-07	2.86E-06	1.46E-05	---	---	5.02E-05
Barium	3.04E-05	1.59E-05	1.67E-08	2.00E-05	5.32E-07	4.94E-04	2.02E-04	---	---	7.63E-04
Beryllium	2.13E-07	1.11E-07	1.17E-10	8.51E-07	8.26E-09	4.89E-07	4.86E-07	---	---	2.16E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	4.68E-07	5.05E-09	5.12E-06	4.86E-07	---	---	6.41E-06
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	1.53E-05	2.19E-06	1.87E-05	3.16E-05	---	---	9.19E-05
Cobalt	3.65E-06	1.91E-07	2.01E-09	1.70E-06	1.95E-06	5.18E-06	7.29E-06	---	---	2.00E-05
Copper	1.34E-05	4.19E-06	7.37E-09	6.81E-05	1.86E-05	2.40E-04	2.92E-05	---	---	3.73E-04
Lead	9.12E-06	2.86E-07	5.02E-09	3.87E-06	5.62E-08	4.53E-06	6.81E-06	---	---	2.47E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	2.55E-04	2.22E-05	1.72E-02	1.62E-03	---	---	1.93E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	1.70E-06	4.78E-06	1.98E-04	1.22E-06	---	---	2.06E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	1.70E-05	2.99E-06	3.72E-05	1.95E-05	---	---	9.10E-05
Selenium	3.47E-07	1.81E-08	1.91E-10	5.11E-05	5.79E-08	2.44E-06	3.16E-06	---	---	5.71E-05
Silver	3.04E-07	1.59E-08	1.67E-10	3.54E-05	2.28E-08	1.01E-06	2.43E-07	---	---	3.70E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	1.66E-06	4.71E-07	4.11E-07	2.43E-07	---	---	2.86E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	1.70E-07	6.88E-09	2.50E-07	7.29E-07	---	---	2.18E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	8.51E-06	1.19E-06	1.15E-05	1.70E-05	---	---	5.30E-05
Zinc	4.07E-05	2.13E-05	2.24E-08	2.09E-03	6.04E-07	8.53E-04	1.46E-04	---	---	3.15E-03

Exposure Estimates for a Recreational Receptor Child at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	2.31E-06	2.27E-09	1.39E-07	6.00E-06	---	---	8.45E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	2.00E-04	1.45E-07	1.26E-06	9.51E-05	---	---	2.96E-04
Barium	1.88E-06	9.84E-07	1.04E-09	1.20E-05	3.65E-08	3.73E-05	1.21E-04	---	---	1.73E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	9.49E-06	5.91E-09	1.43E-07	5.42E-06	---	---	1.51E-05
Cadmium	9.16E-10	4.79E-11	5.05E-13	2.78E-08	1.29E-11	1.74E-08	2.89E-08	---	---	7.51E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	5.06E-05	1.79E-06	5.02E-05	1.04E-04	---	---	2.24E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	2.79E-06	1.10E-06	5.57E-06	1.20E-05	---	---	2.25E-05
Copper	8.76E-07	2.75E-07	4.83E-10	1.33E-04	2.72E-06	2.58E-05	5.69E-05	---	---	2.19E-04
Lead	2.82E-08	8.83E-10	1.55E-11	2.59E-06	1.79E-09	2.50E-07	4.55E-06	---	---	7.42E-06
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	5.49E-07	2.80E-04	0.00E+00	---	---	2.89E-04
Molybdenum	7.72E-09	4.04E-10	4.26E-12	1.11E-04	1.54E-06	1.01E-04	7.94E-05	---	---	2.94E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	1.96E-04	9.54E-06	1.37E-04	2.24E-04	---	---	5.91E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	2.45E-04	1.85E-09	3.20E-08	1.51E-05	---	---	2.60E-04
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	2.05E-10	1.11E-08	0.00E+00	---	---	1.36E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	0.00E+00	7.40E-10	3.08E-09	0.00E+00	---	---	4.47E-09
Uranium	3.25E-09	1.70E-09	1.79E-12	2.18E-05	4.99E-08	2.99E-07	9.36E-05	---	---	1.16E-04
Vanadium	9.67E-07	5.05E-08	5.33E-10	6.31E-05	5.58E-07	5.04E-06	1.26E-04	---	---	1.96E-04
Zinc	6.19E-07	3.23E-07	3.41E-10	2.78E-03	7.58E-09	1.38E-05	1.95E-04	---	---	2.99E-03

Exposure Estimates for a Recreational Receptor Child at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	3.24E-06	7.13E-09	6.27E-07	8.43E-06	---	---	1.25E-05
Arsenic	1.69E-06	2.65E-07	9.33E-10	2.30E-04	3.58E-07	4.12E-06	1.10E-04	---	---	3.46E-04
Barium	3.23E-05	1.69E-05	1.78E-08	3.20E-05	5.69E-07	5.32E-04	3.23E-04	---	---	9.36E-04
Beryllium	2.18E-07	1.14E-07	1.20E-10	1.03E-05	1.42E-08	6.31E-07	5.91E-06	---	---	1.72E-05
Cadmium	3.17E-07	1.66E-08	1.75E-10	4.96E-07	5.06E-09	5.14E-06	5.15E-07	---	---	6.49E-06
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	6.59E-05	3.98E-06	6.89E-05	1.36E-04	---	---	3.16E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	4.49E-06	3.05E-06	1.08E-05	1.93E-05	---	---	4.25E-05
Copper	1.43E-05	4.47E-06	7.85E-09	2.01E-04	2.13E-05	2.66E-04	8.61E-05	---	---	5.93E-04
Lead	9.15E-06	2.87E-07	5.04E-09	6.46E-06	5.80E-08	4.78E-06	1.14E-05	---	---	3.21E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	2.55E-04	2.27E-05	1.75E-02	1.62E-03	---	---	1.96E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	1.13E-04	6.32E-06	2.99E-04	8.06E-05	---	---	5.00E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	2.13E-04	1.25E-05	1.74E-04	2.43E-04	---	---	6.82E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	2.96E-04	5.98E-08	2.47E-06	1.83E-05	---	---	3.17E-04
Silver	3.06E-07	1.60E-08	1.69E-10	3.54E-05	2.30E-08	1.02E-06	2.43E-07	---	---	3.70E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	1.66E-06	4.72E-07	4.14E-07	2.43E-07	---	---	2.86E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	2.20E-05	5.68E-08	5.49E-07	9.43E-05	---	---	1.18E-04
Vanadium	1.49E-05	7.81E-07	8.24E-09	7.16E-05	1.75E-06	1.66E-05	1.43E-04	---	---	2.49E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	4.87E-03	6.11E-07	8.67E-04	3.40E-04	---	---	6.14E-03

Exposure Estimates for a Recreational Receptor Child at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	9.36E-07	4.86E-09	4.89E-07	2.43E-06	---	---	4.07E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	3.06E-05	2.13E-07	2.86E-06	1.46E-05	---	---	5.02E-05
Barium	3.04E-05	1.59E-05	1.67E-08	2.00E-05	5.32E-07	4.94E-04	2.02E-04	---	---	7.63E-04
Beryllium	2.13E-07	1.11E-07	1.17E-10	8.51E-07	8.26E-09	4.89E-07	4.86E-07	---	---	2.16E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	4.68E-07	5.05E-09	5.12E-06	4.86E-07	---	---	6.41E-06
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	1.53E-05	2.19E-06	1.87E-05	3.16E-05	---	---	9.19E-05
Cobalt	3.65E-06	1.91E-07	2.01E-09	1.70E-06	1.95E-06	5.18E-06	7.29E-06	---	---	2.00E-05
Copper	1.34E-05	4.19E-06	7.37E-09	6.81E-05	1.86E-05	2.40E-04	2.92E-05	---	---	3.73E-04
Lead	9.12E-06	2.86E-07	5.02E-09	3.87E-06	5.62E-08	4.53E-06	6.81E-06	---	---	2.47E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	2.55E-04	2.22E-05	1.72E-02	1.62E-03	---	---	1.93E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	1.70E-06	4.78E-06	1.98E-04	1.22E-06	---	---	2.06E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	1.70E-05	2.99E-06	3.72E-05	1.95E-05	---	---	9.10E-05
Selenium	3.47E-07	1.81E-08	1.91E-10	5.11E-05	5.79E-08	2.44E-06	3.16E-06	---	---	5.71E-05
Silver	3.04E-07	1.59E-08	1.67E-10	3.54E-05	2.28E-08	1.01E-06	2.43E-07	---	---	3.70E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	1.66E-06	4.71E-07	4.11E-07	2.43E-07	---	---	2.86E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	1.70E-07	6.88E-09	2.50E-07	7.29E-07	---	---	2.18E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	8.51E-06	1.19E-06	1.15E-05	1.70E-05	---	---	5.30E-05
Zinc	4.07E-05	2.13E-05	2.24E-08	2.09E-03	6.04E-07	8.53E-04	1.46E-04	---	---	3.15E-03

Exposure Estimates for a Recreational Receptor Child at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	2.67E-06	2.60E-09	1.57E-07	6.94E-06	---	---	9.78E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	2.04E-04	1.48E-07	1.28E-06	9.73E-05	---	---	3.03E-04
Barium	1.88E-06	9.84E-07	1.04E-09	8.30E-07	2.67E-08	3.44E-05	8.37E-06	---	---	4.65E-05
Beryllium	4.81E-09	2.51E-09	2.65E-12	1.42E-05	8.79E-09	2.01E-07	8.14E-06	---	---	2.26E-05
Cadmium	9.16E-10	4.79E-11	5.05E-13	6.30E-09	1.09E-11	1.67E-08	6.55E-09	---	---	3.05E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	5.16E-05	1.79E-06	5.02E-05	1.07E-04	---	---	2.27E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	2.88E-06	1.12E-06	5.60E-06	1.24E-05	---	---	2.30E-05
Copper	8.76E-07	2.75E-07	4.83E-10	1.36E-04	2.75E-06	2.60E-05	5.81E-05	---	---	2.24E-04
Lead	2.82E-08	8.83E-10	1.55E-11	2.28E-06	1.60E-09	2.34E-07	4.01E-06	---	---	6.55E-06
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	5.49E-07	2.80E-04	0.00E+00	---	---	2.89E-04
Molybdenum	7.72E-09	4.04E-10	4.26E-12	1.24E-04	1.71E-06	1.13E-04	8.87E-05	---	---	3.27E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	2.17E-04	1.01E-05	1.39E-04	2.48E-04	---	---	6.39E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	2.60E-04	1.94E-09	3.25E-08	1.61E-05	---	---	2.76E-04
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	2.05E-10	1.11E-08	0.00E+00	---	---	1.36E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	0.00E+00	7.40E-10	3.08E-09	0.00E+00	---	---	4.47E-09
Uranium	3.25E-09	1.70E-09	1.79E-12	2.24E-05	5.11E-08	3.06E-07	9.58E-05	---	---	1.19E-04
Vanadium	9.67E-07	5.05E-08	5.33E-10	6.44E-05	5.69E-07	5.06E-06	1.29E-04	---	---	2.00E-04
Zinc	6.19E-07	3.23E-07	3.41E-10	2.78E-03	7.58E-09	1.38E-05	1.95E-04	---	---	2.99E-03

Exposure Estimates for a Recreational Receptor Child at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	3.61E-06	7.46E-09	6.45E-07	9.37E-06	---	---	1.39E-05
Arsenic	1.69E-06	2.65E-07	9.33E-10	2.35E-04	3.61E-07	4.14E-06	1.12E-04	---	---	3.53E-04
Barium	3.23E-05	1.69E-05	1.78E-08	2.08E-05	5.59E-07	5.29E-04	2.10E-04	---	---	8.09E-04
Beryllium	2.18E-07	1.14E-07	1.20E-10	1.51E-05	1.71E-08	6.90E-07	8.63E-06	---	---	2.48E-05
Cadmium	3.17E-07	1.66E-08	1.75E-10	4.74E-07	5.06E-09	5.14E-06	4.93E-07	---	---	6.44E-06
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	6.69E-05	3.98E-06	6.89E-05	1.38E-04	---	---	3.19E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	4.58E-06	3.07E-06	1.08E-05	1.96E-05	---	---	4.30E-05
Copper	1.43E-05	4.47E-06	7.85E-09	2.04E-04	2.13E-05	2.66E-04	8.73E-05	---	---	5.97E-04
Lead	9.15E-06	2.87E-07	5.04E-09	6.15E-06	5.78E-08	4.77E-06	1.08E-05	---	---	3.12E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	2.55E-04	2.27E-05	1.75E-02	1.62E-03	---	---	1.96E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	1.26E-04	6.49E-06	3.11E-04	8.99E-05	---	---	5.33E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	2.34E-04	1.31E-05	1.76E-04	2.67E-04	---	---	7.30E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	3.11E-04	5.99E-08	2.48E-06	1.92E-05	---	---	3.33E-04
Silver	3.06E-07	1.60E-08	1.69E-10	3.54E-05	2.30E-08	1.02E-06	2.43E-07	---	---	3.70E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	1.66E-06	4.72E-07	4.14E-07	2.43E-07	---	---	2.86E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	2.25E-05	5.80E-08	5.56E-07	9.65E-05	---	---	1.21E-04
Vanadium	1.49E-05	7.81E-07	8.24E-09	7.29E-05	1.76E-06	1.66E-05	1.46E-04	---	---	2.53E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	4.87E-03	6.11E-07	8.67E-04	3.40E-04	---	---	6.14E-03

Exposure Estimates for a Recreational Receptor Child at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	8.51E-07	4.78E-09	4.89E-07	2.43E-06	---	---	3.99E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	1.43E-05	2.05E-07	2.86E-06	2.19E-05	---	---	4.12E-05
Barium	3.04E-05	1.59E-05	1.67E-08	8.94E-06	5.26E-07	4.94E-04	1.82E-04	---	---	7.32E-04
Beryllium	2.13E-07	1.11E-07	1.17E-10	8.51E-07	8.22E-09	4.89E-07	4.86E-07	---	---	2.16E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	1.23E-06	4.95E-09	5.12E-06	9.48E-07	---	---	7.64E-06
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	9.79E-06	2.18E-06	1.87E-05	3.16E-05	---	---	8.64E-05
Cobalt	3.65E-06	1.91E-07	2.01E-09	1.70E-06	1.96E-06	5.18E-06	7.29E-06	---	---	2.00E-05
Copper	1.34E-05	4.19E-06	7.37E-09	7.02E-05	1.79E-05	2.40E-04	4.13E-05	---	---	3.87E-04
Lead	9.12E-06	2.86E-07	5.02E-09	1.70E-06	5.27E-08	4.53E-06	1.14E-05	---	---	2.71E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	5.91E-05	2.24E-05	1.72E-02	1.66E-03	---	---	1.92E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	1.70E-06	4.77E-06	1.98E-04	1.22E-06	---	---	2.06E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	1.70E-05	2.95E-06	3.72E-05	2.43E-05	---	---	9.58E-05
Selenium	3.47E-07	1.81E-08	1.91E-10	1.16E-04	5.93E-08	2.44E-06	2.92E-06	---	---	1.22E-04
Silver	3.04E-07	1.59E-08	1.67E-10	3.54E-05	2.17E-08	9.20E-07	2.43E-07	---	---	3.69E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	8.89E-07	4.69E-07	4.11E-07	2.43E-07	---	---	2.08E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	1.70E-07	6.84E-09	2.50E-07	9.73E-07	---	---	2.42E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	8.51E-06	1.19E-06	1.15E-05	2.65E-05	---	---	6.24E-05
Zinc	4.07E-05	2.13E-05	2.24E-08	3.79E-03	5.91E-07	8.53E-04	1.70E-04	---	---	4.88E-03

Exposure Estimates for a Recreational Receptor Child at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	5.49E-07	8.15E-10	6.29E-08	1.57E-06	---	---	2.19E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	1.48E-05	3.79E-08	5.04E-07	2.26E-05	---	---	3.80E-05
Barium	1.88E-06	9.84E-07	1.04E-09	4.70E-06	3.60E-08	3.73E-05	9.59E-05	---	---	1.41E-04
Beryllium	4.81E-09	2.51E-09	2.65E-12	0.00E+00	1.59E-10	2.71E-08	0.00E+00	---	---	3.46E-08
Cadmium	9.16E-10	4.79E-11	5.05E-13	0.00E+00	1.04E-11	1.64E-08	0.00E+00	---	---	1.74E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	8.06E-06	1.71E-06	4.97E-05	2.60E-05	---	---	1.03E-04
Cobalt	1.01E-06	5.27E-08	5.56E-10	7.04E-07	6.76E-07	4.88E-06	3.02E-06	---	---	1.03E-05
Copper	8.76E-07	2.75E-07	4.83E-10	2.11E-05	1.38E-06	1.99E-05	1.24E-05	---	---	5.59E-05
Lead	2.82E-08	8.83E-10	1.55E-11	1.97E-07	6.72E-10	1.59E-07	1.32E-06	---	---	1.71E-06
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	5.49E-07	2.80E-04	0.00E+00	---	---	2.89E-04
Molybdenum	7.72E-09	4.04E-10	4.26E-12	3.62E-05	6.59E-07	4.25E-05	2.59E-05	---	---	1.05E-04
Nickel	1.72E-05	8.09E-06	9.48E-09	4.09E-05	5.45E-06	1.25E-04	5.84E-05	---	---	2.55E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	1.56E-04	6.65E-10	2.56E-08	3.91E-06	---	---	1.60E-04
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	2.05E-10	1.11E-08	0.00E+00	---	---	1.36E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	0.00E+00	7.40E-10	3.08E-09	0.00E+00	---	---	4.47E-09
Uranium	3.25E-09	1.70E-09	1.79E-12	4.09E-06	1.14E-08	7.90E-08	2.33E-05	---	---	2.75E-05
Vanadium	9.67E-07	5.05E-08	5.33E-10	9.68E-06	1.61E-07	4.42E-06	3.02E-05	---	---	4.54E-05
Zinc	6.19E-07	3.23E-07	3.41E-10	9.70E-04	5.28E-09	1.08E-05	4.35E-05	---	---	1.02E-03

Exposure Estimates for a Recreational Receptor Child at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	1.40E-06	5.60E-09	5.51E-07	4.00E-06	---	---	6.18E-06
Arsenic	1.69E-06	2.65E-07	9.33E-10	2.92E-05	2.42E-07	3.37E-06	4.45E-05	---	---	7.92E-05
Barium	3.23E-05	1.69E-05	1.78E-08	1.36E-05	5.62E-07	5.32E-04	2.78E-04	---	---	8.73E-04
Beryllium	2.18E-07	1.14E-07	1.20E-10	8.51E-07	8.37E-09	5.16E-07	4.86E-07	---	---	2.19E-06
Cadmium	3.17E-07	1.66E-08	1.75E-10	1.23E-06	4.96E-09	5.14E-06	9.48E-07	---	---	7.66E-06
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	1.78E-05	3.90E-06	6.84E-05	5.76E-05	---	---	1.89E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	2.41E-06	2.63E-06	1.01E-05	1.03E-05	---	---	3.03E-05
Copper	1.43E-05	4.47E-06	7.85E-09	9.13E-05	1.93E-05	2.60E-04	5.37E-05	---	---	4.43E-04
Lead	9.15E-06	2.87E-07	5.04E-09	1.90E-06	5.34E-08	4.69E-06	1.28E-05	---	---	2.88E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	5.91E-05	2.30E-05	1.75E-02	1.66E-03	---	---	1.95E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	3.79E-05	5.43E-06	2.41E-04	2.71E-05	---	---	3.11E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	5.79E-05	8.40E-06	1.63E-04	8.27E-05	---	---	3.51E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	2.72E-04	5.99E-08	2.47E-06	6.83E-06	---	---	2.82E-04
Silver	3.06E-07	1.60E-08	1.69E-10	3.54E-05	2.19E-08	9.32E-07	2.43E-07	---	---	3.69E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	8.89E-07	4.70E-07	4.14E-07	2.43E-07	---	---	2.09E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	4.26E-06	1.83E-08	3.29E-07	2.43E-05	---	---	2.99E-05
Vanadium	1.49E-05	7.81E-07	8.24E-09	1.82E-05	1.35E-06	1.59E-05	5.67E-05	---	---	1.08E-04
Zinc	4.13E-05	2.16E-05	2.28E-08	4.76E-03	5.96E-07	8.64E-04	2.14E-04	---	---	5.90E-03

Exposure Estimates for a Recreational Receptor Child at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.40E-07	7.31E-08	7.70E-11	8.51E-07	4.78E-09	4.89E-07	2.43E-06	---	---	3.99E-06
Arsenic	1.64E-06	2.57E-07	9.04E-10	1.43E-05	2.05E-07	2.86E-06	2.19E-05	---	---	4.12E-05
Barium	3.04E-05	1.59E-05	1.67E-08	8.94E-06	5.26E-07	4.94E-04	1.82E-04	---	---	7.32E-04
Beryllium	2.13E-07	1.11E-07	1.17E-10	8.51E-07	8.22E-09	4.89E-07	4.86E-07	---	---	2.16E-06
Cadmium	3.16E-07	1.65E-08	1.74E-10	1.23E-06	4.95E-09	5.12E-06	9.48E-07	---	---	7.64E-06
Chromium (Total)	1.58E-05	8.26E-06	8.71E-09	9.79E-06	2.18E-06	1.87E-05	3.16E-05	---	---	8.64E-05
Cobalt	3.65E-06	1.91E-07	2.01E-09	1.70E-06	1.96E-06	5.18E-06	7.29E-06	---	---	2.00E-05
Copper	1.34E-05	4.19E-06	7.37E-09	7.02E-05	1.79E-05	2.40E-04	4.13E-05	---	---	3.87E-04
Lead	9.12E-06	2.86E-07	5.02E-09	1.70E-06	5.27E-08	4.53E-06	1.14E-05	---	---	2.71E-05
Manganese	2.31E-04	1.21E-05	1.27E-07	5.91E-05	2.24E-05	1.72E-02	1.66E-03	---	---	1.92E-02
Molybdenum	3.59E-07	1.87E-08	1.98E-10	1.70E-06	4.77E-06	1.98E-04	1.22E-06	---	---	2.06E-04
Nickel	9.73E-06	4.57E-06	5.36E-09	1.70E-05	2.95E-06	3.72E-05	2.43E-05	---	---	9.58E-05
Selenium	3.47E-07	1.81E-08	1.91E-10	1.16E-04	5.93E-08	2.44E-06	2.92E-06	---	---	1.22E-04
Silver	3.04E-07	1.59E-08	1.67E-10	3.54E-05	2.17E-08	9.20E-07	2.43E-07	---	---	3.69E-05
Thallium	6.69E-08	3.49E-09	3.68E-11	8.89E-07	4.69E-07	4.11E-07	2.43E-07	---	---	2.08E-06
Uranium	6.69E-07	3.49E-07	3.68E-10	1.70E-07	6.84E-09	2.50E-07	9.73E-07	---	---	2.42E-06
Vanadium	1.40E-05	7.31E-07	7.70E-09	8.51E-06	1.19E-06	1.15E-05	2.65E-05	---	---	6.24E-05
Zinc	4.07E-05	2.13E-05	2.24E-08	3.79E-03	5.91E-07	8.53E-04	1.70E-04	---	---	4.88E-03

Exposure Estimates for a Recreational Receptor Child at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	3.66E-09	1.91E-09	2.02E-12	2.57E-07	4.54E-10	4.21E-08	7.34E-07	---	---	1.04E-06
Arsenic	5.13E-08	8.04E-09	2.83E-11	1.91E-06	7.50E-09	2.78E-07	2.92E-06	---	---	5.18E-06
Barium	1.88E-06	9.84E-07	1.04E-09	6.21E-07	2.73E-08	3.46E-05	1.27E-05	---	---	5.08E-05
Beryllium	4.81E-09	2.51E-09	2.65E-12	0.00E+00	1.59E-10	2.71E-08	0.00E+00	---	---	3.46E-08
Cadmium	9.16E-10	4.79E-11	5.05E-13	0.00E+00	1.04E-11	1.64E-08	0.00E+00	---	---	1.74E-08
Chromium (Total)	1.12E-05	5.86E-06	6.18E-09	9.79E-07	1.70E-06	4.96E-05	3.16E-06	---	---	7.25E-05
Cobalt	1.01E-06	5.27E-08	5.56E-10	1.08E-07	5.92E-07	4.75E-06	4.62E-07	---	---	6.97E-06
Copper	8.76E-07	2.75E-07	4.83E-10	2.48E-06	9.42E-07	1.78E-05	1.46E-06	---	---	2.39E-05
Lead	2.82E-08	8.83E-10	1.55E-11	5.04E-10	2.17E-10	1.13E-07	3.39E-09	---	---	1.47E-07
Manganese	8.72E-06	4.56E-07	4.80E-09	0.00E+00	5.49E-07	2.80E-04	0.00E+00	---	---	2.89E-04
Molybdenum	7.72E-09	4.04E-10	4.26E-12	8.20E-06	2.15E-07	1.19E-05	5.86E-06	---	---	2.62E-05
Nickel	1.72E-05	8.09E-06	9.48E-09	6.81E-06	4.38E-06	1.22E-04	9.73E-06	---	---	1.69E-04
Selenium	2.57E-09	1.34E-10	1.42E-12	3.58E-05	3.83E-10	2.46E-08	9.00E-07	---	---	3.67E-05
Silver	2.12E-09	1.11E-10	1.17E-12	0.00E+00	2.05E-10	1.11E-08	0.00E+00	---	---	1.36E-08
Thallium	6.23E-10	3.25E-11	3.43E-13	1.71E-08	3.91E-09	5.53E-09	4.67E-09	---	---	3.19E-08
Uranium	3.25E-09	1.70E-09	1.79E-12	5.06E-07	1.43E-09	2.15E-08	2.89E-06	---	---	3.43E-06
Vanadium	9.67E-07	5.05E-08	5.33E-10	1.17E-06	7.75E-08	4.29E-06	3.65E-06	---	---	1.02E-05
Zinc	6.19E-07	3.23E-07	3.41E-10	1.08E-04	4.66E-09	9.97E-06	4.86E-06	---	---	1.24E-04

Exposure Estimates for a Recreational Receptor Child at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.43E-07	7.50E-08	7.91E-11	1.11E-06	5.24E-09	5.31E-07	3.17E-06	---	---	5.03E-06
Arsenic	1.69E-06	2.65E-07	9.33E-10	1.63E-05	2.12E-07	3.14E-06	2.48E-05	---	---	4.64E-05
Barium	3.23E-05	1.69E-05	1.78E-08	9.56E-06	5.53E-07	5.29E-04	1.95E-04	---	---	7.83E-04
Beryllium	2.18E-07	1.14E-07	1.20E-10	8.51E-07	8.37E-09	5.16E-07	4.86E-07	---	---	2.19E-06
Cadmium	3.17E-07	1.66E-08	1.75E-10	1.23E-06	4.96E-09	5.14E-06	9.48E-07	---	---	7.66E-06
Chromium (Total)	2.70E-05	1.41E-05	1.49E-08	1.08E-05	3.88E-06	6.83E-05	3.48E-05	---	---	1.59E-04
Cobalt	4.66E-06	2.43E-07	2.57E-09	1.81E-06	2.55E-06	9.93E-06	7.76E-06	---	---	2.69E-05
Copper	1.43E-05	4.47E-06	7.85E-09	7.27E-05	1.89E-05	2.58E-04	4.28E-05	---	---	4.11E-04
Lead	9.15E-06	2.87E-07	5.04E-09	1.70E-06	5.29E-08	4.65E-06	1.14E-05	---	---	2.73E-05
Manganese	2.40E-04	1.25E-05	1.32E-07	5.91E-05	2.30E-05	1.75E-02	1.66E-03	---	---	1.95E-02
Molybdenum	3.66E-07	1.91E-08	2.02E-10	9.90E-06	4.99E-06	2.10E-04	7.07E-06	---	---	2.32E-04
Nickel	2.69E-05	1.27E-05	1.48E-08	2.38E-05	7.33E-06	1.60E-04	3.40E-05	---	---	2.64E-04
Selenium	3.49E-07	1.82E-08	1.92E-10	1.52E-04	5.97E-08	2.47E-06	3.82E-06	---	---	1.59E-04
Silver	3.06E-07	1.60E-08	1.69E-10	3.54E-05	2.19E-08	9.32E-07	2.43E-07	---	---	3.69E-05
Thallium	6.75E-08	3.53E-09	3.72E-11	9.06E-07	4.73E-07	4.17E-07	2.48E-07	---	---	2.11E-06
Uranium	6.72E-07	3.51E-07	3.70E-10	6.77E-07	8.27E-09	2.72E-07	3.87E-06	---	---	5.85E-06
Vanadium	1.49E-05	7.81E-07	8.24E-09	9.68E-06	1.26E-06	1.58E-05	3.02E-05	---	---	7.26E-05
Zinc	4.13E-05	2.16E-05	2.28E-08	3.90E-03	5.95E-07	8.63E-04	1.75E-04	---	---	5.00E-03

Exposure Estimates for an Indigenous Receptor Teen at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	1.20E-06	1.37E-08	1.16E-06	1.68E-06	---	---	4.19E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	3.94E-05	5.76E-07	6.52E-06	1.17E-05	---	---	5.93E-05
Barium	1.68E-05	1.27E-05	9.93E-09	2.57E-05	1.50E-06	1.19E-03	1.22E-04	---	---	1.37E-03
Beryllium	1.17E-07	8.91E-08	6.95E-11	1.09E-06	2.29E-08	1.16E-06	3.35E-07	---	---	2.82E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	6.02E-07	1.31E-08	1.23E-05	7.04E-07	---	---	1.38E-05
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.97E-05	5.85E-06	4.29E-05	2.18E-05	---	---	1.06E-04
Cobalt	2.01E-06	1.53E-07	1.19E-09	2.19E-06	5.49E-06	1.21E-05	3.35E-06	---	---	2.52E-05
Copper	7.37E-06	3.36E-06	4.37E-09	8.75E-05	4.97E-05	5.79E-04	3.85E-05	---	---	7.65E-04
Lead	5.03E-06	2.29E-07	2.98E-09	4.98E-06	1.52E-07	1.01E-05	6.87E-06	---	---	2.74E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	3.28E-04	6.29E-05	3.75E-02	6.62E-04	---	---	3.87E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	2.19E-06	1.36E-05	4.59E-04	8.38E-07	---	---	4.76E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	2.19E-05	8.30E-06	8.94E-05	1.51E-05	---	---	1.44E-04
Selenium	1.91E-07	1.45E-08	1.13E-10	6.57E-05	1.55E-07	5.79E-06	3.18E-06	---	---	7.50E-05
Silver	1.68E-07	1.27E-08	9.93E-11	4.55E-05	6.34E-08	2.24E-06	1.68E-07	---	---	4.82E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	2.13E-06	1.33E-06	8.64E-07	1.68E-07	---	---	4.54E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	2.19E-07	1.95E-08	5.99E-07	6.70E-07	---	---	2.16E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	1.09E-05	3.36E-06	2.77E-05	1.34E-05	---	---	6.37E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	2.68E-03	1.56E-06	1.94E-03	1.34E-04	---	---	4.79E-03

Exposure Estimates for an Indigenous Receptor Teen at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	9.54E-07	2.34E-09	1.32E-07	1.33E-06	---	---	2.42E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	4.92E-07	9.28E-09	5.91E-07	1.47E-07	---	---	1.27E-06
Barium	1.04E-06	7.89E-07	6.15E-10	1.03E-07	7.40E-08	8.32E-05	4.92E-07	---	---	8.57E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	0.00E+00	4.49E-10	6.52E-08	0.00E+00	---	---	7.03E-08
Cadmium	5.05E-10	3.84E-11	2.99E-13	0.00E+00	2.92E-11	4.00E-08	0.00E+00	---	---	4.06E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	0.00E+00	4.78E-06	1.19E-04	0.00E+00	---	---	1.34E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	1.63E-07	1.68E-06	1.14E-05	2.49E-07	---	---	1.40E-05
Copper	4.83E-07	2.20E-07	2.86E-10	0.00E+00	2.51E-06	4.28E-05	0.00E+00	---	---	4.60E-05
Lead	1.55E-08	7.08E-10	9.21E-12	0.00E+00	6.09E-10	2.70E-07	0.00E+00	---	---	2.87E-07
Manganese	4.80E-06	3.65E-07	2.85E-09	5.17E-06	1.64E-06	7.48E-04	1.04E-05	---	---	7.70E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	2.57E-05	9.82E-07	4.30E-05	9.85E-06	---	---	7.96E-05
Nickel	9.48E-06	6.49E-06	5.62E-09	8.21E-06	1.23E-05	2.95E-04	5.66E-06	---	---	3.37E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	1.97E-05	1.24E-09	6.01E-08	9.53E-07	---	---	2.07E-05
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	5.75E-10	2.68E-08	0.00E+00	---	---	2.86E-08
Thallium	3.43E-10	2.61E-11	2.03E-13	2.10E-07	5.35E-08	3.55E-08	1.65E-08	---	---	3.16E-07
Uranium	1.79E-09	1.36E-09	1.06E-12	0.00E+00	4.73E-11	3.18E-08	0.00E+00	---	---	3.50E-08
Vanadium	5.33E-07	4.05E-08	3.16E-10	0.00E+00	1.87E-07	1.02E-05	0.00E+00	---	---	1.10E-05
Zinc	3.41E-07	2.59E-07	2.02E-10	0.00E+00	1.30E-08	2.40E-05	0.00E+00	---	---	2.46E-05

Exposure Estimates for an Indigenous Receptor Teen at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	2.16E-06	1.60E-08	1.29E-06	3.00E-06	---	---	6.61E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	3.99E-05	5.86E-07	7.11E-06	1.19E-05	---	---	6.06E-05
Barium	1.78E-05	1.35E-05	1.05E-08	2.58E-05	1.57E-06	1.27E-03	1.23E-04	---	---	1.45E-03
Beryllium	1.20E-07	9.11E-08	7.11E-11	1.09E-06	2.33E-08	1.22E-06	3.35E-07	---	---	2.89E-06
Cadmium	1.75E-07	1.33E-08	1.04E-10	6.02E-07	1.31E-08	1.23E-05	7.04E-07	---	---	1.38E-05
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	1.97E-05	1.06E-05	1.61E-04	2.18E-05	---	---	2.40E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	2.35E-06	7.16E-06	2.34E-05	3.60E-06	---	---	3.93E-05
Copper	7.85E-06	3.58E-06	4.66E-09	8.75E-05	5.22E-05	6.22E-04	3.85E-05	---	---	8.11E-04
Lead	5.04E-06	2.30E-07	2.99E-09	4.98E-06	1.52E-07	1.04E-05	6.87E-06	---	---	2.77E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	3.33E-04	6.45E-05	3.83E-02	6.72E-04	---	---	3.95E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	2.79E-05	1.46E-05	5.02E-04	1.07E-05	---	---	5.55E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	3.01E-05	2.06E-05	3.84E-04	2.07E-05	---	---	4.81E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	8.53E-05	1.56E-07	5.85E-06	4.14E-06	---	---	9.57E-05
Silver	1.69E-07	1.28E-08	1.00E-10	4.55E-05	6.40E-08	2.27E-06	1.68E-07	---	---	4.82E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	2.34E-06	1.39E-06	9.00E-07	1.84E-07	---	---	4.86E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	2.19E-07	1.96E-08	6.31E-07	6.70E-07	---	---	2.19E-06
Vanadium	8.24E-06	6.26E-07	4.88E-09	1.09E-05	3.54E-06	3.79E-05	1.34E-05	---	---	7.47E-05
Zinc	2.28E-05	1.73E-05	1.35E-08	2.68E-03	1.57E-06	1.96E-03	1.34E-04	---	---	4.82E-03

Exposure Estimates for an Indigenous Receptor Teen at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	1.20E-06	1.37E-08	1.16E-06	1.68E-06	---	---	4.19E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	3.94E-05	5.76E-07	6.52E-06	1.01E-05	---	---	5.76E-05
Barium	1.68E-05	1.27E-05	9.93E-09	2.57E-05	1.50E-06	1.19E-03	1.39E-04	---	---	1.38E-03
Beryllium	1.17E-07	8.91E-08	6.95E-11	1.09E-06	2.29E-08	1.16E-06	3.35E-07	---	---	2.82E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	6.02E-07	1.31E-08	1.23E-05	3.35E-07	---	---	1.34E-05
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.97E-05	5.85E-06	4.29E-05	2.18E-05	---	---	1.06E-04
Cobalt	2.01E-06	1.53E-07	1.19E-09	2.19E-06	5.49E-06	1.21E-05	5.03E-06	---	---	2.69E-05
Copper	7.37E-06	3.36E-06	4.37E-09	8.75E-05	4.97E-05	5.79E-04	2.01E-05	---	---	7.47E-04
Lead	5.03E-06	2.29E-07	2.98E-09	4.98E-06	1.52E-07	1.01E-05	4.69E-06	---	---	2.52E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	3.28E-04	6.29E-05	3.75E-02	1.12E-03	---	---	3.92E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	2.19E-06	1.36E-05	4.59E-04	8.38E-07	---	---	4.76E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	2.19E-05	8.30E-06	8.94E-05	1.34E-05	---	---	1.42E-04
Selenium	1.91E-07	1.45E-08	1.13E-10	6.57E-05	1.54E-07	5.79E-06	2.18E-06	---	---	7.40E-05
Silver	1.68E-07	1.27E-08	9.93E-11	4.55E-05	6.34E-08	2.24E-06	1.68E-07	---	---	4.82E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	2.13E-06	1.33E-06	8.64E-07	1.68E-07	---	---	4.54E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	2.19E-07	1.95E-08	5.99E-07	5.03E-07	---	---	1.99E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	1.09E-05	3.36E-06	2.77E-05	1.17E-05	---	---	6.20E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	2.68E-03	1.56E-06	1.94E-03	1.01E-04	---	---	4.76E-03

Exposure Estimates for an Indigenous Receptor Teen at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	2.97E-06	6.44E-09	2.89E-07	4.13E-06	---	---	7.40E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	2.57E-04	3.96E-07	2.63E-06	6.55E-05	---	---	3.25E-04
Barium	1.04E-06	7.89E-07	6.15E-10	1.54E-05	1.03E-07	8.96E-05	8.31E-05	---	---	1.90E-04
Beryllium	2.65E-09	2.01E-09	1.57E-12	1.22E-05	1.61E-08	2.99E-07	3.73E-06	---	---	1.63E-05
Cadmium	5.05E-10	3.84E-11	2.99E-13	3.58E-08	3.52E-11	4.20E-08	1.99E-08	---	---	9.83E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	6.50E-05	5.05E-06	1.20E-04	7.19E-05	---	---	2.73E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	3.59E-06	3.12E-06	1.30E-05	8.24E-06	---	---	2.86E-05
Copper	4.83E-07	2.20E-07	2.86E-10	1.71E-04	7.34E-06	5.95E-05	3.92E-05	---	---	2.77E-04
Lead	1.55E-08	7.08E-10	9.21E-12	3.33E-06	4.77E-09	5.47E-07	3.13E-06	---	---	7.03E-06
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	1.56E-06	6.83E-04	0.00E+00	---	---	6.90E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	1.43E-04	4.36E-06	2.06E-04	5.47E-05	---	---	4.08E-04
Nickel	9.48E-06	6.49E-06	5.62E-09	2.52E-04	2.67E-05	3.25E-04	1.54E-04	---	---	7.73E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	3.15E-04	5.12E-09	7.44E-08	1.04E-05	---	---	3.25E-04
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	5.75E-10	2.68E-08	0.00E+00	---	---	2.86E-08
Thallium	3.43E-10	2.61E-11	2.03E-13	0.00E+00	2.10E-09	7.37E-09	0.00E+00	---	---	9.84E-09
Uranium	1.79E-09	1.36E-09	1.06E-12	2.81E-05	1.42E-07	6.08E-07	6.45E-05	---	---	9.33E-05
Vanadium	5.33E-07	4.05E-08	3.16E-10	8.11E-05	1.58E-06	1.18E-05	8.69E-05	---	---	1.82E-04
Zinc	3.41E-07	2.59E-07	2.02E-10	3.57E-03	2.12E-08	3.20E-05	1.34E-04	---	---	3.74E-03

Exposure Estimates for an Indigenous Receptor Teen at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	4.17E-06	2.01E-08	1.45E-06	5.81E-06	---	---	1.16E-05
Arsenic	9.33E-07	2.13E-07	5.53E-10	2.96E-04	9.72E-07	9.15E-06	7.55E-05	---	---	3.83E-04
Barium	1.78E-05	1.35E-05	1.05E-08	4.11E-05	1.60E-06	1.28E-03	2.22E-04	---	---	1.57E-03
Beryllium	1.20E-07	9.11E-08	7.11E-11	1.33E-05	3.90E-08	1.46E-06	4.07E-06	---	---	1.91E-05
Cadmium	1.75E-07	1.33E-08	1.04E-10	6.38E-07	1.31E-08	1.23E-05	3.55E-07	---	---	1.35E-05
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	8.47E-05	1.09E-05	1.63E-04	9.36E-05	---	---	3.78E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	5.78E-06	8.61E-06	2.51E-05	1.33E-05	---	---	5.55E-05
Copper	7.85E-06	3.58E-06	4.66E-09	2.58E-04	5.70E-05	6.38E-04	5.93E-05	---	---	1.02E-03
Lead	5.04E-06	2.30E-07	2.99E-09	8.31E-06	1.56E-07	1.07E-05	7.82E-06	---	---	3.22E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	3.28E-04	6.44E-05	3.82E-02	1.12E-03	---	---	3.99E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	1.45E-04	1.80E-05	6.65E-04	5.55E-05	---	---	8.84E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	2.74E-04	3.50E-05	4.14E-04	1.68E-04	---	---	9.15E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	3.80E-04	1.60E-07	5.86E-06	1.26E-05	---	---	3.99E-04
Silver	1.69E-07	1.28E-08	1.00E-10	4.55E-05	6.40E-08	2.27E-06	1.68E-07	---	---	4.82E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	2.13E-06	1.34E-06	8.72E-07	1.68E-07	---	---	4.55E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	2.83E-05	1.62E-07	1.21E-06	6.50E-05	---	---	9.53E-05
Vanadium	8.24E-06	6.26E-07	4.88E-09	9.21E-05	4.94E-06	3.95E-05	9.87E-05	---	---	2.44E-04
Zinc	2.28E-05	1.73E-05	1.35E-08	6.26E-03	1.58E-06	1.97E-03	2.35E-04	---	---	8.50E-03

Exposure Estimates for an Indigenous Receptor Teen at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	1.20E-06	1.37E-08	1.16E-06	1.68E-06	---	---	4.19E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	3.94E-05	5.76E-07	6.52E-06	1.01E-05	---	---	5.76E-05
Barium	1.68E-05	1.27E-05	9.93E-09	2.57E-05	1.50E-06	1.19E-03	1.39E-04	---	---	1.38E-03
Beryllium	1.17E-07	8.91E-08	6.95E-11	1.09E-06	2.29E-08	1.16E-06	3.35E-07	---	---	2.82E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	6.02E-07	1.31E-08	1.23E-05	3.35E-07	---	---	1.34E-05
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.97E-05	5.85E-06	4.29E-05	2.18E-05	---	---	1.06E-04
Cobalt	2.01E-06	1.53E-07	1.19E-09	2.19E-06	5.49E-06	1.21E-05	5.03E-06	---	---	2.69E-05
Copper	7.37E-06	3.36E-06	4.37E-09	8.75E-05	4.97E-05	5.79E-04	2.01E-05	---	---	7.47E-04
Lead	5.03E-06	2.29E-07	2.98E-09	4.98E-06	1.52E-07	1.01E-05	4.69E-06	---	---	2.52E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	3.28E-04	6.29E-05	3.75E-02	1.12E-03	---	---	3.92E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	2.19E-06	1.36E-05	4.59E-04	8.38E-07	---	---	4.76E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	2.19E-05	8.30E-06	8.94E-05	1.34E-05	---	---	1.42E-04
Selenium	1.91E-07	1.45E-08	1.13E-10	6.57E-05	1.54E-07	5.79E-06	2.18E-06	---	---	7.40E-05
Silver	1.68E-07	1.27E-08	9.93E-11	4.55E-05	6.34E-08	2.24E-06	1.68E-07	---	---	4.82E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	2.13E-06	1.33E-06	8.64E-07	1.68E-07	---	---	4.54E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	2.19E-07	1.95E-08	5.99E-07	5.03E-07	---	---	1.99E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	1.09E-05	3.36E-06	2.77E-05	1.17E-05	---	---	6.20E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	2.68E-03	1.56E-06	1.94E-03	1.01E-04	---	---	4.76E-03

Exposure Estimates for an Indigenous Receptor Teen at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	3.44E-06	7.40E-09	3.26E-07	4.78E-06	---	---	8.55E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	2.63E-04	4.05E-07	2.68E-06	6.70E-05	---	---	3.33E-04
Barium	1.04E-06	7.89E-07	6.15E-10	1.07E-06	7.58E-08	8.36E-05	5.77E-06	---	---	9.24E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	1.83E-05	2.40E-08	4.16E-07	5.61E-06	---	---	2.44E-05
Cadmium	5.05E-10	3.84E-11	2.99E-13	8.10E-09	3.06E-11	4.05E-08	4.51E-09	---	---	5.37E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	6.64E-05	5.05E-06	1.20E-04	7.34E-05	---	---	2.76E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	3.71E-06	3.17E-06	1.31E-05	8.51E-06	---	---	2.91E-05
Copper	4.83E-07	2.20E-07	2.86E-10	1.74E-04	7.44E-06	5.99E-05	4.00E-05	---	---	2.82E-04
Lead	1.55E-08	7.08E-10	9.21E-12	2.93E-06	4.27E-09	5.14E-07	2.76E-06	---	---	6.22E-06
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	1.56E-06	6.83E-04	0.00E+00	---	---	6.90E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	1.60E-04	4.84E-06	2.29E-04	6.11E-05	---	---	4.54E-04
Nickel	9.48E-06	6.49E-06	5.62E-09	2.79E-04	2.84E-05	3.28E-04	1.71E-04	---	---	8.22E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	3.34E-04	5.38E-09	7.53E-08	1.11E-05	---	---	3.45E-04
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	5.75E-10	2.68E-08	0.00E+00	---	---	2.86E-08
Thallium	3.43E-10	2.61E-11	2.03E-13	0.00E+00	2.10E-09	7.37E-09	0.00E+00	---	---	9.84E-09
Uranium	1.79E-09	1.36E-09	1.06E-12	2.87E-05	1.46E-07	6.21E-07	6.60E-05	---	---	9.55E-05
Vanadium	5.33E-07	4.05E-08	3.16E-10	8.28E-05	1.61E-06	1.18E-05	8.88E-05	---	---	1.86E-04
Zinc	3.41E-07	2.59E-07	2.02E-10	3.57E-03	2.12E-08	3.20E-05	1.34E-04	---	---	3.74E-03

Exposure Estimates for an Indigenous Receptor Teen at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	4.64E-06	2.11E-08	1.48E-06	6.46E-06	---	---	1.27E-05
Arsenic	9.33E-07	2.13E-07	5.53E-10	3.02E-04	9.81E-07	9.19E-06	7.71E-05	---	---	3.90E-04
Barium	1.78E-05	1.35E-05	1.05E-08	2.68E-05	1.57E-06	1.27E-03	1.45E-04	---	---	1.47E-03
Beryllium	1.20E-07	9.11E-08	7.11E-11	1.94E-05	4.69E-08	1.57E-06	5.94E-06	---	---	2.72E-05
Cadmium	1.75E-07	1.33E-08	1.04E-10	6.10E-07	1.31E-08	1.23E-05	3.40E-07	---	---	1.35E-05
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	8.61E-05	1.09E-05	1.63E-04	9.51E-05	---	---	3.81E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	5.89E-06	8.66E-06	2.51E-05	1.35E-05	---	---	5.60E-05
Copper	7.85E-06	3.58E-06	4.66E-09	2.62E-04	5.71E-05	6.39E-04	6.01E-05	---	---	1.03E-03
Lead	5.04E-06	2.30E-07	2.99E-09	7.91E-06	1.56E-07	1.06E-05	7.45E-06	---	---	3.14E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	3.28E-04	6.44E-05	3.82E-02	1.12E-03	---	---	3.99E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	1.62E-04	1.85E-05	6.88E-04	6.19E-05	---	---	9.30E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	3.01E-04	3.67E-05	4.18E-04	1.84E-04	---	---	9.64E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	3.99E-04	1.60E-07	5.86E-06	1.32E-05	---	---	4.19E-04
Silver	1.69E-07	1.28E-08	1.00E-10	4.55E-05	6.40E-08	2.27E-06	1.68E-07	---	---	4.82E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	2.13E-06	1.34E-06	8.72E-07	1.68E-07	---	---	4.55E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	2.90E-05	1.65E-07	1.22E-06	6.65E-05	---	---	9.75E-05
Vanadium	8.24E-06	6.26E-07	4.88E-09	9.38E-05	4.97E-06	3.95E-05	1.01E-04	---	---	2.48E-04
Zinc	2.28E-05	1.73E-05	1.35E-08	6.26E-03	1.58E-06	1.97E-03	2.35E-04	---	---	8.50E-03

Exposure Estimates for an Indigenous Receptor Teen at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	1.09E-06	1.35E-08	1.16E-06	1.68E-06	---	---	4.08E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	1.84E-05	5.59E-07	6.52E-06	1.51E-05	---	---	4.17E-05
Barium	1.68E-05	1.27E-05	9.93E-09	1.15E-05	1.48E-06	1.19E-03	1.26E-04	---	---	1.35E-03
Beryllium	1.17E-07	8.91E-08	6.95E-11	1.09E-06	2.28E-08	1.16E-06	3.35E-07	---	---	2.82E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	1.59E-06	1.29E-08	1.23E-05	6.53E-07	---	---	1.47E-05
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.26E-05	5.83E-06	4.29E-05	2.18E-05	---	---	9.84E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	2.19E-06	5.52E-06	1.21E-05	5.03E-06	---	---	2.70E-05
Copper	7.37E-06	3.36E-06	4.37E-09	9.03E-05	4.84E-05	5.79E-04	2.85E-05	---	---	7.57E-04
Lead	5.03E-06	2.29E-07	2.98E-09	2.19E-06	1.43E-07	1.01E-05	7.87E-06	---	---	2.56E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	7.60E-05	6.34E-05	3.75E-02	1.14E-03	---	---	3.90E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	2.19E-06	1.36E-05	4.59E-04	8.38E-07	---	---	4.76E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	2.19E-05	8.21E-06	8.94E-05	1.68E-05	---	---	1.45E-04
Selenium	1.91E-07	1.45E-08	1.13E-10	1.49E-04	1.57E-07	5.79E-06	2.01E-06	---	---	1.58E-04
Silver	1.68E-07	1.27E-08	9.93E-11	4.55E-05	6.04E-08	2.07E-06	1.68E-07	---	---	4.80E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	1.14E-06	1.33E-06	8.64E-07	1.68E-07	---	---	3.54E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	2.19E-07	1.94E-08	5.99E-07	6.70E-07	---	---	2.16E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	1.09E-05	3.35E-06	2.77E-05	1.83E-05	---	---	6.86E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	4.87E-03	1.54E-06	1.94E-03	1.17E-04	---	---	6.97E-03

Exposure Estimates for an Indigenous Receptor Teen at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	7.06E-07	2.32E-09	1.36E-07	1.08E-06	---	---	1.93E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	1.91E-05	1.05E-07	1.11E-06	1.56E-05	---	---	3.59E-05
Barium	1.04E-06	7.89E-07	6.15E-10	6.04E-06	1.02E-07	8.96E-05	6.61E-05	---	---	1.64E-04
Beryllium	2.65E-09	2.01E-09	1.57E-12	0.00E+00	4.49E-10	6.52E-08	0.00E+00	---	---	7.03E-08
Cadmium	5.05E-10	3.84E-11	2.99E-13	0.00E+00	2.92E-11	4.00E-08	0.00E+00	---	---	4.06E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	1.04E-05	4.84E-06	1.19E-04	1.79E-05	---	---	1.63E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	9.05E-07	1.91E-06	1.16E-05	2.08E-06	---	---	1.71E-05
Copper	4.83E-07	2.20E-07	2.86E-10	2.71E-05	3.83E-06	4.75E-05	8.54E-06	---	---	8.77E-05
Lead	1.55E-08	7.08E-10	9.21E-12	2.53E-07	1.83E-09	3.62E-07	9.10E-07	---	---	1.54E-06
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	1.56E-06	6.83E-04	0.00E+00	---	---	6.90E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	4.65E-05	1.88E-06	8.70E-05	1.78E-05	---	---	1.53E-04
Nickel	9.48E-06	6.49E-06	5.62E-09	5.25E-05	1.53E-05	3.01E-04	4.02E-05	---	---	4.25E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	2.00E-04	1.86E-09	6.15E-08	2.70E-06	---	---	2.03E-04
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	5.75E-10	2.68E-08	0.00E+00	---	---	2.86E-08
Thallium	3.43E-10	2.61E-11	2.03E-13	0.00E+00	2.10E-09	7.37E-09	0.00E+00	---	---	9.84E-09
Uranium	1.79E-09	1.36E-09	1.06E-12	5.25E-06	3.25E-08	1.64E-07	1.61E-05	---	---	2.15E-05
Vanadium	5.33E-07	4.05E-08	3.16E-10	1.24E-05	4.57E-07	1.05E-05	2.08E-05	---	---	4.48E-05
Zinc	3.41E-07	2.59E-07	2.02E-10	1.25E-03	1.49E-08	2.59E-05	3.00E-05	---	---	1.30E-03

Exposure Estimates for an Indigenous Receptor Teen at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	1.80E-06	1.58E-08	1.29E-06	2.76E-06	---	---	6.00E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	3.75E-05	6.63E-07	7.63E-06	3.07E-05	---	---	7.76E-05
Barium	1.78E-05	1.35E-05	1.05E-08	1.75E-05	1.58E-06	1.28E-03	1.92E-04	---	---	1.52E-03
Beryllium	1.20E-07	9.11E-08	7.11E-11	1.09E-06	2.32E-08	1.22E-06	3.35E-07	---	---	2.89E-06
Cadmium	1.75E-07	1.33E-08	1.04E-10	1.59E-06	1.29E-08	1.23E-05	6.53E-07	---	---	1.48E-05
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	2.29E-05	1.07E-05	1.62E-04	3.97E-05	---	---	2.61E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	3.09E-06	7.43E-06	2.37E-05	7.10E-06	---	---	4.41E-05
Copper	7.85E-06	3.58E-06	4.66E-09	1.17E-04	5.22E-05	6.26E-04	3.70E-05	---	---	8.44E-04
Lead	5.04E-06	2.30E-07	2.99E-09	2.44E-06	1.45E-07	1.05E-05	8.78E-06	---	---	2.71E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	7.60E-05	6.49E-05	3.82E-02	1.14E-03	---	---	3.96E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	4.87E-05	1.55E-05	5.46E-04	1.86E-05	---	---	6.29E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	7.44E-05	2.36E-05	3.91E-04	5.70E-05	---	---	5.71E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	3.50E-04	1.59E-07	5.85E-06	4.71E-06	---	---	3.61E-04
Silver	1.69E-07	1.28E-08	1.00E-10	4.55E-05	6.09E-08	2.09E-06	1.68E-07	---	---	4.80E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	1.14E-06	1.33E-06	8.72E-07	1.68E-07	---	---	3.55E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	5.47E-06	5.20E-08	7.63E-07	1.68E-05	---	---	2.37E-05
Vanadium	8.24E-06	6.26E-07	4.88E-09	2.34E-05	3.81E-06	3.82E-05	3.90E-05	---	---	1.13E-04
Zinc	2.28E-05	1.73E-05	1.35E-08	6.12E-03	1.55E-06	1.96E-03	1.47E-04	---	---	8.27E-03

Exposure Estimates for an Indigenous Receptor Teen at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	1.09E-06	1.35E-08	1.16E-06	1.68E-06	---	---	4.08E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	1.84E-05	5.59E-07	6.52E-06	1.51E-05	---	---	4.17E-05
Barium	1.68E-05	1.27E-05	9.93E-09	1.15E-05	1.48E-06	1.19E-03	1.26E-04	---	---	1.35E-03
Beryllium	1.17E-07	8.91E-08	6.95E-11	1.09E-06	2.28E-08	1.16E-06	3.35E-07	---	---	2.82E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	1.59E-06	1.29E-08	1.23E-05	6.53E-07	---	---	1.47E-05
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.26E-05	5.83E-06	4.29E-05	2.18E-05	---	---	9.84E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	2.19E-06	5.52E-06	1.21E-05	5.03E-06	---	---	2.70E-05
Copper	7.37E-06	3.36E-06	4.37E-09	9.03E-05	4.84E-05	5.79E-04	2.85E-05	---	---	7.57E-04
Lead	5.03E-06	2.29E-07	2.98E-09	2.19E-06	1.43E-07	1.01E-05	7.87E-06	---	---	2.56E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	7.60E-05	6.34E-05	3.75E-02	1.14E-03	---	---	3.90E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	2.19E-06	1.36E-05	4.59E-04	8.38E-07	---	---	4.76E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	2.19E-05	8.21E-06	8.94E-05	1.68E-05	---	---	1.45E-04
Selenium	1.91E-07	1.45E-08	1.13E-10	1.49E-04	1.57E-07	5.79E-06	2.01E-06	---	---	1.58E-04
Silver	1.68E-07	1.27E-08	9.93E-11	4.55E-05	6.04E-08	2.07E-06	1.68E-07	---	---	4.80E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	1.14E-06	1.33E-06	8.64E-07	1.68E-07	---	---	3.54E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	2.19E-07	1.94E-08	5.99E-07	6.70E-07	---	---	2.16E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	1.09E-05	3.35E-06	2.77E-05	1.83E-05	---	---	6.86E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	4.87E-03	1.54E-06	1.94E-03	1.17E-04	---	---	6.97E-03

Exposure Estimates for an Indigenous Receptor Teen at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	3.30E-07	1.29E-09	9.43E-08	5.05E-07	---	---	9.35E-07
Arsenic	2.83E-08	6.44E-09	1.67E-11	2.46E-06	2.08E-08	6.54E-07	2.01E-06	---	---	5.18E-06
Barium	1.04E-06	7.89E-07	6.15E-10	7.98E-07	7.75E-08	8.40E-05	8.73E-06	---	---	9.55E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	0.00E+00	4.49E-10	6.52E-08	0.00E+00	---	---	7.03E-08
Cadmium	5.05E-10	3.84E-11	2.99E-13	0.00E+00	2.92E-11	4.00E-08	0.00E+00	---	---	4.06E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	1.26E-06	4.79E-06	1.19E-04	2.18E-06	---	---	1.38E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	1.39E-07	1.67E-06	1.14E-05	3.18E-07	---	---	1.41E-05
Copper	4.83E-07	2.20E-07	2.86E-10	3.19E-06	2.67E-06	4.33E-05	1.01E-06	---	---	5.09E-05
Lead	1.55E-08	7.08E-10	9.21E-12	6.48E-10	6.12E-10	2.70E-07	2.33E-09	---	---	2.90E-07
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	1.56E-06	6.83E-04	0.00E+00	---	---	6.90E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	1.05E-05	6.11E-07	2.54E-05	4.03E-06	---	---	4.05E-05
Nickel	9.48E-06	6.49E-06	5.62E-09	8.75E-06	1.24E-05	2.95E-04	6.70E-06	---	---	3.39E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	4.61E-05	1.08E-09	5.94E-08	6.20E-07	---	---	4.67E-05
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	5.75E-10	2.68E-08	0.00E+00	---	---	2.86E-08
Thallium	3.43E-10	2.61E-11	2.03E-13	2.20E-08	1.11E-08	1.23E-08	3.22E-09	---	---	4.90E-08
Uranium	1.79E-09	1.36E-09	1.06E-12	6.51E-07	4.08E-09	4.82E-08	1.99E-06	---	---	2.70E-06
Vanadium	5.33E-07	4.05E-08	3.16E-10	1.51E-06	2.19E-07	1.02E-05	2.51E-06	---	---	1.51E-05
Zinc	3.41E-07	2.59E-07	2.02E-10	1.39E-04	1.32E-08	2.42E-05	3.35E-06	---	---	1.67E-04

Exposure Estimates for an Indigenous Receptor Teen at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	1.42E-06	1.48E-08	1.25E-06	2.18E-06	---	---	5.01E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	2.09E-05	5.80E-07	7.17E-06	1.71E-05	---	---	4.69E-05
Barium	1.78E-05	1.35E-05	1.05E-08	1.23E-05	1.56E-06	1.27E-03	1.34E-04	---	---	1.45E-03
Beryllium	1.20E-07	9.11E-08	7.11E-11	1.09E-06	2.32E-08	1.22E-06	3.35E-07	---	---	2.89E-06
Cadmium	1.75E-07	1.33E-08	1.04E-10	1.59E-06	1.29E-08	1.23E-05	6.53E-07	---	---	1.48E-05
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	1.38E-05	1.06E-05	1.62E-04	2.40E-05	---	---	2.36E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	2.33E-06	7.19E-06	2.34E-05	5.34E-06	---	---	4.10E-05
Copper	7.85E-06	3.58E-06	4.66E-09	9.35E-05	5.10E-05	6.22E-04	2.95E-05	---	---	8.08E-04
Lead	5.04E-06	2.30E-07	2.99E-09	2.19E-06	1.44E-07	1.04E-05	7.88E-06	---	---	2.59E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	7.60E-05	6.49E-05	3.82E-02	1.14E-03	---	---	3.96E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	1.27E-05	1.42E-05	4.84E-04	4.87E-06	---	---	5.16E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	3.06E-05	2.06E-05	3.85E-04	2.35E-05	---	---	4.84E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	1.95E-04	1.58E-07	5.85E-06	2.63E-06	---	---	2.04E-04
Silver	1.69E-07	1.28E-08	1.00E-10	4.55E-05	6.09E-08	2.09E-06	1.68E-07	---	---	4.80E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	1.17E-06	1.34E-06	8.77E-07	1.71E-07	---	---	3.59E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	8.70E-07	2.35E-08	6.47E-07	2.66E-06	---	---	4.86E-06
Vanadium	8.24E-06	6.26E-07	4.88E-09	1.24E-05	3.57E-06	3.80E-05	2.08E-05	---	---	8.36E-05
Zinc	2.28E-05	1.73E-05	1.35E-08	5.01E-03	1.55E-06	1.96E-03	1.21E-04	---	---	7.14E-03

Exposure Estimates for a Recreational Receptor Teen at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	8.11E-07	3.70E-09	2.72E-07	1.68E-06	---	---	2.90E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	2.65E-05	1.62E-07	1.69E-06	1.17E-05	---	---	4.12E-05
Barium	1.68E-05	1.27E-05	9.93E-09	1.73E-05	4.05E-07	2.70E-04	1.22E-04	---	---	4.40E-04
Beryllium	1.17E-07	8.91E-08	6.95E-11	7.37E-07	6.29E-09	2.72E-07	3.35E-07	---	---	1.56E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	4.05E-07	3.85E-09	2.81E-06	7.04E-07	---	---	4.11E-06
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.33E-05	1.67E-06	1.09E-05	2.18E-05	---	---	6.29E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	1.47E-06	1.48E-06	2.96E-06	3.35E-06	---	---	1.14E-05
Copper	7.37E-06	3.36E-06	4.37E-09	5.90E-05	1.42E-05	1.30E-04	3.85E-05	---	---	2.53E-04
Lead	5.03E-06	2.29E-07	2.98E-09	3.35E-06	4.28E-08	2.73E-06	6.87E-06	---	---	1.83E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	2.21E-04	1.69E-05	1.07E-02	6.62E-04	---	---	1.17E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	1.47E-06	3.64E-06	1.14E-04	8.38E-07	---	---	1.20E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	1.47E-05	2.28E-06	2.03E-05	1.51E-05	---	---	6.14E-05
Selenium	1.91E-07	1.45E-08	1.13E-10	4.42E-05	4.42E-08	1.36E-06	3.18E-06	---	---	4.90E-05
Silver	1.68E-07	1.27E-08	9.93E-11	3.07E-05	1.73E-08	6.11E-07	1.68E-07	---	---	3.16E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	1.44E-06	3.59E-07	2.66E-07	1.68E-07	---	---	2.27E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	1.47E-07	5.24E-09	1.37E-07	6.70E-07	---	---	1.61E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	7.37E-06	9.06E-07	6.28E-06	1.34E-05	---	---	3.63E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	1.81E-03	4.60E-07	5.04E-04	1.34E-04	---	---	2.48E-03

Exposure Estimates for a Recreational Receptor Teen at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	6.43E-07	6.27E-10	3.79E-08	1.33E-06	---	---	2.01E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	3.32E-07	2.51E-09	1.36E-07	1.47E-07	---	---	6.51E-07
Barium	1.04E-06	7.89E-07	6.15E-10	6.97E-08	1.98E-08	1.83E-05	4.92E-07	---	---	2.07E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	0.00E+00	1.21E-10	1.48E-08	0.00E+00	---	---	1.96E-08
Cadmium	5.05E-10	3.84E-11	2.99E-13	0.00E+00	7.90E-12	8.80E-09	0.00E+00	---	---	9.35E-09
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	0.00E+00	1.29E-06	2.73E-05	0.00E+00	---	---	3.94E-05
Cobalt	5.56E-07	4.22E-08	3.29E-10	1.09E-07	4.52E-07	2.61E-06	2.49E-07	---	---	4.02E-06
Copper	4.83E-07	2.20E-07	2.86E-10	0.00E+00	6.73E-07	9.39E-06	0.00E+00	---	---	1.08E-05
Lead	1.55E-08	7.08E-10	9.21E-12	0.00E+00	1.64E-10	6.26E-08	0.00E+00	---	---	7.90E-08
Manganese	4.80E-06	3.65E-07	2.85E-09	3.48E-06	4.39E-07	1.71E-04	1.04E-05	---	---	1.90E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	1.73E-05	2.64E-07	1.35E-05	9.85E-06	---	---	4.10E-05
Nickel	9.48E-06	6.49E-06	5.62E-09	5.53E-06	3.33E-06	6.65E-05	5.66E-06	---	---	9.70E-05
Selenium	1.42E-09	1.08E-10	8.41E-13	1.32E-05	3.35E-10	1.36E-08	9.53E-07	---	---	1.42E-05
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	1.56E-10	6.10E-09	0.00E+00	---	---	7.51E-09
Thallium	3.43E-10	2.61E-11	2.03E-13	1.41E-07	1.44E-08	1.11E-08	1.65E-08	---	---	1.84E-07
Uranium	1.79E-09	1.36E-09	1.06E-12	0.00E+00	1.27E-11	7.36E-09	0.00E+00	---	---	1.05E-08
Vanadium	5.33E-07	4.05E-08	3.16E-10	0.00E+00	5.03E-08	2.35E-06	0.00E+00	---	---	2.97E-06
Zinc	3.41E-07	2.59E-07	2.02E-10	0.00E+00	3.49E-09	5.29E-06	0.00E+00	---	---	5.89E-06

Exposure Estimates for a Recreational Receptor Teen at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	1.45E-06	4.33E-09	3.10E-07	3.00E-06	---	---	4.91E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	2.69E-05	1.65E-07	1.82E-06	1.19E-05	---	---	4.19E-05
Barium	1.78E-05	1.35E-05	1.05E-08	1.74E-05	4.25E-07	2.89E-04	1.23E-04	---	---	4.61E-04
Beryllium	1.20E-07	9.11E-08	7.11E-11	7.37E-07	6.41E-09	2.87E-07	3.35E-07	---	---	1.58E-06
Cadmium	1.75E-07	1.33E-08	1.04E-10	4.05E-07	3.85E-09	2.82E-06	7.04E-07	---	---	4.12E-06
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	1.33E-05	2.96E-06	3.82E-05	2.18E-05	---	---	1.02E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	1.58E-06	1.93E-06	5.57E-06	3.60E-06	---	---	1.55E-05
Copper	7.85E-06	3.58E-06	4.66E-09	5.90E-05	1.48E-05	1.40E-04	3.85E-05	---	---	2.64E-04
Lead	5.04E-06	2.30E-07	2.99E-09	3.35E-06	4.30E-08	2.80E-06	6.87E-06	---	---	1.83E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	2.25E-04	1.73E-05	1.08E-02	6.72E-04	---	---	1.19E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	1.88E-05	3.91E-06	1.27E-04	1.07E-05	---	---	1.61E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	2.03E-05	5.61E-06	8.68E-05	2.07E-05	---	---	1.58E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	5.75E-05	4.45E-08	1.38E-06	4.14E-06	---	---	6.32E-05
Silver	1.69E-07	1.28E-08	1.00E-10	3.07E-05	1.75E-08	6.17E-07	1.68E-07	---	---	3.16E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	1.58E-06	3.73E-07	2.77E-07	1.84E-07	---	---	2.45E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	1.47E-07	5.25E-09	1.45E-07	6.70E-07	---	---	1.62E-06
Vanadium	8.24E-06	6.26E-07	4.88E-09	7.37E-06	9.56E-07	8.63E-06	1.34E-05	---	---	3.92E-05
Zinc	2.28E-05	1.73E-05	1.35E-08	1.81E-03	4.63E-07	5.09E-04	1.34E-04	---	---	2.49E-03

Exposure Estimates for a Recreational Receptor Teen at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	8.11E-07	3.70E-09	2.72E-07	1.68E-06	---	---	2.90E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	2.65E-05	1.62E-07	1.69E-06	1.01E-05	---	---	3.95E-05
Barium	1.68E-05	1.27E-05	9.93E-09	1.73E-05	4.05E-07	2.70E-04	1.39E-04	---	---	4.57E-04
Beryllium	1.17E-07	8.91E-08	6.95E-11	7.37E-07	6.29E-09	2.72E-07	3.35E-07	---	---	1.56E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	4.05E-07	3.84E-09	2.81E-06	3.35E-07	---	---	3.74E-06
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.33E-05	1.67E-06	1.09E-05	2.18E-05	---	---	6.29E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	1.47E-06	1.48E-06	2.96E-06	5.03E-06	---	---	1.31E-05
Copper	7.37E-06	3.36E-06	4.37E-09	5.90E-05	1.41E-05	1.30E-04	2.01E-05	---	---	2.34E-04
Lead	5.03E-06	2.29E-07	2.98E-09	3.35E-06	4.28E-08	2.73E-06	4.69E-06	---	---	1.61E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	2.21E-04	1.69E-05	1.07E-02	1.12E-03	---	---	1.21E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	1.47E-06	3.64E-06	1.14E-04	8.38E-07	---	---	1.20E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	1.47E-05	2.28E-06	2.03E-05	1.34E-05	---	---	5.98E-05
Selenium	1.91E-07	1.45E-08	1.13E-10	4.42E-05	4.41E-08	1.36E-06	2.18E-06	---	---	4.80E-05
Silver	1.68E-07	1.27E-08	9.93E-11	3.07E-05	1.73E-08	6.11E-07	1.68E-07	---	---	3.16E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	1.44E-06	3.59E-07	2.66E-07	1.68E-07	---	---	2.27E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	1.47E-07	5.24E-09	1.37E-07	5.03E-07	---	---	1.44E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	7.37E-06	9.06E-07	6.28E-06	1.17E-05	---	---	3.46E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	1.81E-03	4.60E-07	5.04E-04	1.01E-04	---	---	2.45E-03

Exposure Estimates for a Recreational Receptor Teen at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	2.00E-06	1.73E-09	9.05E-08	4.13E-06	---	---	6.23E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	1.73E-04	1.10E-07	8.17E-07	6.55E-05	---	---	2.39E-04
Barium	1.04E-06	7.89E-07	6.15E-10	1.04E-05	2.78E-08	2.04E-05	8.31E-05	---	---	1.16E-04
Beryllium	2.65E-09	2.01E-09	1.57E-12	8.22E-06	4.50E-09	9.30E-08	3.73E-06	---	---	1.21E-05
Cadmium	5.05E-10	3.84E-11	2.99E-13	2.41E-08	9.84E-12	9.45E-09	1.99E-08	---	---	5.40E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	4.38E-05	1.36E-06	2.77E-05	7.19E-05	---	---	1.56E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	2.42E-06	8.39E-07	3.16E-06	8.24E-06	---	---	1.53E-05
Copper	4.83E-07	2.20E-07	2.86E-10	1.15E-04	2.07E-06	1.50E-05	3.92E-05	---	---	1.72E-04
Lead	1.55E-08	7.08E-10	9.21E-12	2.24E-06	1.36E-09	1.55E-07	3.13E-06	---	---	5.55E-06
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	4.18E-07	1.49E-04	0.00E+00	---	---	1.55E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	9.63E-05	1.17E-06	6.80E-05	5.47E-05	---	---	2.20E-04
Nickel	9.48E-06	6.49E-06	5.62E-09	1.70E-04	7.27E-06	7.64E-05	1.54E-04	---	---	4.23E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	2.12E-04	1.41E-09	1.83E-08	1.04E-05	---	---	2.22E-04
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	1.56E-10	6.10E-09	0.00E+00	---	---	7.51E-09
Thallium	3.43E-10	2.61E-11	2.03E-13	0.00E+00	5.64E-10	1.69E-09	0.00E+00	---	---	2.62E-09
Uranium	1.79E-09	1.36E-09	1.06E-12	1.89E-05	3.80E-08	2.00E-07	6.45E-05	---	---	8.36E-05
Vanadium	5.33E-07	4.05E-08	3.16E-10	5.46E-05	4.25E-07	2.87E-06	8.69E-05	---	---	1.45E-04
Zinc	3.41E-07	2.59E-07	2.02E-10	2.41E-03	5.78E-09	7.97E-06	1.34E-04	---	---	2.55E-03

Exposure Estimates for a Recreational Receptor Teen at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	2.81E-06	5.43E-09	3.63E-07	5.81E-06	---	---	9.12E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	1.99E-04	2.72E-07	2.50E-06	7.55E-05	---	---	2.79E-04
Barium	1.78E-05	1.35E-05	1.05E-08	2.77E-05	4.33E-07	2.91E-04	2.22E-04	---	---	5.72E-04
Beryllium	1.20E-07	9.11E-08	7.11E-11	8.95E-06	1.08E-08	3.65E-07	4.07E-06	---	---	1.36E-05
Cadmium	1.75E-07	1.33E-08	1.04E-10	4.29E-07	3.85E-09	2.82E-06	3.55E-07	---	---	3.79E-06
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	5.70E-05	3.03E-06	3.86E-05	9.36E-05	---	---	2.19E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	3.89E-06	2.32E-06	6.13E-06	1.33E-05	---	---	2.84E-05
Copper	7.85E-06	3.58E-06	4.66E-09	1.74E-04	1.62E-05	1.45E-04	5.93E-05	---	---	4.06E-04
Lead	5.04E-06	2.30E-07	2.99E-09	5.59E-06	4.42E-08	2.89E-06	7.82E-06	---	---	2.16E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	2.21E-04	1.73E-05	1.08E-02	1.12E-03	---	---	1.23E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	9.78E-05	4.81E-06	1.82E-04	5.55E-05	---	---	3.40E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	1.84E-04	9.55E-06	9.67E-05	1.68E-04	---	---	4.83E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	2.56E-04	4.55E-08	1.38E-06	1.26E-05	---	---	2.70E-04
Silver	1.69E-07	1.28E-08	1.00E-10	3.07E-05	1.75E-08	6.17E-07	1.68E-07	---	---	3.16E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	1.44E-06	3.60E-07	2.68E-07	1.68E-07	---	---	2.27E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	1.91E-05	4.33E-08	3.37E-07	6.50E-05	---	---	8.51E-05
Vanadium	8.24E-06	6.26E-07	4.88E-09	6.20E-05	1.33E-06	9.15E-06	9.87E-05	---	---	1.80E-04
Zinc	2.28E-05	1.73E-05	1.35E-08	4.21E-03	4.66E-07	5.12E-04	2.35E-04	---	---	5.00E-03

Exposure Estimates for a Recreational Receptor Teen at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	8.11E-07	3.70E-09	2.72E-07	1.68E-06	---	---	2.90E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	2.65E-05	1.62E-07	1.69E-06	1.01E-05	---	---	3.95E-05
Barium	1.68E-05	1.27E-05	9.93E-09	1.73E-05	4.05E-07	2.70E-04	1.39E-04	---	---	4.57E-04
Beryllium	1.17E-07	8.91E-08	6.95E-11	7.37E-07	6.29E-09	2.72E-07	3.35E-07	---	---	1.56E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	4.05E-07	3.84E-09	2.81E-06	3.35E-07	---	---	3.74E-06
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	1.33E-05	1.67E-06	1.09E-05	2.18E-05	---	---	6.29E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	1.47E-06	1.48E-06	2.96E-06	5.03E-06	---	---	1.31E-05
Copper	7.37E-06	3.36E-06	4.37E-09	5.90E-05	1.41E-05	1.30E-04	2.01E-05	---	---	2.34E-04
Lead	5.03E-06	2.29E-07	2.98E-09	3.35E-06	4.28E-08	2.73E-06	4.69E-06	---	---	1.61E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	2.21E-04	1.69E-05	1.07E-02	1.12E-03	---	---	1.21E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	1.47E-06	3.64E-06	1.14E-04	8.38E-07	---	---	1.20E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	1.47E-05	2.28E-06	2.03E-05	1.34E-05	---	---	5.98E-05
Selenium	1.91E-07	1.45E-08	1.13E-10	4.42E-05	4.41E-08	1.36E-06	2.18E-06	---	---	4.80E-05
Silver	1.68E-07	1.27E-08	9.93E-11	3.07E-05	1.73E-08	6.11E-07	1.68E-07	---	---	3.16E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	1.44E-06	3.59E-07	2.66E-07	1.68E-07	---	---	2.27E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	1.47E-07	5.24E-09	1.37E-07	5.03E-07	---	---	1.44E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	7.37E-06	9.06E-07	6.28E-06	1.17E-05	---	---	3.46E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	1.81E-03	4.60E-07	5.04E-04	1.01E-04	---	---	2.45E-03

Exposure Estimates for a Recreational Receptor Teen at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	2.31E-06	1.98E-09	1.03E-07	4.78E-06	---	---	7.20E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	1.77E-04	1.13E-07	8.33E-07	6.70E-05	---	---	2.45E-04
Barium	1.04E-06	7.89E-07	6.15E-10	7.18E-07	2.03E-08	1.84E-05	5.77E-06	---	---	2.68E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	1.23E-05	6.70E-09	1.32E-07	5.61E-06	---	---	1.81E-05
Cadmium	5.05E-10	3.84E-11	2.99E-13	5.46E-09	8.34E-12	8.95E-09	4.51E-09	---	---	1.95E-08
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	4.47E-05	1.37E-06	2.77E-05	7.34E-05	---	---	1.58E-04
Cobalt	5.56E-07	4.22E-08	3.29E-10	2.50E-06	8.52E-07	3.18E-06	8.51E-06	---	---	1.56E-05
Copper	4.83E-07	2.20E-07	2.86E-10	1.17E-04	2.10E-06	1.51E-05	4.00E-05	---	---	1.75E-04
Lead	1.55E-08	7.08E-10	9.21E-12	1.97E-06	1.22E-09	1.44E-07	2.76E-06	---	---	4.90E-06
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	4.18E-07	1.49E-04	0.00E+00	---	---	1.55E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	1.07E-04	1.30E-06	7.57E-05	6.11E-05	---	---	2.46E-04
Nickel	9.48E-06	6.49E-06	5.62E-09	1.88E-04	7.72E-06	7.75E-05	1.71E-04	---	---	4.60E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	2.25E-04	1.48E-09	1.86E-08	1.11E-05	---	---	2.36E-04
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	1.56E-10	6.10E-09	0.00E+00	---	---	7.51E-09
Thallium	3.43E-10	2.61E-11	2.03E-13	0.00E+00	5.64E-10	1.69E-09	0.00E+00	---	---	2.62E-09
Uranium	1.79E-09	1.36E-09	1.06E-12	1.94E-05	3.89E-08	2.05E-07	6.60E-05	---	---	8.56E-05
Vanadium	5.33E-07	4.05E-08	3.16E-10	5.58E-05	4.33E-07	2.88E-06	8.88E-05	---	---	1.48E-04
Zinc	3.41E-07	2.59E-07	2.02E-10	2.41E-03	5.78E-09	7.97E-06	1.34E-04	---	---	2.55E-03

Exposure Estimates for a Recreational Receptor Teen at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	3.12E-06	5.68E-09	3.75E-07	6.46E-06	---	---	1.01E-05
Arsenic	9.33E-07	2.13E-07	5.53E-10	2.03E-04	2.75E-07	2.52E-06	7.71E-05	---	---	2.84E-04
Barium	1.78E-05	1.35E-05	1.05E-08	1.80E-05	4.26E-07	2.89E-04	1.45E-04	---	---	4.83E-04
Beryllium	1.20E-07	9.11E-08	7.11E-11	1.31E-05	1.30E-08	4.04E-07	5.94E-06	---	---	1.96E-05
Cadmium	1.75E-07	1.33E-08	1.04E-10	4.11E-07	3.85E-09	2.82E-06	3.40E-07	---	---	3.76E-06
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	5.80E-05	3.03E-06	3.86E-05	9.51E-05	---	---	2.21E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	3.97E-06	2.34E-06	6.15E-06	1.35E-05	---	---	2.87E-05
Copper	7.85E-06	3.58E-06	4.66E-09	1.76E-04	1.62E-05	1.45E-04	6.01E-05	---	---	4.10E-04
Lead	5.04E-06	2.30E-07	2.99E-09	5.33E-06	4.40E-08	2.88E-06	7.45E-06	---	---	2.10E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	2.21E-04	1.73E-05	1.08E-02	1.12E-03	---	---	1.23E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	1.09E-04	4.94E-06	1.90E-04	6.19E-05	---	---	3.66E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	2.03E-04	1.00E-05	9.79E-05	1.84E-04	---	---	5.20E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	2.69E-04	4.56E-08	1.38E-06	1.32E-05	---	---	2.84E-04
Silver	1.69E-07	1.28E-08	1.00E-10	3.07E-05	1.75E-08	6.17E-07	1.68E-07	---	---	3.16E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	1.44E-06	3.60E-07	2.68E-07	1.68E-07	---	---	2.27E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	1.95E-05	4.41E-08	3.42E-07	6.65E-05	---	---	8.70E-05
Vanadium	8.24E-06	6.26E-07	4.88E-09	6.32E-05	1.34E-06	9.16E-06	1.01E-04	---	---	1.83E-04
Zinc	2.28E-05	1.73E-05	1.35E-08	4.21E-03	4.66E-07	5.12E-04	2.35E-04	---	---	5.00E-03

Exposure Estimates for a Recreational Receptor Teen at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	7.37E-07	3.64E-09	2.72E-07	1.68E-06	---	---	2.82E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	1.24E-05	1.56E-07	1.69E-06	1.51E-05	---	---	3.04E-05
Barium	1.68E-05	1.27E-05	9.93E-09	7.74E-06	4.00E-07	2.70E-04	1.26E-04	---	---	4.34E-04
Beryllium	1.17E-07	8.91E-08	6.95E-11	7.37E-07	6.26E-09	2.72E-07	3.35E-07	---	---	1.56E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	1.07E-06	3.77E-09	2.81E-06	6.53E-07	---	---	4.72E-06
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	8.48E-06	1.66E-06	1.09E-05	2.18E-05	---	---	5.81E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	1.47E-06	1.49E-06	2.96E-06	5.03E-06	---	---	1.31E-05
Copper	7.37E-06	3.36E-06	4.37E-09	6.08E-05	1.37E-05	1.30E-04	2.85E-05	---	---	2.44E-04
Lead	5.03E-06	2.29E-07	2.98E-09	1.47E-06	4.01E-08	2.73E-06	7.87E-06	---	---	1.74E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	5.12E-05	1.71E-05	1.07E-02	1.14E-03	---	---	1.20E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	1.47E-06	3.63E-06	1.14E-04	8.38E-07	---	---	1.20E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	1.47E-05	2.25E-06	2.03E-05	1.68E-05	---	---	6.31E-05
Selenium	1.91E-07	1.45E-08	1.13E-10	1.01E-04	4.51E-08	1.36E-06	2.01E-06	---	---	1.04E-04
Silver	1.68E-07	1.27E-08	9.93E-11	3.07E-05	1.65E-08	5.51E-07	1.68E-07	---	---	3.16E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	7.70E-07	3.57E-07	2.66E-07	1.68E-07	---	---	1.60E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	1.47E-07	5.21E-09	1.37E-07	6.70E-07	---	---	1.61E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	7.37E-06	9.04E-07	6.28E-06	1.83E-05	---	---	4.11E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	3.28E-03	4.50E-07	5.04E-04	1.17E-04	---	---	3.94E-03

Exposure Estimates for a Recreational Receptor Teen at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	4.75E-07	6.21E-10	3.93E-08	1.08E-06	---	---	1.60E-06
Arsenic	2.83E-08	6.44E-09	1.67E-11	1.28E-05	2.89E-08	3.09E-07	1.56E-05	---	---	2.88E-05
Barium	1.04E-06	7.89E-07	6.15E-10	4.07E-06	2.75E-08	2.04E-05	6.61E-05	---	---	9.24E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	0.00E+00	1.21E-10	1.48E-08	0.00E+00	---	---	1.96E-08
Cadmium	5.05E-10	3.84E-11	2.99E-13	0.00E+00	7.90E-12	8.80E-09	0.00E+00	---	---	9.35E-09
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	6.98E-06	1.31E-06	2.74E-05	1.79E-05	---	---	6.44E-05
Cobalt	5.56E-07	4.22E-08	3.29E-10	6.09E-07	5.15E-07	2.70E-06	2.08E-06	---	---	6.50E-06
Copper	4.83E-07	2.20E-07	2.86E-10	1.82E-05	1.05E-06	1.10E-05	8.54E-06	---	---	3.95E-05
Lead	1.55E-08	7.08E-10	9.21E-12	1.70E-07	5.12E-10	9.33E-08	9.10E-07	---	---	1.19E-06
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	4.18E-07	1.49E-04	0.00E+00	---	---	1.55E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	3.13E-05	5.02E-07	2.82E-05	1.78E-05	---	---	7.79E-05
Nickel	9.48E-06	6.49E-06	5.62E-09	3.54E-05	4.15E-06	6.86E-05	4.02E-05	---	---	1.64E-04
Selenium	1.42E-09	1.08E-10	8.41E-13	1.35E-04	5.07E-10	1.40E-08	2.70E-06	---	---	1.38E-04
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	1.56E-10	6.10E-09	0.00E+00	---	---	7.51E-09
Thallium	3.43E-10	2.61E-11	2.03E-13	0.00E+00	5.64E-10	1.69E-09	0.00E+00	---	---	2.62E-09
Uranium	1.79E-09	1.36E-09	1.06E-12	3.54E-06	8.69E-09	5.17E-08	1.61E-05	---	---	1.97E-05
Vanadium	5.33E-07	4.05E-08	3.16E-10	8.38E-06	1.23E-07	2.45E-06	2.08E-05	---	---	3.23E-05
Zinc	3.41E-07	2.59E-07	2.02E-10	8.40E-04	4.02E-09	5.93E-06	3.00E-05	---	---	8.76E-04

Exposure Estimates for a Recreational Receptor Teen at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	1.21E-06	4.26E-09	3.12E-07	2.76E-06	---	---	4.42E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	2.53E-05	1.85E-07	2.00E-06	3.07E-05	---	---	5.92E-05
Barium	1.78E-05	1.35E-05	1.05E-08	1.18E-05	4.28E-07	2.91E-04	1.92E-04	---	---	5.26E-04
Beryllium	1.20E-07	9.11E-08	7.11E-11	7.37E-07	6.38E-09	2.87E-07	3.35E-07	---	---	1.58E-06
Cadmium	1.75E-07	1.33E-08	1.04E-10	1.07E-06	3.77E-09	2.82E-06	6.53E-07	---	---	4.73E-06
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	1.55E-05	2.97E-06	3.83E-05	3.97E-05	---	---	1.23E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	2.08E-06	2.01E-06	5.66E-06	7.10E-06	---	---	1.96E-05
Copper	7.85E-06	3.58E-06	4.66E-09	7.90E-05	1.47E-05	1.41E-04	3.70E-05	---	---	2.84E-04
Lead	5.04E-06	2.30E-07	2.99E-09	1.64E-06	4.07E-08	2.83E-06	8.78E-06	---	---	1.86E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	5.12E-05	1.75E-05	1.08E-02	1.14E-03	---	---	1.22E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	3.28E-05	4.14E-06	1.42E-04	1.86E-05	---	---	1.98E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	5.01E-05	6.40E-06	8.89E-05	5.70E-05	---	---	2.27E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	2.36E-04	4.57E-08	1.38E-06	4.71E-06	---	---	2.42E-04
Silver	1.69E-07	1.28E-08	1.00E-10	3.07E-05	1.67E-08	5.58E-07	1.68E-07	---	---	3.16E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	7.70E-07	3.58E-07	2.68E-07	1.68E-07	---	---	1.60E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	3.69E-06	1.39E-08	1.89E-07	1.68E-05	---	---	2.13E-05
Vanadium	8.24E-06	6.26E-07	4.88E-09	1.58E-05	1.03E-06	8.73E-06	3.90E-05	---	---	7.34E-05
Zinc	2.28E-05	1.73E-05	1.35E-08	4.12E-03	4.54E-07	5.10E-04	1.47E-04	---	---	4.82E-03

Exposure Estimates for a Recreational Receptor Teen at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.71E-08	5.86E-08	4.57E-11	7.37E-07	3.64E-09	2.72E-07	1.68E-06	---	---	2.82E-06
Arsenic	9.05E-07	2.06E-07	5.36E-10	1.24E-05	1.56E-07	1.69E-06	1.51E-05	---	---	3.04E-05
Barium	1.68E-05	1.27E-05	9.93E-09	7.74E-06	4.00E-07	2.70E-04	1.26E-04	---	---	4.34E-04
Beryllium	1.17E-07	8.91E-08	6.95E-11	7.37E-07	6.26E-09	2.72E-07	3.35E-07	---	---	1.56E-06
Cadmium	1.74E-07	1.32E-08	1.03E-10	1.07E-06	3.77E-09	2.81E-06	6.53E-07	---	---	4.72E-06
Chromium (Total)	8.71E-06	6.62E-06	5.16E-09	8.48E-06	1.66E-06	1.09E-05	2.18E-05	---	---	5.81E-05
Cobalt	2.01E-06	1.53E-07	1.19E-09	1.47E-06	1.49E-06	2.96E-06	5.03E-06	---	---	1.31E-05
Copper	7.37E-06	3.36E-06	4.37E-09	6.08E-05	1.37E-05	1.30E-04	2.85E-05	---	---	2.44E-04
Lead	5.03E-06	2.29E-07	2.98E-09	1.47E-06	4.01E-08	2.73E-06	7.87E-06	---	---	1.74E-05
Manganese	1.27E-04	9.68E-06	7.55E-08	5.12E-05	1.71E-05	1.07E-02	1.14E-03	---	---	1.20E-02
Molybdenum	1.98E-07	1.50E-08	1.17E-10	1.47E-06	3.63E-06	1.14E-04	8.38E-07	---	---	1.20E-04
Nickel	5.36E-06	3.67E-06	3.18E-09	1.47E-05	2.25E-06	2.03E-05	1.68E-05	---	---	6.31E-05
Selenium	1.91E-07	1.45E-08	1.13E-10	1.01E-04	4.51E-08	1.36E-06	2.01E-06	---	---	1.04E-04
Silver	1.68E-07	1.27E-08	9.93E-11	3.07E-05	1.65E-08	5.51E-07	1.68E-07	---	---	3.16E-05
Thallium	3.69E-08	2.80E-09	2.18E-11	7.70E-07	3.57E-07	2.66E-07	1.68E-07	---	---	1.60E-06
Uranium	3.69E-07	2.80E-07	2.18E-10	1.47E-07	5.21E-09	1.37E-07	6.70E-07	---	---	1.61E-06
Vanadium	7.71E-06	5.86E-07	4.57E-09	7.37E-06	9.04E-07	6.28E-06	1.83E-05	---	---	4.11E-05
Zinc	2.24E-05	1.71E-05	1.33E-08	3.28E-03	4.50E-07	5.04E-04	1.17E-04	---	---	3.94E-03

Exposure Estimates for a Recreational Receptor Teen at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	2.02E-09	1.53E-09	1.20E-12	2.22E-07	3.46E-10	2.53E-08	5.05E-07	---	---	7.57E-07
Arsenic	2.83E-08	6.44E-09	1.67E-11	1.66E-06	5.71E-09	1.57E-07	2.01E-06	---	---	3.86E-06
Barium	1.04E-06	7.89E-07	6.15E-10	5.38E-07	2.08E-08	1.86E-05	8.73E-06	---	---	2.97E-05
Beryllium	2.65E-09	2.01E-09	1.57E-12	0.00E+00	1.21E-10	1.48E-08	0.00E+00	---	---	1.96E-08
Cadmium	5.05E-10	3.84E-11	2.99E-13	0.00E+00	7.90E-12	8.80E-09	0.00E+00	---	---	9.35E-09
Chromium (Total)	6.18E-06	4.69E-06	3.66E-09	8.48E-07	1.29E-06	2.73E-05	2.18E-06	---	---	4.25E-05
Cobalt	5.56E-07	4.22E-08	3.29E-10	9.34E-08	4.51E-07	2.61E-06	3.18E-07	---	---	4.07E-06
Copper	4.83E-07	2.20E-07	2.86E-10	2.15E-06	7.18E-07	9.57E-06	1.01E-06	---	---	1.41E-05
Lead	1.55E-08	7.08E-10	9.21E-12	4.37E-10	1.65E-10	6.27E-08	2.33E-09	---	---	8.19E-08
Manganese	4.80E-06	3.65E-07	2.85E-09	0.00E+00	4.18E-07	1.49E-04	0.00E+00	---	---	1.55E-04
Molybdenum	4.26E-09	3.23E-10	2.52E-12	7.10E-06	1.64E-07	7.62E-06	4.03E-06	---	---	1.89E-05
Nickel	9.48E-06	6.49E-06	5.62E-09	5.90E-06	3.34E-06	6.65E-05	6.70E-06	---	---	9.84E-05
Selenium	1.42E-09	1.08E-10	8.41E-13	3.10E-05	2.92E-10	1.33E-08	6.20E-07	---	---	3.17E-05
Silver	1.17E-09	8.87E-11	6.92E-13	0.00E+00	1.56E-10	6.10E-09	0.00E+00	---	---	7.51E-09
Thallium	3.43E-10	2.61E-11	2.03E-13	1.48E-08	2.98E-09	3.34E-09	3.22E-09	---	---	2.47E-08
Uranium	1.79E-09	1.36E-09	1.06E-12	4.39E-07	1.09E-09	1.29E-08	1.99E-06	---	---	2.45E-06
Vanadium	5.33E-07	4.05E-08	3.16E-10	1.01E-06	5.91E-08	2.36E-06	2.51E-06	---	---	6.52E-06
Zinc	3.41E-07	2.59E-07	2.02E-10	9.38E-05	3.55E-09	5.36E-06	3.35E-06	---	---	1.03E-04

Exposure Estimates for a Recreational Receptor Teen at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	7.91E-08	6.01E-08	4.69E-11	9.59E-07	3.99E-09	2.98E-07	2.18E-06	---	---	3.58E-06
Arsenic	9.33E-07	2.13E-07	5.53E-10	1.41E-05	1.61E-07	1.84E-06	1.71E-05	---	---	3.43E-05
Barium	1.78E-05	1.35E-05	1.05E-08	8.28E-06	4.21E-07	2.89E-04	1.34E-04	---	---	4.63E-04
Beryllium	1.20E-07	9.11E-08	7.11E-11	7.37E-07	6.38E-09	2.87E-07	3.35E-07	---	---	1.58E-06
Cadmium	1.75E-07	1.33E-08	1.04E-10	1.07E-06	3.77E-09	2.82E-06	6.53E-07	---	---	4.73E-06
Chromium (Total)	1.49E-05	1.13E-05	8.82E-09	9.32E-06	2.95E-06	3.82E-05	2.40E-05	---	---	1.01E-04
Cobalt	2.57E-06	1.95E-07	1.52E-09	1.57E-06	1.94E-06	5.57E-06	5.34E-06	---	---	1.72E-05
Copper	7.85E-06	3.58E-06	4.66E-09	6.30E-05	1.44E-05	1.40E-04	2.95E-05	---	---	2.58E-04
Lead	5.04E-06	2.30E-07	2.99E-09	1.47E-06	4.03E-08	2.80E-06	7.88E-06	---	---	1.75E-05
Manganese	1.32E-04	1.00E-05	7.83E-08	5.12E-05	1.75E-05	1.08E-02	1.14E-03	---	---	1.22E-02
Molybdenum	2.02E-07	1.53E-08	1.20E-10	8.57E-06	3.80E-06	1.21E-04	4.87E-06	---	---	1.39E-04
Nickel	1.48E-05	1.02E-05	8.80E-09	2.06E-05	5.58E-06	8.68E-05	2.35E-05	---	---	1.61E-04
Selenium	1.92E-07	1.46E-08	1.14E-10	1.32E-04	4.54E-08	1.37E-06	2.63E-06	---	---	1.36E-04
Silver	1.69E-07	1.28E-08	1.00E-10	3.07E-05	1.67E-08	5.58E-07	1.68E-07	---	---	3.16E-05
Thallium	3.72E-08	2.83E-09	2.20E-11	7.85E-07	3.60E-07	2.69E-07	1.71E-07	---	---	1.63E-06
Uranium	3.70E-07	2.81E-07	2.20E-10	5.86E-07	6.30E-09	1.50E-07	2.66E-06	---	---	4.06E-06
Vanadium	8.24E-06	6.26E-07	4.88E-09	8.38E-06	9.63E-07	8.64E-06	2.08E-05	---	---	4.76E-05
Zinc	2.28E-05	1.73E-05	1.35E-08	3.38E-03	4.54E-07	5.09E-04	1.21E-04	---	---	4.05E-03

Exposure Estimates for an Indigenous Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	1.08E-06	1.13E-08	9.58E-07	2.12E-06	---	---	4.30E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	3.55E-05	4.75E-07	5.61E-06	1.49E-05	---	---	5.74E-05
Barium	1.41E-05	1.21E-05	8.92E-09	2.32E-05	1.23E-06	9.70E-04	1.55E-04	---	---	1.18E-03
Beryllium	9.90E-08	8.48E-08	6.25E-11	9.86E-07	1.88E-08	9.58E-07	4.24E-07	---	---	2.57E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	5.42E-07	1.08E-08	1.00E-05	8.91E-07	---	---	1.17E-05
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.78E-05	4.83E-06	3.66E-05	2.76E-05	---	---	1.00E-04
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.97E-06	4.52E-06	1.02E-05	4.24E-06	---	---	2.27E-05
Copper	6.22E-06	3.20E-06	3.93E-09	7.89E-05	4.10E-05	4.71E-04	4.88E-05	---	---	6.49E-04
Lead	4.24E-06	2.18E-07	2.68E-09	4.49E-06	1.25E-07	8.86E-06	8.70E-06	---	---	2.66E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	2.96E-04	5.18E-05	3.36E-02	8.38E-04	---	---	3.49E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.97E-06	1.12E-05	3.88E-04	1.06E-06	---	---	4.02E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.97E-05	6.84E-06	7.30E-05	1.91E-05	---	---	1.27E-04
Selenium	1.61E-07	1.38E-08	1.02E-10	5.92E-05	1.28E-07	4.79E-06	4.03E-06	---	---	6.83E-05
Silver	1.41E-07	1.21E-08	8.92E-11	4.10E-05	5.23E-08	1.97E-06	2.12E-07	---	---	4.34E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.92E-06	1.10E-06	8.02E-07	2.12E-07	---	---	4.07E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.97E-07	1.61E-08	4.91E-07	8.49E-07	---	---	2.13E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	9.86E-06	2.77E-06	2.26E-05	1.70E-05	---	---	5.93E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	2.42E-03	1.29E-06	1.67E-03	1.70E-04	---	---	4.29E-03

Exposure Estimates for an Indigenous Receptor Adult at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	8.60E-07	1.93E-09	1.19E-07	1.68E-06	---	---	2.67E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	4.44E-07	7.66E-09	4.85E-07	1.86E-07	---	---	1.15E-06
Barium	8.76E-07	7.50E-07	5.53E-10	9.32E-08	6.10E-08	6.71E-05	6.23E-07	---	---	6.95E-05
Beryllium	2.24E-09	1.91E-09	1.41E-12	0.00E+00	3.71E-10	5.32E-08	0.00E+00	---	---	5.78E-08
Cadmium	4.26E-10	3.65E-11	2.69E-13	0.00E+00	2.41E-11	3.23E-08	0.00E+00	---	---	3.28E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	0.00E+00	3.95E-06	9.73E-05	0.00E+00	---	---	1.11E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	1.46E-07	1.38E-06	9.32E-06	3.15E-07	---	---	1.17E-05
Copper	4.08E-07	2.09E-07	2.57E-10	0.00E+00	2.07E-06	3.45E-05	0.00E+00	---	---	3.72E-05
Lead	1.31E-08	6.73E-10	8.27E-12	0.00E+00	5.02E-10	2.22E-07	0.00E+00	---	---	2.37E-07
Manganese	4.06E-06	3.47E-07	2.56E-09	4.66E-06	1.35E-06	6.12E-04	1.32E-05	---	---	6.35E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	2.32E-05	8.10E-07	4.03E-05	1.25E-05	---	---	7.68E-05
Nickel	8.01E-06	6.17E-06	5.05E-09	7.40E-06	1.02E-05	2.40E-04	7.17E-06	---	---	2.79E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	1.77E-05	1.02E-09	4.90E-08	1.21E-06	---	---	1.90E-05
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	4.74E-10	2.19E-08	0.00E+00	---	---	2.34E-08
Thallium	2.90E-10	2.48E-11	1.83E-13	1.89E-07	4.41E-08	3.31E-08	2.09E-08	---	---	2.88E-07
Uranium	1.51E-09	1.29E-09	9.53E-13	0.00E+00	3.90E-11	2.62E-08	0.00E+00	---	---	2.90E-08
Vanadium	4.50E-07	3.85E-08	2.84E-10	0.00E+00	1.54E-07	8.37E-06	0.00E+00	---	---	9.02E-06
Zinc	2.88E-07	2.47E-07	1.82E-10	0.00E+00	1.07E-08	1.94E-05	0.00E+00	---	---	1.99E-05

Exposure Estimates for an Indigenous Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	1.94E-06	1.32E-08	1.08E-06	3.80E-06	---	---	6.96E-06
Arsenic	7.88E-07	2.02E-07	4.97E-10	3.59E-05	4.83E-07	6.09E-06	1.50E-05	---	---	5.85E-05
Barium	1.50E-05	1.29E-05	9.47E-09	2.33E-05	1.29E-06	1.04E-03	1.56E-04	---	---	1.25E-03
Beryllium	1.01E-07	8.67E-08	6.39E-11	9.86E-07	1.92E-08	1.01E-06	4.24E-07	---	---	2.63E-06
Cadmium	1.48E-07	1.26E-08	9.31E-11	5.42E-07	1.08E-08	1.01E-05	8.91E-07	---	---	1.17E-05
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	1.78E-05	8.77E-06	1.34E-04	2.76E-05	---	---	2.11E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	2.12E-06	5.91E-06	1.95E-05	4.56E-06	---	---	3.44E-05
Copper	6.63E-06	3.41E-06	4.18E-09	7.89E-05	4.30E-05	5.06E-04	4.88E-05	---	---	6.86E-04
Lead	4.26E-06	2.19E-07	2.68E-09	4.49E-06	1.26E-07	9.08E-06	8.70E-06	---	---	2.69E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	3.00E-04	5.32E-05	3.42E-02	8.51E-04	---	---	3.55E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	2.52E-05	1.20E-05	4.28E-04	1.35E-05	---	---	4.79E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	2.71E-05	1.70E-05	3.13E-04	2.63E-05	---	---	4.06E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	7.69E-05	1.29E-07	4.84E-06	5.24E-06	---	---	8.73E-05
Silver	1.42E-07	1.22E-08	8.98E-11	4.10E-05	5.28E-08	1.99E-06	2.12E-07	---	---	4.34E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	2.11E-06	1.14E-06	8.35E-07	2.33E-07	---	---	4.36E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	1.97E-07	1.61E-08	5.17E-07	8.49E-07	---	---	2.16E-06
Vanadium	6.96E-06	5.95E-07	4.39E-09	9.86E-06	2.92E-06	3.10E-05	1.70E-05	---	---	6.83E-05
Zinc	1.92E-05	1.65E-05	1.21E-08	2.42E-03	1.30E-06	1.69E-03	1.70E-04	---	---	4.31E-03

Exposure Estimates for an Indigenous Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	1.08E-06	1.13E-08	9.58E-07	2.12E-06	---	---	4.30E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	3.55E-05	4.75E-07	5.61E-06	1.27E-05	---	---	5.53E-05
Barium	1.41E-05	1.21E-05	8.92E-09	2.32E-05	1.23E-06	9.70E-04	1.76E-04	---	---	1.20E-03
Beryllium	9.90E-08	8.48E-08	6.25E-11	9.86E-07	1.88E-08	9.58E-07	4.24E-07	---	---	2.57E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	5.42E-07	1.08E-08	1.00E-05	4.24E-07	---	---	1.12E-05
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.78E-05	4.83E-06	3.66E-05	2.76E-05	---	---	1.00E-04
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.97E-06	4.53E-06	1.02E-05	6.36E-06	---	---	2.49E-05
Copper	6.22E-06	3.20E-06	3.93E-09	7.89E-05	4.10E-05	4.71E-04	2.55E-05	---	---	6.26E-04
Lead	4.24E-06	2.18E-07	2.68E-09	4.49E-06	1.25E-07	8.86E-06	5.94E-06	---	---	2.39E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	2.96E-04	5.18E-05	3.36E-02	1.41E-03	---	---	3.55E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.97E-06	1.12E-05	3.88E-04	1.06E-06	---	---	4.02E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.97E-05	6.84E-06	7.30E-05	1.70E-05	---	---	1.25E-04
Selenium	1.61E-07	1.38E-08	1.02E-10	5.92E-05	1.27E-07	4.79E-06	2.76E-06	---	---	6.70E-05
Silver	1.41E-07	1.21E-08	8.92E-11	4.10E-05	5.23E-08	1.97E-06	2.12E-07	---	---	4.34E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.92E-06	1.10E-06	8.02E-07	2.12E-07	---	---	4.07E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.97E-07	1.61E-08	4.91E-07	6.36E-07	---	---	1.92E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	9.86E-06	2.77E-06	2.26E-05	1.49E-05	---	---	5.72E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	2.42E-03	1.29E-06	1.67E-03	1.27E-04	---	---	4.25E-03

Exposure Estimates for an Indigenous Receptor Adult at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	2.67E-06	5.31E-09	2.70E-07	5.23E-06	---	---	8.19E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	2.31E-04	3.26E-07	2.45E-06	8.30E-05	---	---	3.17E-04
Barium	8.76E-07	7.50E-07	5.53E-10	1.39E-05	8.49E-08	7.33E-05	1.05E-04	---	---	1.94E-04
Beryllium	2.24E-09	1.91E-09	1.41E-12	1.10E-05	1.33E-08	2.78E-07	4.73E-06	---	---	1.60E-05
Cadmium	4.26E-10	3.65E-11	2.69E-13	3.23E-08	2.90E-11	3.42E-08	2.52E-08	---	---	9.21E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	5.86E-05	4.16E-06	9.85E-05	9.10E-05	---	---	2.62E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	3.23E-06	2.57E-06	1.09E-05	1.04E-05	---	---	2.77E-05
Copper	4.08E-07	2.09E-07	2.57E-10	1.54E-04	6.05E-06	5.06E-05	4.96E-05	---	---	2.61E-04
Lead	1.31E-08	6.73E-10	8.27E-12	3.00E-06	3.93E-09	4.89E-07	3.97E-06	---	---	7.48E-06
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	1.29E-06	5.49E-04	0.00E+00	---	---	5.55E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	1.29E-04	3.59E-06	1.97E-04	6.93E-05	---	---	3.99E-04
Nickel	8.01E-06	6.17E-06	5.05E-09	2.27E-04	2.21E-05	2.69E-04	1.95E-04	---	---	7.27E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	2.84E-04	4.22E-09	6.27E-08	1.32E-05	---	---	2.97E-04
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	4.74E-10	2.19E-08	0.00E+00	---	---	2.34E-08
Thallium	2.90E-10	2.48E-11	1.83E-13	0.00E+00	1.73E-09	6.04E-09	0.00E+00	---	---	8.08E-09
Uranium	1.51E-09	1.29E-09	9.53E-13	2.53E-05	1.17E-07	5.82E-07	8.17E-05	---	---	1.08E-04
Vanadium	4.50E-07	3.85E-08	2.84E-10	7.31E-05	1.30E-06	9.87E-06	1.10E-04	---	---	1.95E-04
Zinc	2.88E-07	2.47E-07	1.82E-10	3.22E-03	1.75E-08	2.71E-05	1.70E-04	---	---	3.42E-03

Exposure Estimates for an Indigenous Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	3.76E-06	1.66E-08	1.23E-06	7.35E-06	---	---	1.25E-05
Arsenic	7.88E-07	2.02E-07	4.97E-10	2.67E-04	8.01E-07	8.05E-06	9.57E-05	---	---	3.72E-04
Barium	1.50E-05	1.29E-05	9.47E-09	3.70E-05	1.32E-06	1.04E-03	2.81E-04	---	---	1.39E-03
Beryllium	1.01E-07	8.67E-08	6.39E-11	1.20E-05	3.22E-08	1.24E-06	5.15E-06	---	---	1.86E-05
Cadmium	1.48E-07	1.26E-08	9.31E-11	5.75E-07	1.08E-08	1.01E-05	4.50E-07	---	---	1.13E-05
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	7.63E-05	8.99E-06	1.35E-04	1.19E-04	---	---	3.62E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	5.21E-06	7.10E-06	2.11E-05	1.68E-05	---	---	5.25E-05
Copper	6.63E-06	3.41E-06	4.18E-09	2.33E-04	4.70E-05	5.22E-04	7.51E-05	---	---	8.87E-04
Lead	4.26E-06	2.19E-07	2.68E-09	7.49E-06	1.29E-07	9.35E-06	9.91E-06	---	---	3.14E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	2.96E-04	5.31E-05	3.41E-02	1.41E-03	---	---	3.60E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	1.31E-04	1.48E-05	5.85E-04	7.04E-05	---	---	8.01E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	2.47E-04	2.89E-05	3.42E-04	2.12E-04	---	---	8.52E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	3.43E-04	1.32E-07	4.85E-06	1.60E-05	---	---	3.64E-04
Silver	1.42E-07	1.22E-08	8.98E-11	4.10E-05	5.28E-08	1.99E-06	2.12E-07	---	---	4.34E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.92E-06	1.10E-06	8.08E-07	2.12E-07	---	---	4.08E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	2.55E-05	1.33E-07	1.07E-06	8.23E-05	---	---	1.10E-04
Vanadium	6.96E-06	5.95E-07	4.39E-09	8.30E-05	4.07E-06	3.25E-05	1.25E-04	---	---	2.52E-04
Zinc	1.92E-05	1.65E-05	1.21E-08	5.64E-03	1.31E-06	1.70E-03	2.97E-04	---	---	7.67E-03

Exposure Estimates for an Indigenous Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	1.08E-06	1.13E-08	9.58E-07	2.12E-06	---	---	4.30E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	3.55E-05	4.75E-07	5.61E-06	1.27E-05	---	---	5.53E-05
Barium	1.41E-05	1.21E-05	8.92E-09	2.32E-05	1.23E-06	9.70E-04	1.76E-04	---	---	1.20E-03
Beryllium	9.90E-08	8.48E-08	6.25E-11	9.86E-07	1.88E-08	9.58E-07	4.24E-07	---	---	2.57E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	5.42E-07	1.08E-08	1.00E-05	4.24E-07	---	---	1.12E-05
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.78E-05	4.83E-06	3.66E-05	2.76E-05	---	---	1.00E-04
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.97E-06	4.53E-06	1.02E-05	6.36E-06	---	---	2.49E-05
Copper	6.22E-06	3.20E-06	3.93E-09	7.89E-05	4.10E-05	4.71E-04	2.55E-05	---	---	6.26E-04
Lead	4.24E-06	2.18E-07	2.68E-09	4.49E-06	1.25E-07	8.86E-06	5.94E-06	---	---	2.39E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	2.96E-04	5.18E-05	3.36E-02	1.41E-03	---	---	3.55E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.97E-06	1.12E-05	3.88E-04	1.06E-06	---	---	4.02E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.97E-05	6.84E-06	7.30E-05	1.70E-05	---	---	1.25E-04
Selenium	1.61E-07	1.38E-08	1.02E-10	5.92E-05	1.27E-07	4.79E-06	2.76E-06	---	---	6.70E-05
Silver	1.41E-07	1.21E-08	8.92E-11	4.10E-05	5.23E-08	1.97E-06	2.12E-07	---	---	4.34E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.92E-06	1.10E-06	8.02E-07	2.12E-07	---	---	4.07E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.97E-07	1.61E-08	4.91E-07	6.36E-07	---	---	1.92E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	9.86E-06	2.77E-06	2.26E-05	1.49E-05	---	---	5.72E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	2.42E-03	1.29E-06	1.67E-03	1.27E-04	---	---	4.25E-03

Exposure Estimates for an Indigenous Receptor Adult at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	3.10E-06	6.10E-09	3.05E-07	6.06E-06	---	---	9.47E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	2.37E-04	3.34E-07	2.49E-06	8.49E-05	---	---	3.24E-04
Barium	8.76E-07	7.50E-07	5.53E-10	9.61E-07	6.25E-08	6.75E-05	7.30E-06	---	---	7.75E-05
Beryllium	2.24E-09	1.91E-09	1.41E-12	1.65E-05	1.98E-08	3.92E-07	7.10E-06	---	---	2.40E-05
Cadmium	4.26E-10	3.65E-11	2.69E-13	7.30E-09	2.52E-11	3.27E-08	5.71E-09	---	---	4.62E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	5.98E-05	4.17E-06	9.86E-05	9.29E-05	---	---	2.65E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	3.34E-06	2.61E-06	1.10E-05	1.08E-05	---	---	2.82E-05
Copper	4.08E-07	2.09E-07	2.57E-10	1.57E-04	6.14E-06	5.09E-05	5.07E-05	---	---	2.66E-04
Lead	1.31E-08	6.73E-10	8.27E-12	2.64E-06	3.52E-09	4.57E-07	3.50E-06	---	---	6.61E-06
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	1.29E-06	5.49E-04	0.00E+00	---	---	5.55E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	1.44E-04	3.99E-06	2.19E-04	7.74E-05	---	---	4.45E-04
Nickel	8.01E-06	6.17E-06	5.05E-09	2.51E-04	2.34E-05	2.72E-04	2.16E-04	---	---	7.78E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	3.01E-04	4.43E-09	6.36E-08	1.40E-05	---	---	3.15E-04
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	4.74E-10	2.19E-08	0.00E+00	---	---	2.34E-08
Thallium	2.90E-10	2.48E-11	1.83E-13	0.00E+00	1.73E-09	6.04E-09	0.00E+00	---	---	8.08E-09
Uranium	1.51E-09	1.29E-09	9.53E-13	2.59E-05	1.20E-07	5.95E-07	8.36E-05	---	---	1.10E-04
Vanadium	4.50E-07	3.85E-08	2.84E-10	7.47E-05	1.33E-06	9.91E-06	1.12E-04	---	---	1.99E-04
Zinc	2.88E-07	2.47E-07	1.82E-10	3.22E-03	1.75E-08	2.71E-05	1.70E-04	---	---	3.42E-03

Exposure Estimates for an Indigenous Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	4.18E-06	1.74E-08	1.26E-06	8.18E-06	---	---	1.38E-05
Arsenic	7.88E-07	2.02E-07	4.97E-10	2.72E-04	8.09E-07	8.10E-06	9.76E-05	---	---	3.80E-04
Barium	1.50E-05	1.29E-05	9.47E-09	2.41E-05	1.30E-06	1.04E-03	1.83E-04	---	---	1.27E-03
Beryllium	1.01E-07	8.67E-08	6.39E-11	1.75E-05	3.86E-08	1.35E-06	7.53E-06	---	---	2.66E-05
Cadmium	1.48E-07	1.26E-08	9.31E-11	5.50E-07	1.08E-08	1.01E-05	4.30E-07	---	---	1.12E-05
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	7.76E-05	8.99E-06	1.35E-04	1.21E-04	---	---	3.66E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	5.31E-06	7.14E-06	2.11E-05	1.71E-05	---	---	5.31E-05
Copper	6.63E-06	3.41E-06	4.18E-09	2.36E-04	4.71E-05	5.22E-04	7.62E-05	---	---	8.91E-04
Lead	4.26E-06	2.19E-07	2.68E-09	7.13E-06	1.28E-07	9.32E-06	9.44E-06	---	---	3.05E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	2.96E-04	5.31E-05	3.41E-02	1.41E-03	---	---	3.60E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	1.46E-04	1.52E-05	6.08E-04	7.84E-05	---	---	8.47E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	2.71E-04	3.03E-05	3.45E-04	2.33E-04	---	---	9.02E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	3.60E-04	1.32E-07	4.85E-06	1.68E-05	---	---	3.82E-04
Silver	1.42E-07	1.22E-08	8.98E-11	4.10E-05	5.28E-08	1.99E-06	2.12E-07	---	---	4.34E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.92E-06	1.10E-06	8.08E-07	2.12E-07	---	---	4.08E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	2.61E-05	1.36E-07	1.09E-06	8.42E-05	---	---	1.12E-04
Vanadium	6.96E-06	5.95E-07	4.39E-09	8.45E-05	4.10E-06	3.25E-05	1.27E-04	---	---	2.56E-04
Zinc	1.92E-05	1.65E-05	1.21E-08	5.64E-03	1.31E-06	1.70E-03	2.97E-04	---	---	7.67E-03

Exposure Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	9.86E-07	1.11E-08	9.58E-07	2.12E-06	---	---	4.20E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	1.66E-05	4.61E-07	5.61E-06	1.91E-05	---	---	4.27E-05
Barium	1.41E-05	1.21E-05	8.92E-09	1.04E-05	1.22E-06	9.70E-04	1.59E-04	---	---	1.17E-03
Beryllium	9.90E-08	8.48E-08	6.25E-11	9.86E-07	1.88E-08	9.58E-07	4.24E-07	---	---	2.57E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	1.43E-06	1.06E-08	1.00E-05	8.27E-07	---	---	1.25E-05
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.13E-05	4.81E-06	3.66E-05	2.76E-05	---	---	9.40E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.97E-06	4.55E-06	1.02E-05	6.36E-06	---	---	2.49E-05
Copper	6.22E-06	3.20E-06	3.93E-09	8.14E-05	3.99E-05	4.71E-04	3.61E-05	---	---	6.38E-04
Lead	4.24E-06	2.18E-07	2.68E-09	1.97E-06	1.18E-07	8.86E-06	9.97E-06	---	---	2.54E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	6.85E-05	5.22E-05	3.36E-02	1.45E-03	---	---	3.53E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.97E-06	1.12E-05	3.88E-04	1.06E-06	---	---	4.02E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.97E-05	6.77E-06	7.30E-05	2.12E-05	---	---	1.29E-04
Selenium	1.61E-07	1.38E-08	1.02E-10	1.35E-04	1.30E-07	4.79E-06	2.55E-06	---	---	1.42E-04
Silver	1.41E-07	1.21E-08	8.92E-11	4.10E-05	4.98E-08	1.80E-06	2.12E-07	---	---	4.32E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.03E-06	1.10E-06	8.02E-07	2.12E-07	---	---	3.17E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.97E-07	1.60E-08	4.91E-07	8.49E-07	---	---	2.13E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	9.86E-06	2.76E-06	2.26E-05	2.31E-05	---	---	6.54E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	4.39E-03	1.27E-06	1.67E-03	1.49E-04	---	---	6.25E-03

Exposure Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	6.36E-07	1.91E-09	1.23E-07	1.37E-06	---	---	2.13E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	1.72E-05	8.62E-08	9.84E-07	1.97E-05	---	---	3.80E-05
Barium	8.76E-07	7.50E-07	5.53E-10	5.44E-06	8.40E-08	7.33E-05	8.37E-05	---	---	1.64E-04
Beryllium	2.24E-09	1.91E-09	1.41E-12	0.00E+00	3.71E-10	5.32E-08	0.00E+00	---	---	5.78E-08
Cadmium	4.26E-10	3.65E-11	2.69E-13	0.00E+00	2.41E-11	3.23E-08	0.00E+00	---	---	3.28E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	9.33E-06	3.99E-06	9.76E-05	2.27E-05	---	---	1.43E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	8.15E-07	1.58E-06	9.57E-06	2.63E-06	---	---	1.51E-05
Copper	4.08E-07	2.09E-07	2.57E-10	2.44E-05	3.16E-06	3.90E-05	1.08E-05	---	---	7.80E-05
Lead	1.31E-08	6.73E-10	8.27E-12	2.28E-07	1.51E-09	3.11E-07	1.15E-06	---	---	1.71E-06
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	1.29E-06	5.49E-04	0.00E+00	---	---	5.55E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	4.19E-05	1.55E-06	8.27E-05	2.26E-05	---	---	1.49E-04
Nickel	8.01E-06	6.17E-06	5.05E-09	4.73E-05	1.27E-05	2.46E-04	5.09E-05	---	---	3.71E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	1.81E-04	1.54E-09	5.03E-08	3.42E-06	---	---	1.84E-04
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	4.74E-10	2.19E-08	0.00E+00	---	---	2.34E-08
Thallium	2.90E-10	2.48E-11	1.83E-13	0.00E+00	1.73E-09	6.04E-09	0.00E+00	---	---	8.08E-09
Uranium	1.51E-09	1.29E-09	9.53E-13	4.73E-06	2.68E-08	1.54E-07	2.04E-05	---	---	2.53E-05
Vanadium	4.50E-07	3.85E-08	2.84E-10	1.12E-05	3.77E-07	8.66E-06	2.63E-05	---	---	4.71E-05
Zinc	2.88E-07	2.47E-07	1.82E-10	1.12E-03	1.23E-08	2.12E-05	3.80E-05	---	---	1.18E-03

Exposure Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	1.62E-06	1.30E-08	1.08E-06	3.49E-06	---	---	6.33E-06
Arsenic	7.88E-07	2.02E-07	4.97E-10	3.38E-05	5.47E-07	6.59E-06	3.88E-05	---	---	8.07E-05
Barium	1.50E-05	1.29E-05	9.47E-09	1.58E-05	1.31E-06	1.04E-03	2.43E-04	---	---	1.33E-03
Beryllium	1.01E-07	8.67E-08	6.39E-11	9.86E-07	1.91E-08	1.01E-06	4.24E-07	---	---	2.63E-06
Cadmium	1.48E-07	1.26E-08	9.31E-11	1.43E-06	1.06E-08	1.01E-05	8.27E-07	---	---	1.25E-05
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	2.07E-05	8.80E-06	1.34E-04	5.03E-05	---	---	2.37E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	2.79E-06	6.12E-06	1.97E-05	9.00E-06	---	---	4.00E-05
Copper	6.63E-06	3.41E-06	4.18E-09	1.06E-04	4.30E-05	5.10E-04	4.69E-05	---	---	7.16E-04
Lead	4.26E-06	2.19E-07	2.68E-09	2.20E-06	1.20E-07	9.17E-06	1.11E-05	---	---	2.71E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	6.85E-05	5.35E-05	3.41E-02	1.45E-03	---	---	3.58E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	4.39E-05	1.28E-05	4.71E-04	2.36E-05	---	---	5.51E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	6.71E-05	1.94E-05	3.19E-04	7.21E-05	---	---	5.00E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	3.15E-04	1.31E-07	4.84E-06	5.96E-06	---	---	3.26E-04
Silver	1.42E-07	1.22E-08	8.98E-11	4.10E-05	5.02E-08	1.82E-06	2.12E-07	---	---	4.33E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.03E-06	1.10E-06	8.08E-07	2.12E-07	---	---	3.18E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	4.93E-06	4.28E-08	6.45E-07	2.12E-05	---	---	2.74E-05
Vanadium	6.96E-06	5.95E-07	4.39E-09	2.11E-05	3.14E-06	3.13E-05	4.94E-05	---	---	1.12E-04
Zinc	1.92E-05	1.65E-05	1.21E-08	5.52E-03	1.28E-06	1.69E-03	1.86E-04	---	---	7.43E-03

Exposure Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	9.86E-07	1.11E-08	9.58E-07	2.12E-06	---	---	4.20E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	1.66E-05	4.61E-07	5.61E-06	1.91E-05	---	---	4.27E-05
Barium	1.41E-05	1.21E-05	8.92E-09	1.04E-05	1.22E-06	9.70E-04	1.59E-04	---	---	1.17E-03
Beryllium	9.90E-08	8.48E-08	6.25E-11	9.86E-07	1.88E-08	9.58E-07	4.24E-07	---	---	2.57E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	1.43E-06	1.06E-08	1.00E-05	8.27E-07	---	---	1.25E-05
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.13E-05	4.81E-06	3.66E-05	2.76E-05	---	---	9.40E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.97E-06	4.55E-06	1.02E-05	6.36E-06	---	---	2.49E-05
Copper	6.22E-06	3.20E-06	3.93E-09	8.14E-05	3.99E-05	4.71E-04	3.61E-05	---	---	6.38E-04
Lead	4.24E-06	2.18E-07	2.68E-09	1.97E-06	1.18E-07	8.86E-06	9.97E-06	---	---	2.54E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	6.85E-05	5.22E-05	3.36E-02	1.45E-03	---	---	3.53E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.97E-06	1.12E-05	3.88E-04	1.06E-06	---	---	4.02E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.97E-05	6.77E-06	7.30E-05	2.12E-05	---	---	1.29E-04
Selenium	1.61E-07	1.38E-08	1.02E-10	1.35E-04	1.30E-07	4.79E-06	2.55E-06	---	---	1.42E-04
Silver	1.41E-07	1.21E-08	8.92E-11	4.10E-05	4.98E-08	1.80E-06	2.12E-07	---	---	4.32E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.03E-06	1.10E-06	8.02E-07	2.12E-07	---	---	3.17E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.97E-07	1.60E-08	4.91E-07	8.49E-07	---	---	2.13E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	9.86E-06	2.76E-06	2.26E-05	2.31E-05	---	---	6.54E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	4.39E-03	1.27E-06	1.67E-03	1.49E-04	---	---	6.25E-03

Exposure Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	2.97E-07	1.07E-09	8.23E-08	6.40E-07	---	---	1.02E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	2.22E-06	1.72E-08	5.45E-07	2.55E-06	---	---	5.35E-06
Barium	8.76E-07	7.50E-07	5.53E-10	7.20E-07	6.39E-08	6.79E-05	1.11E-05	---	---	8.14E-05
Beryllium	2.24E-09	1.91E-09	1.41E-12	0.00E+00	3.71E-10	5.32E-08	0.00E+00	---	---	5.78E-08
Cadmium	4.26E-10	3.65E-11	2.69E-13	0.00E+00	2.41E-11	3.23E-08	0.00E+00	---	---	3.28E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	1.13E-06	3.95E-06	9.73E-05	2.76E-06	---	---	1.15E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	1.25E-07	1.38E-06	9.31E-06	4.03E-07	---	---	1.17E-05
Copper	4.08E-07	2.09E-07	2.57E-10	2.87E-06	2.20E-06	3.50E-05	1.27E-06	---	---	4.20E-05
Lead	1.31E-08	6.73E-10	8.27E-12	5.84E-10	5.05E-10	2.22E-07	2.95E-09	---	---	2.40E-07
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	1.29E-06	5.49E-04	0.00E+00	---	---	5.55E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	9.50E-06	5.04E-07	2.33E-05	5.11E-06	---	---	3.84E-05
Nickel	8.01E-06	6.17E-06	5.05E-09	7.89E-06	1.02E-05	2.40E-04	8.49E-06	---	---	2.81E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	4.15E-05	8.90E-10	4.82E-08	7.85E-07	---	---	4.23E-05
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	4.74E-10	2.19E-08	0.00E+00	---	---	2.34E-08
Thallium	2.90E-10	2.48E-11	1.83E-13	1.98E-08	9.15E-09	1.08E-08	4.08E-09	---	---	4.41E-08
Uranium	1.51E-09	1.29E-09	9.53E-13	5.87E-07	3.36E-09	4.20E-08	2.52E-06	---	---	3.16E-06
Vanadium	4.50E-07	3.85E-08	2.84E-10	1.36E-06	1.81E-07	8.41E-06	3.18E-06	---	---	1.36E-05
Zinc	2.88E-07	2.47E-07	1.82E-10	1.26E-04	1.09E-08	1.96E-05	4.24E-06	---	---	1.50E-04

Exposure Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	1.28E-06	1.22E-08	1.04E-06	2.76E-06	---	---	5.22E-06
Arsenic	7.88E-07	2.02E-07	4.97E-10	1.88E-05	4.78E-07	6.15E-06	2.16E-05	---	---	4.81E-05
Barium	1.50E-05	1.29E-05	9.47E-09	1.11E-05	1.29E-06	1.04E-03	1.70E-04	---	---	1.25E-03
Beryllium	1.01E-07	8.67E-08	6.39E-11	9.86E-07	1.91E-08	1.01E-06	4.24E-07	---	---	2.63E-06
Cadmium	1.48E-07	1.26E-08	9.31E-11	1.43E-06	1.06E-08	1.01E-05	8.27E-07	---	---	1.25E-05
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	1.25E-05	8.76E-06	1.34E-04	3.03E-05	---	---	2.09E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	2.10E-06	5.93E-06	1.95E-05	6.77E-06	---	---	3.66E-05
Copper	6.63E-06	3.41E-06	4.18E-09	8.42E-05	4.21E-05	5.06E-04	3.73E-05	---	---	6.80E-04
Lead	4.26E-06	2.19E-07	2.68E-09	1.97E-06	1.19E-07	9.08E-06	9.97E-06	---	---	2.56E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	6.85E-05	5.35E-05	3.41E-02	1.45E-03	---	---	3.58E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	1.15E-05	1.17E-05	4.11E-04	6.17E-06	---	---	4.41E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	2.76E-05	1.70E-05	3.13E-04	2.97E-05	---	---	4.10E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	1.76E-04	1.30E-07	4.84E-06	3.33E-06	---	---	1.85E-04
Silver	1.42E-07	1.22E-08	8.98E-11	4.10E-05	5.02E-08	1.82E-06	2.12E-07	---	---	4.33E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.05E-06	1.11E-06	8.12E-07	2.16E-07	---	---	3.22E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	7.84E-07	1.94E-08	5.33E-07	3.37E-06	---	---	5.29E-06
Vanadium	6.96E-06	5.95E-07	4.39E-09	1.12E-05	2.94E-06	3.10E-05	2.63E-05	---	---	7.90E-05
Zinc	1.92E-05	1.65E-05	1.21E-08	4.52E-03	1.28E-06	1.69E-03	1.53E-04	---	---	6.40E-03

Exposure Estimates for a Recreational Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	6.85E-07	3.05E-09	2.28E-07	2.12E-06	---	---	3.16E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	2.24E-05	1.34E-07	1.48E-06	1.49E-05	---	---	3.98E-05
Barium	1.41E-05	1.21E-05	8.92E-09	1.46E-05	3.34E-07	2.23E-04	1.55E-04	---	---	4.19E-04
Beryllium	9.90E-08	8.48E-08	6.25E-11	6.22E-07	5.19E-09	2.28E-07	4.24E-07	---	---	1.46E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	3.42E-07	3.17E-09	2.32E-06	8.91E-07	---	---	3.72E-06
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.12E-05	1.38E-06	9.48E-06	2.76E-05	---	---	6.33E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.24E-06	1.22E-06	2.54E-06	4.24E-06	---	---	1.11E-05
Copper	6.22E-06	3.20E-06	3.93E-09	4.98E-05	1.17E-05	1.07E-04	4.88E-05	---	---	2.27E-04
Lead	4.24E-06	2.18E-07	2.68E-09	2.83E-06	3.53E-08	2.44E-06	8.70E-06	---	---	1.85E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	1.87E-04	1.39E-05	9.71E-03	8.38E-04	---	---	1.09E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.24E-06	3.00E-06	9.80E-05	1.06E-06	---	---	1.03E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.24E-05	1.88E-06	1.67E-05	1.91E-05	---	---	5.82E-05
Selenium	1.61E-07	1.38E-08	1.02E-10	3.73E-05	3.64E-08	1.14E-06	4.03E-06	---	---	4.27E-05
Silver	1.41E-07	1.21E-08	8.92E-11	2.59E-05	1.43E-08	5.47E-07	2.12E-07	---	---	2.68E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.21E-06	2.96E-07	2.50E-07	2.12E-07	---	---	2.01E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.24E-07	4.32E-09	1.13E-07	8.49E-07	---	---	1.67E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	6.22E-06	7.47E-07	5.17E-06	1.70E-05	---	---	3.62E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	1.52E-03	3.79E-07	4.43E-04	1.70E-04	---	---	2.17E-03

Exposure Estimates for a Recreational Receptor Adult at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	5.43E-07	5.17E-10	3.47E-08	1.68E-06	---	---	2.26E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	2.80E-07	2.07E-09	1.13E-07	1.86E-07	---	---	6.10E-07
Barium	8.76E-07	7.50E-07	5.53E-10	5.88E-08	1.63E-08	1.48E-05	6.23E-07	---	---	1.71E-05
Beryllium	2.24E-09	1.91E-09	1.41E-12	0.00E+00	9.97E-11	1.22E-08	0.00E+00	---	---	1.65E-08
Cadmium	4.26E-10	3.65E-11	2.69E-13	0.00E+00	6.51E-12	7.12E-09	0.00E+00	---	---	7.59E-09
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	0.00E+00	1.06E-06	2.26E-05	0.00E+00	---	---	3.34E-05
Cobalt	4.69E-07	4.02E-08	2.96E-10	9.24E-08	3.72E-07	2.16E-06	3.15E-07	---	---	3.45E-06
Copper	4.08E-07	2.09E-07	2.57E-10	0.00E+00	5.55E-07	7.58E-06	0.00E+00	---	---	8.76E-06
Lead	1.31E-08	6.73E-10	8.27E-12	0.00E+00	1.36E-10	5.21E-08	0.00E+00	---	---	6.60E-08
Manganese	4.06E-06	3.47E-07	2.56E-09	2.94E-06	3.62E-07	1.41E-04	1.32E-05	---	---	1.62E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	1.46E-05	2.17E-07	1.28E-05	1.25E-05	---	---	4.01E-05
Nickel	8.01E-06	6.17E-06	5.05E-09	4.67E-06	2.74E-06	5.45E-05	7.17E-06	---	---	8.32E-05
Selenium	1.20E-09	1.03E-10	7.55E-13	1.12E-05	2.76E-10	1.11E-08	1.21E-06	---	---	1.24E-05
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	1.29E-10	5.03E-09	0.00E+00	---	---	6.23E-09
Thallium	2.90E-10	2.48E-11	1.83E-13	1.19E-07	1.19E-08	1.05E-08	2.09E-08	---	---	1.63E-07
Uranium	1.51E-09	1.29E-09	9.53E-13	0.00E+00	1.05E-11	6.12E-09	0.00E+00	---	---	8.94E-09
Vanadium	4.50E-07	3.85E-08	2.84E-10	0.00E+00	4.15E-08	1.95E-06	0.00E+00	---	---	2.48E-06
Zinc	2.88E-07	2.47E-07	1.82E-10	0.00E+00	2.88E-09	4.28E-06	0.00E+00	---	---	4.82E-06

Exposure Estimates for a Recreational Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	1.23E-06	3.57E-09	2.63E-07	3.80E-06	---	---	5.42E-06
Arsenic	7.88E-07	2.02E-07	4.97E-10	2.27E-05	1.36E-07	1.59E-06	1.50E-05	---	---	4.04E-05
Barium	1.50E-05	1.29E-05	9.47E-09	1.47E-05	3.50E-07	2.38E-04	1.56E-04	---	---	4.36E-04
Beryllium	1.01E-07	8.67E-08	6.39E-11	6.22E-07	5.29E-09	2.40E-07	4.24E-07	---	---	1.48E-06
Cadmium	1.48E-07	1.26E-08	9.31E-11	3.42E-07	3.18E-09	2.33E-06	8.91E-07	---	---	3.72E-06
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	1.12E-05	2.44E-06	3.21E-05	2.76E-05	---	---	9.66E-05
Cobalt	2.17E-06	1.85E-07	1.37E-09	1.34E-06	1.59E-06	4.70E-06	4.56E-06	---	---	1.45E-05
Copper	6.63E-06	3.41E-06	4.18E-09	4.98E-05	1.22E-05	1.14E-04	4.88E-05	---	---	2.35E-04
Lead	4.26E-06	2.19E-07	2.68E-09	2.83E-06	3.55E-08	2.49E-06	8.70E-06	---	---	1.85E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	1.90E-04	1.43E-05	9.85E-03	8.51E-04	---	---	1.10E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	1.59E-05	3.22E-06	1.11E-04	1.35E-05	---	---	1.44E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	1.71E-05	4.62E-06	7.12E-05	2.63E-05	---	---	1.41E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	4.85E-05	3.67E-08	1.15E-06	5.24E-06	---	---	5.51E-05
Silver	1.42E-07	1.22E-08	8.98E-11	2.59E-05	1.44E-08	5.52E-07	2.12E-07	---	---	2.68E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.33E-06	3.08E-07	2.60E-07	2.33E-07	---	---	2.17E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	1.24E-07	4.33E-09	1.20E-07	8.49E-07	---	---	1.68E-06
Vanadium	6.96E-06	5.95E-07	4.39E-09	6.22E-06	7.89E-07	7.11E-06	1.70E-05	---	---	3.87E-05
Zinc	1.92E-05	1.65E-05	1.21E-08	1.52E-03	3.82E-07	4.47E-04	1.70E-04	---	---	2.18E-03

Exposure Estimates for a Recreational Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	6.85E-07	3.05E-09	2.28E-07	2.12E-06	---	---	3.16E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	2.24E-05	1.34E-07	1.48E-06	1.27E-05	---	---	3.77E-05
Barium	1.41E-05	1.21E-05	8.92E-09	1.46E-05	3.34E-07	2.23E-04	1.76E-04	---	---	4.40E-04
Beryllium	9.90E-08	8.48E-08	6.25E-11	6.22E-07	5.19E-09	2.28E-07	4.24E-07	---	---	1.46E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	3.42E-07	3.17E-09	2.32E-06	4.24E-07	---	---	3.25E-06
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.12E-05	1.38E-06	9.48E-06	2.76E-05	---	---	6.33E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.24E-06	1.22E-06	2.54E-06	6.36E-06	---	---	1.32E-05
Copper	6.22E-06	3.20E-06	3.93E-09	4.98E-05	1.17E-05	1.07E-04	2.55E-05	---	---	2.03E-04
Lead	4.24E-06	2.18E-07	2.68E-09	2.83E-06	3.53E-08	2.44E-06	5.94E-06	---	---	1.57E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	1.87E-04	1.39E-05	9.71E-03	1.41E-03	---	---	1.14E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.24E-06	3.00E-06	9.80E-05	1.06E-06	---	---	1.03E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.24E-05	1.88E-06	1.67E-05	1.70E-05	---	---	5.60E-05
Selenium	1.61E-07	1.38E-08	1.02E-10	3.73E-05	3.64E-08	1.14E-06	2.76E-06	---	---	4.15E-05
Silver	1.41E-07	1.21E-08	8.92E-11	2.59E-05	1.43E-08	5.47E-07	2.12E-07	---	---	2.68E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.21E-06	2.96E-07	2.50E-07	2.12E-07	---	---	2.01E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.24E-07	4.32E-09	1.13E-07	6.36E-07	---	---	1.46E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	6.22E-06	7.47E-07	5.17E-06	1.49E-05	---	---	3.41E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	1.52E-03	3.79E-07	4.43E-04	1.27E-04	---	---	2.13E-03

Exposure Estimates for a Recreational Receptor Adult at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	1.69E-06	1.42E-09	8.53E-08	5.23E-06	---	---	7.01E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	1.46E-04	9.10E-08	7.69E-07	8.30E-05	---	---	2.30E-04
Barium	8.76E-07	7.50E-07	5.53E-10	8.75E-06	2.29E-08	1.69E-05	1.05E-04	---	---	1.33E-04
Beryllium	2.24E-09	1.91E-09	1.41E-12	6.94E-06	3.71E-09	8.75E-08	4.73E-06	---	---	1.18E-05
Cadmium	4.26E-10	3.65E-11	2.69E-13	2.04E-08	8.11E-12	7.74E-09	2.52E-08	---	---	5.38E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	3.70E-05	1.12E-06	2.30E-05	9.10E-05	---	---	1.62E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	2.04E-06	6.92E-07	2.70E-06	1.04E-05	---	---	1.64E-05
Copper	4.08E-07	2.09E-07	2.57E-10	9.71E-05	1.71E-06	1.30E-05	4.96E-05	---	---	1.62E-04
Lead	1.31E-08	6.73E-10	8.27E-12	1.89E-06	1.12E-09	1.41E-07	3.97E-06	---	---	6.02E-06
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	3.45E-07	1.20E-04	0.00E+00	---	---	1.25E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	8.13E-05	9.66E-07	6.53E-05	6.93E-05	---	---	2.17E-04
Nickel	8.01E-06	6.17E-06	5.05E-09	1.43E-04	5.99E-06	6.41E-05	1.95E-04	---	---	4.23E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	1.79E-04	1.16E-09	1.57E-08	1.32E-05	---	---	1.92E-04
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	1.29E-10	5.03E-09	0.00E+00	---	---	6.23E-09
Thallium	2.90E-10	2.48E-11	1.83E-13	0.00E+00	4.65E-10	1.39E-09	0.00E+00	---	---	2.17E-09
Uranium	1.51E-09	1.29E-09	9.53E-13	1.60E-05	3.13E-08	1.92E-07	8.17E-05	---	---	9.79E-05
Vanadium	4.50E-07	3.85E-08	2.84E-10	4.61E-05	3.51E-07	2.45E-06	1.10E-04	---	---	1.60E-04
Zinc	2.88E-07	2.47E-07	1.82E-10	2.03E-03	4.76E-09	6.87E-06	1.70E-04	---	---	2.21E-03

Exposure Estimates for a Recreational Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	2.37E-06	4.47E-09	3.14E-07	7.35E-06	---	---	1.02E-05
Arsenic	7.88E-07	2.02E-07	4.97E-10	1.68E-04	2.25E-07	2.25E-06	9.57E-05	---	---	2.68E-04
Barium	1.50E-05	1.29E-05	9.47E-09	2.34E-05	3.57E-07	2.40E-04	2.81E-04	---	---	5.73E-04
Beryllium	1.01E-07	8.67E-08	6.39E-11	7.56E-06	8.90E-09	3.16E-07	5.15E-06	---	---	1.32E-05
Cadmium	1.48E-07	1.26E-08	9.31E-11	3.63E-07	3.18E-09	2.33E-06	4.50E-07	---	---	3.30E-06
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	4.82E-05	2.50E-06	3.25E-05	1.19E-04	---	---	2.25E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	3.29E-06	1.92E-06	5.24E-06	1.68E-05	---	---	2.96E-05
Copper	6.63E-06	3.41E-06	4.18E-09	1.47E-04	1.34E-05	1.20E-04	7.51E-05	---	---	3.65E-04
Lead	4.26E-06	2.19E-07	2.68E-09	4.72E-06	3.64E-08	2.58E-06	9.91E-06	---	---	2.17E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	1.87E-04	1.43E-05	9.83E-03	1.41E-03	---	---	1.16E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	8.26E-05	3.97E-06	1.63E-04	7.04E-05	---	---	3.20E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	1.56E-04	7.87E-06	8.08E-05	2.12E-04	---	---	4.79E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	2.16E-04	3.75E-08	1.16E-06	1.60E-05	---	---	2.34E-04
Silver	1.42E-07	1.22E-08	8.98E-11	2.59E-05	1.44E-08	5.52E-07	2.12E-07	---	---	2.68E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.21E-06	2.96E-07	2.51E-07	2.12E-07	---	---	2.01E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	1.61E-05	3.57E-08	3.05E-07	8.23E-05	---	---	9.93E-05
Vanadium	6.96E-06	5.95E-07	4.39E-09	5.24E-05	1.10E-06	7.61E-06	1.25E-04	---	---	1.94E-04
Zinc	1.92E-05	1.65E-05	1.21E-08	3.56E-03	3.84E-07	4.50E-04	2.97E-04	---	---	4.34E-03

Exposure Estimates for a Recreational Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	6.85E-07	3.05E-09	2.28E-07	2.12E-06	---	---	3.16E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	2.24E-05	1.34E-07	1.48E-06	1.27E-05	---	---	3.77E-05
Barium	1.41E-05	1.21E-05	8.92E-09	1.46E-05	3.34E-07	2.23E-04	1.76E-04	---	---	4.40E-04
Beryllium	9.90E-08	8.48E-08	6.25E-11	6.22E-07	5.19E-09	2.28E-07	4.24E-07	---	---	1.46E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	3.42E-07	3.17E-09	2.32E-06	4.24E-07	---	---	3.25E-06
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	1.12E-05	1.38E-06	9.48E-06	2.76E-05	---	---	6.33E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.24E-06	1.22E-06	2.54E-06	6.36E-06	---	---	1.32E-05
Copper	6.22E-06	3.20E-06	3.93E-09	4.98E-05	1.17E-05	1.07E-04	2.55E-05	---	---	2.03E-04
Lead	4.24E-06	2.18E-07	2.68E-09	2.83E-06	3.53E-08	2.44E-06	5.94E-06	---	---	1.57E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	1.87E-04	1.39E-05	9.71E-03	1.41E-03	---	---	1.14E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.24E-06	3.00E-06	9.80E-05	1.06E-06	---	---	1.03E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.24E-05	1.88E-06	1.67E-05	1.70E-05	---	---	5.60E-05
Selenium	1.61E-07	1.38E-08	1.02E-10	3.73E-05	3.64E-08	1.14E-06	2.76E-06	---	---	4.15E-05
Silver	1.41E-07	1.21E-08	8.92E-11	2.59E-05	1.43E-08	5.47E-07	2.12E-07	---	---	2.68E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	1.21E-06	2.96E-07	2.50E-07	2.12E-07	---	---	2.01E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.24E-07	4.32E-09	1.13E-07	6.36E-07	---	---	1.46E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	6.22E-06	7.47E-07	5.17E-06	1.49E-05	---	---	3.41E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	1.52E-03	3.79E-07	4.43E-04	1.27E-04	---	---	2.13E-03

Exposure Estimates for a Recreational Receptor Adult at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	1.95E-06	1.64E-09	9.71E-08	6.06E-06	---	---	8.11E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	1.49E-04	9.30E-08	7.85E-07	8.49E-05	---	---	2.35E-04
Barium	8.76E-07	7.50E-07	5.53E-10	6.07E-07	1.68E-08	1.49E-05	7.30E-06	---	---	2.45E-05
Beryllium	2.24E-09	1.91E-09	1.41E-12	1.04E-05	5.52E-09	1.25E-07	7.10E-06	---	---	1.77E-05
Cadmium	4.26E-10	3.65E-11	2.69E-13	4.61E-09	6.88E-12	7.26E-09	5.71E-09	---	---	1.81E-08
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	3.77E-05	1.13E-06	2.30E-05	9.29E-05	---	---	1.65E-04
Cobalt	4.69E-07	4.02E-08	2.96E-10	2.11E-06	7.03E-07	2.71E-06	1.08E-05	---	---	1.68E-05
Copper	4.08E-07	2.09E-07	2.57E-10	9.92E-05	1.73E-06	1.31E-05	5.07E-05	---	---	1.65E-04
Lead	1.31E-08	6.73E-10	8.27E-12	1.67E-06	1.00E-09	1.31E-07	3.50E-06	---	---	5.31E-06
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	3.45E-07	1.20E-04	0.00E+00	---	---	1.25E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	9.08E-05	1.07E-06	7.27E-05	7.74E-05	---	---	2.42E-04
Nickel	8.01E-06	6.17E-06	5.05E-09	1.59E-04	6.36E-06	6.52E-05	2.16E-04	---	---	4.61E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	1.90E-04	1.22E-09	1.60E-08	1.40E-05	---	---	2.04E-04
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	1.29E-10	5.03E-09	0.00E+00	---	---	6.23E-09
Thallium	2.90E-10	2.48E-11	1.83E-13	0.00E+00	4.65E-10	1.39E-09	0.00E+00	---	---	2.17E-09
Uranium	1.51E-09	1.29E-09	9.53E-13	1.63E-05	3.21E-08	1.96E-07	8.36E-05	---	---	1.00E-04
Vanadium	4.50E-07	3.85E-08	2.84E-10	4.71E-05	3.57E-07	2.46E-06	1.12E-04	---	---	1.63E-04
Zinc	2.88E-07	2.47E-07	1.82E-10	2.03E-03	4.76E-09	6.87E-06	1.70E-04	---	---	2.21E-03

Exposure Estimates for a Recreational Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	2.64E-06	4.69E-09	3.25E-07	8.18E-06	---	---	1.13E-05
Arsenic	7.88E-07	2.02E-07	4.97E-10	1.72E-04	2.27E-07	2.26E-06	9.76E-05	---	---	2.73E-04
Barium	1.50E-05	1.29E-05	9.47E-09	1.52E-05	3.51E-07	2.38E-04	1.83E-04	---	---	4.65E-04
Beryllium	1.01E-07	8.67E-08	6.39E-11	1.10E-05	1.07E-08	3.54E-07	7.53E-06	---	---	1.91E-05
Cadmium	1.48E-07	1.26E-08	9.31E-11	3.47E-07	3.18E-09	2.33E-06	4.30E-07	---	---	3.27E-06
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	4.89E-05	2.50E-06	3.25E-05	1.21E-04	---	---	2.28E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	3.35E-06	1.93E-06	5.25E-06	1.71E-05	---	---	3.00E-05
Copper	6.63E-06	3.41E-06	4.18E-09	1.49E-04	1.34E-05	1.20E-04	7.62E-05	---	---	3.69E-04
Lead	4.26E-06	2.19E-07	2.68E-09	4.50E-06	3.63E-08	2.57E-06	9.44E-06	---	---	2.10E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	1.87E-04	1.43E-05	9.83E-03	1.41E-03	---	---	1.16E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	9.20E-05	4.08E-06	1.71E-04	7.84E-05	---	---	3.45E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	1.71E-04	8.24E-06	8.19E-05	2.33E-04	---	---	5.17E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	2.27E-04	3.76E-08	1.16E-06	1.68E-05	---	---	2.45E-04
Silver	1.42E-07	1.22E-08	8.98E-11	2.59E-05	1.44E-08	5.52E-07	2.12E-07	---	---	2.68E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	1.21E-06	2.96E-07	2.51E-07	2.12E-07	---	---	2.01E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	1.65E-05	3.64E-08	3.10E-07	8.42E-05	---	---	1.02E-04
Vanadium	6.96E-06	5.95E-07	4.39E-09	5.33E-05	1.10E-06	7.63E-06	1.27E-04	---	---	1.97E-04
Zinc	1.92E-05	1.65E-05	1.21E-08	3.56E-03	3.84E-07	4.50E-04	2.97E-04	---	---	4.34E-03

Exposure Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	6.22E-07	3.00E-09	2.28E-07	2.12E-06	---	---	3.10E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	1.05E-05	1.28E-07	1.48E-06	1.91E-05	---	---	3.21E-05
Barium	1.41E-05	1.21E-05	8.92E-09	6.53E-06	3.30E-07	2.23E-04	1.59E-04	---	---	4.15E-04
Beryllium	9.90E-08	8.48E-08	6.25E-11	6.22E-07	5.16E-09	2.28E-07	4.24E-07	---	---	1.46E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	9.02E-07	3.11E-09	2.32E-06	8.27E-07	---	---	4.21E-06
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	7.16E-06	1.37E-06	9.48E-06	2.76E-05	---	---	5.92E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.24E-06	1.23E-06	2.54E-06	6.36E-06	---	---	1.32E-05
Copper	6.22E-06	3.20E-06	3.93E-09	5.13E-05	1.13E-05	1.07E-04	3.61E-05	---	---	2.15E-04
Lead	4.24E-06	2.18E-07	2.68E-09	1.24E-06	3.31E-08	2.44E-06	9.97E-06	---	---	1.82E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	4.33E-05	1.41E-05	9.71E-03	1.45E-03	---	---	1.13E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.24E-06	3.00E-06	9.80E-05	1.06E-06	---	---	1.03E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.24E-05	1.85E-06	1.67E-05	2.12E-05	---	---	6.03E-05
Selenium	1.61E-07	1.38E-08	1.02E-10	8.50E-05	3.72E-08	1.14E-06	2.55E-06	---	---	8.89E-05
Silver	1.41E-07	1.21E-08	8.92E-11	2.59E-05	1.36E-08	4.90E-07	2.12E-07	---	---	2.68E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	6.50E-07	2.95E-07	2.50E-07	2.12E-07	---	---	1.44E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.24E-07	4.29E-09	1.13E-07	8.49E-07	---	---	1.67E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	6.22E-06	7.46E-07	5.17E-06	2.31E-05	---	---	4.23E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	2.77E-03	3.71E-07	4.43E-04	1.49E-04	---	---	3.40E-03

Exposure Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	4.01E-07	5.12E-10	3.61E-08	1.37E-06	---	---	1.81E-06
Arsenic	2.39E-08	6.13E-09	1.51E-11	1.08E-05	2.38E-08	2.80E-07	1.97E-05	---	---	3.09E-05
Barium	8.76E-07	7.50E-07	5.53E-10	3.44E-06	2.26E-08	1.69E-05	8.37E-05	---	---	1.06E-04
Beryllium	2.24E-09	1.91E-09	1.41E-12	0.00E+00	9.97E-11	1.22E-08	0.00E+00	---	---	1.65E-08
Cadmium	4.26E-10	3.65E-11	2.69E-13	0.00E+00	6.51E-12	7.12E-09	0.00E+00	---	---	7.59E-09
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	5.89E-06	1.08E-06	2.27E-05	2.27E-05	---	---	6.20E-05
Cobalt	4.69E-07	4.02E-08	2.96E-10	5.14E-07	4.24E-07	2.25E-06	2.63E-06	---	---	6.33E-06
Copper	4.08E-07	2.09E-07	2.57E-10	1.54E-05	8.67E-07	9.11E-06	1.08E-05	---	---	3.68E-05
Lead	1.31E-08	6.73E-10	8.27E-12	1.44E-07	4.22E-10	8.17E-08	1.15E-06	---	---	1.39E-06
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	3.45E-07	1.20E-04	0.00E+00	---	---	1.25E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	2.65E-05	4.14E-07	2.70E-05	2.26E-05	---	---	7.64E-05
Nickel	8.01E-06	6.17E-06	5.05E-09	2.99E-05	3.42E-06	5.65E-05	5.09E-05	---	---	1.55E-04
Selenium	1.20E-09	1.03E-10	7.55E-13	1.14E-04	4.18E-10	1.16E-08	3.42E-06	---	---	1.17E-04
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	1.29E-10	5.03E-09	0.00E+00	---	---	6.23E-09
Thallium	2.90E-10	2.48E-11	1.83E-13	0.00E+00	4.65E-10	1.39E-09	0.00E+00	---	---	2.17E-09
Uranium	1.51E-09	1.29E-09	9.53E-13	2.99E-06	7.17E-09	4.88E-08	2.04E-05	---	---	2.34E-05
Vanadium	4.50E-07	3.85E-08	2.84E-10	7.08E-06	1.01E-07	2.04E-06	2.63E-05	---	---	3.60E-05
Zinc	2.88E-07	2.47E-07	1.82E-10	7.09E-04	3.32E-09	4.90E-06	3.80E-05	---	---	7.52E-04

Exposure Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	1.02E-06	3.51E-09	2.64E-07	3.49E-06	---	---	4.91E-06
Arsenic	7.88E-07	2.02E-07	4.97E-10	2.13E-05	1.52E-07	1.76E-06	3.88E-05	---	---	6.30E-05
Barium	1.50E-05	1.29E-05	9.47E-09	9.97E-06	3.53E-07	2.40E-04	2.43E-04	---	---	5.21E-04
Beryllium	1.01E-07	8.67E-08	6.39E-11	6.22E-07	5.26E-09	2.40E-07	4.24E-07	---	---	1.48E-06
Cadmium	1.48E-07	1.26E-08	9.31E-11	9.02E-07	3.11E-09	2.33E-06	8.27E-07	---	---	4.22E-06
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	1.30E-05	2.45E-06	3.22E-05	5.03E-05	---	---	1.21E-04
Cobalt	2.17E-06	1.85E-07	1.37E-09	1.76E-06	1.65E-06	4.79E-06	9.00E-06	---	---	1.95E-05
Copper	6.63E-06	3.41E-06	4.18E-09	6.67E-05	1.21E-05	1.16E-04	4.69E-05	---	---	2.52E-04
Lead	4.26E-06	2.19E-07	2.68E-09	1.39E-06	3.35E-08	2.52E-06	1.11E-05	---	---	1.95E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	4.33E-05	1.44E-05	9.83E-03	1.45E-03	---	---	1.15E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	2.77E-05	3.41E-06	1.25E-04	2.36E-05	---	---	1.80E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	4.23E-05	5.28E-06	7.32E-05	7.21E-05	---	---	2.15E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	1.99E-04	3.76E-08	1.15E-06	5.96E-06	---	---	2.06E-04
Silver	1.42E-07	1.22E-08	8.98E-11	2.59E-05	1.37E-08	4.95E-07	2.12E-07	---	---	2.68E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	6.50E-07	2.95E-07	2.51E-07	2.12E-07	---	---	1.44E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	3.11E-06	1.15E-08	1.62E-07	2.12E-05	---	---	2.51E-05
Vanadium	6.96E-06	5.95E-07	4.39E-09	1.33E-05	8.47E-07	7.21E-06	4.94E-05	---	---	7.84E-05
Zinc	1.92E-05	1.65E-05	1.21E-08	3.48E-03	3.74E-07	4.48E-04	1.86E-04	---	---	4.15E-03

Exposure Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.51E-08	5.57E-08	4.10E-11	6.22E-07	3.00E-09	2.28E-07	2.12E-06	---	---	3.10E-06
Arsenic	7.64E-07	1.96E-07	4.82E-10	1.05E-05	1.28E-07	1.48E-06	1.91E-05	---	---	3.21E-05
Barium	1.41E-05	1.21E-05	8.92E-09	6.53E-06	3.30E-07	2.23E-04	1.59E-04	---	---	4.15E-04
Beryllium	9.90E-08	8.48E-08	6.25E-11	6.22E-07	5.16E-09	2.28E-07	4.24E-07	---	---	1.46E-06
Cadmium	1.47E-07	1.26E-08	9.28E-11	9.02E-07	3.11E-09	2.32E-06	8.27E-07	---	---	4.21E-06
Chromium (Total)	7.36E-06	6.30E-06	4.64E-09	7.16E-06	1.37E-06	9.48E-06	2.76E-05	---	---	5.92E-05
Cobalt	1.70E-06	1.45E-07	1.07E-09	1.24E-06	1.23E-06	2.54E-06	6.36E-06	---	---	1.32E-05
Copper	6.22E-06	3.20E-06	3.93E-09	5.13E-05	1.13E-05	1.07E-04	3.61E-05	---	---	2.15E-04
Lead	4.24E-06	2.18E-07	2.68E-09	1.24E-06	3.31E-08	2.44E-06	9.97E-06	---	---	1.82E-05
Manganese	1.07E-04	9.20E-06	6.78E-08	4.33E-05	1.41E-05	9.71E-03	1.45E-03	---	---	1.13E-02
Molybdenum	1.67E-07	1.43E-08	1.05E-10	1.24E-06	3.00E-06	9.80E-05	1.06E-06	---	---	1.03E-04
Nickel	4.53E-06	3.49E-06	2.86E-09	1.24E-05	1.85E-06	1.67E-05	2.12E-05	---	---	6.03E-05
Selenium	1.61E-07	1.38E-08	1.02E-10	8.50E-05	3.72E-08	1.14E-06	2.55E-06	---	---	8.89E-05
Silver	1.41E-07	1.21E-08	8.92E-11	2.59E-05	1.36E-08	4.90E-07	2.12E-07	---	---	2.68E-05
Thallium	3.11E-08	2.66E-09	1.96E-11	6.50E-07	2.95E-07	2.50E-07	2.12E-07	---	---	1.44E-06
Uranium	3.11E-07	2.66E-07	1.96E-10	1.24E-07	4.29E-09	1.13E-07	8.49E-07	---	---	1.67E-06
Vanadium	6.51E-06	5.57E-07	4.10E-09	6.22E-06	7.46E-07	5.17E-06	2.31E-05	---	---	4.23E-05
Zinc	1.90E-05	1.62E-05	1.20E-08	2.77E-03	3.71E-07	4.43E-04	1.49E-04	---	---	3.40E-03

Exposure Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	1.70E-09	1.46E-09	1.07E-12	1.88E-07	2.85E-10	2.25E-08	6.40E-07	---	---	8.54E-07
Arsenic	2.39E-08	6.13E-09	1.51E-11	1.40E-06	4.71E-09	1.33E-07	2.55E-06	---	---	4.11E-06
Barium	8.76E-07	7.50E-07	5.53E-10	4.54E-07	1.71E-08	1.51E-05	1.11E-05	---	---	2.82E-05
Beryllium	2.24E-09	1.91E-09	1.41E-12	0.00E+00	9.97E-11	1.22E-08	0.00E+00	---	---	1.65E-08
Cadmium	4.26E-10	3.65E-11	2.69E-13	0.00E+00	6.51E-12	7.12E-09	0.00E+00	---	---	7.59E-09
Chromium (Total)	5.22E-06	4.46E-06	3.29E-09	7.16E-07	1.07E-06	2.26E-05	2.76E-06	---	---	3.68E-05
Cobalt	4.69E-07	4.02E-08	2.96E-10	7.88E-08	3.72E-07	2.16E-06	4.03E-07	---	---	3.52E-06
Copper	4.08E-07	2.09E-07	2.57E-10	1.81E-06	5.92E-07	7.76E-06	1.27E-06	---	---	1.21E-05
Lead	1.31E-08	6.73E-10	8.27E-12	3.69E-10	1.36E-10	5.22E-08	2.95E-09	---	---	6.94E-08
Manganese	4.06E-06	3.47E-07	2.56E-09	0.00E+00	3.45E-07	1.20E-04	0.00E+00	---	---	1.25E-04
Molybdenum	3.59E-09	3.08E-10	2.27E-12	6.00E-06	1.35E-07	7.09E-06	5.11E-06	---	---	1.83E-05
Nickel	8.01E-06	6.17E-06	5.05E-09	4.98E-06	2.75E-06	5.45E-05	8.49E-06	---	---	8.49E-05
Selenium	1.20E-09	1.03E-10	7.55E-13	2.62E-05	2.41E-10	1.09E-08	7.85E-07	---	---	2.70E-05
Silver	9.86E-10	8.44E-11	6.22E-13	0.00E+00	1.29E-10	5.03E-09	0.00E+00	---	---	6.23E-09
Thallium	2.90E-10	2.48E-11	1.83E-13	1.25E-08	2.46E-09	2.99E-09	4.08E-09	---	---	2.23E-08
Uranium	1.51E-09	1.29E-09	9.53E-13	3.70E-07	8.98E-10	1.14E-08	2.52E-06	---	---	2.91E-06
Vanadium	4.50E-07	3.85E-08	2.84E-10	8.56E-07	4.87E-08	1.96E-06	3.18E-06	---	---	6.53E-06
Zinc	2.88E-07	2.47E-07	1.82E-10	7.92E-05	2.92E-09	4.35E-06	4.24E-06	---	---	8.83E-05

Exposure Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Sediment Ingestion	Dermal Contact with Sediment	Total Exposure
	mg/kg-day	mg/kg-day	mg/m^3	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Antimony	6.68E-08	5.72E-08	4.21E-11	8.10E-07	3.29E-09	2.51E-07	2.76E-06	---	---	3.95E-06
Arsenic	7.88E-07	2.02E-07	4.97E-10	1.19E-05	1.33E-07	1.61E-06	2.16E-05	---	---	3.63E-05
Barium	1.50E-05	1.29E-05	9.47E-09	6.99E-06	3.47E-07	2.38E-04	1.70E-04	---	---	4.44E-04
Beryllium	1.01E-07	8.67E-08	6.39E-11	6.22E-07	5.26E-09	2.40E-07	4.24E-07	---	---	1.48E-06
Cadmium	1.48E-07	1.26E-08	9.31E-11	9.02E-07	3.11E-09	2.33E-06	8.27E-07	---	---	4.22E-06
Chromium (Total)	1.26E-05	1.08E-05	7.93E-09	7.87E-06	2.44E-06	3.21E-05	3.03E-05	---	---	9.61E-05
Cobalt	2.17E-06	1.85E-07	1.37E-09	1.32E-06	1.60E-06	4.70E-06	6.77E-06	---	---	1.67E-05
Copper	6.63E-06	3.41E-06	4.18E-09	5.32E-05	1.19E-05	1.15E-04	3.73E-05	---	---	2.27E-04
Lead	4.26E-06	2.19E-07	2.68E-09	1.25E-06	3.32E-08	2.49E-06	9.97E-06	---	---	1.82E-05
Manganese	1.12E-04	9.55E-06	7.04E-08	4.33E-05	1.44E-05	9.83E-03	1.45E-03	---	---	1.15E-02
Molybdenum	1.70E-07	1.46E-08	1.08E-10	7.24E-06	3.13E-06	1.05E-04	6.17E-06	---	---	1.22E-04
Nickel	1.25E-05	9.65E-06	7.91E-09	1.74E-05	4.60E-06	7.12E-05	2.97E-05	---	---	1.45E-04
Selenium	1.62E-07	1.39E-08	1.02E-10	1.11E-04	3.75E-08	1.15E-06	3.33E-06	---	---	1.16E-04
Silver	1.42E-07	1.22E-08	8.98E-11	2.59E-05	1.37E-08	4.95E-07	2.12E-07	---	---	2.68E-05
Thallium	3.14E-08	2.69E-09	1.98E-11	6.63E-07	2.97E-07	2.53E-07	2.16E-07	---	---	1.46E-06
Uranium	3.13E-07	2.68E-07	1.97E-10	4.95E-07	5.19E-09	1.25E-07	3.37E-06	---	---	4.58E-06
Vanadium	6.96E-06	5.95E-07	4.39E-09	7.08E-06	7.94E-07	7.12E-06	2.63E-05	---	---	4.89E-05
Zinc	1.92E-05	1.65E-05	1.21E-08	2.85E-03	3.74E-07	4.47E-04	1.53E-04	---	---	3.49E-03

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	6.E-03	6.E-05	9.E-03	9.E-03	3.E-02
Arsenic	4.E-02	1.E-03	3.E-06	**3.E-01**	4.E-03	6.E-02	8.E-02	**5.E-01**
Barium	1.E-03	1.E-04	1.E-07	3.E-04	1.E-05	2.E-02	1.E-03	2.E-02
Beryllium	8.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	1.E-03	3.E-05	5.E-02	2.E-03	5.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	3.E-05	7.E-06	8.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	1.E-03	3.E-03	1.E-02	2.E-03	3.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	4.E-03	2.E-04	5.E-03
Lead	1.E-01	8.E-04	1.E-05	2.E-02	6.E-04	5.E-02	3.E-02	3.E-01
Manganese	7.E-02	6.E-04	6.E-06	3.E-02	5.E-03	**4.E+00**	6.E-02	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	9.E-04	5.E-03	**3.E-01**	4.E-04	**3.E-01**
Nickel	2.E-03	1.E-04	1.E-07	9.E-04	3.E-04	6.E-03	7.E-04	9.E-03
Selenium	5.E-04	4.E-06	4.E-08	2.E-02	5.E-05	3.E-03	1.E-03	3.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	**3.E-01**	2.E-01	1.E-01	3.E-02	**7.E-01**
Uranium	9.E-03	8.E-04	7.E-07	7.E-04	6.E-05	3.E-03	2.E-03	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	6.E-03	9.E-02	3.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	6.E-06	1.E-02	6.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	7.E-05	6.E-06	6.E-09	5.E-03	1.E-05	8.E-04	7.E-03	1.E-02
Arsenic	1.E-03	4.E-05	1.E-07	3.E-03	6.E-05	6.E-03	1.E-03	1.E-02
Barium	8.E-05	6.E-06	6.E-09	1.E-06	7.E-07	1.E-03	5.E-06	1.E-03
Beryllium	2.E-05	2.E-06	2.E-09	0.E+00	4.E-07	1.E-04	0.E+00	1.E-04
Cadmium	9.E-06	8.E-08	7.E-10	0.E+00	7.E-08	2.E-04	0.E+00	2.E-04
Chromium (Total)	6.E-05	5.E-06	5.E-09	0.E+00	6.E-06	2.E-04	0.E+00	3.E-04
Cobalt	3.E-03	2.E-05	2.E-07	1.E-04	1.E-03	1.E-02	2.E-04	2.E-02
Copper	2.E-05	8.E-07	1.E-09	0.E+00	1.E-05	3.E-04	0.E+00	4.E-04
Lead	4.E-04	2.E-06	4.E-08	0.E+00	2.E-06	2.E-03	0.E+00	2.E-03
Manganese	3.E-03	2.E-05	2.E-07	4.E-04	1.E-04	9.E-02	9.E-04	1.E-01
Molybdenum	1.E-05	1.E-07	1.E-09	1.E-02	4.E-04	2.E-02	4.E-03	3.E-02
Nickel	3.E-03	2.E-04	2.E-07	3.E-04	5.E-04	2.E-02	2.E-04	2.E-02
Selenium	3.E-06	3.E-08	3.E-10	6.E-03	4.E-07	3.E-05	3.E-04	7.E-03
Silver	3.E-06	3.E-08	3.E-10	0.E+00	2.E-07	2.E-05	0.E+00	2.E-05
Thallium	4.E-04	3.E-06	3.E-08	3.E-02	7.E-03	6.E-03	3.E-03	4.E-02
Uranium	4.E-05	4.E-06	3.E-09	0.E+00	1.E-07	2.E-04	0.E+00	2.E-04
Vanadium	8.E-03	7.E-05	6.E-07	0.E+00	3.E-04	3.E-02	0.E+00	4.E-02
Zinc	1.E-05	9.E-07	8.E-10	0.E+00	5.E-08	2.E-04	0.E+00	2.E-04

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	1.E-02	7.E-05	1.E-02	2.E-02	4.E-02
Arsenic	4.E-02	1.E-03	4.E-06	**3.E-01**	4.E-03	7.E-02	9.E-02	**5.E-01**
Barium	1.E-03	1.E-04	1.E-07	3.E-04	1.E-05	2.E-02	1.E-03	2.E-02
Beryllium	9.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	1.E-03	3.E-05	5.E-02	2.E-03	6.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	3.E-05	1.E-05	3.E-04	3.E-05	6.E-04
Cobalt	1.E-02	1.E-04	1.E-06	2.E-03	4.E-03	2.E-02	3.E-03	4.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	5.E-03	2.E-04	6.E-03
Lead	1.E-01	8.E-04	1.E-05	2.E-02	6.E-04	6.E-02	3.E-02	3.E-01
Manganese	8.E-02	7.E-04	6.E-06	3.E-02	5.E-03	**4.E+00**	6.E-02	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	1.E-02	5.E-03	**3.E-01**	5.E-03	**3.E-01**
Nickel	4.E-03	3.E-04	3.E-07	1.E-03	8.E-04	2.E-02	9.E-04	3.E-02
Selenium	5.E-04	4.E-06	4.E-08	3.E-02	5.E-05	3.E-03	1.E-03	3.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	**3.E-01**	2.E-01	1.E-01	3.E-02	**7.E-01**
Uranium	9.E-03	8.E-04	7.E-07	7.E-04	6.E-05	3.E-03	2.E-03	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	6.E-03	1.E-01	3.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	6.E-06	1.E-02	6.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	6.E-03	6.E-05	9.E-03	9.E-03	3.E-02
Arsenic	4.E-02	1.E-03	3.E-06	**3.E-01**	4.E-03	6.E-02	7.E-02	**4.E-01**
Barium	1.E-03	1.E-04	1.E-07	3.E-04	1.E-05	2.E-02	2.E-03	2.E-02
Beryllium	8.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	1.E-03	3.E-05	5.E-02	9.E-04	5.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	3.E-05	7.E-06	8.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	1.E-03	3.E-03	1.E-02	4.E-03	3.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	4.E-03	1.E-04	5.E-03
Lead	1.E-01	8.E-04	1.E-05	2.E-02	6.E-04	5.E-02	2.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	3.E-02	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	9.E-04	5.E-03	**3.E-01**	4.E-04	**3.E-01**
Nickel	2.E-03	1.E-04	1.E-07	9.E-04	3.E-04	6.E-03	6.E-04	9.E-03
Selenium	5.E-04	4.E-06	4.E-08	2.E-02	5.E-05	3.E-03	8.E-04	3.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	**3.E-01**	2.E-01	1.E-01	3.E-02	**7.E-01**
Uranium	9.E-03	8.E-04	7.E-07	7.E-04	6.E-05	3.E-03	2.E-03	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	6.E-03	9.E-02	3.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	6.E-06	1.E-02	5.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	1.E-02	3.E-05	2.E-03	2.E-02	4.E-02
Arsenic	1.E-03	4.E-05	1.E-07	**2.E+00**	2.E-03	2.E-02	**5.E-01**	**2.E+00**
Barium	8.E-05	6.E-06	6.E-09	1.E-04	9.E-07	1.E-03	9.E-04	3.E-03
Beryllium	2.E-05	2.E-06	2.E-09	1.E-02	1.E-05	3.E-04	4.E-03	2.E-02
Cadmium	9.E-06	8.E-08	7.E-10	9.E-05	8.E-08	2.E-04	5.E-05	3.E-04
Chromium (Total)	6.E-05	5.E-06	5.E-09	8.E-05	6.E-06	2.E-04	1.E-04	5.E-04
Cobalt	3.E-03	2.E-05	2.E-07	2.E-03	2.E-03	1.E-02	6.E-03	3.E-02
Copper	2.E-05	8.E-07	1.E-09	8.E-04	3.E-05	4.E-04	2.E-04	1.E-03
Lead	4.E-04	2.E-06	4.E-08	1.E-02	2.E-05	3.E-03	1.E-02	3.E-02
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	1.E-04	9.E-02	0.E+00	9.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	6.E-02	2.E-03	8.E-02	2.E-02	2.E-01
Nickel	3.E-03	2.E-04	2.E-07	1.E-02	1.E-03	2.E-02	7.E-03	4.E-02
Selenium	3.E-06	3.E-08	3.E-10	1.E-01	2.E-06	4.E-05	4.E-03	1.E-01
Silver	3.E-06	3.E-08	3.E-10	0.E+00	2.E-07	2.E-05	0.E+00	2.E-05
Thallium	4.E-04	3.E-06	3.E-08	0.E+00	3.E-04	2.E-03	0.E+00	2.E-03
Uranium	4.E-05	4.E-06	3.E-09	9.E-02	4.E-04	2.E-03	2.E-01	**3.E-01**
Vanadium	8.E-03	7.E-05	6.E-07	2.E-01	3.E-03	4.E-02	2.E-01	**4.E-01**
Zinc	1.E-05	9.E-07	8.E-10	1.E-02	8.E-08	2.E-04	6.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	2.E-02	9.E-05	1.E-02	3.E-02	7.E-02
Arsenic	4.E-02	1.E-03	4.E-06	**2.E+00**	6.E-03	8.E-02	**5.E-01**	**3.E+00**
Barium	1.E-03	1.E-04	1.E-07	4.E-04	1.E-05	2.E-02	2.E-03	2.E-02
Beryllium	9.E-04	7.E-05	7.E-08	1.E-02	4.E-05	2.E-03	4.E-03	2.E-02
Cadmium	3.E-03	3.E-05	2.E-07	2.E-03	3.E-05	5.E-02	1.E-03	5.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	1.E-04	1.E-05	3.E-04	1.E-04	7.E-04
Cobalt	1.E-02	1.E-04	1.E-06	4.E-03	5.E-03	2.E-02	1.E-02	6.E-02
Copper	3.E-04	1.E-05	2.E-08	1.E-03	2.E-04	5.E-03	3.E-04	7.E-03
Lead	1.E-01	8.E-04	1.E-05	3.E-02	6.E-04	6.E-02	3.E-02	3.E-01
Manganese	8.E-02	7.E-04	6.E-06	3.E-02	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	6.E-02	7.E-03	**4.E-01**	2.E-02	**4.E-01**
Nickel	4.E-03	3.E-04	3.E-07	1.E-02	1.E-03	3.E-02	7.E-03	5.E-02
Selenium	5.E-04	4.E-06	4.E-08	1.E-01	5.E-05	3.E-03	5.E-03	1.E-01
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	**3.E-01**	2.E-01	1.E-01	3.E-02	**7.E-01**
Uranium	9.E-03	8.E-04	7.E-07	9.E-02	5.E-04	5.E-03	2.E-01	**3.E-01**
Vanadium	1.E-01	1.E-03	9.E-06	2.E-01	9.E-03	1.E-01	2.E-01	**6.E-01**
Zinc	7.E-04	6.E-05	5.E-08	3.E-02	6.E-06	1.E-02	1.E-03	4.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	6.E-03	6.E-05	9.E-03	9.E-03	3.E-02
Arsenic	4.E-02	1.E-03	3.E-06	**3.E-01**	4.E-03	6.E-02	7.E-02	**4.E-01**
Barium	1.E-03	1.E-04	1.E-07	3.E-04	1.E-05	2.E-02	2.E-03	2.E-02
Beryllium	8.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	1.E-03	3.E-05	5.E-02	9.E-04	5.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	3.E-05	7.E-06	8.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	1.E-03	3.E-03	1.E-02	4.E-03	3.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	4.E-03	1.E-04	5.E-03
Lead	1.E-01	8.E-04	1.E-05	2.E-02	6.E-04	5.E-02	2.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	3.E-02	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	9.E-04	5.E-03	**3.E-01**	4.E-04	**3.E-01**
Nickel	2.E-03	1.E-04	1.E-07	9.E-04	3.E-04	6.E-03	6.E-04	9.E-03
Selenium	5.E-04	4.E-06	4.E-08	2.E-02	5.E-05	3.E-03	8.E-04	3.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	**3.E-01**	2.E-01	1.E-01	3.E-02	**7.E-01**
Uranium	9.E-03	8.E-04	7.E-07	7.E-04	6.E-05	3.E-03	2.E-03	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	6.E-03	9.E-02	3.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	6.E-06	1.E-02	5.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	2.E-02	3.E-05	2.E-03	3.E-02	4.E-02
Arsenic	1.E-03	4.E-05	1.E-07	**2.E+00**	2.E-03	2.E-02	**5.E-01**	**2.E+00**
Barium	8.E-05	6.E-06	6.E-09	1.E-05	7.E-07	1.E-03	6.E-05	2.E-03
Beryllium	2.E-05	2.E-06	2.E-09	2.E-02	2.E-05	5.E-04	6.E-03	2.E-02
Cadmium	9.E-06	8.E-08	7.E-10	2.E-05	7.E-08	2.E-04	1.E-05	2.E-04
Chromium (Total)	6.E-05	5.E-06	5.E-09	9.E-05	6.E-06	2.E-04	1.E-04	5.E-04
Cobalt	3.E-03	2.E-05	2.E-07	2.E-03	2.E-03	1.E-02	6.E-03	3.E-02
Copper	2.E-05	8.E-07	1.E-09	8.E-04	3.E-05	4.E-04	2.E-04	1.E-03
Lead	4.E-04	2.E-06	4.E-08	1.E-02	2.E-05	3.E-03	1.E-02	3.E-02
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	1.E-04	9.E-02	0.E+00	9.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	6.E-02	2.E-03	9.E-02	3.E-02	2.E-01
Nickel	3.E-03	2.E-04	2.E-07	1.E-02	1.E-03	2.E-02	7.E-03	4.E-02
Selenium	3.E-06	3.E-08	3.E-10	1.E-01	2.E-06	4.E-05	4.E-03	1.E-01
Silver	3.E-06	3.E-08	3.E-10	0.E+00	2.E-07	2.E-05	0.E+00	2.E-05
Thallium	4.E-04	3.E-06	3.E-08	0.E+00	3.E-04	2.E-03	0.E+00	2.E-03
Uranium	4.E-05	4.E-06	3.E-09	9.E-02	4.E-04	2.E-03	2.E-01	**3.E-01**
Vanadium	8.E-03	7.E-05	6.E-07	2.E-01	3.E-03	4.E-02	2.E-01	**4.E-01**
Zinc	1.E-05	9.E-07	8.E-10	1.E-02	8.E-08	2.E-04	6.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	2.E-02	1.E-04	1.E-02	4.E-02	7.E-02
Arsenic	4.E-02	1.E-03	4.E-06	**2.E+00**	6.E-03	8.E-02	**6.E-01**	**3.E+00**
Barium	1.E-03	1.E-04	1.E-07	3.E-04	1.E-05	2.E-02	2.E-03	2.E-02
Beryllium	9.E-04	7.E-05	7.E-08	2.E-02	4.E-05	2.E-03	6.E-03	3.E-02
Cadmium	3.E-03	3.E-05	2.E-07	1.E-03	3.E-05	5.E-02	9.E-04	5.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	1.E-04	1.E-05	3.E-04	1.E-04	8.E-04
Cobalt	1.E-02	1.E-04	1.E-06	4.E-03	5.E-03	2.E-02	1.E-02	6.E-02
Copper	3.E-04	1.E-05	2.E-08	1.E-03	2.E-04	5.E-03	3.E-04	7.E-03
Lead	1.E-01	8.E-04	1.E-05	3.E-02	6.E-04	6.E-02	3.E-02	3.E-01
Manganese	8.E-02	7.E-04	6.E-06	3.E-02	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	6.E-02	7.E-03	**4.E-01**	3.E-02	**5.E-01**
Nickel	4.E-03	3.E-04	3.E-07	1.E-02	1.E-03	3.E-02	8.E-03	5.E-02
Selenium	5.E-04	4.E-06	4.E-08	1.E-01	5.E-05	3.E-03	5.E-03	1.E-01
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	**3.E-01**	2.E-01	1.E-01	3.E-02	**7.E-01**
Uranium	9.E-03	8.E-04	7.E-07	9.E-02	5.E-04	5.E-03	2.E-01	**4.E-01**
Vanadium	1.E-01	1.E-03	9.E-06	2.E-01	9.E-03	1.E-01	2.E-01	**7.E-01**
Zinc	7.E-04	6.E-05	5.E-08	3.E-02	6.E-06	1.E-02	1.E-03	4.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	5.E-03	6.E-05	9.E-03	9.E-03	3.E-02
Arsenic	4.E-02	1.E-03	3.E-06	1.E-01	3.E-03	6.E-02	1.E-01	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	1.E-05	2.E-02	1.E-03	2.E-02
Beryllium	8.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	4.E-03	3.E-05	5.E-02	2.E-03	6.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	2.E-05	7.E-06	8.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	1.E-03	3.E-03	1.E-02	4.E-03	3.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	4.E-03	1.E-04	5.E-03
Lead	1.E-01	8.E-04	1.E-05	9.E-03	5.E-04	5.E-02	3.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	6.E-03	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	9.E-04	5.E-03	**3.E-01**	4.E-04	**3.E-01**
Nickel	2.E-03	1.E-04	1.E-07	9.E-04	3.E-04	6.E-03	7.E-04	9.E-03
Selenium	5.E-04	4.E-06	4.E-08	5.E-02	5.E-05	3.E-03	7.E-04	5.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	2.E-01	1.E-01	3.E-02	**5.E-01**
Uranium	9.E-03	8.E-04	7.E-07	7.E-04	6.E-05	3.E-03	2.E-03	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	6.E-03	9.E-02	4.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	2.E-02	6.E-06	1.E-02	5.E-04	3.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	3.E-03	1.E-05	9.E-04	6.E-03	1.E-02
Arsenic	1.E-03	4.E-05	1.E-07	1.E-01	6.E-04	1.E-02	1.E-01	2.E-01
Barium	8.E-05	6.E-06	6.E-09	6.E-05	9.E-07	1.E-03	7.E-04	2.E-03
Beryllium	2.E-05	2.E-06	2.E-09	0.E+00	4.E-07	1.E-04	0.E+00	1.E-04
Cadmium	9.E-06	8.E-08	7.E-10	0.E+00	7.E-08	2.E-04	0.E+00	2.E-04
Chromium (Total)	6.E-05	5.E-06	5.E-09	1.E-05	6.E-06	2.E-04	3.E-05	4.E-04
Cobalt	3.E-03	2.E-05	2.E-07	6.E-04	1.E-03	1.E-02	2.E-03	2.E-02
Copper	2.E-05	8.E-07	1.E-09	1.E-04	2.E-05	3.E-04	4.E-05	5.E-04
Lead	4.E-04	2.E-06	4.E-08	1.E-03	7.E-06	2.E-03	4.E-03	7.E-03
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	1.E-04	9.E-02	0.E+00	9.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	2.E-02	7.E-04	4.E-02	8.E-03	6.E-02
Nickel	3.E-03	2.E-04	2.E-07	2.E-03	6.E-04	2.E-02	2.E-03	3.E-02
Selenium	3.E-06	3.E-08	3.E-10	7.E-02	6.E-07	3.E-05	1.E-03	7.E-02
Silver	3.E-06	3.E-08	3.E-10	0.E+00	2.E-07	2.E-05	0.E+00	2.E-05
Thallium	4.E-04	3.E-06	3.E-08	0.E+00	3.E-04	2.E-03	0.E+00	2.E-03
Uranium	4.E-05	4.E-06	3.E-09	2.E-02	1.E-04	6.E-04	6.E-02	8.E-02
Vanadium	8.E-03	7.E-05	6.E-07	2.E-02	8.E-04	3.E-02	5.E-02	1.E-01
Zinc	1.E-05	9.E-07	8.E-10	5.E-03	6.E-08	2.E-04	1.E-04	5.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	9.E-03	7.E-05	1.E-02	1.E-02	4.E-02
Arsenic	4.E-02	1.E-03	4.E-06	2.E-01	4.E-03	7.E-02	2.E-01	**6.E-01**
Barium	1.E-03	1.E-04	1.E-07	2.E-04	1.E-05	2.E-02	2.E-03	2.E-02
Beryllium	9.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	4.E-03	3.E-05	5.E-02	2.E-03	6.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	3.E-05	1.E-05	3.E-04	6.E-05	6.E-04
Cobalt	1.E-02	1.E-04	1.E-06	2.E-03	5.E-03	2.E-02	5.E-03	5.E-02
Copper	3.E-04	1.E-05	2.E-08	5.E-04	2.E-04	5.E-03	2.E-04	6.E-03
Lead	1.E-01	8.E-04	1.E-05	1.E-02	5.E-04	6.E-02	4.E-02	3.E-01
Manganese	8.E-02	7.E-04	6.E-06	6.E-03	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	2.E-02	6.E-03	**3.E-01**	8.E-03	**3.E-01**
Nickel	4.E-03	3.E-04	3.E-07	3.E-03	9.E-04	2.E-02	2.E-03	4.E-02
Selenium	5.E-04	4.E-06	4.E-08	1.E-01	5.E-05	3.E-03	2.E-03	1.E-01
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	2.E-01	1.E-01	3.E-02	**5.E-01**
Uranium	9.E-03	8.E-04	7.E-07	2.E-02	2.E-04	4.E-03	6.E-02	9.E-02
Vanadium	1.E-01	1.E-03	9.E-06	5.E-02	7.E-03	1.E-01	8.E-02	**4.E-01**
Zinc	7.E-04	6.E-05	5.E-08	2.E-02	6.E-06	1.E-02	7.E-04	4.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	5.E-03	6.E-05	9.E-03	9.E-03	3.E-02
Arsenic	4.E-02	1.E-03	3.E-06	1.E-01	3.E-03	6.E-02	1.E-01	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	1.E-05	2.E-02	1.E-03	2.E-02
Beryllium	8.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	4.E-03	3.E-05	5.E-02	2.E-03	6.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	2.E-05	7.E-06	8.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	1.E-03	3.E-03	1.E-02	4.E-03	3.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	4.E-03	1.E-04	5.E-03
Lead	1.E-01	8.E-04	1.E-05	9.E-03	5.E-04	5.E-02	3.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	6.E-03	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	9.E-04	5.E-03	**3.E-01**	4.E-04	**3.E-01**
Nickel	2.E-03	1.E-04	1.E-07	9.E-04	3.E-04	6.E-03	7.E-04	9.E-03
Selenium	5.E-04	4.E-06	4.E-08	5.E-02	5.E-05	3.E-03	7.E-04	5.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	2.E-01	1.E-01	3.E-02	**5.E-01**
Uranium	9.E-03	8.E-04	7.E-07	7.E-04	6.E-05	3.E-03	2.E-03	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	6.E-03	9.E-02	4.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	2.E-02	6.E-06	1.E-02	5.E-04	3.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	2.E-03	6.E-06	6.E-04	3.E-03	5.E-03
Arsenic	1.E-03	4.E-05	1.E-07	2.E-02	1.E-04	7.E-03	1.E-02	4.E-02
Barium	8.E-05	6.E-06	6.E-09	8.E-06	7.E-07	1.E-03	9.E-05	2.E-03
Beryllium	2.E-05	2.E-06	2.E-09	0.E+00	4.E-07	1.E-04	0.E+00	1.E-04
Cadmium	9.E-06	8.E-08	7.E-10	0.E+00	7.E-08	2.E-04	0.E+00	2.E-04
Chromium (Total)	6.E-05	5.E-06	5.E-09	2.E-06	6.E-06	2.E-04	3.E-06	3.E-04
Cobalt	3.E-03	2.E-05	2.E-07	9.E-05	1.E-03	1.E-02	2.E-04	2.E-02
Copper	2.E-05	8.E-07	1.E-09	1.E-05	1.E-05	3.E-04	5.E-06	4.E-04
Lead	4.E-04	2.E-06	4.E-08	3.E-06	2.E-06	2.E-03	1.E-05	2.E-03
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	1.E-04	9.E-02	0.E+00	9.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	4.E-03	2.E-04	1.E-02	2.E-03	2.E-02
Nickel	3.E-03	2.E-04	2.E-07	3.E-04	5.E-04	2.E-02	3.E-04	2.E-02
Selenium	3.E-06	3.E-08	3.E-10	1.E-02	3.E-07	3.E-05	2.E-04	2.E-02
Silver	3.E-06	3.E-08	3.E-10	0.E+00	2.E-07	2.E-05	0.E+00	2.E-05
Thallium	4.E-04	3.E-06	3.E-08	3.E-03	1.E-03	2.E-03	5.E-04	8.E-03
Uranium	4.E-05	4.E-06	3.E-09	2.E-03	1.E-05	2.E-04	7.E-03	1.E-02
Vanadium	8.E-03	7.E-05	6.E-07	3.E-03	4.E-04	3.E-02	5.E-03	5.E-02
Zinc	1.E-05	9.E-07	8.E-10	6.E-04	5.E-08	2.E-04	2.E-05	8.E-04

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	7.E-03	7.E-05	1.E-02	1.E-02	3.E-02
Arsenic	4.E-02	1.E-03	4.E-06	1.E-01	4.E-03	7.E-02	1.E-01	**4.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	1.E-05	2.E-02	1.E-03	2.E-02
Beryllium	9.E-04	7.E-05	7.E-08	1.E-03	2.E-05	2.E-03	4.E-04	4.E-03
Cadmium	3.E-03	3.E-05	2.E-07	4.E-03	3.E-05	5.E-02	2.E-03	6.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	2.E-05	1.E-05	3.E-04	3.E-05	6.E-04
Cobalt	1.E-02	1.E-04	1.E-06	2.E-03	4.E-03	2.E-02	4.E-03	5.E-02
Copper	3.E-04	1.E-05	2.E-08	4.E-04	2.E-04	5.E-03	2.E-04	6.E-03
Lead	1.E-01	8.E-04	1.E-05	9.E-03	5.E-04	6.E-02	3.E-02	2.E-01
Manganese	8.E-02	7.E-04	6.E-06	6.E-03	5.E-03	**4.E+00**	1.E-01	**4.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	5.E-03	5.E-03	**3.E-01**	2.E-03	**3.E-01**
Nickel	4.E-03	3.E-04	3.E-07	1.E-03	8.E-04	2.E-02	1.E-03	3.E-02
Selenium	5.E-04	4.E-06	4.E-08	6.E-02	5.E-05	3.E-03	1.E-03	7.E-02
Silver	5.E-04	4.E-06	4.E-08	2.E-02	2.E-05	1.E-03	7.E-05	2.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	2.E-01	1.E-01	3.E-02	**5.E-01**
Uranium	9.E-03	8.E-04	7.E-07	3.E-03	7.E-05	3.E-03	1.E-02	3.E-02
Vanadium	1.E-01	1.E-03	9.E-06	2.E-02	7.E-03	1.E-01	5.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	2.E-02	6.E-06	1.E-02	5.E-04	3.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	3.E-03	2.E-05	2.E-03	9.E-03	2.E-02
Arsenic	4.E-02	1.E-03	3.E-06	1.E-01	1.E-03	2.E-02	8.E-02	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	4.E-06	4.E-03	1.E-03	7.E-03
Beryllium	8.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	8.E-04	9.E-06	1.E-02	2.E-03	2.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	1.E-05	2.E-06	2.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	8.E-04	9.E-04	3.E-03	2.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	2.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	1.E-02	2.E-04	1.E-02	3.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	1.E-02	1.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	5.E-04	1.E-03	6.E-02	4.E-04	7.E-02
Nickel	2.E-03	1.E-04	1.E-07	5.E-04	8.E-05	1.E-03	7.E-04	4.E-03
Selenium	5.E-04	4.E-06	4.E-08	1.E-02	1.E-05	7.E-04	1.E-03	1.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	5.E-02	4.E-02	3.E-02	**3.E-01**
Uranium	9.E-03	8.E-04	7.E-07	4.E-04	2.E-05	7.E-04	2.E-03	1.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	2.E-02	3.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	6.E-03	2.E-06	3.E-03	6.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	3.E-03	3.E-06	2.E-04	7.E-03	1.E-02
Arsenic	1.E-03	4.E-05	1.E-07	2.E-03	2.E-05	1.E-03	1.E-03	6.E-03
Barium	8.E-05	6.E-06	6.E-09	6.E-07	2.E-07	3.E-04	5.E-06	4.E-04
Beryllium	2.E-05	2.E-06	2.E-09	0.E+00	1.E-07	2.E-05	0.E+00	4.E-05
Cadmium	9.E-06	8.E-08	7.E-10	0.E+00	2.E-08	4.E-05	0.E+00	4.E-05
Chromium (Total)	6.E-05	5.E-06	5.E-09	0.E+00	2.E-06	6.E-05	0.E+00	1.E-04
Cobalt	3.E-03	2.E-05	2.E-07	6.E-05	3.E-04	3.E-03	2.E-04	6.E-03
Copper	2.E-05	8.E-07	1.E-09	0.E+00	3.E-06	7.E-05	0.E+00	9.E-05
Lead	4.E-04	2.E-06	4.E-08	0.E+00	6.E-07	4.E-04	0.E+00	8.E-04
Manganese	3.E-03	2.E-05	2.E-07	2.E-04	3.E-05	2.E-02	9.E-04	3.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	6.E-03	1.E-04	6.E-03	4.E-03	2.E-02
Nickel	3.E-03	2.E-04	2.E-07	2.E-04	1.E-04	4.E-03	2.E-04	8.E-03
Selenium	3.E-06	3.E-08	3.E-10	4.E-03	1.E-07	7.E-06	3.E-04	4.E-03
Silver	3.E-06	3.E-08	3.E-10	0.E+00	6.E-08	4.E-06	0.E+00	7.E-06
Thallium	4.E-04	3.E-06	3.E-08	2.E-02	2.E-03	2.E-03	3.E-03	2.E-02
Uranium	4.E-05	4.E-06	3.E-09	0.E+00	4.E-08	4.E-05	0.E+00	8.E-05
Vanadium	8.E-03	7.E-05	6.E-07	0.E+00	9.E-05	7.E-03	0.E+00	2.E-02
Zinc	1.E-05	9.E-07	8.E-10	0.E+00	1.E-08	4.E-05	0.E+00	5.E-05

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	6.E-03	2.E-05	2.E-03	2.E-02	3.E-02
Arsenic	4.E-02	1.E-03	4.E-06	1.E-01	1.E-03	2.E-02	9.E-02	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	4.E-06	4.E-03	1.E-03	7.E-03
Beryllium	9.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	8.E-04	9.E-06	1.E-02	2.E-03	2.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	1.E-05	4.E-06	8.E-05	3.E-05	3.E-04
Cobalt	1.E-02	1.E-04	1.E-06	9.E-04	1.E-03	5.E-03	3.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	2.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	1.E-02	2.E-04	1.E-02	3.E-02	2.E-01
Manganese	8.E-02	7.E-04	6.E-06	1.E-02	1.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	6.E-03	1.E-03	7.E-02	5.E-03	8.E-02
Nickel	4.E-03	3.E-04	3.E-07	7.E-04	2.E-04	5.E-03	9.E-04	1.E-02
Selenium	5.E-04	4.E-06	4.E-08	2.E-02	1.E-05	7.E-04	1.E-03	2.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	5.E-02	4.E-02	3.E-02	**3.E-01**
Uranium	9.E-03	8.E-04	7.E-07	4.E-04	2.E-05	7.E-04	2.E-03	1.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	3.E-02	3.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	6.E-03	2.E-06	3.E-03	6.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	3.E-03	2.E-05	2.E-03	9.E-03	2.E-02
Arsenic	4.E-02	1.E-03	3.E-06	1.E-01	1.E-03	2.E-02	7.E-02	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	4.E-06	4.E-03	2.E-03	7.E-03
Beryllium	8.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	8.E-04	9.E-06	1.E-02	9.E-04	2.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	1.E-05	2.E-06	2.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	8.E-04	9.E-04	3.E-03	4.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	1.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	1.E-02	2.E-04	1.E-02	2.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	1.E-02	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	5.E-04	1.E-03	6.E-02	4.E-04	7.E-02
Nickel	2.E-03	1.E-04	1.E-07	5.E-04	8.E-05	1.E-03	6.E-04	4.E-03
Selenium	5.E-04	4.E-06	4.E-08	1.E-02	1.E-05	7.E-04	8.E-04	1.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	5.E-02	4.E-02	3.E-02	**3.E-01**
Uranium	9.E-03	8.E-04	7.E-07	4.E-04	2.E-05	7.E-04	2.E-03	1.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	2.E-02	3.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	6.E-03	2.E-06	3.E-03	5.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	7.E-05	6.E-06	6.E-09	8.E-03	8.E-06	5.E-04	2.E-02	3.E-02
Arsenic	1.E-03	4.E-05	1.E-07	**9.E-01**	7.E-04	6.E-03	**5.E-01**	**1.E+00**
Barium	8.E-05	6.E-06	6.E-09	9.E-05	3.E-07	3.E-04	9.E-04	1.E-03
Beryllium	2.E-05	2.E-06	2.E-09	7.E-03	4.E-06	1.E-04	4.E-03	1.E-02
Cadmium	9.E-06	8.E-08	7.E-10	5.E-05	2.E-08	4.E-05	5.E-05	2.E-04
Chromium (Total)	6.E-05	5.E-06	5.E-09	5.E-05	2.E-06	6.E-05	1.E-04	3.E-04
Cobalt	3.E-03	2.E-05	2.E-07	1.E-03	5.E-04	3.E-03	6.E-03	1.E-02
Copper	2.E-05	8.E-07	1.E-09	4.E-04	9.E-06	1.E-04	2.E-04	8.E-04
Lead	4.E-04	2.E-06	4.E-08	7.E-03	5.E-06	8.E-04	1.E-02	2.E-02
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	3.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	3.E-02	4.E-04	3.E-02	2.E-02	8.E-02
Nickel	3.E-03	2.E-04	2.E-07	6.E-03	3.E-04	5.E-03	7.E-03	2.E-02
Selenium	3.E-06	3.E-08	3.E-10	6.E-02	4.E-07	9.E-06	4.E-03	6.E-02
Silver	3.E-06	3.E-08	3.E-10	0.E+00	6.E-08	4.E-06	0.E+00	7.E-06
Thallium	4.E-04	3.E-06	3.E-08	0.E+00	7.E-05	4.E-04	0.E+00	8.E-04
Uranium	4.E-05	4.E-06	3.E-09	5.E-02	1.E-04	7.E-04	2.E-01	**3.E-01**
Vanadium	8.E-03	7.E-05	6.E-07	9.E-02	8.E-04	8.E-03	2.E-01	**3.E-01**
Zinc	1.E-05	9.E-07	8.E-10	8.E-03	2.E-08	5.E-05	6.E-04	9.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	1.E-02	2.E-05	3.E-03	3.E-02	5.E-02
Arsenic	4.E-02	1.E-03	4.E-06	**1.E+00**	2.E-03	2.E-02	**5.E-01**	**2.E+00**
Barium	1.E-03	1.E-04	1.E-07	2.E-04	4.E-06	5.E-03	2.E-03	9.E-03
Beryllium	9.E-04	7.E-05	7.E-08	7.E-03	1.E-05	5.E-04	4.E-03	1.E-02
Cadmium	3.E-03	3.E-05	2.E-07	9.E-04	9.E-06	1.E-02	1.E-03	2.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	6.E-05	4.E-06	8.E-05	1.E-04	4.E-04
Cobalt	1.E-02	1.E-04	1.E-06	2.E-03	1.E-03	6.E-03	1.E-02	3.E-02
Copper	3.E-04	1.E-05	2.E-08	7.E-04	7.E-05	1.E-03	3.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	2.E-02	2.E-04	1.E-02	3.E-02	2.E-01
Manganese	8.E-02	7.E-04	6.E-06	1.E-02	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	3.E-02	2.E-03	9.E-02	2.E-02	2.E-01
Nickel	4.E-03	3.E-04	3.E-07	6.E-03	3.E-04	6.E-03	7.E-03	2.E-02
Selenium	5.E-04	4.E-06	4.E-08	7.E-02	1.E-05	7.E-04	5.E-03	8.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	5.E-02	4.E-02	3.E-02	**3.E-01**
Uranium	9.E-03	8.E-04	7.E-07	5.E-02	1.E-04	1.E-03	2.E-01	**3.E-01**
Vanadium	1.E-01	1.E-03	9.E-06	1.E-01	2.E-03	3.E-02	2.E-01	**5.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	2.E-06	3.E-03	1.E-03	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	3.E-03	2.E-05	2.E-03	9.E-03	2.E-02
Arsenic	4.E-02	1.E-03	3.E-06	1.E-01	1.E-03	2.E-02	7.E-02	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	4.E-06	4.E-03	2.E-03	7.E-03
Beryllium	8.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	8.E-04	9.E-06	1.E-02	9.E-04	2.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	1.E-05	2.E-06	2.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	8.E-04	9.E-04	3.E-03	4.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	1.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	1.E-02	2.E-04	1.E-02	2.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	1.E-02	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	5.E-04	1.E-03	6.E-02	4.E-04	7.E-02
Nickel	2.E-03	1.E-04	1.E-07	5.E-04	8.E-05	1.E-03	6.E-04	4.E-03
Selenium	5.E-04	4.E-06	4.E-08	1.E-02	1.E-05	7.E-04	8.E-04	1.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	5.E-02	4.E-02	3.E-02	**3.E-01**
Uranium	9.E-03	8.E-04	7.E-07	4.E-04	2.E-05	7.E-04	2.E-03	1.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	2.E-02	3.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	6.E-03	2.E-06	3.E-03	5.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	1.E-02	9.E-06	6.E-04	3.E-02	4.E-02
Arsenic	1.E-03	4.E-05	1.E-07	**1.E+00**	7.E-04	6.E-03	**5.E-01**	**1.E+00**
Barium	8.E-05	6.E-06	6.E-09	6.E-06	2.E-07	3.E-04	6.E-05	4.E-04
Beryllium	2.E-05	2.E-06	2.E-09	1.E-02	6.E-06	1.E-04	6.E-03	2.E-02
Cadmium	9.E-06	8.E-08	7.E-10	1.E-05	2.E-08	4.E-05	1.E-05	7.E-05
Chromium (Total)	6.E-05	5.E-06	5.E-09	5.E-05	2.E-06	6.E-05	1.E-04	3.E-04
Cobalt	3.E-03	2.E-05	2.E-07	1.E-03	5.E-04	3.E-03	6.E-03	1.E-02
Copper	2.E-05	8.E-07	1.E-09	5.E-04	9.E-06	1.E-04	2.E-04	8.E-04
Lead	4.E-04	2.E-06	4.E-08	6.E-03	4.E-06	7.E-04	1.E-02	2.E-02
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	3.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	4.E-02	5.E-04	3.E-02	3.E-02	9.E-02
Nickel	3.E-03	2.E-04	2.E-07	6.E-03	3.E-04	5.E-03	7.E-03	2.E-02
Selenium	3.E-06	3.E-08	3.E-10	6.E-02	5.E-07	9.E-06	4.E-03	7.E-02
Silver	3.E-06	3.E-08	3.E-10	0.E+00	6.E-08	4.E-06	0.E+00	7.E-06
Thallium	4.E-04	3.E-06	3.E-08	0.E+00	7.E-05	4.E-04	0.E+00	8.E-04
Uranium	4.E-05	4.E-06	3.E-09	5.E-02	1.E-04	7.E-04	2.E-01	**3.E-01**
Vanadium	8.E-03	7.E-05	6.E-07	9.E-02	8.E-04	8.E-03	2.E-01	**3.E-01**
Zinc	1.E-05	9.E-07	8.E-10	8.E-03	2.E-08	5.E-05	6.E-04	9.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	1.E-02	3.E-05	3.E-03	4.E-02	5.E-02
Arsenic	4.E-02	1.E-03	4.E-06	**1.E+00**	2.E-03	2.E-02	**6.E-01**	**2.E+00**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	4.E-06	4.E-03	2.E-03	8.E-03
Beryllium	9.E-04	7.E-05	7.E-08	1.E-02	1.E-05	5.E-04	6.E-03	2.E-02
Cadmium	3.E-03	3.E-05	2.E-07	8.E-04	9.E-06	1.E-02	9.E-04	2.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	6.E-05	4.E-06	8.E-05	1.E-04	4.E-04
Cobalt	1.E-02	1.E-04	1.E-06	2.E-03	1.E-03	6.E-03	1.E-02	3.E-02
Copper	3.E-04	1.E-05	2.E-08	7.E-04	7.E-05	1.E-03	3.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	2.E-02	2.E-04	1.E-02	3.E-02	2.E-01
Manganese	8.E-02	7.E-04	6.E-06	1.E-02	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	4.E-02	2.E-03	1.E-01	3.E-02	2.E-01
Nickel	4.E-03	3.E-04	3.E-07	7.E-03	4.E-04	6.E-03	8.E-03	3.E-02
Selenium	5.E-04	4.E-06	4.E-08	7.E-02	1.E-05	7.E-04	5.E-03	8.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	2.E-01	5.E-02	4.E-02	3.E-02	**3.E-01**
Uranium	9.E-03	8.E-04	7.E-07	5.E-02	1.E-04	1.E-03	2.E-01	**3.E-01**
Vanadium	1.E-01	1.E-03	9.E-06	1.E-01	2.E-03	3.E-02	2.E-01	**5.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	2.E-06	3.E-03	1.E-03	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	3.E-03	2.E-05	2.E-03	9.E-03	2.E-02
Arsenic	4.E-02	1.E-03	3.E-06	7.E-02	1.E-03	2.E-02	1.E-01	2.E-01
Barium	1.E-03	1.E-04	1.E-07	6.E-05	4.E-06	4.E-03	1.E-03	7.E-03
Beryllium	8.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	2.E-03	9.E-06	1.E-02	2.E-03	2.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	9.E-06	2.E-06	2.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	8.E-04	9.E-04	3.E-03	4.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	1.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	5.E-03	1.E-04	1.E-02	3.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	3.E-03	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	5.E-04	1.E-03	6.E-02	4.E-04	7.E-02
Nickel	2.E-03	1.E-04	1.E-07	5.E-04	8.E-05	1.E-03	7.E-04	4.E-03
Selenium	5.E-04	4.E-06	4.E-08	3.E-02	1.E-05	7.E-04	7.E-04	3.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	9.E-02	5.E-02	4.E-02	3.E-02	2.E-01
Uranium	9.E-03	8.E-04	7.E-07	4.E-04	2.E-05	7.E-04	2.E-03	1.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	2.E-02	4.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	2.E-06	3.E-03	5.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	2.E-03	3.E-06	2.E-04	6.E-03	8.E-03
Arsenic	1.E-03	4.E-05	1.E-07	7.E-02	2.E-04	3.E-03	1.E-01	2.E-01
Barium	8.E-05	6.E-06	6.E-09	3.E-05	3.E-07	3.E-04	7.E-04	1.E-03
Beryllium	2.E-05	2.E-06	2.E-09	0.E+00	1.E-07	2.E-05	0.E+00	4.E-05
Cadmium	9.E-06	8.E-08	7.E-10	0.E+00	2.E-08	4.E-05	0.E+00	4.E-05
Chromium (Total)	6.E-05	5.E-06	5.E-09	8.E-06	2.E-06	6.E-05	3.E-05	2.E-04
Cobalt	3.E-03	2.E-05	2.E-07	3.E-04	3.E-04	3.E-03	2.E-03	8.E-03
Copper	2.E-05	8.E-07	1.E-09	7.E-05	5.E-06	8.E-05	4.E-05	2.E-04
Lead	4.E-04	2.E-06	4.E-08	6.E-04	2.E-06	5.E-04	4.E-03	5.E-03
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	3.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	1.E-02	2.E-04	1.E-02	8.E-03	3.E-02
Nickel	3.E-03	2.E-04	2.E-07	1.E-03	2.E-04	4.E-03	2.E-03	1.E-02
Selenium	3.E-06	3.E-08	3.E-10	4.E-02	2.E-07	7.E-06	1.E-03	4.E-02
Silver	3.E-06	3.E-08	3.E-10	0.E+00	6.E-08	4.E-06	0.E+00	7.E-06
Thallium	4.E-04	3.E-06	3.E-08	0.E+00	7.E-05	4.E-04	0.E+00	8.E-04
Uranium	4.E-05	4.E-06	3.E-09	1.E-02	3.E-05	2.E-04	6.E-02	7.E-02
Vanadium	8.E-03	7.E-05	6.E-07	1.E-02	2.E-04	7.E-03	5.E-02	7.E-02
Zinc	1.E-05	9.E-07	8.E-10	3.E-03	2.E-08	4.E-05	1.E-04	3.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	3.E-03	2.E-04	2.E-07	5.E-03	2.E-05	2.E-03	1.E-02	3.E-02
Arsenic	4.E-02	1.E-03	4.E-06	1.E-01	1.E-03	2.E-02	2.E-01	**4.E-01**
Barium	1.E-03	1.E-04	1.E-07	1.E-04	4.E-06	5.E-03	2.E-03	8.E-03
Beryllium	9.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	2.E-03	9.E-06	1.E-02	2.E-03	2.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	2.E-05	4.E-06	8.E-05	6.E-05	3.E-04
Cobalt	1.E-02	1.E-04	1.E-06	1.E-03	1.E-03	6.E-03	5.E-03	3.E-02
Copper	3.E-04	1.E-05	2.E-08	3.E-04	6.E-05	1.E-03	2.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	5.E-03	1.E-04	1.E-02	4.E-02	2.E-01
Manganese	8.E-02	7.E-04	6.E-06	3.E-03	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	1.E-02	2.E-03	8.E-02	8.E-03	1.E-01
Nickel	4.E-03	3.E-04	3.E-07	2.E-03	2.E-04	6.E-03	2.E-03	1.E-02
Selenium	5.E-04	4.E-06	4.E-08	6.E-02	1.E-05	7.E-04	2.E-03	7.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	9.E-02	5.E-02	4.E-02	3.E-02	2.E-01
Uranium	9.E-03	8.E-04	7.E-07	1.E-02	4.E-05	9.E-04	6.E-02	8.E-02
Vanadium	1.E-01	1.E-03	9.E-06	3.E-02	2.E-03	3.E-02	8.E-02	**3.E-01**
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	2.E-06	3.E-03	7.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	3.E-03	2.E-05	2.E-03	9.E-03	2.E-02
Arsenic	4.E-02	1.E-03	3.E-06	7.E-02	1.E-03	2.E-02	1.E-01	2.E-01
Barium	1.E-03	1.E-04	1.E-07	6.E-05	4.E-06	4.E-03	1.E-03	7.E-03
Beryllium	8.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	2.E-03	9.E-06	1.E-02	2.E-03	2.E-02
Chromium (Total)	8.E-05	7.E-06	7.E-09	9.E-06	2.E-06	2.E-05	3.E-05	2.E-04
Cobalt	1.E-02	8.E-05	8.E-07	8.E-04	9.E-04	3.E-03	4.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	1.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	5.E-03	1.E-04	1.E-02	3.E-02	2.E-01
Manganese	7.E-02	6.E-04	6.E-06	3.E-03	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	5.E-04	1.E-03	6.E-02	4.E-04	7.E-02
Nickel	2.E-03	1.E-04	1.E-07	5.E-04	8.E-05	1.E-03	7.E-04	4.E-03
Selenium	5.E-04	4.E-06	4.E-08	3.E-02	1.E-05	7.E-04	7.E-04	3.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	9.E-02	5.E-02	4.E-02	3.E-02	2.E-01
Uranium	9.E-03	8.E-04	7.E-07	4.E-04	2.E-05	7.E-04	2.E-03	1.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	2.E-02	4.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	2.E-06	3.E-03	5.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	7.E-05	6.E-06	6.E-09	9.E-04	2.E-06	2.E-04	3.E-03	4.E-03
Arsenic	1.E-03	4.E-05	1.E-07	9.E-03	3.E-05	2.E-03	1.E-02	3.E-02
Barium	8.E-05	6.E-06	6.E-09	4.E-06	2.E-07	3.E-04	9.E-05	5.E-04
Beryllium	2.E-05	2.E-06	2.E-09	0.E+00	1.E-07	2.E-05	0.E+00	4.E-05
Cadmium	9.E-06	8.E-08	7.E-10	0.E+00	2.E-08	4.E-05	0.E+00	4.E-05
Chromium (Total)	6.E-05	5.E-06	5.E-09	9.E-07	2.E-06	6.E-05	3.E-06	1.E-04
Cobalt	3.E-03	2.E-05	2.E-07	5.E-05	3.E-04	3.E-03	2.E-04	6.E-03
Copper	2.E-05	8.E-07	1.E-09	8.E-06	3.E-06	7.E-05	5.E-06	1.E-04
Lead	4.E-04	2.E-06	4.E-08	1.E-06	6.E-07	4.E-04	1.E-05	8.E-04
Manganese	3.E-03	2.E-05	2.E-07	0.E+00	3.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	1.E-05	1.E-07	1.E-09	2.E-03	6.E-05	3.E-03	2.E-03	8.E-03
Nickel	3.E-03	2.E-04	2.E-07	2.E-04	1.E-04	4.E-03	3.E-04	8.E-03
Selenium	3.E-06	3.E-08	3.E-10	9.E-03	9.E-08	7.E-06	2.E-04	9.E-03
Silver	3.E-06	3.E-08	3.E-10	0.E+00	6.E-08	4.E-06	0.E+00	7.E-06
Thallium	4.E-04	3.E-06	3.E-08	2.E-03	4.E-04	6.E-04	5.E-04	4.E-03
Uranium	4.E-05	4.E-06	3.E-09	1.E-03	3.E-06	6.E-05	7.E-03	9.E-03
Vanadium	8.E-03	7.E-05	6.E-07	2.E-03	1.E-04	7.E-03	5.E-03	2.E-02
Zinc	1.E-05	9.E-07	8.E-10	3.E-04	1.E-08	4.E-05	2.E-05	4.E-04

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Toddler at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	3.E-03	2.E-04	2.E-07	4.E-03	2.E-05	2.E-03	1.E-02	2.E-02
Arsenic	4.E-02	1.E-03	4.E-06	8.E-02	1.E-03	2.E-02	1.E-01	**3.E-01**
Barium	1.E-03	1.E-04	1.E-07	7.E-05	4.E-06	4.E-03	1.E-03	7.E-03
Beryllium	9.E-04	7.E-05	7.E-08	6.E-04	6.E-06	4.E-04	4.E-04	2.E-03
Cadmium	3.E-03	3.E-05	2.E-07	2.E-03	9.E-06	1.E-02	2.E-03	2.E-02
Chromium (Total)	1.E-04	1.E-05	1.E-08	1.E-05	4.E-06	8.E-05	3.E-05	3.E-04
Cobalt	1.E-02	1.E-04	1.E-06	9.E-04	1.E-03	5.E-03	4.E-03	2.E-02
Copper	3.E-04	1.E-05	2.E-08	2.E-04	6.E-05	1.E-03	2.E-04	2.E-03
Lead	1.E-01	8.E-04	1.E-05	5.E-03	1.E-04	1.E-02	3.E-02	2.E-01
Manganese	8.E-02	7.E-04	6.E-06	3.E-03	1.E-03	**1.E+00**	1.E-01	**1.E+00**
Molybdenum	6.E-04	5.E-06	5.E-08	3.E-03	1.E-03	7.E-02	2.E-03	7.E-02
Nickel	4.E-03	3.E-04	3.E-07	7.E-04	2.E-04	5.E-03	1.E-03	1.E-02
Selenium	5.E-04	4.E-06	4.E-08	4.E-02	1.E-05	7.E-04	1.E-03	4.E-02
Silver	5.E-04	4.E-06	4.E-08	1.E-02	6.E-06	3.E-04	7.E-05	1.E-02
Thallium	4.E-02	3.E-04	3.E-06	9.E-02	5.E-02	4.E-02	3.E-02	2.E-01
Uranium	9.E-03	8.E-04	7.E-07	2.E-03	2.E-05	8.E-04	1.E-02	2.E-02
Vanadium	1.E-01	1.E-03	9.E-06	1.E-02	2.E-03	3.E-02	5.E-02	2.E-01
Zinc	7.E-04	6.E-05	5.E-08	1.E-02	2.E-06	3.E-03	5.E-04	2.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	3.E-03	3.E-05	2.E-03	5.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	1.E-01	2.E-03	2.E-02	5.E-02	2.E-01
Barium	7.E-05	6.E-05	4.E-08	1.E-04	6.E-06	5.E-03	8.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	9.E-06	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	7.E-04	1.E-05	1.E-02	1.E-03	1.E-02
Chromium (Total)	5.E-06	4.E-06	3.E-09	1.E-05	3.E-06	2.E-05	2.E-05	7.E-05
Cobalt	6.E-04	5.E-05	4.E-07	7.E-04	2.E-03	3.E-03	1.E-03	8.E-03
Copper	1.E-05	8.E-06	9.E-09	2.E-04	1.E-04	1.E-03	1.E-04	2.E-03
Lead	8.E-03	4.E-04	5.E-06	9.E-03	3.E-04	2.E-02	2.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	1.E-02	2.E-03	**1.E+00**	3.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	4.E-04	2.E-03	8.E-02	2.E-04	8.E-02
Nickel	9.E-05	7.E-05	6.E-08	4.E-04	1.E-04	1.E-03	4.E-04	3.E-03
Selenium	3.E-05	2.E-06	2.E-08	1.E-02	2.E-05	8.E-04	7.E-04	1.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	1.E-01	8.E-02	6.E-02	2.E-02	**3.E-01**
Uranium	5.E-04	4.E-04	3.E-07	3.E-04	3.E-05	8.E-04	1.E-03	4.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	2.E-02	2.E-02	6.E-02
Zinc	3.E-05	3.E-05	2.E-08	4.E-03	2.E-06	3.E-03	3.E-04	8.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	4.E-06	4.E-06	3.E-09	2.E-03	5.E-06	3.E-04	4.E-03	7.E-03
Arsenic	8.E-05	2.E-05	5.E-08	1.E-03	3.E-05	2.E-03	6.E-04	4.E-03
Barium	4.E-06	4.E-06	3.E-09	5.E-07	3.E-07	3.E-04	3.E-06	3.E-04
Beryllium	1.E-06	1.E-06	7.E-10	0.E+00	2.E-07	3.E-05	0.E+00	3.E-05
Cadmium	5.E-07	5.E-08	3.E-10	0.E+00	3.E-08	4.E-05	0.E+00	4.E-05
Chromium (Total)	3.E-06	3.E-06	2.E-09	0.E+00	3.E-06	6.E-05	0.E+00	7.E-05
Cobalt	2.E-04	1.E-05	1.E-07	5.E-05	5.E-04	3.E-03	1.E-04	4.E-03
Copper	1.E-06	5.E-07	6.E-10	0.E+00	5.E-06	8.E-05	0.E+00	9.E-05
Lead	3.E-05	1.E-06	2.E-08	0.E+00	1.E-06	4.E-04	0.E+00	5.E-04
Manganese	2.E-04	1.E-05	1.E-07	2.E-04	5.E-05	2.E-02	5.E-04	3.E-02
Molybdenum	7.E-07	6.E-08	5.E-10	5.E-03	2.E-04	8.E-03	2.E-03	2.E-02
Nickel	2.E-04	1.E-04	1.E-07	1.E-04	2.E-04	5.E-03	1.E-04	6.E-03
Selenium	2.E-07	2.E-08	1.E-10	3.E-03	2.E-07	9.E-06	2.E-04	3.E-03
Silver	2.E-07	2.E-08	1.E-10	0.E+00	9.E-08	4.E-06	0.E+00	5.E-06
Thallium	2.E-05	2.E-06	1.E-08	1.E-02	3.E-03	2.E-03	1.E-03	2.E-02
Uranium	3.E-06	2.E-06	2.E-09	0.E+00	7.E-08	4.E-05	0.E+00	5.E-05
Vanadium	4.E-04	4.E-05	3.E-07	0.E+00	2.E-04	8.E-03	0.E+00	9.E-03
Zinc	5.E-07	4.E-07	3.E-10	0.E+00	2.E-08	3.E-05	0.E+00	3.E-05

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	5.E-03	3.E-05	3.E-03	1.E-02	2.E-02
Arsenic	3.E-03	7.E-04	2.E-06	1.E-01	2.E-03	2.E-02	5.E-02	2.E-01
Barium	8.E-05	6.E-05	5.E-08	1.E-04	6.E-06	5.E-03	8.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	1.E-05	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	7.E-04	1.E-05	1.E-02	1.E-03	1.E-02
Chromium (Total)	8.E-06	7.E-06	5.E-09	1.E-05	6.E-06	9.E-05	2.E-05	1.E-04
Cobalt	7.E-04	6.E-05	5.E-07	7.E-04	2.E-03	6.E-03	2.E-03	1.E-02
Copper	2.E-05	8.E-06	1.E-08	2.E-04	1.E-04	1.E-03	1.E-04	2.E-03
Lead	9.E-03	4.E-04	5.E-06	9.E-03	3.E-04	2.E-02	2.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	1.E-02	2.E-03	**1.E+00**	3.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	5.E-03	2.E-03	9.E-02	3.E-03	1.E-01
Nickel	3.E-04	2.E-04	2.E-07	5.E-04	3.E-04	6.E-03	5.E-04	8.E-03
Selenium	3.E-05	2.E-06	2.E-08	1.E-02	2.E-05	8.E-04	9.E-04	2.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	2.E-01	8.E-02	6.E-02	2.E-02	**3.E-01**
Uranium	5.E-04	4.E-04	3.E-07	3.E-04	3.E-05	9.E-04	1.E-03	4.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	3.E-02	2.E-02	7.E-02
Zinc	3.E-05	3.E-05	2.E-08	4.E-03	2.E-06	3.E-03	3.E-04	8.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	3.E-03	3.E-05	2.E-03	5.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	1.E-01	2.E-03	2.E-02	4.E-02	2.E-01
Barium	7.E-05	6.E-05	4.E-08	1.E-04	6.E-06	5.E-03	9.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	9.E-06	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	7.E-04	1.E-05	1.E-02	5.E-04	1.E-02
Chromium (Total)	5.E-06	4.E-06	3.E-09	1.E-05	3.E-06	2.E-05	2.E-05	7.E-05
Cobalt	6.E-04	5.E-05	4.E-07	7.E-04	2.E-03	3.E-03	2.E-03	8.E-03
Copper	1.E-05	8.E-06	9.E-09	2.E-04	1.E-04	1.E-03	6.E-05	1.E-03
Lead	8.E-03	4.E-04	5.E-06	9.E-03	2.E-04	2.E-02	1.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	1.E-02	2.E-03	**<u>1.E+00</u>**	6.E-02	**<u>1.E+00</u>**
Molybdenum	3.E-05	3.E-06	2.E-08	4.E-04	2.E-03	8.E-02	2.E-04	8.E-02
Nickel	9.E-05	7.E-05	6.E-08	4.E-04	1.E-04	1.E-03	3.E-04	2.E-03
Selenium	3.E-05	2.E-06	2.E-08	1.E-02	2.E-05	8.E-04	5.E-04	1.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	1.E-01	8.E-02	6.E-02	2.E-02	**<u>3.E-01</u>**
Uranium	5.E-04	4.E-04	3.E-07	3.E-04	3.E-05	8.E-04	1.E-03	3.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	2.E-02	1.E-02	6.E-02
Zinc	3.E-05	3.E-05	2.E-08	4.E-03	2.E-06	3.E-03	2.E-04	7.E-03

<u>Notes:</u>

<u>Bold</u> HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	4.E-06	4.E-06	3.E-09	7.E-03	1.E-05	7.E-04	1.E-02	2.E-02
Arsenic	8.E-05	2.E-05	5.E-08	**8.E-01**	1.E-03	8.E-03	**3.E-01**	**1.E+00**
Barium	4.E-06	4.E-06	3.E-09	7.E-05	4.E-07	4.E-04	5.E-04	1.E-03
Beryllium	1.E-06	1.E-06	7.E-10	5.E-03	7.E-06	1.E-04	2.E-03	8.E-03
Cadmium	5.E-07	5.E-08	3.E-10	4.E-05	4.E-08	4.E-05	3.E-05	1.E-04
Chromium (Total)	3.E-06	3.E-06	2.E-09	4.E-05	3.E-06	7.E-05	6.E-05	2.E-04
Cobalt	2.E-04	1.E-05	1.E-07	1.E-03	9.E-04	4.E-03	3.E-03	9.E-03
Copper	1.E-06	5.E-07	6.E-10	4.E-04	1.E-05	1.E-04	1.E-04	6.E-04
Lead	3.E-05	1.E-06	2.E-08	6.E-03	8.E-06	1.E-03	8.E-03	1.E-02
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	5.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	7.E-07	6.E-08	5.E-10	3.E-02	7.E-04	4.E-02	1.E-02	8.E-02
Nickel	2.E-04	1.E-04	1.E-07	5.E-03	4.E-04	5.E-03	4.E-03	1.E-02
Selenium	2.E-07	2.E-08	1.E-10	5.E-02	7.E-07	1.E-05	2.E-03	5.E-02
Silver	2.E-07	2.E-08	1.E-10	0.E+00	9.E-08	4.E-06	0.E+00	5.E-06
Thallium	2.E-05	2.E-06	1.E-08	0.E+00	1.E-04	4.E-04	0.E+00	6.E-04
Uranium	3.E-06	2.E-06	2.E-09	4.E-02	2.E-04	1.E-03	1.E-01	2.E-01
Vanadium	4.E-04	4.E-05	3.E-07	7.E-02	1.E-03	1.E-02	1.E-01	2.E-01
Zinc	5.E-07	4.E-07	3.E-10	6.E-03	3.E-08	5.E-05	3.E-04	6.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	9.E-03	4.E-05	3.E-03	2.E-02	3.E-02
Arsenic	3.E-03	7.E-04	2.E-06	**9.E-01**	3.E-03	3.E-02	**3.E-01**	**1.E+00**
Barium	8.E-05	6.E-05	5.E-08	2.E-04	7.E-06	5.E-03	1.E-03	7.E-03
Beryllium	5.E-05	4.E-05	3.E-08	6.E-03	2.E-05	6.E-04	3.E-03	9.E-03
Cadmium	2.E-04	2.E-05	1.E-07	7.E-04	1.E-05	1.E-02	6.E-04	1.E-02
Chromium (Total)	8.E-06	7.E-06	5.E-09	5.E-05	6.E-06	9.E-05	8.E-05	2.E-04
Cobalt	7.E-04	6.E-05	5.E-07	2.E-03	2.E-03	7.E-03	6.E-03	2.E-02
Copper	2.E-05	8.E-06	1.E-08	5.E-04	1.E-04	1.E-03	2.E-04	2.E-03
Lead	9.E-03	4.E-04	5.E-06	1.E-02	3.E-04	2.E-02	2.E-02	6.E-02
Manganese	4.E-03	4.E-04	3.E-06	1.E-02	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	3.E-02	3.E-03	1.E-01	1.E-02	2.E-01
Nickel	3.E-04	2.E-04	2.E-07	5.E-03	6.E-04	7.E-03	4.E-03	2.E-02
Selenium	3.E-05	2.E-06	2.E-08	6.E-02	2.E-05	9.E-04	3.E-03	6.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	1.E-01	8.E-02	6.E-02	2.E-02	**3.E-01**
Uranium	5.E-04	4.E-04	3.E-07	4.E-02	2.E-04	2.E-03	1.E-01	2.E-01
Vanadium	7.E-03	6.E-04	4.E-06	8.E-02	4.E-03	3.E-02	1.E-01	**3.E-01**
Zinc	3.E-05	3.E-05	2.E-08	1.E-02	2.E-06	3.E-03	5.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	3.E-03	3.E-05	2.E-03	5.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	1.E-01	2.E-03	2.E-02	4.E-02	2.E-01
Barium	7.E-05	6.E-05	4.E-08	1.E-04	6.E-06	5.E-03	9.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	9.E-06	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	7.E-04	1.E-05	1.E-02	5.E-04	1.E-02
Chromium (Total)	5.E-06	4.E-06	3.E-09	1.E-05	3.E-06	2.E-05	2.E-05	7.E-05
Cobalt	6.E-04	5.E-05	4.E-07	7.E-04	2.E-03	3.E-03	2.E-03	8.E-03
Copper	1.E-05	8.E-06	9.E-09	2.E-04	1.E-04	1.E-03	6.E-05	1.E-03
Lead	8.E-03	4.E-04	5.E-06	9.E-03	2.E-04	2.E-02	1.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	1.E-02	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	4.E-04	2.E-03	8.E-02	2.E-04	8.E-02
Nickel	9.E-05	7.E-05	6.E-08	4.E-04	1.E-04	1.E-03	3.E-04	2.E-03
Selenium	3.E-05	2.E-06	2.E-08	1.E-02	2.E-05	8.E-04	5.E-04	1.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	1.E-01	8.E-02	6.E-02	2.E-02	**3.E-01**
Uranium	5.E-04	4.E-04	3.E-07	3.E-04	3.E-05	8.E-04	1.E-03	3.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	2.E-02	1.E-02	6.E-02
Zinc	3.E-05	3.E-05	2.E-08	4.E-03	2.E-06	3.E-03	2.E-04	7.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	4.E-06	4.E-06	3.E-09	8.E-03	2.E-05	8.E-04	2.E-02	2.E-02
Arsenic	8.E-05	2.E-05	5.E-08	**8.E-01**	1.E-03	8.E-03	**3.E-01**	**1.E+00**
Barium	4.E-06	4.E-06	3.E-09	5.E-06	3.E-07	3.E-04	4.E-05	4.E-04
Beryllium	1.E-06	1.E-06	7.E-10	8.E-03	1.E-05	2.E-04	4.E-03	1.E-02
Cadmium	5.E-07	5.E-08	3.E-10	9.E-06	3.E-08	4.E-05	7.E-06	6.E-05
Chromium (Total)	3.E-06	3.E-06	2.E-09	4.E-05	3.E-06	7.E-05	6.E-05	2.E-04
Cobalt	2.E-04	1.E-05	1.E-07	1.E-03	9.E-04	4.E-03	4.E-03	9.E-03
Copper	1.E-06	5.E-07	6.E-10	4.E-04	1.E-05	1.E-04	1.E-04	6.E-04
Lead	3.E-05	1.E-06	2.E-08	5.E-03	7.E-06	9.E-04	7.E-03	1.E-02
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	5.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	7.E-07	6.E-08	5.E-10	3.E-02	8.E-04	4.E-02	2.E-02	9.E-02
Nickel	2.E-04	1.E-04	1.E-07	5.E-03	5.E-04	5.E-03	4.E-03	2.E-02
Selenium	2.E-07	2.E-08	1.E-10	5.E-02	8.E-07	1.E-05	2.E-03	6.E-02
Silver	2.E-07	2.E-08	1.E-10	0.E+00	9.E-08	4.E-06	0.E+00	5.E-06
Thallium	2.E-05	2.E-06	1.E-08	0.E+00	1.E-04	4.E-04	0.E+00	6.E-04
Uranium	3.E-06	2.E-06	2.E-09	4.E-02	2.E-04	1.E-03	1.E-01	2.E-01
Vanadium	4.E-04	4.E-05	3.E-07	7.E-02	1.E-03	1.E-02	1.E-01	2.E-01
Zinc	5.E-07	4.E-07	3.E-10	6.E-03	3.E-08	5.E-05	3.E-04	6.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	1.E-02	4.E-05	3.E-03	2.E-02	3.E-02
Arsenic	3.E-03	7.E-04	2.E-06	**9.E-01**	3.E-03	3.E-02	**3.E-01**	**1.E+00**
Barium	8.E-05	6.E-05	5.E-08	1.E-04	6.E-06	5.E-03	9.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	9.E-03	2.E-05	7.E-04	4.E-03	1.E-02
Cadmium	2.E-04	2.E-05	1.E-07	7.E-04	1.E-05	1.E-02	5.E-04	1.E-02
Chromium (Total)	8.E-06	7.E-06	5.E-09	5.E-05	6.E-06	9.E-05	8.E-05	2.E-04
Cobalt	7.E-04	6.E-05	5.E-07	2.E-03	2.E-03	7.E-03	6.E-03	2.E-02
Copper	2.E-05	8.E-06	1.E-08	6.E-04	1.E-04	1.E-03	2.E-04	2.E-03
Lead	9.E-03	4.E-04	5.E-06	1.E-02	3.E-04	2.E-02	2.E-02	6.E-02
Manganese	4.E-03	4.E-04	3.E-06	1.E-02	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	3.E-02	3.E-03	1.E-01	2.E-02	2.E-01
Nickel	3.E-04	2.E-04	2.E-07	5.E-03	6.E-04	7.E-03	5.E-03	2.E-02
Selenium	3.E-05	2.E-06	2.E-08	6.E-02	2.E-05	9.E-04	3.E-03	7.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	1.E-01	8.E-02	6.E-02	2.E-02	**3.E-01**
Uranium	5.E-04	4.E-04	3.E-07	4.E-02	2.E-04	2.E-03	1.E-01	2.E-01
Vanadium	7.E-03	6.E-04	4.E-06	8.E-02	4.E-03	3.E-02	1.E-01	**3.E-01**
Zinc	3.E-05	3.E-05	2.E-08	1.E-02	2.E-06	3.E-03	5.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	3.E-05	2.E-03	5.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	6.E-02	2.E-03	2.E-02	6.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	5.E-05	6.E-06	5.E-03	8.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	9.E-06	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	2.E-03	1.E-05	1.E-02	1.E-03	2.E-02
Chromium (Total)	5.E-06	4.E-06	3.E-09	8.E-06	3.E-06	2.E-05	2.E-05	6.E-05
Cobalt	6.E-04	5.E-05	4.E-07	7.E-04	2.E-03	3.E-03	2.E-03	8.E-03
Copper	1.E-05	8.E-06	9.E-09	2.E-04	9.E-05	1.E-03	8.E-05	1.E-03
Lead	8.E-03	4.E-04	5.E-06	4.E-03	2.E-04	2.E-02	2.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	3.E-03	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	4.E-04	2.E-03	8.E-02	2.E-04	8.E-02
Nickel	9.E-05	7.E-05	6.E-08	4.E-04	1.E-04	1.E-03	4.E-04	3.E-03
Selenium	3.E-05	2.E-06	2.E-08	2.E-02	2.E-05	8.E-04	4.E-04	2.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	7.E-02	8.E-02	6.E-02	2.E-02	2.E-01
Uranium	5.E-04	4.E-04	3.E-07	3.E-04	3.E-05	8.E-04	1.E-03	4.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	2.E-02	2.E-02	7.E-02
Zinc	3.E-05	3.E-05	2.E-08	8.E-03	2.E-06	3.E-03	3.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	4.E-06	4.E-06	3.E-09	2.E-03	5.E-06	3.E-04	3.E-03	5.E-03
Arsenic	8.E-05	2.E-05	5.E-08	6.E-02	3.E-04	3.E-03	7.E-02	1.E-01
Barium	4.E-06	4.E-06	3.E-09	3.E-05	4.E-07	4.E-04	4.E-04	8.E-04
Beryllium	1.E-06	1.E-06	7.E-10	0.E+00	2.E-07	3.E-05	0.E+00	3.E-05
Cadmium	5.E-07	5.E-08	3.E-10	0.E+00	3.E-08	4.E-05	0.E+00	4.E-05
Chromium (Total)	3.E-06	3.E-06	2.E-09	6.E-06	3.E-06	7.E-05	2.E-05	1.E-04
Cobalt	2.E-04	1.E-05	1.E-07	3.E-04	5.E-04	3.E-03	9.E-04	5.E-03
Copper	1.E-06	5.E-07	6.E-10	6.E-05	7.E-06	9.E-05	3.E-05	2.E-04
Lead	3.E-05	1.E-06	2.E-08	5.E-04	3.E-06	6.E-04	2.E-03	3.E-03
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	5.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	7.E-07	6.E-08	5.E-10	8.E-03	3.E-04	2.E-02	5.E-03	3.E-02
Nickel	2.E-04	1.E-04	1.E-07	9.E-04	3.E-04	5.E-03	1.E-03	7.E-03
Selenium	2.E-07	2.E-08	1.E-10	3.E-02	3.E-07	9.E-06	6.E-04	3.E-02
Silver	2.E-07	2.E-08	1.E-10	0.E+00	9.E-08	4.E-06	0.E+00	5.E-06
Thallium	2.E-05	2.E-06	1.E-08	0.E+00	1.E-04	4.E-04	0.E+00	6.E-04
Uranium	3.E-06	2.E-06	2.E-09	8.E-03	4.E-05	3.E-04	3.E-02	4.E-02
Vanadium	4.E-04	4.E-05	3.E-07	1.E-02	4.E-04	9.E-03	3.E-02	5.E-02
Zinc	5.E-07	4.E-07	3.E-10	2.E-03	2.E-08	4.E-05	7.E-05	2.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	4.E-03	3.E-05	3.E-03	9.E-03	2.E-02
Arsenic	3.E-03	7.E-04	2.E-06	1.E-01	2.E-03	2.E-02	1.E-01	**3.E-01**
Barium	8.E-05	6.E-05	5.E-08	8.E-05	7.E-06	5.E-03	1.E-03	7.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	1.E-05	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	2.E-03	1.E-05	1.E-02	1.E-03	2.E-02
Chromium (Total)	8.E-06	7.E-06	5.E-09	1.E-05	6.E-06	9.E-05	3.E-05	2.E-04
Cobalt	7.E-04	6.E-05	5.E-07	9.E-04	2.E-03	7.E-03	3.E-03	1.E-02
Copper	2.E-05	8.E-06	1.E-08	2.E-04	1.E-04	1.E-03	1.E-04	2.E-03
Lead	9.E-03	4.E-04	5.E-06	4.E-03	2.E-04	2.E-02	2.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	3.E-03	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	9.E-03	3.E-03	9.E-02	5.E-03	1.E-01
Nickel	3.E-04	2.E-04	2.E-07	1.E-03	4.E-04	6.E-03	1.E-03	1.E-02
Selenium	3.E-05	2.E-06	2.E-08	6.E-02	2.E-05	8.E-04	1.E-03	6.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	7.E-02	8.E-02	6.E-02	2.E-02	2.E-01
Uranium	5.E-04	4.E-04	3.E-07	8.E-03	7.E-05	1.E-03	4.E-02	5.E-02
Vanadium	7.E-03	6.E-04	4.E-06	2.E-02	3.E-03	3.E-02	5.E-02	1.E-01
Zinc	3.E-05	3.E-05	2.E-08	1.E-02	2.E-06	3.E-03	3.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	3.E-05	2.E-03	5.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	6.E-02	2.E-03	2.E-02	6.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	5.E-05	6.E-06	5.E-03	8.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	9.E-06	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	2.E-03	1.E-05	1.E-02	1.E-03	2.E-02
Chromium (Total)	5.E-06	4.E-06	3.E-09	8.E-06	3.E-06	2.E-05	2.E-05	6.E-05
Cobalt	6.E-04	5.E-05	4.E-07	7.E-04	2.E-03	3.E-03	2.E-03	8.E-03
Copper	1.E-05	8.E-06	9.E-09	2.E-04	9.E-05	1.E-03	8.E-05	1.E-03
Lead	8.E-03	4.E-04	5.E-06	4.E-03	2.E-04	2.E-02	2.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	3.E-03	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	4.E-04	2.E-03	8.E-02	2.E-04	8.E-02
Nickel	9.E-05	7.E-05	6.E-08	4.E-04	1.E-04	1.E-03	4.E-04	3.E-03
Selenium	3.E-05	2.E-06	2.E-08	2.E-02	2.E-05	8.E-04	4.E-04	2.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	7.E-02	8.E-02	6.E-02	2.E-02	2.E-01
Uranium	5.E-04	4.E-04	3.E-07	3.E-04	3.E-05	8.E-04	1.E-03	4.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	2.E-02	2.E-02	7.E-02
Zinc	3.E-05	3.E-05	2.E-08	8.E-03	2.E-06	3.E-03	3.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	4.E-06	4.E-06	3.E-09	7.E-04	3.E-06	2.E-04	2.E-03	3.E-03
Arsenic	8.E-05	2.E-05	5.E-08	7.E-03	6.E-05	2.E-03	8.E-03	2.E-02
Barium	4.E-06	4.E-06	3.E-09	4.E-06	3.E-07	3.E-04	6.E-05	4.E-04
Beryllium	1.E-06	1.E-06	7.E-10	0.E+00	2.E-07	3.E-05	0.E+00	3.E-05
Cadmium	5.E-07	5.E-08	3.E-10	0.E+00	3.E-08	4.E-05	0.E+00	4.E-05
Chromium (Total)	3.E-06	3.E-06	2.E-09	8.E-07	3.E-06	6.E-05	2.E-06	8.E-05
Cobalt	2.E-04	1.E-05	1.E-07	4.E-05	5.E-04	3.E-03	1.E-04	4.E-03
Copper	1.E-06	5.E-07	6.E-10	7.E-06	5.E-06	8.E-05	3.E-06	1.E-04
Lead	3.E-05	1.E-06	2.E-08	1.E-06	1.E-06	4.E-04	6.E-06	5.E-04
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	5.E-05	2.E-02	0.E+00	2.E-02
Molybdenum	7.E-07	6.E-08	5.E-10	2.E-03	1.E-04	5.E-03	1.E-03	8.E-03
Nickel	2.E-04	1.E-04	1.E-07	2.E-04	2.E-04	5.E-03	2.E-04	6.E-03
Selenium	2.E-07	2.E-08	1.E-10	7.E-03	2.E-07	8.E-06	1.E-04	7.E-03
Silver	2.E-07	2.E-08	1.E-10	0.E+00	9.E-08	4.E-06	0.E+00	5.E-06
Thallium	2.E-05	2.E-06	1.E-08	1.E-03	7.E-04	8.E-04	3.E-04	3.E-03
Uranium	3.E-06	2.E-06	2.E-09	1.E-03	6.E-06	7.E-05	4.E-03	5.E-03
Vanadium	4.E-04	4.E-05	3.E-07	1.E-03	2.E-04	8.E-03	3.E-03	1.E-02
Zinc	5.E-07	4.E-07	3.E-10	2.E-04	2.E-08	3.E-05	7.E-06	3.E-04

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for an Indigenous Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	3.E-03	3.E-05	3.E-03	7.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	6.E-02	2.E-03	2.E-02	7.E-02	2.E-01
Barium	8.E-05	6.E-05	5.E-08	6.E-05	6.E-06	5.E-03	9.E-04	6.E-03
Beryllium	5.E-05	4.E-05	3.E-08	5.E-04	1.E-05	5.E-04	2.E-04	1.E-03
Cadmium	2.E-04	2.E-05	1.E-07	2.E-03	1.E-05	1.E-02	1.E-03	2.E-02
Chromium (Total)	8.E-06	7.E-06	5.E-09	8.E-06	6.E-06	9.E-05	2.E-05	1.E-04
Cobalt	7.E-04	6.E-05	5.E-07	7.E-04	2.E-03	6.E-03	2.E-03	1.E-02
Copper	2.E-05	8.E-06	1.E-08	2.E-04	1.E-04	1.E-03	9.E-05	2.E-03
Lead	9.E-03	4.E-04	5.E-06	4.E-03	2.E-04	2.E-02	2.E-02	5.E-02
Manganese	4.E-03	4.E-04	3.E-06	3.E-03	2.E-03	**1.E+00**	6.E-02	**1.E+00**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-03	2.E-03	8.E-02	1.E-03	9.E-02
Nickel	3.E-04	2.E-04	2.E-07	6.E-04	3.E-04	6.E-03	6.E-04	8.E-03
Selenium	3.E-05	2.E-06	2.E-08	3.E-02	2.E-05	8.E-04	6.E-04	3.E-02
Silver	3.E-05	2.E-06	2.E-08	8.E-03	1.E-05	4.E-04	4.E-05	9.E-03
Thallium	2.E-03	2.E-04	1.E-06	8.E-02	8.E-02	6.E-02	2.E-02	2.E-01
Uranium	5.E-04	4.E-04	3.E-07	1.E-03	3.E-05	9.E-04	6.E-03	9.E-03
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	3.E-03	3.E-02	3.E-02	8.E-02
Zinc	3.E-05	3.E-05	2.E-08	8.E-03	2.E-06	3.E-03	3.E-04	1.E-02

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	8.E-06	6.E-04	5.E-03	8.E-03
Arsenic	3.E-03	7.E-04	2.E-06	7.E-02	4.E-04	5.E-03	5.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	7.E-05	2.E-06	1.E-03	8.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	4.E-04	4.E-06	3.E-03	1.E-03	5.E-03
Chromium (Total)	5.E-06	4.E-06	3.E-09	7.E-06	9.E-07	6.E-06	2.E-05	4.E-05
Cobalt	6.E-04	5.E-05	4.E-07	4.E-04	4.E-04	8.E-04	1.E-03	4.E-03
Copper	1.E-05	8.E-06	9.E-09	1.E-04	3.E-05	3.E-04	1.E-04	5.E-04
Lead	8.E-03	4.E-04	5.E-06	6.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	7.E-03	6.E-04	**4.E-01**	3.E-02	**4.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-04	6.E-04	2.E-02	2.E-04	2.E-02
Nickel	9.E-05	7.E-05	6.E-08	2.E-04	4.E-05	3.E-04	4.E-04	1.E-03
Selenium	3.E-05	2.E-06	2.E-08	7.E-03	6.E-06	2.E-04	7.E-04	7.E-03
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	9.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	2.E-04	7.E-06	2.E-04	1.E-03	3.E-03
Vanadium	7.E-03	6.E-04	4.E-06	6.E-03	7.E-04	5.E-03	2.E-02	4.E-02
Zinc	3.E-05	3.E-05	2.E-08	3.E-03	7.E-07	8.E-04	3.E-04	4.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	4.E-06	4.E-06	3.E-09	1.E-03	1.E-06	9.E-05	4.E-03	6.E-03
Arsenic	8.E-05	2.E-05	5.E-08	9.E-04	7.E-06	4.E-04	6.E-04	2.E-03
Barium	4.E-06	4.E-06	3.E-09	3.E-07	8.E-08	7.E-05	3.E-06	9.E-05
Beryllium	1.E-06	1.E-06	7.E-10	0.E+00	5.E-08	6.E-06	0.E+00	8.E-06
Cadmium	5.E-07	5.E-08	3.E-10	0.E+00	8.E-09	9.E-06	0.E+00	9.E-06
Chromium (Total)	3.E-06	3.E-06	2.E-09	0.E+00	7.E-07	2.E-05	0.E+00	2.E-05
Cobalt	2.E-04	1.E-05	1.E-07	3.E-05	1.E-04	7.E-04	1.E-04	1.E-03
Copper	1.E-06	5.E-07	6.E-10	0.E+00	1.E-06	2.E-05	0.E+00	2.E-05
Lead	3.E-05	1.E-06	2.E-08	0.E+00	3.E-07	1.E-04	0.E+00	1.E-04
Manganese	2.E-04	1.E-05	1.E-07	1.E-04	1.E-05	6.E-03	5.E-04	6.E-03
Molybdenum	7.E-07	6.E-08	5.E-10	3.E-03	4.E-05	3.E-03	2.E-03	8.E-03
Nickel	2.E-04	1.E-04	1.E-07	9.E-05	5.E-05	1.E-03	1.E-04	2.E-03
Selenium	2.E-07	2.E-08	1.E-10	2.E-03	5.E-08	2.E-06	2.E-04	2.E-03
Silver	2.E-07	2.E-08	1.E-10	0.E+00	3.E-08	1.E-06	0.E+00	1.E-06
Thallium	2.E-05	2.E-06	1.E-08	9.E-03	8.E-04	7.E-04	1.E-03	1.E-02
Uranium	3.E-06	2.E-06	2.E-09	0.E+00	2.E-08	1.E-05	0.E+00	1.E-05
Vanadium	4.E-04	4.E-05	3.E-07	0.E+00	4.E-05	2.E-03	0.E+00	2.E-03
Zinc	5.E-07	4.E-07	3.E-10	0.E+00	5.E-09	8.E-06	0.E+00	8.E-06

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	3.E-03	9.E-06	7.E-04	1.E-02	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	8.E-02	5.E-04	5.E-03	5.E-02	1.E-01
Barium	8.E-05	6.E-05	5.E-08	7.E-05	2.E-06	1.E-03	8.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	4.E-04	4.E-06	3.E-03	1.E-03	5.E-03
Chromium (Total)	8.E-06	7.E-06	5.E-09	7.E-06	2.E-06	2.E-05	2.E-05	6.E-05
Cobalt	7.E-04	6.E-05	5.E-07	4.E-04	5.E-04	2.E-03	2.E-03	5.E-03
Copper	2.E-05	8.E-06	1.E-08	1.E-04	3.E-05	3.E-04	1.E-04	6.E-04
Lead	9.E-03	4.E-04	5.E-06	6.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	8.E-03	6.E-04	**4.E-01**	3.E-02	**4.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	3.E-03	6.E-04	2.E-02	3.E-03	3.E-02
Nickel	3.E-04	2.E-04	2.E-07	3.E-04	9.E-05	1.E-03	5.E-04	3.E-03
Selenium	3.E-05	2.E-06	2.E-08	9.E-03	6.E-06	2.E-04	9.E-04	1.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	1.E-01	2.E-02	2.E-02	2.E-02	2.E-01
Uranium	5.E-04	4.E-04	3.E-07	2.E-04	7.E-06	2.E-04	1.E-03	3.E-03
Vanadium	7.E-03	6.E-04	4.E-06	6.E-03	8.E-04	7.E-03	2.E-02	4.E-02
Zinc	3.E-05	3.E-05	2.E-08	3.E-03	7.E-07	8.E-04	3.E-04	4.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	8.E-06	6.E-04	5.E-03	8.E-03
Arsenic	3.E-03	7.E-04	2.E-06	7.E-02	4.E-04	5.E-03	4.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	7.E-05	2.E-06	1.E-03	9.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	4.E-04	4.E-06	3.E-03	5.E-04	4.E-03
Chromium (Total)	5.E-06	4.E-06	3.E-09	7.E-06	9.E-07	6.E-06	2.E-05	4.E-05
Cobalt	6.E-04	5.E-05	4.E-07	4.E-04	4.E-04	8.E-04	2.E-03	4.E-03
Copper	1.E-05	8.E-06	9.E-09	1.E-04	3.E-05	3.E-04	6.E-05	5.E-04
Lead	8.E-03	4.E-04	5.E-06	6.E-03	7.E-05	5.E-03	1.E-02	3.E-02
Manganese	4.E-03	4.E-04	3.E-06	7.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-04	6.E-04	2.E-02	2.E-04	2.E-02
Nickel	9.E-05	7.E-05	6.E-08	2.E-04	4.E-05	3.E-04	3.E-04	1.E-03
Selenium	3.E-05	2.E-06	2.E-08	7.E-03	6.E-06	2.E-04	5.E-04	7.E-03
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	9.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	2.E-04	7.E-06	2.E-04	1.E-03	2.E-03
Vanadium	7.E-03	6.E-04	4.E-06	6.E-03	7.E-04	5.E-03	1.E-02	3.E-02
Zinc	3.E-05	3.E-05	2.E-08	3.E-03	7.E-07	8.E-04	2.E-04	4.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	4.E-06	4.E-06	3.E-09	4.E-03	4.E-06	2.E-04	1.E-02	2.E-02
Arsenic	8.E-05	2.E-05	5.E-08	**5.E-01**	3.E-04	3.E-03	**3.E-01**	**8.E-01**
Barium	4.E-06	4.E-06	3.E-09	4.E-05	1.E-07	8.E-05	5.E-04	7.E-04
Beryllium	1.E-06	1.E-06	7.E-10	3.E-03	2.E-06	4.E-05	2.E-03	6.E-03
Cadmium	5.E-07	5.E-08	3.E-10	3.E-05	1.E-08	1.E-05	3.E-05	7.E-05
Chromium (Total)	3.E-06	3.E-06	2.E-09	2.E-05	7.E-07	2.E-05	6.E-05	1.E-04
Cobalt	2.E-04	1.E-05	1.E-07	7.E-04	2.E-04	9.E-04	3.E-03	5.E-03
Copper	1.E-06	5.E-07	6.E-10	2.E-04	4.E-06	3.E-05	1.E-04	4.E-04
Lead	3.E-05	1.E-06	2.E-08	4.E-03	2.E-06	3.E-04	8.E-03	1.E-02
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	1.E-05	5.E-03	0.E+00	5.E-03
Molybdenum	7.E-07	6.E-08	5.E-10	2.E-02	2.E-04	1.E-02	1.E-02	4.E-02
Nickel	2.E-04	1.E-04	1.E-07	3.E-03	1.E-04	1.E-03	4.E-03	8.E-03
Selenium	2.E-07	2.E-08	1.E-10	3.E-02	2.E-07	3.E-06	2.E-03	3.E-02
Silver	2.E-07	2.E-08	1.E-10	0.E+00	3.E-08	1.E-06	0.E+00	1.E-06
Thallium	2.E-05	2.E-06	1.E-08	0.E+00	3.E-05	1.E-04	0.E+00	2.E-04
Uranium	3.E-06	2.E-06	2.E-09	3.E-02	5.E-05	3.E-04	1.E-01	2.E-01
Vanadium	4.E-04	4.E-05	3.E-07	5.E-02	4.E-04	2.E-03	1.E-01	2.E-01
Zinc	5.E-07	4.E-07	3.E-10	4.E-03	8.E-09	1.E-05	3.E-04	4.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	6.E-03	1.E-05	8.E-04	2.E-02	3.E-02
Arsenic	3.E-03	7.E-04	2.E-06	**6.E-01**	7.E-04	7.E-03	**3.E-01**	**9.E-01**
Barium	8.E-05	6.E-05	5.E-08	1.E-04	2.E-06	1.E-03	1.E-03	3.E-03
Beryllium	5.E-05	4.E-05	3.E-08	4.E-03	4.E-06	2.E-04	3.E-03	7.E-03
Cadmium	2.E-04	2.E-05	1.E-07	5.E-04	4.E-06	3.E-03	6.E-04	4.E-03
Chromium (Total)	8.E-06	7.E-06	5.E-09	3.E-05	2.E-06	2.E-05	8.E-05	2.E-04
Cobalt	7.E-04	6.E-05	5.E-07	1.E-03	6.E-04	2.E-03	6.E-03	1.E-02
Copper	2.E-05	8.E-06	1.E-08	3.E-04	3.E-05	3.E-04	2.E-04	9.E-04
Lead	9.E-03	4.E-04	5.E-06	9.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	7.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-02	8.E-04	3.E-02	1.E-02	6.E-02
Nickel	3.E-04	2.E-04	2.E-07	3.E-03	2.E-04	2.E-03	4.E-03	1.E-02
Selenium	3.E-05	2.E-06	2.E-08	4.E-02	7.E-06	2.E-04	3.E-03	4.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	9.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	3.E-02	6.E-05	5.E-04	1.E-01	2.E-01
Vanadium	7.E-03	6.E-04	4.E-06	5.E-02	1.E-03	8.E-03	1.E-01	2.E-01
Zinc	3.E-05	3.E-05	2.E-08	6.E-03	7.E-07	8.E-04	5.E-04	8.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	8.E-06	6.E-04	5.E-03	8.E-03
Arsenic	3.E-03	7.E-04	2.E-06	7.E-02	4.E-04	5.E-03	4.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	7.E-05	2.E-06	1.E-03	9.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	4.E-04	4.E-06	3.E-03	5.E-04	4.E-03
Chromium (Total)	5.E-06	4.E-06	3.E-09	7.E-06	9.E-07	6.E-06	2.E-05	4.E-05
Cobalt	6.E-04	5.E-05	4.E-07	4.E-04	4.E-04	8.E-04	2.E-03	4.E-03
Copper	1.E-05	8.E-06	9.E-09	1.E-04	3.E-05	3.E-04	6.E-05	5.E-04
Lead	8.E-03	4.E-04	5.E-06	6.E-03	7.E-05	5.E-03	1.E-02	3.E-02
Manganese	4.E-03	4.E-04	3.E-06	7.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-04	6.E-04	2.E-02	2.E-04	2.E-02
Nickel	9.E-05	7.E-05	6.E-08	2.E-04	4.E-05	3.E-04	3.E-04	1.E-03
Selenium	3.E-05	2.E-06	2.E-08	7.E-03	6.E-06	2.E-04	5.E-04	7.E-03
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	9.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	2.E-04	7.E-06	2.E-04	1.E-03	2.E-03
Vanadium	7.E-03	6.E-04	4.E-06	6.E-03	7.E-04	5.E-03	1.E-02	3.E-02
Zinc	3.E-05	3.E-05	2.E-08	3.E-03	7.E-07	8.E-04	2.E-04	4.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	4.E-06	4.E-06	3.E-09	5.E-03	4.E-06	2.E-04	2.E-02	2.E-02
Arsenic	8.E-05	2.E-05	5.E-08	**5.E-01**	3.E-04	3.E-03	**3.E-01**	**8.E-01**
Barium	4.E-06	4.E-06	3.E-09	3.E-06	8.E-08	7.E-05	4.E-05	1.E-04
Beryllium	1.E-06	1.E-06	7.E-10	5.E-03	3.E-06	6.E-05	4.E-03	9.E-03
Cadmium	5.E-07	5.E-08	3.E-10	6.E-06	9.E-09	9.E-06	7.E-06	2.E-05
Chromium (Total)	3.E-06	3.E-06	2.E-09	3.E-05	8.E-07	2.E-05	6.E-05	1.E-04
Cobalt	2.E-04	1.E-05	1.E-07	7.E-04	2.E-04	9.E-04	4.E-03	6.E-03
Copper	1.E-06	5.E-07	6.E-10	2.E-04	4.E-06	3.E-05	1.E-04	4.E-04
Lead	3.E-05	1.E-06	2.E-08	3.E-03	2.E-06	3.E-04	7.E-03	1.E-02
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	1.E-05	5.E-03	0.E+00	5.E-03
Molybdenum	7.E-07	6.E-08	5.E-10	2.E-02	2.E-04	1.E-02	2.E-02	5.E-02
Nickel	2.E-04	1.E-04	1.E-07	3.E-03	1.E-04	1.E-03	4.E-03	9.E-03
Selenium	2.E-07	2.E-08	1.E-10	3.E-02	2.E-07	3.E-06	2.E-03	4.E-02
Silver	2.E-07	2.E-08	1.E-10	0.E+00	3.E-08	1.E-06	0.E+00	1.E-06
Thallium	2.E-05	2.E-06	1.E-08	0.E+00	3.E-05	1.E-04	0.E+00	2.E-04
Uranium	3.E-06	2.E-06	2.E-09	3.E-02	5.E-05	3.E-04	1.E-01	2.E-01
Vanadium	4.E-04	4.E-05	3.E-07	5.E-02	4.E-04	2.E-03	1.E-01	2.E-01
Zinc	5.E-07	4.E-07	3.E-10	4.E-03	8.E-09	1.E-05	3.E-04	4.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	7.E-03	1.E-05	8.E-04	2.E-02	3.E-02
Arsenic	3.E-03	7.E-04	2.E-06	**6.E-01**	8.E-04	8.E-03	**3.E-01**	**9.E-01**
Barium	8.E-05	6.E-05	5.E-08	8.E-05	2.E-06	1.E-03	9.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	6.E-03	5.E-06	2.E-04	4.E-03	1.E-02
Cadmium	2.E-04	2.E-05	1.E-07	4.E-04	4.E-06	3.E-03	5.E-04	4.E-03
Chromium (Total)	8.E-06	7.E-06	5.E-09	3.E-05	2.E-06	2.E-05	8.E-05	2.E-04
Cobalt	7.E-04	6.E-05	5.E-07	1.E-03	6.E-04	2.E-03	6.E-03	1.E-02
Copper	2.E-05	8.E-06	1.E-08	3.E-04	3.E-05	3.E-04	2.E-04	9.E-04
Lead	9.E-03	4.E-04	5.E-06	9.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	7.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-02	8.E-04	3.E-02	2.E-02	7.E-02
Nickel	3.E-04	2.E-04	2.E-07	3.E-03	2.E-04	2.E-03	5.E-03	1.E-02
Selenium	3.E-05	2.E-06	2.E-08	4.E-02	7.E-06	2.E-04	3.E-03	4.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	9.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	3.E-02	6.E-05	5.E-04	1.E-01	2.E-01
Vanadium	7.E-03	6.E-04	4.E-06	5.E-02	1.E-03	8.E-03	1.E-01	2.E-01
Zinc	3.E-05	3.E-05	2.E-08	6.E-03	7.E-07	8.E-04	5.E-04	8.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	8.E-06	6.E-04	5.E-03	8.E-03
Arsenic	3.E-03	7.E-04	2.E-06	3.E-02	4.E-04	5.E-03	6.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	3.E-05	2.E-06	1.E-03	8.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	1.E-03	4.E-06	3.E-03	1.E-03	5.E-03
Chromium (Total)	5.E-06	4.E-06	3.E-09	5.E-06	9.E-07	6.E-06	2.E-05	4.E-05
Cobalt	6.E-04	5.E-05	4.E-07	4.E-04	4.E-04	8.E-04	2.E-03	4.E-03
Copper	1.E-05	8.E-06	9.E-09	1.E-04	3.E-05	3.E-04	8.E-05	5.E-04
Lead	8.E-03	4.E-04	5.E-06	2.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	2.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-04	6.E-04	2.E-02	2.E-04	2.E-02
Nickel	9.E-05	7.E-05	6.E-08	2.E-04	4.E-05	3.E-04	4.E-04	1.E-03
Selenium	3.E-05	2.E-06	2.E-08	1.E-02	7.E-06	2.E-04	4.E-04	2.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	5.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	2.E-04	7.E-06	2.E-04	1.E-03	3.E-03
Vanadium	7.E-03	6.E-04	4.E-06	6.E-03	7.E-04	5.E-03	2.E-02	4.E-02
Zinc	3.E-05	3.E-05	2.E-08	5.E-03	7.E-07	8.E-04	3.E-04	6.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	4.E-06	4.E-06	3.E-09	1.E-03	1.E-06	9.E-05	3.E-03	5.E-03
Arsenic	8.E-05	2.E-05	5.E-08	4.E-02	8.E-05	9.E-04	7.E-02	1.E-01
Barium	4.E-06	4.E-06	3.E-09	2.E-05	1.E-07	8.E-05	4.E-04	5.E-04
Beryllium	1.E-06	1.E-06	7.E-10	0.E+00	5.E-08	6.E-06	0.E+00	8.E-06
Cadmium	5.E-07	5.E-08	3.E-10	0.E+00	8.E-09	9.E-06	0.E+00	9.E-06
Chromium (Total)	3.E-06	3.E-06	2.E-09	4.E-06	7.E-07	2.E-05	2.E-05	4.E-05
Cobalt	2.E-04	1.E-05	1.E-07	2.E-04	1.E-04	7.E-04	9.E-04	2.E-03
Copper	1.E-06	5.E-07	6.E-10	4.E-05	2.E-06	2.E-05	3.E-05	9.E-05
Lead	3.E-05	1.E-06	2.E-08	3.E-04	8.E-07	2.E-04	2.E-03	3.E-03
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	1.E-05	5.E-03	0.E+00	5.E-03
Molybdenum	7.E-07	6.E-08	5.E-10	5.E-03	8.E-05	5.E-03	5.E-03	2.E-02
Nickel	2.E-04	1.E-04	1.E-07	6.E-04	7.E-05	1.E-03	1.E-03	3.E-03
Selenium	2.E-07	2.E-08	1.E-10	2.E-02	7.E-08	2.E-06	6.E-04	2.E-02
Silver	2.E-07	2.E-08	1.E-10	0.E+00	3.E-08	1.E-06	0.E+00	1.E-06
Thallium	2.E-05	2.E-06	1.E-08	0.E+00	3.E-05	1.E-04	0.E+00	2.E-04
Uranium	3.E-06	2.E-06	2.E-09	5.E-03	1.E-05	8.E-05	3.E-02	4.E-02
Vanadium	4.E-04	4.E-05	3.E-07	7.E-03	1.E-04	2.E-03	3.E-02	4.E-02
Zinc	5.E-07	4.E-07	3.E-10	1.E-03	6.E-09	9.E-06	7.E-05	1.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	3.E-03	9.E-06	7.E-04	9.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	7.E-02	5.E-04	6.E-03	1.E-01	2.E-01
Barium	8.E-05	6.E-05	5.E-08	5.E-05	2.E-06	1.E-03	1.E-03	3.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	1.E-03	4.E-06	3.E-03	1.E-03	5.E-03
Chromium (Total)	8.E-06	7.E-06	5.E-09	9.E-06	2.E-06	2.E-05	3.E-05	8.E-05
Cobalt	7.E-04	6.E-05	5.E-07	6.E-04	6.E-04	2.E-03	3.E-03	7.E-03
Copper	2.E-05	8.E-06	1.E-08	2.E-04	3.E-05	3.E-04	1.E-04	6.E-04
Lead	9.E-03	4.E-04	5.E-06	3.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	2.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	6.E-03	7.E-04	2.E-02	5.E-03	4.E-02
Nickel	3.E-04	2.E-04	2.E-07	8.E-04	1.E-04	1.E-03	1.E-03	4.E-03
Selenium	3.E-05	2.E-06	2.E-08	3.E-02	7.E-06	2.E-04	1.E-03	4.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	5.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	5.E-03	2.E-05	3.E-04	4.E-02	4.E-02
Vanadium	7.E-03	6.E-04	4.E-06	1.E-02	8.E-04	7.E-03	5.E-02	8.E-02
Zinc	3.E-05	3.E-05	2.E-08	6.E-03	7.E-07	8.E-04	3.E-04	7.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**	**Unitless**
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	8.E-06	6.E-04	5.E-03	8.E-03
Arsenic	3.E-03	7.E-04	2.E-06	3.E-02	4.E-04	5.E-03	6.E-02	1.E-01
Barium	7.E-05	6.E-05	4.E-08	3.E-05	2.E-06	1.E-03	8.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	1.E-03	4.E-06	3.E-03	1.E-03	5.E-03
Chromium (Total)	5.E-06	4.E-06	3.E-09	5.E-06	9.E-07	6.E-06	2.E-05	4.E-05
Cobalt	6.E-04	5.E-05	4.E-07	4.E-04	4.E-04	8.E-04	2.E-03	4.E-03
Copper	1.E-05	8.E-06	9.E-09	1.E-04	3.E-05	3.E-04	8.E-05	5.E-04
Lead	8.E-03	4.E-04	5.E-06	2.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	2.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	2.E-04	6.E-04	2.E-02	2.E-04	2.E-02
Nickel	9.E-05	7.E-05	6.E-08	2.E-04	4.E-05	3.E-04	4.E-04	1.E-03
Selenium	3.E-05	2.E-06	2.E-08	1.E-02	7.E-06	2.E-04	4.E-04	2.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	5.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	2.E-04	7.E-06	2.E-04	1.E-03	3.E-03
Vanadium	7.E-03	6.E-04	4.E-06	6.E-03	7.E-04	5.E-03	2.E-02	4.E-02
Zinc	3.E-05	3.E-05	2.E-08	5.E-03	7.E-07	8.E-04	3.E-04	6.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	4.E-06	4.E-06	3.E-09	5.E-04	7.E-07	6.E-05	2.E-03	2.E-03
Arsenic	8.E-05	2.E-05	5.E-08	5.E-03	2.E-05	4.E-04	8.E-03	1.E-02
Barium	4.E-06	4.E-06	3.E-09	2.E-06	9.E-08	8.E-05	6.E-05	1.E-04
Beryllium	1.E-06	1.E-06	7.E-10	0.E+00	5.E-08	6.E-06	0.E+00	8.E-06
Cadmium	5.E-07	5.E-08	3.E-10	0.E+00	8.E-09	9.E-06	0.E+00	9.E-06
Chromium (Total)	3.E-06	3.E-06	2.E-09	5.E-07	7.E-07	2.E-05	2.E-06	2.E-05
Cobalt	2.E-04	1.E-05	1.E-07	3.E-05	1.E-04	7.E-04	1.E-04	1.E-03
Copper	1.E-06	5.E-07	6.E-10	4.E-06	1.E-06	2.E-05	3.E-06	3.E-05
Lead	3.E-05	1.E-06	2.E-08	7.E-07	3.E-07	1.E-04	6.E-06	1.E-04
Manganese	2.E-04	1.E-05	1.E-07	0.E+00	1.E-05	5.E-03	0.E+00	5.E-03
Molybdenum	7.E-07	6.E-08	5.E-10	1.E-03	3.E-05	1.E-03	1.E-03	4.E-03
Nickel	2.E-04	1.E-04	1.E-07	1.E-04	6.E-05	1.E-03	2.E-04	2.E-03
Selenium	2.E-07	2.E-08	1.E-10	5.E-03	4.E-08	2.E-06	1.E-04	5.E-03
Silver	2.E-07	2.E-08	1.E-10	0.E+00	3.E-08	1.E-06	0.E+00	1.E-06
Thallium	2.E-05	2.E-06	1.E-08	9.E-04	2.E-04	2.E-04	3.E-04	2.E-03
Uranium	3.E-06	2.E-06	2.E-09	6.E-04	1.E-06	2.E-05	4.E-03	5.E-03
Vanadium	4.E-04	4.E-05	3.E-07	9.E-04	5.E-05	2.E-03	3.E-03	7.E-03
Zinc	5.E-07	4.E-07	3.E-10	1.E-04	5.E-09	8.E-06	7.E-06	2.E-04

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Non-Carcinogenic Risk Estimates for a Recreational Receptor Adult at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless	Unitless
Antimony	2.E-04	1.E-04	1.E-07	2.E-03	8.E-06	6.E-04	7.E-03	1.E-02
Arsenic	3.E-03	7.E-04	2.E-06	4.E-02	4.E-04	5.E-03	7.E-02	1.E-01
Barium	8.E-05	6.E-05	5.E-08	3.E-05	2.E-06	1.E-03	9.E-04	2.E-03
Beryllium	5.E-05	4.E-05	3.E-08	3.E-04	3.E-06	1.E-04	2.E-04	7.E-04
Cadmium	2.E-04	2.E-05	1.E-07	1.E-03	4.E-06	3.E-03	1.E-03	5.E-03
Chromium (Total)	8.E-06	7.E-06	5.E-09	5.E-06	2.E-06	2.E-05	2.E-05	6.E-05
Cobalt	7.E-04	6.E-05	5.E-07	4.E-04	5.E-04	2.E-03	2.E-03	6.E-03
Copper	2.E-05	8.E-06	1.E-08	1.E-04	3.E-05	3.E-04	9.E-05	5.E-04
Lead	9.E-03	4.E-04	5.E-06	2.E-03	7.E-05	5.E-03	2.E-02	4.E-02
Manganese	4.E-03	4.E-04	3.E-06	2.E-03	6.E-04	**4.E-01**	6.E-02	**5.E-01**
Molybdenum	3.E-05	3.E-06	2.E-08	1.E-03	6.E-04	2.E-02	1.E-03	2.E-02
Nickel	3.E-04	2.E-04	2.E-07	3.E-04	9.E-05	1.E-03	6.E-04	3.E-03
Selenium	3.E-05	2.E-06	2.E-08	2.E-02	7.E-06	2.E-04	6.E-04	2.E-02
Silver	3.E-05	2.E-06	2.E-08	5.E-03	3.E-06	1.E-04	4.E-05	5.E-03
Thallium	2.E-03	2.E-04	1.E-06	5.E-02	2.E-02	2.E-02	2.E-02	1.E-01
Uranium	5.E-04	4.E-04	3.E-07	8.E-04	9.E-06	2.E-04	6.E-03	8.E-03
Vanadium	7.E-03	6.E-04	4.E-06	7.E-03	8.E-04	7.E-03	3.E-02	5.E-02
Zinc	3.E-05	3.E-05	2.E-08	5.E-03	7.E-07	8.E-04	3.E-04	6.E-03

Notes:

Bold HQ greater than benchmark of 1 for lead, or 0.2 for other chemicals

Lifetime Averaged Daily Dose for an Indigenous Receptor at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	4.0E-05	5.4E-07	6.9E-06	1.5E-05	6.5E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	5.0E-07	8.7E-09	6.2E-07	1.9E-07	1.4E-06

Lifetime Averaged Daily Dose for an Indigenous Receptor at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	4.1E-05	5.5E-07	7.5E-06	1.6E-05	6.6E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	4.0E-05	5.4E-07	6.9E-06	1.3E-05	6.3E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	2.6E-04	3.7E-07	2.8E-06	8.6E-05	3.5E-04

Lifetime Averaged Daily Dose for an Indigenous Receptor at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	3.0E-04	9.1E-07	9.7E-06	9.9E-05	4.1E-04

Lifetime Averaged Daily Dose for an Indigenous Receptor at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	4.0E-05	5.4E-07	6.9E-06	1.3E-05	6.3E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	2.7E-04	3.8E-07	2.8E-06	8.8E-05	3.6E-04

Lifetime Averaged Daily Dose for an Indigenous Receptor at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	3.1E-04	9.2E-07	9.7E-06	1.0E-04	4.2E-04

Lifetime Averaged Daily Dose for an Indigenous Receptor at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	1.9E-05	5.2E-07	6.9E-06	2.0E-05	4.8E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	1.9E-05	9.8E-08	1.2E-06	2.0E-05	4.1E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	3.8E-05	6.2E-07	8.1E-06	4.0E-05	8.9E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	1.9E-05	5.2E-07	6.9E-06	2.0E-05	4.8E-05

Lifetime Averaged Daily Dose for an Indigenous Receptor at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	2.5E-06	2.0E-08	6.9E-07	2.6E-06	5.9E-06

Lifetime Averaged Daily Dose for an Indigenous Receptor at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	2.1E-05	5.4E-07	7.6E-06	2.2E-05	5.4E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	2.5E-05	1.5E-07	1.8E-06	1.5E-05	4.4E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	3.1E-07	2.3E-09	1.4E-07	1.9E-07	7.0E-07

Lifetime Averaged Daily Dose for a Recreational Receptor at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	2.5E-05	1.5E-07	1.9E-06	1.6E-05	4.4E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	2.5E-05	1.5E-07	1.8E-06	1.3E-05	4.2E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	1.6E-04	1.0E-07	8.7E-07	8.6E-05	2.5E-04

Lifetime Averaged Daily Dose for a Recreational Receptor at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	1.8E-04	2.6E-07	2.7E-06	9.9E-05	2.9E-04

Lifetime Averaged Daily Dose for a Recreational Receptor at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	2.5E-05	1.5E-07	1.8E-06	1.3E-05	4.2E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	1.6E-04	1.1E-07	8.9E-07	8.8E-05	2.5E-04

Lifetime Averaged Daily Dose for a Recreational Receptor at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	1.9E-04	2.6E-07	2.7E-06	1.0E-04	2.9E-04

Lifetime Averaged Daily Dose for a Recreational Receptor at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	1.2E-05	1.5E-07	1.8E-06	2.0E-05	3.5E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	1.2E-05	2.7E-08	3.3E-07	2.0E-05	3.3E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	2.3E-05	1.7E-07	2.1E-06	4.0E-05	6.8E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.1E-07	5.6E-10	1.2E-05	1.5E-07	1.8E-06	2.0E-05	3.5E-05

Lifetime Averaged Daily Dose for a Recreational Receptor at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	4.9E-08	6.6E-09	1.7E-11	1.5E-06	5.3E-09	1.7E-07	2.6E-06	4.4E-06

Lifetime Averaged Daily Dose for a Recreational Receptor at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day	mg/kg-day
Arsenic	1.6E-06	2.2E-07	5.7E-10	1.3E-05	1.5E-07	1.9E-06	2.2E-05	3.9E-05

Carcinogenic Risk for an Indigenous Receptor at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**7E-05**	1E-06	**1E-05**	**3E-05**	**1E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	9E-07	2E-08	1E-06	3E-07	2E-06

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**7E-05**	1E-06	**1E-05**	**3E-05**	**1E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**7E-05**	1E-06	**1E-05**	**2E-05**	**1E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	**5E-04**	7E-07	5E-06	**2E-04**	**6E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**5E-04**	2E-06	**2E-05**	**2E-04**	**7E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**7E-05**	1E-06	**1E-05**	**2E-05**	**1E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	**5E-04**	7E-07	5E-06	**2E-04**	**6E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**6E-04**	2E-06	**2E-05**	**2E-04**	**8E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**3E-05**	9E-07	**1E-05**	**4E-05**	**9E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	**4E-05**	2E-07	2E-06	**4E-05**	**7E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**7E-05**	1E-06	**1E-05**	**7E-05**	**2E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**3E-05**	9E-07	**1E-05**	**4E-05**	**9E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	5E-06	4E-08	1E-06	5E-06	**1E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for an Indigenous Receptor at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**4E-05**	1E-06	**1E-05**	**4E-05**	**1E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the Jocko Creek and Mattagami River Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**4E-05**	3E-07	3E-06	**3E-05**	**8E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the Jocko Creek and Mattagami River Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	6E-07	4E-09	3E-07	3E-07	1E-06

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the Jocko Creek and Mattagami River Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**4E-05**	3E-07	3E-06	**3E-05**	**8E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the North Driftwood River (Pond 2) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**4E-05**	3E-07	3E-06	**2E-05**	**7E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the North Driftwood River (Pond 2) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	**3E-04**	2E-07	2E-06	**2E-04**	**4E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the North Driftwood River (Pond 2) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**3E-04**	5E-07	5E-06	**2E-04**	**5E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the North Driftwood River (TMF Ponds) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**4E-05**	3E-07	3E-06	**2E-05**	**7E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the North Driftwood River (TMF Ponds) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	**3E-04**	2E-07	2E-06	**2E-04**	**5E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the North Driftwood River (TMF Ponds) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**3E-04**	5E-07	5E-06	**2E-04**	**5E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the West Buskegau River (Pond 1) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**2E-05**	3E-07	3E-06	**4E-05**	**6E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the West Buskegau River (Pond 1) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	**2E-05**	5E-08	6E-07	**4E-05**	**6E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the West Buskegau River (Pond 1) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**4E-05**	3E-07	4E-06	**7E-05**	**1E-04**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the West Buskegau River (Pond 3) Location under Baseline Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**2E-05**	3E-07	3E-06	**4E-05**	**6E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the West Buskegau River (Pond 3) Location under Project Alone Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Ingestion Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	9E-08	1E-08	3E-11	3E-06	1E-08	3E-07	5E-06	8E-06

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Carcinogenic Risk for a Recreational Receptor at the West Buskegau River (Pond 3) Location under Baseline + Project Scenario

Chemical	Soil Ingestion	Dermal Contact with Soil	Particulate Inhalation	Fish Consumption	Wild Meat Consumption	Wild Vegetation Consumption	DW Consumption	Total Exposure
	unitless	unitless	unitless	unitless	unitless	unitless	unitless	unitless
Arsenic	3E-06	4E-07	1E-09	**2E-05**	3E-07	4E-06	**4E-05**	**7E-05**

Notes:

Bold ILCR greater than benchmark of 1 in 100,000

Appendix F ERA Input and Output

Toxicity Reference Values for the American Black Bear Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	American Black Bear	0.27	1	1.6E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	American Black Bear	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	American Black Bear	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	American Black Bear	0.27	1	1.4E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	American Black Bear	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	American Black Bear	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	American Black Bear	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	American Black Bear	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	American Black Bear	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	American Black Bear	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	American Black Bear	0.14	1	3.8E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	American Black Bear	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	American Black Bear	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	American Black Bear	0.27	1	4.0E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	American Black Bear	0.14	1	8.9E-01
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	American Black Bear	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	American Black Bear	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the American Mink Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	American Mink	0.81	1	4.8E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	American Mink	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	American Mink	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	American Mink	0.81	1	4.3E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	American Mink	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	American Mink	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	American Mink	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	American Mink	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	American Mink	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	American Mink	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	American Mink	0.44	1	1.1E+00
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	American Mink	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	American Mink	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	American Mink	0.81	1	1.2E-02
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	American Mink	0.44	1	2.7E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	American Mink	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	American Mink	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Beaver Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Beaver	0.35	1	2.1E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Beaver	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Beaver	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Beaver	0.35	1	1.8E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Beaver	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Beaver	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Beaver	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Beaver	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Beaver	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Beaver	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Beaver	0.19	1	4.9E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Beaver	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Beaver	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Beaver	0.35	1	5.2E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Beaver	0.19	1	1.2E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Beaver	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Beaver	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Bobcat Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Bobcat	0.46	1	2.8E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Bobcat	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Bobcat	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Bobcat	0.46	1	2.5E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Bobcat	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Bobcat	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Bobcat	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Bobcat	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Bobcat	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Bobcat	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Bobcat	0.25	1	6.5E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Bobcat	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Bobcat	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Bobcat	0.46	1	7.0E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Bobcat	0.25	1	1.5E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Bobcat	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Bobcat	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Bobcat (SaR) Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Bobcat (SaR)	0.46	3	9.2E-02
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Bobcat (SaR)	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Bobcat (SaR)	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Bobcat (SaR)	0.46	1	2.5E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Bobcat (SaR)	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Bobcat (SaR)	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Bobcat (SaR)	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Bobcat (SaR)	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Bobcat (SaR)	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Bobcat (SaR)	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Bobcat (SaR)	0.25	3	2.2E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Bobcat (SaR)	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Bobcat (SaR)	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Bobcat (SaR)	0.46	3	2.3E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Bobcat (SaR)	0.25	3	5.1E-01
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Bobcat (SaR)	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Bobcat (SaR)	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Boreal Caribou Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Boreal Caribou	0.22	3	4.3E-02
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Boreal Caribou	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Boreal Caribou	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Boreal Caribou	0.22	1	1.2E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Boreal Caribou	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Boreal Caribou	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Boreal Caribou	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Boreal Caribou	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Boreal Caribou	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Boreal Caribou	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Boreal Caribou	0.12	3	1.0E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Boreal Caribou	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Boreal Caribou	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Boreal Caribou	0.22	3	1.1E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Boreal Caribou	0.12	3	2.4E-01
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Boreal Caribou	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Boreal Caribou	--	1	7.5E+01

Notes:

(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL. In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.

(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Common (Masked) Shrew Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Common (Masked) Shrew	--	1	5.9E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Common (Masked) Shrew	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Common (Masked) Shrew	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Common (Masked) Shrew	--	1	5.3E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Common (Masked) Shrew	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Common (Masked) Shrew	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Common (Masked) Shrew	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Common (Masked) Shrew	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Common (Masked) Shrew	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Common (Masked) Shrew	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Common (Masked) Shrew	--	1	2.6E+00
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Common (Masked) Shrew	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Common (Masked) Shrew	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Common (Masked) Shrew	--	1	1.5E-02
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Common (Masked) Shrew	--	1	6.1E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Common (Masked) Shrew	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Common (Masked) Shrew	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL- Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Common (Masked) Shrew (SaR)	--	3	2.0E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Common (Masked) Shrew (SaR)	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Common (Masked) Shrew (SaR)	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Common (Masked) Shrew (SaR)	--	1	5.3E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Common (Masked) Shrew (SaR)	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Common (Masked) Shrew (SaR)	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Common (Masked) Shrew (SaR)	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Common (Masked) Shrew (SaR)	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Common (Masked) Shrew (SaR)	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Common (Masked) Shrew (SaR)	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Common (Masked) Shrew (SaR)	--	3	8.7E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Common (Masked) Shrew (SaR)	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Common (Masked) Shrew (SaR)	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Common (Masked) Shrew (SaR)	--	3	5.0E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Common (Masked) Shrew (SaR)	--	3	2.0E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Common (Masked) Shrew (SaR)	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Common (Masked) Shrew (SaR)	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Meadow Vole Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Meadow Vole	--	1	5.9E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Meadow Vole	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Meadow Vole	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Meadow Vole	--	1	5.3E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Meadow Vole	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Meadow Vole	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Meadow Vole	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Meadow Vole	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Meadow Vole	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Meadow Vole	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Meadow Vole	0.96	1	2.5E+00
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Meadow Vole	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Meadow Vole	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Meadow Vole	--	1	1.5E-02
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Meadow Vole	0.96	1	5.9E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Meadow Vole	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Meadow Vole	--	1	7.5E+01

Notes:

(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.

(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Moose Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Moose	0.17	1	1.0E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Moose	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Moose	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Moose	0.17	1	9.1E-02
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Moose	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Moose	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Moose	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Moose	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Moose	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Moose	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Moose	0.09	1	2.4E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Moose	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Moose	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Moose	0.17	1	2.6E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Moose	0.09	1	5.7E-01
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Moose	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Moose	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Northern River Otter Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Northern River Otter	0.46	1	2.8E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Northern River Otter	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Northern River Otter	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Northern River Otter	0.46	1	2.5E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Northern River Otter	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Northern River Otter	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Northern River Otter	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Northern River Otter	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Northern River Otter	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Northern River Otter	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Northern River Otter	0.25	1	6.5E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Northern River Otter	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Northern River Otter	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Northern River Otter	0.46	1	7.0E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Northern River Otter	0.25	1	1.5E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Northern River Otter	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Northern River Otter	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Red Fox Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Red Fox	0.55	1	3.3E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Red Fox	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Red Fox	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Red Fox	0.55	1	2.9E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Red Fox	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Red Fox	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Red Fox	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Red Fox	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Red Fox	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Red Fox	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Red Fox	0.30	1	7.8E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Red Fox	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Red Fox	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Red Fox	0.55	1	8.3E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Red Fox	0.30	1	1.8E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Red Fox	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Red Fox	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Snowshoe Hare Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	Snowshoe Hare	0.72	1	4.3E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	Snowshoe Hare	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Snowshoe Hare	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	Snowshoe Hare	0.72	1	3.8E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	Snowshoe Hare	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	Snowshoe Hare	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	Snowshoe Hare	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	Snowshoe Hare	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	Snowshoe Hare	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	Snowshoe Hare	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	Snowshoe Hare	0.39	1	1.0E+00
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	Snowshoe Hare	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	Snowshoe Hare	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	Snowshoe Hare	0.72	1	1.1E-02
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	Snowshoe Hare	0.39	1	2.4E+00
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	Snowshoe Hare	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	Snowshoe Hare	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL. In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the White-tailed Deer Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	Rat	0.35	USEPA (1988)	reproduction	Rossi et al. (1987), in USEPA Eco-SSL (2005)	chronic LOAEL	5.9E-01	1	5.9E-01	White-tailed Deer	0.26	1	1.5E-01
Arsenic	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.0E+00	1	1.0E+00	White-tailed Deer	--	1	1.0E+00
Barium	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	5.2E+01	1	5.2E+01	White-tailed Deer	--	1	5.2E+01
Beryllium	Rat	0.35	USEPA (1988)	longevity, growth	Schroeder & Mitchener (1975), in Sample et al. (1996) and USEPA Eco-SSL (2005)	chronic NOAEL	5.3E-01	1	5.3E-01	White-tailed Deer	0.26	1	1.4E-01
Cadmium	multiple	--	--	survival, growth, reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	7.7E-01	1	7.7E-01	White-tailed Deer	--	1	7.7E-01
Chromium (Total)	multiple	--	--	growth	FCSAP 2021	geometric mean of NOAEL	2.4E+00	1	2.4E+00	White-tailed Deer	--	1	2.4E+00
Cobalt	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2005)	geometric mean of NOAEL	7.3E+00	1	7.3E+00	White-tailed Deer	--	1	7.3E+00
Copper	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	5.6E+00	1	5.6E+00	White-tailed Deer	--	1	5.6E+00
Lead	multiple	--	--	reproduction, growth, mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.7E+00	1	4.7E+00	White-tailed Deer	--	1	4.7E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	5.2E+01	1	5.2E+01	White-tailed Deer	--	1	5.2E+01
Molybdenum	Mouse	0.03	USEPA (1988)	reproduction	Schroeder & Mitchner (1971), Sample et al. (1996)	chronic LOAEL	2.6E+00	1	2.6E+00	White-tailed Deer	0.14	1	3.7E-01
Nickel	multiple	--	--	reproductive, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.7E+00	1	1.7E+00	White-tailed Deer	--	1	1.7E+00
Selenium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.4E-01	1	1.4E-01	White-tailed Deer	--	1	1.4E-01
Thallium	Rat	0.35	USEPA (1988)	reproduction	FCSAP 2021	unbound LOAEL	1.5E-02	1	1.5E-02	White-tailed Deer	0.26	1	3.9E-03
Uranium	Mouse	0.03	USEPA (1988)	reproduction	FCSAP 2021	bound LOAEL	6.1E+00	1	6.1E+00	White-tailed Deer	0.14	1	8.7E-01
Vanadium	multiple	--	--	reproduction, growth, survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	4.2E+00	1	4.2E+00	White-tailed Deer	--	1	4.2E+00
Zinc	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	7.5E+01	1	7.5E+01	White-tailed Deer	--	1	7.5E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the American Robin Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	American Robin	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	American Robin	--	1	5.1E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	American Robin	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	American Robin	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	American Robin	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	American Robin	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	American Robin	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	American Robin	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	American Robin	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	American Robin	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	American Robin	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	American Robin	9.7E-01	1	3.4E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	American Robin	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	American Robin	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	American Robin	--	1	6.6E+01

Notes:

(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL. In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.

(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the American Robin (SaR) Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	No suitable study identified												--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	American Robin (SaR)	--	3	1.5E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	American Robin (SaR)	--	3	1.7E+01
Beryllium	No suitable study identified												--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	American Robin (SaR)	--	3	7.0E-01
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	American Robin (SaR)	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	American Robin (SaR)	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	American Robin (SaR)	--	3	1.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	American Robin (SaR)	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	American Robin (SaR)	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	American Robin (SaR)	--	3	1.2E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	American Robin (SaR)	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	American Robin (SaR)	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	American Robin (SaR)	9.7E-01	3	1.1E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	American Robin (SaR)	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	American Robin (SaR)	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	American Robin (SaR)	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Bald Eagle Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Bald Eagle	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Bald Eagle	7.6E-01	1	3.9E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Bald Eagle	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Bald Eagle	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Bald Eagle	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Bald Eagle	7.6E-01	1	3.4E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Bald Eagle	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Bald Eagle	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Bald Eagle	7.5E-01	1	2.7E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Bald Eagle	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Bald Eagle	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Bald Eagle	3.5E-01	1	1.2E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Bald Eagle	7.2E-01	1	3.8E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Bald Eagle	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Bald Eagle	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Barn Swallow Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Barn Swallow	--	3	1.5E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Barn Swallow	--	3	1.7E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Barn Swallow	--	3	7.0E-01
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Barn Swallow	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Barn Swallow	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Barn Swallow	--	3	1.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Barn Swallow	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Barn Swallow	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Barn Swallow	--	3	1.2E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Barn Swallow	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Barn Swallow	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Barn Swallow	--	3	1.2E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Barn Swallow	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Barn Swallow	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Barn Swallow	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncertainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Common Merganser Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	No suitable study identified												--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Common Merganser	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Common Merganser	--	1	5.1E+01
Beryllium	No suitable study identified												--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Common Merganser	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Common Merganser	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Common Merganser	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Common Merganser	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Common Merganser	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Common Merganser	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Common Merganser	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Common Merganser	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Common Merganser	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Common Merganser	4.6E-01	1	1.6E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Common Merganser	9.6E-01	1	5.1E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Common Merganser	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Common Merganser	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncertainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Lesser Scaup Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Lesser Scaup	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Lesser Scaup	--	1	5.1E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Lesser Scaup	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Lesser Scaup	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Lesser Scaup	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Lesser Scaup	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Lesser Scaup	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Lesser Scaup	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Lesser Scaup	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Lesser Scaup	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Lesser Scaup	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Lesser Scaup	5.6E-01	1	1.9E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Lesser Scaup	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Lesser Scaup	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Lesser Scaup	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Mallard Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	No suitable study identified												--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Mallard	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Mallard	--	1	5.1E+01
Beryllium	No suitable study identified												--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Mallard	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Mallard	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Mallard	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Mallard	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Mallard	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Mallard	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Mallard	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Mallard	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Mallard	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Mallard	4.9E-01	1	1.7E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Mallard	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Mallard	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Mallard	--	1	6.6E+01

Notes:

(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.

(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Mallard (SaR) Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Mallard (SaR)	--	3	1.5E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Mallard (SaR)	--	3	1.7E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Mallard (SaR)	--	3	7.0E-01
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Mallard (SaR)	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Mallard (SaR)	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Mallard (SaR)	--	3	1.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Mallard (SaR)	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Mallard (SaR)	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Mallard (SaR)	--	3	1.2E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Mallard (SaR)	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Mallard (SaR)	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Mallard (SaR)	4.9E-01	3	5.7E-02
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Mallard (SaR)	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Mallard (SaR)	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Mallard (SaR)	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Red-tailed Hawk Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Red-tailed Hawk	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Red-tailed Hawk	--	1	5.1E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Red-tailed Hawk	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Red-tailed Hawk	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Red-tailed Hawk	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Red-tailed Hawk	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Red-tailed Hawk	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Red-tailed Hawk	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Red-tailed Hawk	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Red-tailed Hawk	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Red-tailed Hawk	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Red-tailed Hawk	5.0E-01	1	1.7E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Red-tailed Hawk	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Red-tailed Hawk	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Red-tailed Hawk	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncertainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	No suitable study identified												--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Red-tailed Hawk (SaR)	--	3	1.5E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Red-tailed Hawk (SaR)	--	3	1.7E+01
Beryllium	No suitable study identified												--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Red-tailed Hawk (SaR)	--	3	7.0E-01
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Red-tailed Hawk (SaR)	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Red-tailed Hawk (SaR)	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Red-tailed Hawk (SaR)	--	3	1.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Red-tailed Hawk (SaR)	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Red-tailed Hawk (SaR)	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Red-tailed Hawk (SaR)	--	3	1.2E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Red-tailed Hawk (SaR)	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Red-tailed Hawk (SaR)	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Red-tailed Hawk (SaR)	5.0E-01	3	5.8E-02
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Red-tailed Hawk (SaR)	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Red-tailed Hawk (SaR)	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Red-tailed Hawk (SaR)	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Short-eared Owl Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Short-eared Owl	--	3	1.5E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Short-eared Owl	--	3	1.7E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Short-eared Owl	--	3	7.0E-01
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Short-eared Owl	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Short-eared Owl	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Short-eared Owl	--	3	1.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Short-eared Owl	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Short-eared Owl	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Short-eared Owl	--	3	1.2E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Short-eared Owl	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Short-eared Owl	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Short-eared Owl	6.7E-01	3	7.7E-02
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Short-eared Owl	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Short-eared Owl	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Short-eared Owl	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Spotted Sandpiper Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony	No suitable study identified												--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Spotted Sandpiper	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Spotted Sandpiper	--	1	5.1E+01
Beryllium	No suitable study identified												--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Spotted Sandpiper	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Spotted Sandpiper	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Spotted Sandpiper	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Spotted Sandpiper	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Spotted Sandpiper	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Spotted Sandpiper	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Spotted Sandpiper	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Spotted Sandpiper	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Spotted Sandpiper	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Spotted Sandpiper	--	1	3.5E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Spotted Sandpiper	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Spotted Sandpiper	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Spotted Sandpiper	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Spotted Sandpiper (SaR)	--	3	1.5E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Spotted Sandpiper (SaR)	--	3	1.7E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Spotted Sandpiper (SaR)	--	3	7.0E-01
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Spotted Sandpiper (SaR)	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Spotted Sandpiper (SaR)	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Spotted Sandpiper (SaR)	--	3	1.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Spotted Sandpiper (SaR)	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Spotted Sandpiper (SaR)	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Spotted Sandpiper (SaR)	--	3	1.2E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Spotted Sandpiper (SaR)	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Spotted Sandpiper (SaR)	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Spotted Sandpiper (SaR)	--	3	1.2E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Spotted Sandpiper (SaR)	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Spotted Sandpiper (SaR)	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Spotted Sandpiper (SaR)	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL.
In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Toxicity Reference Values for the Spruce Grouse Exposed to Constituents of Concern

Constituent	Test Species	Test Species Body Weight (kg wet)	Body Weight Reference	Effect	Reference	Endpoint	Daily Dose (mg/kg-day)	Total Uncertainty Factor (a)	Chronic LOAEL-Test Species (b) (mg/kg-day)	Receptor Species	Body Weight Scaling Factor	Sensitive Species Factor	Toxicity Reference Value (mg/kg-day)
Inorganics													
Antimony					No suitable study identified								--
Arsenic	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	EC20	4.4E+00	1	4.4E+00	Spruce Grouse	--	1	4.4E+00
Barium	Chicken	1.6	USEPA Eco-SSL (2005)	mortality	FCSAP 2021	EC20	5.1E+01	1	5.1E+01	Spruce Grouse	--	1	5.1E+01
Beryllium					No suitable study identified								--
Cadmium	multiple	--	--	mortality	FCSAP 2021	EC20	2.1E+00	1	2.1E+00	Spruce Grouse	--	1	2.1E+00
Chromium (Total)	multiple	--	--	growth, reproduction	FCSAP 2021	geometric mean of NOAEL	2.7E+00	1	2.7E+00	Spruce Grouse	--	1	2.7E+00
Cobalt	multiple	--	--	growth	USEPA Eco-SSL (2005)	geometric mean of subchronic NOAEL	7.6E+00	3	2.5E+00	Spruce Grouse	--	1	2.5E+00
Copper	Chicken	1.6	USEPA Eco-SSL (2005)	reproduction	FCSAP 2021	EC20	4.5E+00	1	4.5E+00	Spruce Grouse	--	1	4.5E+00
Lead	multiple	--	--	reproduction, growth, and mortality	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	1.6E+00	1	1.6E+00	Spruce Grouse	--	1	1.6E+00
Manganese	multiple	--	--	growth, reproduction	USEPA Eco-SSL (2007)	geometric mean of NOAEL	1.8E+02	1	1.8E+02	Spruce Grouse	--	1	1.8E+02
Molybdenum	Chicken	1.5	USEPA (1988)	reproduction	Lepore and Miller (1965) in Sample et al. (1996)	chronic LOAEL	3.5E+01	1	3.5E+01	Spruce Grouse	--	1	3.5E+01
Nickel	multiple	--	--	reproduction and growth	FCSAP 2021	geometric mean of NOAEL	6.7E+00	1	6.7E+00	Spruce Grouse	--	1	6.7E+00
Selenium	multiple	--	--	reproduction, growth and survival	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	2.9E-01	1	2.9E-01	Spruce Grouse	--	1	2.9E-01
Thallium	Starling	0.07	Bonser and Rayner (1996)	mortality	Schafer (1972) in Shafer et al. (1983)	acute LD50	3.5E+01	100	3.5E-01	Spruce Grouse	5.8E-01	1	2.0E-01
Uranium	Black Duck	1.25	Dunning (1984)	various, including mortality	Haseltine and Sileo (1983) in Sample et al. (1996)	subchronic NOAEL	1.6E+02	3	5.3E+01	Spruce Grouse	--	1	5.3E+01
Vanadium	multiple	--	--	survival, growth and reproduction	FCSAP 2021	highest bound NOAEL below the lowest bound LOAEL	3.4E-01	1	3.4E-01	Spruce Grouse	--	1	0.344
Zinc	multiple	--	--	reproduction or growth	FCSAP 2021	geometric mean of NOAEL	6.6E+01	1	6.6E+01	Spruce Grouse	--	1	6.6E+01

Notes:
(a) For non-FCSAP Daily Dose values, the following uncertainty factors have been used to convert to chronic LOAEL/NOAEL:100 for acute LD50; 30 for sub-chronic LD50; 3 for subchronic LOAEL or NOAEL; 1 for chronic LOAEL or NOAEL. In the case of Daily Dose values from FCSAP, uncentainty values were already applied by the authors, and hence an uncentainty value of 1 is used so as to not introduce further coversion.
(b) The chronic LOAEL is calculated as the Daily Dose divided by the Total Uncertainty Factor.

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.5E-04	3.5E-04	2.7E-06	6.5E-06	9.4E-06	---	---	1.9E-05	8.7E-04
Arsenic	1.6E-03	2.4E-03	7.3E-04	1.1E-04	3.9E-05	1.9E-04	---	---	2.3E-04	5.4E-03
Barium	1.5E-03	7.3E-02	3.4E-04	2.1E-03	5.4E-04	4.1E-04	---	---	3.6E-03	8.2E-02
Beryllium	2.1E-04	1.2E-03	2.4E-05	8.1E-05	1.3E-06	2.0E-05	---	---	1.9E-05	1.5E-03
Cadmium	3.1E-04	4.5E-03	7.4E-03	2.8E-03	1.3E-06	4.0E-05	---	---	1.7E-04	1.5E-02
Chromium (Total)	1.6E-02	2.0E-02	1.2E-02	1.5E-02	8.4E-05	1.5E-03	---	---	3.6E-04	6.5E-02
Cobalt	3.6E-03	6.2E-03	1.1E-03	7.9E-04	1.9E-05	3.9E-04	---	---	1.7E-04	1.2E-02
Copper	1.3E-02	2.0E-01	1.8E-02	7.2E-02	7.8E-05	9.4E-04	---	---	1.8E-02	3.2E-01
Lead	9.0E-03	7.3E-03	1.1E-02	2.1E-02	1.8E-05	1.0E-03	---	---	2.9E-04	5.0E-02
Manganese	1.1E-02	5.3E-01	1.9E-03	4.7E-03	4.3E-03	3.3E-03	---	---	7.6E-03	5.6E-01
Molybdenum	3.5E-04	1.0E-01	8.5E-04	7.8E-04	3.2E-06	3.7E-05	---	---	3.1E-04	1.0E-01
Nickel	9.6E-03	2.9E-02	2.5E-02	1.7E-02	5.2E-05	9.4E-04	---	---	3.8E-04	8.3E-02
Selenium	3.4E-04	2.5E-03	8.4E-04	3.2E-03	8.4E-06	3.3E-05	---	---	2.4E-03	9.3E-03
Thallium	6.6E-05	1.7E-04	7.8E-06	7.4E-05	6.5E-07	7.0E-06	---	---	4.3E-05	3.7E-04
Uranium	6.6E-04	4.1E-04	5.5E-05	1.5E-05	1.9E-06	6.1E-05	---	---	2.1E-05	1.2E-03
Vanadium	1.4E-02	1.9E-02	1.5E-03	1.7E-03	4.5E-05	1.3E-03	---	---	6.3E-04	3.8E-02
Zinc	4.0E-02	7.9E-01	5.1E-01	7.2E-01	3.9E-04	5.2E-03	---	---	4.4E-01	2.5E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.2E-05	---	---	5.1E-06	3.0E-06	1.0E-04	---	2.0E-05	1.8E-04	3.7E-04
Arsenic	6.0E-04	---	---	2.0E-04	1.8E-05	2.1E-03	---	2.0E-02	2.2E-03	2.5E-02
Barium	5.6E-04	---	---	3.9E-03	2.5E-04	4.6E-03	---	1.7E-02	3.5E-02	6.1E-02
Beryllium	7.8E-05	---	---	1.5E-04	6.0E-07	2.2E-04	---	7.8E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	6.0E-07	4.4E-04	---	1.4E-02	1.6E-03	2.1E-02
Chromium (Total)	5.8E-03	---	---	2.8E-02	3.9E-05	1.7E-02	---	8.0E-02	3.5E-03	1.3E-01
Cobalt	1.3E-03	---	---	1.5E-03	9.0E-06	4.3E-03	---	2.8E-04	1.6E-03	9.1E-03
Copper	4.9E-03	---	---	1.3E-01	3.6E-05	1.0E-02	---	4.5E-01	1.7E-01	7.7E-01
Lead	3.4E-03	---	---	4.0E-02	8.4E-06	1.1E-02	---	2.8E-02	2.8E-03	8.6E-02
Manganese	4.3E-03	---	---	8.7E-03	2.0E-03	3.7E-02	---	1.5E-01	7.4E-02	2.7E-01
Molybdenum	1.3E-04	---	---	1.5E-03	1.5E-06	4.1E-04	---	5.8E-03	3.0E-03	1.1E-02
Nickel	3.6E-03	---	---	3.2E-02	2.4E-05	1.0E-02	---	4.0E-02	3.6E-03	8.9E-02
Selenium	1.3E-04	---	---	6.0E-03	3.9E-06	3.7E-04	---	6.1E-03	2.4E-02	3.6E-02
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	7.8E-05	---	4.2E-04	4.2E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	9.0E-07	6.8E-04	---	3.1E-04	2.0E-04	1.5E-03
Vanadium	5.2E-03	---	---	3.2E-03	2.1E-05	1.5E-02	---	7.1E-03	6.1E-03	3.6E-02
Zinc	1.5E-02	---	---	1.3E+00	1.8E-04	5.7E-02	---	2.3E+00	4.3E+00	8.0E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.4E-05	---	---	7.2E-06	5.1E-05	6.3E-05	---	---	1.9E-04
Arsenic	4.3E-04	3.5E-04	---	---	4.3E-05	1.0E-03	3.0E-03	---	---	4.8E-03
Barium	4.0E-04	1.1E-02	---	---	6.0E-04	2.3E-03	4.7E-03	---	---	1.9E-02
Beryllium	5.6E-05	2.1E-04	---	---	1.4E-06	1.1E-04	1.6E-04	---	---	5.4E-04
Cadmium	8.4E-05	5.2E-04	---	---	1.4E-06	2.2E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	4.2E-03	3.1E-03	---	---	9.4E-05	8.2E-03	4.8E-03	---	---	2.0E-02
Cobalt	9.7E-04	9.6E-04	---	---	2.2E-05	2.1E-03	1.8E-03	---	---	5.9E-03
Copper	3.5E-03	2.1E-02	---	---	8.6E-05	5.1E-03	1.6E-02	---	---	4.5E-02
Lead	2.4E-03	1.3E-03	---	---	2.0E-05	5.6E-03	2.3E-03	---	---	1.2E-02
Manganese	3.1E-03	4.7E-02	---	---	4.8E-03	1.8E-02	9.7E-02	---	---	1.7E-01
Molybdenum	9.5E-05	8.0E-03	---	---	3.6E-06	2.0E-04	6.7E-03	---	---	1.5E-02
Nickel	2.6E-03	2.9E-03	---	---	5.8E-05	5.1E-03	9.3E-03	---	---	2.0E-02
Selenium	9.2E-05	3.3E-04	---	---	9.4E-06	1.8E-04	3.5E-04	---	---	9.5E-04
Thallium	1.8E-05	2.9E-05	---	---	7.2E-07	3.8E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.5E-05	---	---	2.2E-06	3.3E-04	1.2E-03	---	---	1.8E-03
Vanadium	3.7E-03	3.0E-03	---	---	5.0E-05	7.2E-03	1.2E-02	---	---	2.6E-02
Zinc	1.1E-02	1.2E-01	---	---	4.3E-04	2.8E-02	9.3E-02	---	---	2.5E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	4.9E-05	---	---	---	---	2.2E-03
Barium	1.3E-03	---	---	1.6E-02	6.7E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	9.7E-05	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	2.3E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.4E-03	---	---	---	---	5.1E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	6.5E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.1E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	2.4E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	5.7E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	4.9E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	4.9E-05	---	---	---	---	2.2E-03
Barium	1.3E-03	---	---	1.6E-02	6.7E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	9.7E-05	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	2.3E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.4E-03	---	---	---	---	5.1E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	6.5E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.1E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	2.4E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	5.7E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	4.9E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.4E-04	---	---	5.9E-06	---	---	---	---	4.0E-04
Arsenic	2.9E-03	1.5E-03	---	---	3.5E-05	---	---	---	---	4.4E-03
Barium	2.7E-03	4.8E-02	---	---	4.9E-04	---	---	---	---	5.1E-02
Beryllium	3.7E-04	9.0E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	1.2E-06	---	---	---	---	2.8E-03
Chromium (Total)	2.8E-02	1.3E-02	---	---	7.6E-05	---	---	---	---	4.1E-02
Cobalt	6.4E-03	4.0E-03	---	---	1.8E-05	---	---	---	---	1.0E-02
Copper	2.4E-02	8.7E-02	---	---	7.1E-05	---	---	---	---	1.1E-01
Lead	1.6E-02	5.6E-03	---	---	1.6E-05	---	---	---	---	2.2E-02
Manganese	2.0E-02	2.0E-01	---	---	3.9E-03	---	---	---	---	2.2E-01
Molybdenum	6.3E-04	3.4E-02	---	---	2.9E-06	---	---	---	---	3.4E-02
Nickel	1.7E-02	1.2E-02	---	---	4.7E-05	---	---	---	---	2.9E-02
Selenium	6.1E-04	1.4E-03	---	---	7.6E-06	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.2E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	1.8E-06	---	---	---	---	1.5E-03
Vanadium	2.5E-02	1.3E-02	---	---	4.1E-05	---	---	---	---	3.7E-02
Zinc	7.2E-02	5.0E-01	---	---	3.5E-04	---	---	---	---	5.7E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.0E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.4E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.4E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.1E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	4.8E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.1E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.4E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.2E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	5.1E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.2E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.0E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.0E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.4E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.4E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.1E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	4.8E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.1E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.4E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.2E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	5.1E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.2E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.0E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.7E-04	7.5E-04	---	---	2.1E-05	---	---	---	---	1.0E-03
Arsenic	3.2E-03	5.4E-03	---	---	1.3E-04	---	---	---	---	8.7E-03
Barium	2.9E-03	1.6E-01	---	---	1.7E-03	---	---	---	---	1.7E-01
Beryllium	4.1E-04	2.7E-03	---	---	4.2E-06	---	---	---	---	3.1E-03
Cadmium	6.1E-04	1.0E-02	---	---	4.2E-06	---	---	---	---	1.1E-02
Chromium (Total)	3.0E-02	4.6E-02	---	---	2.7E-04	---	---	---	---	7.6E-02
Cobalt	7.0E-03	1.4E-02	---	---	6.3E-05	---	---	---	---	2.1E-02
Copper	2.6E-02	4.4E-01	---	---	2.5E-04	---	---	---	---	4.6E-01
Lead	1.8E-02	1.7E-02	---	---	5.9E-05	---	---	---	---	3.4E-02
Manganese	2.2E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	6.9E-04	2.2E-01	---	---	1.1E-05	---	---	---	---	2.2E-01
Nickel	1.9E-02	6.4E-02	---	---	1.7E-04	---	---	---	---	8.3E-02
Selenium	6.7E-04	5.5E-03	---	---	2.7E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	3.9E-04	---	---	2.1E-06	---	---	---	---	5.2E-04
Uranium	1.3E-03	9.2E-04	---	---	6.3E-06	---	---	---	---	2.2E-03
Vanadium	2.7E-02	4.3E-02	---	---	1.5E-04	---	---	---	---	7.0E-02
Zinc	7.8E-02	1.8E+00	---	---	1.3E-03	---	---	---	---	1.8E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.0E-05	2.8E-04	---	---	5.4E-06	1.3E-05	1.6E-04	---	---	5.4E-04
Arsenic	8.2E-04	2.9E-03	---	---	3.3E-05	2.6E-04	7.6E-03	---	---	1.2E-02
Barium	7.6E-04	9.5E-02	---	---	4.5E-04	5.8E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.8E-05	4.1E-04	---	---	2.3E-03
Cadmium	1.6E-04	4.4E-03	---	---	1.1E-06	5.6E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	7.9E-03	2.6E-02	---	---	7.1E-05	2.1E-03	1.2E-02	---	---	4.9E-02
Cobalt	1.8E-03	8.0E-03	---	---	1.6E-05	5.5E-04	4.6E-03	---	---	1.5E-02
Copper	6.7E-03	1.7E-01	---	---	6.5E-05	1.3E-03	4.1E-02	---	---	2.2E-01
Lead	4.6E-03	1.1E-02	---	---	1.5E-05	1.5E-03	5.8E-03	---	---	2.3E-02
Manganese	5.8E-03	4.0E-01	---	---	3.6E-03	4.6E-03	2.5E-01	---	---	6.6E-01
Molybdenum	1.8E-04	6.7E-02	---	---	2.7E-06	5.2E-05	1.7E-02	---	---	8.5E-02
Nickel	4.9E-03	2.4E-02	---	---	4.4E-05	1.3E-03	2.4E-02	---	---	5.5E-02
Selenium	1.7E-04	2.7E-03	---	---	7.1E-06	4.6E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.4E-04	---	---	5.4E-07	9.9E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.5E-04	---	---	1.6E-06	8.6E-05	3.1E-03	---	---	4.1E-03
Vanadium	7.0E-03	2.5E-02	---	---	3.8E-05	1.9E-03	3.2E-02	---	---	6.6E-02
Zinc	2.0E-02	1.0E+00	---	---	3.3E-04	7.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.8E-06	---	---	8.6E-07	8.1E-06	1.1E-04	---	2.6E-05	1.9E-04	3.5E-04
Arsenic	1.0E-04	---	---	3.4E-05	4.9E-05	2.2E-03	---	2.6E-02	2.3E-03	3.1E-02
Barium	9.5E-05	---	---	6.6E-04	6.7E-04	4.9E-03	---	2.1E-02	3.6E-02	6.4E-02
Beryllium	1.3E-05	---	---	2.6E-05	1.6E-06	2.4E-04	---	9.9E-04	1.9E-04	1.5E-03
Cadmium	2.0E-05	---	---	9.0E-04	1.6E-06	4.8E-04	---	1.7E-02	1.7E-03	2.1E-02
Chromium (Total)	9.9E-04	---	---	4.8E-03	1.1E-04	1.8E-02	---	1.0E-01	3.6E-03	1.3E-01
Cobalt	2.3E-04	---	---	2.5E-04	2.4E-05	4.7E-03	---	3.6E-04	1.7E-03	7.2E-03
Copper	8.4E-04	---	---	2.3E-02	9.7E-05	1.1E-02	---	5.7E-01	1.8E-01	7.9E-01
Lead	5.7E-04	---	---	6.8E-03	2.3E-05	1.2E-02	---	3.6E-02	3.0E-03	5.8E-02
Manganese	7.2E-04	---	---	1.5E-03	5.4E-03	3.9E-02	---	1.9E-01	7.7E-02	3.1E-01
Molybdenum	2.2E-05	---	---	2.5E-04	4.0E-06	4.4E-04	---	7.4E-03	3.1E-03	1.1E-02
Nickel	6.1E-04	---	---	5.4E-03	6.5E-05	1.1E-02	---	5.1E-02	3.8E-03	7.2E-02
Selenium	2.2E-05	---	---	1.0E-03	1.1E-05	3.9E-04	---	7.8E-03	2.5E-02	3.4E-02
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	8.4E-05	---	5.3E-04	4.4E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	2.4E-06	7.3E-04	---	3.9E-04	2.1E-04	1.4E-03
Vanadium	8.8E-04	---	---	5.4E-04	5.7E-05	1.6E-02	---	9.0E-03	6.4E-03	3.3E-02
Zinc	2.6E-03	---	---	2.3E-01	4.9E-04	6.2E-02	---	3.0E+00	4.5E+00	7.8E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.7E-05	8.3E-04	7.8E-06	8.7E-06	---	---	---	---	1.0E-03
Arsenic	1.7E-03	1.2E-04	1.8E-03	3.1E-04	5.2E-05	---	---	---	---	4.0E-03
Barium	1.6E-03	3.0E-03	8.2E-04	6.0E-03	7.2E-04	---	---	---	---	1.2E-02
Beryllium	2.2E-04	2.7E-05	5.7E-05	2.3E-04	1.7E-06	---	---	---	---	5.4E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	1.7E-06	---	---	---	---	2.7E-02
Chromium (Total)	1.7E-02	8.1E-04	2.9E-02	4.4E-02	1.1E-04	---	---	---	---	9.0E-02
Cobalt	3.8E-03	2.5E-04	2.6E-03	2.3E-03	2.6E-05	---	---	---	---	9.0E-03
Copper	1.4E-02	1.5E-02	4.3E-02	2.1E-01	1.0E-04	---	---	---	---	2.8E-01
Lead	9.6E-03	1.5E-04	2.6E-02	6.2E-02	2.4E-05	---	---	---	---	9.7E-02
Manganese	1.2E-02	4.5E-02	4.6E-03	1.3E-02	5.8E-03	---	---	---	---	8.1E-02
Molybdenum	3.8E-04	9.3E-03	2.0E-03	2.2E-03	4.3E-06	---	---	---	---	1.4E-02
Nickel	1.0E-02	2.3E-03	6.1E-02	4.9E-02	6.9E-05	---	---	---	---	1.2E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.2E-03	1.1E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.4E-06	1.9E-05	2.1E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.5E-05	1.3E-04	4.4E-05	2.6E-06	---	---	---	---	9.0E-04
Vanadium	1.5E-02	7.0E-04	3.5E-03	4.9E-03	6.1E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	3.4E-02	1.2E+00	2.1E+00	5.2E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.7E-04	1.1E-03	---	---	9.6E-06	---	---	---	---	2.0E-03
Arsenic	1.0E-02	1.1E-02	---	---	5.8E-05	---	---	---	---	2.1E-02
Barium	9.5E-03	3.4E-01	---	---	8.0E-04	---	---	---	---	3.5E-01
Beryllium	1.3E-03	6.4E-03	---	---	1.9E-06	---	---	---	---	7.7E-03
Cadmium	2.0E-03	1.6E-02	---	---	1.9E-06	---	---	---	---	1.8E-02
Chromium (Total)	9.8E-02	9.6E-02	---	---	1.3E-04	---	---	---	---	1.9E-01
Cobalt	2.3E-02	2.9E-02	---	---	2.9E-05	---	---	---	---	5.2E-02
Copper	8.3E-02	6.6E-01	---	---	1.2E-04	---	---	---	---	7.4E-01
Lead	5.7E-02	4.0E-02	---	---	2.7E-05	---	---	---	---	9.7E-02
Manganese	7.2E-02	1.5E+00	---	---	6.4E-03	---	---	---	---	1.6E+00
Molybdenum	2.2E-03	2.7E-01	---	---	4.8E-06	---	---	---	---	2.7E-01
Nickel	6.0E-02	9.3E-02	---	---	7.7E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	1.0E-02	---	---	1.3E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	8.8E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	2.9E-06	---	---	---	---	6.1E-03
Vanadium	8.7E-02	9.2E-02	---	---	6.8E-05	---	---	---	---	1.8E-01
Zinc	2.5E-01	3.6E+00	---	---	5.8E-04	---	---	---	---	3.9E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	4.9E-04	---	---	6.4E-06	---	---	---	---	6.2E-04
Arsenic	1.5E-03	4.8E-03	---	---	3.9E-05	---	---	---	---	6.3E-03
Barium	1.3E-03	1.5E-01	---	---	5.3E-04	---	---	---	---	1.6E-01
Beryllium	1.9E-04	2.9E-03	---	---	1.3E-06	---	---	---	---	3.1E-03
Cadmium	2.8E-04	7.4E-03	---	---	1.3E-06	---	---	---	---	7.6E-03
Chromium (Total)	1.4E-02	4.3E-02	---	---	8.4E-05	---	---	---	---	5.7E-02
Cobalt	3.2E-03	1.3E-02	---	---	1.9E-05	---	---	---	---	1.6E-02
Copper	1.2E-02	2.9E-01	---	---	7.7E-05	---	---	---	---	3.1E-01
Lead	8.1E-03	1.8E-02	---	---	1.8E-05	---	---	---	---	2.6E-02
Manganese	1.0E-02	6.9E-01	---	---	4.3E-03	---	---	---	---	7.0E-01
Molybdenum	3.2E-04	1.2E-01	---	---	3.2E-06	---	---	---	---	1.2E-01
Nickel	8.6E-03	4.2E-02	---	---	5.1E-05	---	---	---	---	5.0E-02
Selenium	3.1E-04	4.5E-03	---	---	8.4E-06	---	---	---	---	4.9E-03
Thallium	5.9E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.5E-04
Uranium	5.9E-04	8.9E-04	---	---	1.9E-06	---	---	---	---	1.5E-03
Vanadium	1.2E-02	4.1E-02	---	---	4.5E-05	---	---	---	---	5.4E-02
Zinc	3.6E-02	1.6E+00	---	---	3.9E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	8.2E-05	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.1E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	1.6E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	3.8E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.1E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.1E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.8E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	4.1E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	9.5E-05	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	8.2E-04	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	8.2E-05	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.1E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	1.6E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	3.8E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.1E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.1E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.8E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	4.1E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	9.5E-05	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	8.2E-04	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.2E-05	---	---	6.1E-06	3.5E-06	7.8E-05	---	---	1.6E-04	3.1E-04
Arsenic	7.3E-04	---	---	2.4E-04	2.1E-05	1.6E-03	---	---	1.9E-03	4.4E-03
Barium	6.7E-04	---	---	4.7E-03	2.9E-04	3.4E-03	---	---	3.0E-02	3.9E-02
Beryllium	9.4E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	6.0E-04
Cadmium	1.4E-04	---	---	6.4E-03	7.1E-07	3.3E-04	---	---	1.4E-03	8.2E-03
Chromium (Total)	7.0E-03	---	---	3.4E-02	4.6E-05	1.2E-02	---	---	3.0E-03	5.7E-02
Cobalt	1.6E-03	---	---	1.8E-03	1.1E-05	3.2E-03	---	---	1.4E-03	8.0E-03
Copper	5.9E-03	---	---	1.6E-01	4.2E-05	7.8E-03	---	---	1.5E-01	3.2E-01
Lead	4.0E-03	---	---	4.8E-02	9.9E-06	8.6E-03	---	---	2.4E-03	6.3E-02
Manganese	5.1E-03	---	---	1.0E-02	2.4E-03	2.7E-02	---	---	6.3E-02	1.1E-01
Molybdenum	1.6E-04	---	---	1.7E-03	1.8E-06	3.1E-04	---	---	2.6E-03	4.8E-03
Nickel	4.3E-03	---	---	3.8E-02	2.8E-05	7.8E-03	---	---	3.1E-03	5.3E-02
Selenium	1.5E-04	---	---	7.2E-03	4.6E-06	2.7E-04	---	---	2.0E-02	2.8E-02
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.9E-05	---	---	3.6E-04	6.1E-04
Uranium	3.0E-04	---	---	3.4E-05	1.1E-06	5.1E-04	---	---	1.7E-04	1.0E-03
Vanadium	6.2E-03	---	---	3.8E-03	2.5E-05	1.1E-02	---	---	5.2E-03	2.6E-02
Zinc	1.8E-02	---	---	1.6E+00	2.1E-04	4.3E-02	---	---	3.7E+00	5.3E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.2E-05	5.8E-02	---	2.2E-05	---	---	---	---	6.0E-02
Arsenic	1.4E-02	1.4E-04	1.2E-01	---	1.3E-04	---	---	---	---	1.4E-01
Barium	1.3E-02	3.5E-03	5.8E-02	---	1.8E-03	---	---	---	---	7.6E-02
Beryllium	1.8E-03	3.2E-05	4.0E-03	---	4.4E-06	---	---	---	---	5.8E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	4.4E-06	---	---	---	---	1.3E+00
Chromium (Total)	1.3E-01	9.6E-04	2.0E+00	---	2.9E-04	---	---	---	---	2.2E+00
Cobalt	3.1E-02	3.0E-04	1.9E-01	---	6.6E-05	---	---	---	---	2.2E-01
Copper	1.1E-01	1.8E-02	3.1E+00	---	2.6E-04	---	---	---	---	3.2E+00
Lead	7.7E-02	1.8E-04	1.8E+00	---	6.1E-05	---	---	---	---	1.9E+00
Manganese	9.7E-02	5.3E-02	3.3E-01	---	1.5E-02	---	---	---	---	4.9E-01
Molybdenum	3.0E-03	1.1E-02	1.4E-01	---	1.1E-05	---	---	---	---	1.6E-01
Nickel	8.2E-02	2.7E-03	4.3E+00	---	1.8E-04	---	---	---	---	4.4E+00
Selenium	2.9E-03	1.6E-04	1.4E-01	---	2.9E-05	---	---	---	---	1.5E-01
Thallium	5.6E-04	6.4E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.6E-03	1.8E-05	9.2E-03	---	6.6E-06	---	---	---	---	1.5E-02
Vanadium	1.2E-01	8.3E-04	2.5E-01	---	1.5E-04	---	---	---	---	3.6E-01
Zinc	3.4E-01	4.0E-02	8.6E+01	---	1.3E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	5.2E-06	2.0E-04	2.6E-05	2.4E-05	3.7E-04	6.2E-04
Arsenic	---	---	---	---	3.1E-05	4.0E-03	1.2E-03	2.4E-02	4.4E-03	3.3E-02
Barium	---	---	---	---	4.3E-04	8.9E-03	1.9E-03	2.0E-02	7.0E-02	1.0E-01
Beryllium	---	---	---	---	1.0E-06	4.2E-04	6.6E-05	9.1E-04	3.7E-04	1.8E-03
Cadmium	---	---	---	---	1.0E-06	8.6E-04	1.0E-04	1.6E-02	3.3E-03	2.0E-02
Chromium (Total)	---	---	---	---	6.7E-05	3.2E-02	2.0E-03	9.4E-02	7.0E-03	1.4E-01
Cobalt	---	---	---	---	1.5E-05	8.4E-03	7.4E-04	3.3E-04	3.3E-03	1.3E-02
Copper	---	---	---	---	6.2E-05	2.0E-02	6.5E-03	5.2E-01	3.5E-01	9.0E-01
Lead	---	---	---	---	1.4E-05	2.2E-02	9.4E-04	3.3E-02	5.7E-03	6.1E-02
Manganese	---	---	---	---	3.4E-03	7.1E-02	4.0E-02	1.7E-01	1.5E-01	4.4E-01
Molybdenum	---	---	---	---	2.6E-06	8.0E-04	2.8E-03	6.7E-03	6.1E-03	1.6E-02
Nickel	---	---	---	---	4.1E-05	2.0E-02	3.8E-03	4.6E-02	7.4E-03	7.8E-02
Selenium	---	---	---	---	6.7E-06	7.1E-04	1.4E-04	7.2E-03	4.8E-02	5.6E-02
Thallium	---	---	---	---	5.2E-07	1.5E-04	2.0E-04	4.9E-04	8.5E-04	1.7E-03
Uranium	---	---	---	---	1.5E-06	1.3E-03	5.0E-04	3.6E-04	4.0E-04	2.6E-03
Vanadium	---	---	---	---	3.6E-05	2.8E-02	5.2E-03	8.3E-03	1.2E-02	5.4E-02
Zinc	---	---	---	---	3.1E-04	1.1E-01	3.8E-02	2.7E+00	8.7E+00	1.2E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	6.6E-06	2.6E-04	1.8E-04	3.7E-04	---	8.2E-04
Arsenic	---	---	---	---	4.0E-05	5.3E-03	8.6E-03	3.7E-01	---	3.9E-01
Barium	---	---	---	---	5.5E-04	1.2E-02	1.3E-02	3.1E-01	---	3.4E-01
Beryllium	---	---	---	---	1.3E-06	5.5E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	1.3E-06	1.1E-03	7.2E-04	2.5E-01	---	2.5E-01
Chromium (Total)	---	---	---	---	8.6E-05	4.2E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	2.0E-05	1.1E-02	5.2E-03	5.1E-03	---	2.1E-02
Copper	---	---	---	---	7.9E-05	2.6E-02	4.6E-02	8.2E+00	---	8.3E+00
Lead	---	---	---	---	1.9E-05	2.9E-02	6.6E-03	5.1E-01	---	5.5E-01
Manganese	---	---	---	---	4.4E-03	9.2E-02	2.8E-01	2.7E+00	---	3.1E+00
Molybdenum	---	---	---	---	3.3E-06	1.0E-03	1.9E-02	1.1E-01	---	1.3E-01
Nickel	---	---	---	---	5.3E-05	2.6E-02	2.7E-02	7.3E-01	---	7.8E-01
Selenium	---	---	---	---	8.6E-06	9.2E-04	1.0E-03	1.1E-01	---	1.1E-01
Thallium	---	---	---	---	6.6E-07	2.0E-04	1.4E-03	7.7E-03	---	9.3E-03
Uranium	---	---	---	---	2.0E-06	1.7E-03	3.5E-03	5.6E-03	---	1.1E-02
Vanadium	---	---	---	---	4.6E-05	3.7E-02	3.6E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	4.0E-04	1.4E-01	2.7E-01	4.3E+01	---	4.4E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	3.3E-04	9.9E-04	1.8E-04	---	2.1E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	3.3E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.6E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.1E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.6E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.5E-03	---	4.7E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	6.7E-05	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	1.6E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	1.3E-03	1.1E-01	5.1E-02	---	1.7E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	4.4E-05	3.3E-02	1.5E-01	3.5E-01	---	5.8E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	7.2E-06	1.1E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	1.7E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	3.9E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.3E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	3.3E-04	9.9E-04	1.8E-04	---	2.1E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	3.3E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.6E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.1E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.6E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.5E-03	---	4.7E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	6.7E-05	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	1.6E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	1.3E-03	1.1E-01	5.1E-02	---	1.7E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	4.4E-05	3.3E-02	1.5E-01	3.5E-01	---	5.8E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	7.2E-06	1.1E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	1.7E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	3.9E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.3E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	3.4E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.7E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.1E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	6.9E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	1.6E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.8E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	4.6E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	7.4E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	1.7E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	4.0E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	3.4E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	3.4E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.7E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.1E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	6.9E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	1.6E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.8E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	4.6E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	7.4E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	1.7E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	4.0E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	3.4E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.7E-04	3.5E-05	8.6E-06	---	---	---	---	7.6E-04
Arsenic	2.8E-03	---	1.0E-03	1.4E-03	5.1E-05	---	---	---	---	5.2E-03
Barium	2.6E-03	---	4.7E-04	2.7E-02	7.1E-04	---	---	---	---	3.1E-02
Beryllium	3.6E-04	---	3.2E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	1.7E-06	---	---	---	---	4.8E-02
Chromium (Total)	2.7E-02	---	1.6E-02	2.0E-01	1.1E-04	---	---	---	---	2.4E-01
Cobalt	6.2E-03	---	1.5E-03	1.0E-02	2.6E-05	---	---	---	---	1.8E-02
Copper	2.3E-02	---	2.5E-02	9.4E-01	1.0E-04	---	---	---	---	9.9E-01
Lead	1.6E-02	---	1.5E-02	2.8E-01	2.4E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.6E-03	6.1E-02	5.7E-03	---	---	---	---	8.9E-02
Molybdenum	6.1E-04	---	1.2E-03	1.0E-02	4.3E-06	---	---	---	---	1.2E-02
Nickel	1.7E-02	---	3.5E-02	2.2E-01	6.9E-05	---	---	---	---	2.7E-01
Selenium	5.9E-04	---	1.2E-03	4.2E-02	1.1E-05	---	---	---	---	4.4E-02
Thallium	1.1E-04	---	1.1E-05	9.7E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	2.6E-06	---	---	---	---	1.4E-03
Vanadium	2.4E-02	---	2.0E-03	2.2E-02	6.0E-05	---	---	---	---	4.8E-02
Zinc	7.0E-02	---	7.0E-01	9.3E+00	5.1E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	3.6E-04	3.1E-04	4.2E-04	9.8E-05	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.0E-04	7.1E-03	1.5E-02	4.3E-01	1.2E-03	5.0E-01
Barium	4.7E-03	---	2.1E-02	---	1.4E-03	1.6E-02	2.3E-02	3.5E-01	1.9E-02	4.4E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.5E-06	1.5E-03	1.2E-03	2.9E-01	8.8E-04	7.5E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	1.9E-03	2.6E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.5E-02	8.8E-03	5.8E-03	8.8E-04	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	2.1E-04	3.6E-02	7.8E-02	9.4E+00	9.3E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	4.9E-05	3.9E-02	1.1E-02	5.8E-01	1.5E-03	1.3E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	1.4E-03	3.3E-02	1.2E-01	1.6E-03	2.1E-01
Nickel	3.0E-02	---	1.6E+00	---	1.4E-04	3.6E-02	4.6E-02	8.3E-01	2.0E-03	2.5E+00
Selenium	1.1E-03	---	5.3E-02	---	2.3E-05	1.2E-03	1.7E-03	1.3E-01	1.3E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	5.2E-06	2.3E-03	6.0E-03	6.4E-03	1.1E-04	2.0E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.2E-04	5.0E-02	6.2E-02	1.5E-01	3.3E-03	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.0E-03	2.0E-01	4.6E-01	4.9E+01	2.3E+00	8.4E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	3.6E-04	3.1E-04	4.2E-04	9.8E-05	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.0E-04	7.1E-03	1.5E-02	4.3E-01	1.2E-03	5.0E-01
Barium	4.7E-03	---	2.1E-02	---	1.4E-03	1.6E-02	2.3E-02	3.5E-01	1.9E-02	4.4E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.5E-06	1.5E-03	1.2E-03	2.9E-01	8.8E-04	7.5E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	1.9E-03	2.6E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.5E-02	8.8E-03	5.8E-03	8.8E-04	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	2.1E-04	3.6E-02	7.8E-02	9.4E+00	9.3E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	4.9E-05	3.9E-02	1.1E-02	5.8E-01	1.5E-03	1.3E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	1.4E-03	3.3E-02	1.2E-01	1.6E-03	2.1E-01
Nickel	3.0E-02	---	1.6E+00	---	1.4E-04	3.6E-02	4.6E-02	8.3E-01	2.0E-03	2.5E+00
Selenium	1.1E-03	---	5.3E-02	---	2.3E-05	1.2E-03	1.7E-03	1.3E-01	1.3E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	5.2E-06	2.3E-03	6.0E-03	6.4E-03	1.1E-04	2.0E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.2E-04	5.0E-02	6.2E-02	1.5E-01	3.3E-03	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.0E-03	2.0E-01	4.6E-01	4.9E+01	2.3E+00	8.4E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.2E-04	1.1E-03	8.5E-04	---	7.0E-06	---	---	---	---	2.3E-03
Arsenic	3.8E-03	9.9E-03	1.8E-03	---	4.2E-05	---	---	---	---	1.5E-02
Barium	3.5E-03	3.1E-01	8.4E-04	---	5.8E-04	---	---	---	---	3.1E-01
Beryllium	4.9E-04	5.6E-03	5.8E-05	---	1.4E-06	---	---	---	---	6.1E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	1.4E-06	---	---	---	---	3.5E-02
Chromium (Total)	3.6E-02	8.6E-02	2.9E-02	---	9.1E-05	---	---	---	---	1.5E-01
Cobalt	8.3E-03	2.6E-02	2.7E-03	---	2.1E-05	---	---	---	---	3.7E-02
Copper	3.1E-02	6.6E-01	4.5E-02	---	8.4E-05	---	---	---	---	7.4E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	2.0E-05	---	---	---	---	8.2E-02
Manganese	2.6E-02	1.6E+00	4.7E-03	---	4.7E-03	---	---	---	---	1.7E+00
Molybdenum	8.2E-04	2.9E-01	2.1E-03	---	3.5E-06	---	---	---	---	3.0E-01
Nickel	2.2E-02	9.5E-02	6.3E-02	---	5.6E-05	---	---	---	---	1.8E-01
Selenium	7.9E-04	9.5E-03	2.1E-03	---	9.1E-06	---	---	---	---	1.2E-02
Thallium	1.5E-04	7.8E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.5E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.1E-06	---	---	---	---	3.4E-03
Vanadium	3.2E-02	8.2E-02	3.6E-03	---	4.9E-05	---	---	---	---	1.2E-01
Zinc	9.3E-02	3.3E+00	1.3E+00	---	4.2E-04	---	---	---	---	4.6E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.7E-04	3.5E-04	2.8E-06	2.5E-05	2.3E-05	---	---	7.2E-05	9.9E-04
Arsenic	1.7E-03	2.7E-03	7.5E-04	1.1E-04	3.0E-04	3.6E-04	---	---	1.7E-03	7.6E-03
Barium	1.6E-03	7.8E-02	3.6E-04	2.2E-03	5.6E-04	4.2E-04	---	---	3.7E-03	8.7E-02
Beryllium	2.2E-04	1.2E-03	2.4E-05	8.3E-05	2.3E-05	5.8E-05	---	---	3.3E-04	2.0E-03
Cadmium	3.1E-04	4.6E-03	7.4E-03	2.8E-03	1.3E-06	4.0E-05	---	---	1.7E-04	1.5E-02
Chromium (Total)	2.7E-02	7.5E-02	2.0E-02	2.3E-02	3.7E-04	1.6E-03	---	---	1.6E-03	1.5E-01
Cobalt	4.6E-03	1.2E-02	1.4E-03	1.0E-03	5.2E-05	6.2E-04	---	---	4.6E-04	2.0E-02
Copper	1.4E-02	2.2E-01	1.8E-02	7.3E-02	2.3E-04	1.3E-03	---	---	5.3E-02	3.8E-01
Lead	9.1E-03	7.4E-03	1.1E-02	2.2E-02	2.9E-05	1.1E-03	---	---	4.6E-04	5.0E-02
Manganese	1.2E-02	5.5E-01	2.0E-03	4.9E-03	4.3E-03	3.3E-03	---	---	7.6E-03	5.9E-01
Molybdenum	3.6E-04	1.0E-01	8.6E-04	8.0E-04	2.4E-04	1.0E-04	---	---	2.3E-02	1.3E-01
Nickel	2.7E-02	1.4E-01	7.1E-02	2.7E-02	7.1E-04	4.9E-03	---	---	5.2E-03	2.8E-01
Selenium	3.5E-04	2.5E-03	8.5E-04	3.2E-03	5.1E-05	3.3E-05	---	---	1.5E-02	2.2E-02
Thallium	6.7E-05	1.8E-04	7.8E-06	7.5E-05	6.5E-07	7.0E-06	---	---	4.3E-05	3.8E-04
Uranium	6.6E-04	4.2E-04	5.5E-05	1.5E-05	2.6E-04	6.3E-04	---	---	2.7E-03	4.8E-03
Vanadium	1.5E-02	2.4E-02	1.6E-03	1.8E-03	3.9E-04	2.2E-03	---	---	5.4E-03	5.0E-02
Zinc	4.1E-02	8.0E-01	5.1E-01	7.2E-01	9.1E-04	5.2E-03	---	---	1.0E+00	3.1E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.3E-05	---	---	5.2E-06	1.2E-05	2.6E-04	---	5.0E-05	7.0E-04	1.1E-03
Arsenic	6.2E-04	---	---	2.0E-04	1.4E-04	4.0E-03	---	3.3E-02	1.7E-02	5.5E-02
Barium	5.9E-04	---	---	4.1E-03	2.6E-04	4.6E-03	---	1.7E-02	3.6E-02	6.3E-02
Beryllium	8.0E-05	---	---	1.5E-04	1.1E-05	6.4E-04	---	2.3E-03	3.2E-03	6.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	6.1E-07	4.4E-04	---	1.4E-02	1.7E-03	2.1E-02
Chromium (Total)	1.0E-02	---	---	4.2E-02	1.7E-04	1.8E-02	---	8.3E-02	1.5E-02	1.7E-01
Cobalt	1.7E-03	---	---	1.9E-03	2.4E-05	6.9E-03	---	4.4E-04	4.4E-03	1.5E-02
Copper	5.3E-03	---	---	1.4E-01	1.1E-04	1.5E-02	---	5.0E-01	5.2E-01	1.2E+00
Lead	3.4E-03	---	---	4.0E-02	1.3E-05	1.2E-02	---	2.9E-02	4.5E-03	8.9E-02
Manganese	4.4E-03	---	---	9.1E-03	2.0E-03	3.7E-02	---	1.5E-01	7.4E-02	2.7E-01
Molybdenum	1.4E-04	---	---	1.5E-03	1.1E-04	1.2E-03	---	1.6E-02	2.2E-01	2.4E-01
Nickel	9.9E-03	---	---	5.1E-02	3.3E-04	5.5E-02	---	1.3E-01	5.0E-02	3.0E-01
Selenium	1.3E-04	---	---	6.0E-03	2.4E-05	3.7E-04	---	6.2E-03	1.4E-01	1.6E-01
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	7.8E-05	---	4.2E-04	4.2E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	1.2E-04	7.0E-03	---	3.2E-03	2.6E-02	3.7E-02
Vanadium	5.5E-03	---	---	3.4E-03	1.8E-04	2.4E-02	---	1.2E-02	5.2E-02	9.8E-02
Zinc	1.5E-02	---	---	1.3E+00	4.2E-04	5.8E-02	---	2.4E+00	1.0E+01	1.4E+01

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.8E-05	3.6E-05	---	---	2.8E-05	1.3E-04	1.6E-04	---	---	3.8E-04
Arsenic	4.5E-04	3.9E-04	---	---	3.3E-04	1.9E-03	5.6E-03	---	---	8.7E-03
Barium	4.3E-04	1.2E-02	---	---	6.2E-04	2.3E-03	4.7E-03	---	---	2.0E-02
Beryllium	5.8E-05	2.2E-04	---	---	2.6E-05	3.1E-04	4.7E-04	---	---	1.1E-03
Cadmium	8.4E-05	5.2E-04	---	---	1.5E-06	2.2E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	7.1E-03	1.1E-02	---	---	4.1E-04	9.0E-03	5.2E-03	---	---	3.2E-02
Cobalt	1.2E-03	1.7E-03	---	---	5.8E-05	3.4E-03	2.8E-03	---	---	9.2E-03
Copper	3.8E-03	2.2E-02	---	---	2.6E-04	7.2E-03	2.2E-02	---	---	5.6E-02
Lead	2.4E-03	1.3E-03	---	---	3.2E-05	5.9E-03	2.4E-03	---	---	1.2E-02
Manganese	3.2E-03	4.9E-02	---	---	4.8E-03	1.8E-02	9.7E-02	---	---	1.7E-01
Molybdenum	9.7E-05	8.2E-03	---	---	2.7E-04	5.7E-04	1.9E-02	---	---	2.8E-02
Nickel	7.1E-03	1.6E-02	---	---	7.9E-04	2.7E-02	4.9E-02	---	---	1.0E-01
Selenium	9.2E-05	3.3E-04	---	---	5.7E-05	1.8E-04	3.5E-04	---	---	1.0E-03
Thallium	1.8E-05	3.0E-05	---	---	7.2E-07	3.8E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.7E-05	---	---	2.9E-04	3.4E-03	1.2E-02	---	---	1.6E-02
Vanadium	4.0E-03	3.7E-03	---	---	4.3E-04	1.2E-02	2.1E-02	---	---	4.1E-02
Zinc	1.1E-02	1.2E-01	---	---	1.0E-03	2.9E-02	9.4E-02	---	---	2.6E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	3.1E-05	---	---	---	---	1.7E-04
Arsenic	1.4E-03	---	---	8.5E-04	3.7E-04	---	---	---	---	2.6E-03
Barium	1.3E-03	---	---	1.7E-02	7.0E-04	---	---	---	---	1.9E-02
Beryllium	1.8E-04	---	---	6.4E-04	2.9E-05	---	---	---	---	8.5E-04
Cadmium	2.7E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	4.6E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	6.5E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	2.9E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.6E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.4E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	3.0E-04	---	---	---	---	6.8E-03
Nickel	2.3E-02	---	---	2.1E-01	8.9E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	6.4E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-04	---	---	---	---	1.0E-03
Vanadium	1.3E-02	---	---	1.4E-02	4.9E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	1.1E-03	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	3.1E-05	---	---	---	---	1.7E-04
Arsenic	1.4E-03	---	---	8.5E-04	3.7E-04	---	---	---	---	2.6E-03
Barium	1.3E-03	---	---	1.7E-02	7.0E-04	---	---	---	---	1.9E-02
Beryllium	1.8E-04	---	---	6.4E-04	2.9E-05	---	---	---	---	8.5E-04
Cadmium	2.7E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	4.6E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	6.5E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	2.9E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.6E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.4E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	3.0E-04	---	---	---	---	6.8E-03
Nickel	2.3E-02	---	---	2.1E-01	8.9E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	6.4E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-04	---	---	---	---	1.0E-03
Vanadium	1.3E-02	---	---	1.4E-02	4.9E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	1.1E-03	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.5E-04	---	---	2.3E-05	---	---	---	---	4.3E-04
Arsenic	3.0E-03	1.6E-03	---	---	2.7E-04	---	---	---	---	4.9E-03
Barium	2.8E-03	5.1E-02	---	---	5.1E-04	---	---	---	---	5.4E-02
Beryllium	3.8E-04	9.3E-04	---	---	2.1E-05	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	1.2E-06	---	---	---	---	2.8E-03
Chromium (Total)	4.8E-02	4.5E-02	---	---	3.3E-04	---	---	---	---	9.2E-02
Cobalt	8.2E-03	7.1E-03	---	---	4.7E-05	---	---	---	---	1.5E-02
Copper	2.5E-02	9.5E-02	---	---	2.1E-04	---	---	---	---	1.2E-01
Lead	1.6E-02	5.7E-03	---	---	2.6E-05	---	---	---	---	2.2E-02
Manganese	2.1E-02	2.1E-01	---	---	3.9E-03	---	---	---	---	2.3E-01
Molybdenum	6.4E-04	3.5E-02	---	---	2.2E-04	---	---	---	---	3.5E-02
Nickel	4.7E-02	6.8E-02	---	---	6.5E-04	---	---	---	---	1.2E-01
Selenium	6.1E-04	1.4E-03	---	---	4.6E-05	---	---	---	---	2.1E-03
Thallium	1.2E-04	1.3E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	2.3E-04	---	---	---	---	1.7E-03
Vanadium	2.6E-02	1.6E-02	---	---	3.5E-04	---	---	---	---	4.2E-02
Zinc	7.3E-02	5.1E-01	---	---	8.2E-04	---	---	---	---	5.8E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	6.6E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	7.9E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	1.5E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	6.1E-05	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.5E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	9.7E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	1.4E-04	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	6.2E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	7.6E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.1E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	6.3E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	1.9E-03	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	1.4E-04	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	6.8E-04	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	1.0E-03	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	2.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	6.6E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	7.9E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	1.5E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	6.1E-05	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.5E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	9.7E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	1.4E-04	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	6.2E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	7.6E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.1E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	6.3E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	1.9E-03	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	1.4E-04	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	6.8E-04	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	1.0E-03	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	2.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.8E-04	8.0E-04	---	---	8.1E-05	---	---	---	---	1.2E-03
Arsenic	3.3E-03	6.0E-03	---	---	9.7E-04	---	---	---	---	1.0E-02
Barium	3.1E-03	1.8E-01	---	---	1.8E-03	---	---	---	---	1.8E-01
Beryllium	4.2E-04	2.8E-03	---	---	7.5E-05	---	---	---	---	3.3E-03
Cadmium	6.1E-04	1.0E-02	---	---	4.3E-06	---	---	---	---	1.1E-02
Chromium (Total)	5.2E-02	1.7E-01	---	---	1.2E-03	---	---	---	---	2.2E-01
Cobalt	9.0E-03	2.6E-02	---	---	1.7E-04	---	---	---	---	3.5E-02
Copper	2.7E-02	4.7E-01	---	---	7.5E-04	---	---	---	---	5.0E-01
Lead	1.8E-02	1.7E-02	---	---	9.3E-05	---	---	---	---	3.4E-02
Manganese	2.3E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	7.1E-04	2.3E-01	---	---	7.8E-04	---	---	---	---	2.3E-01
Nickel	5.2E-02	3.1E-01	---	---	2.3E-03	---	---	---	---	3.7E-01
Selenium	6.7E-04	5.5E-03	---	---	1.7E-04	---	---	---	---	6.4E-03
Thallium	1.3E-04	4.0E-04	---	---	2.1E-06	---	---	---	---	5.3E-04
Uranium	1.3E-03	9.5E-04	---	---	8.3E-04	---	---	---	---	3.1E-03
Vanadium	2.9E-02	5.3E-02	---	---	1.3E-03	---	---	---	---	8.3E-02
Zinc	8.0E-02	1.8E+00	---	---	2.9E-03	---	---	---	---	1.9E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.2E-05	3.1E-04	---	---	2.1E-05	3.3E-05	4.0E-04	---	---	8.3E-04
Arsenic	8.5E-04	3.2E-03	---	---	2.5E-04	5.0E-04	1.4E-02	---	---	1.9E-02
Barium	8.1E-04	1.0E-01	---	---	4.7E-04	5.8E-04	1.2E-02	---	---	1.2E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.9E-05	8.1E-05	1.2E-03	---	---	3.3E-03
Cadmium	1.6E-04	4.4E-03	---	---	1.1E-06	5.6E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	1.4E-02	8.9E-02	---	---	3.1E-04	2.3E-03	1.3E-02	---	---	1.2E-01
Cobalt	2.3E-03	1.4E-02	---	---	4.4E-05	8.7E-04	7.3E-03	---	---	2.5E-02
Copper	7.2E-03	1.9E-01	---	---	2.0E-04	1.8E-03	5.7E-02	---	---	2.5E-01
Lead	4.6E-03	1.1E-02	---	---	2.4E-05	1.5E-03	6.2E-03	---	---	2.4E-02
Manganese	6.0E-03	4.1E-01	---	---	3.6E-03	4.6E-03	2.5E-01	---	---	6.8E-01
Molybdenum	1.8E-04	6.9E-02	---	---	2.0E-04	1.5E-04	4.8E-02	---	---	1.2E-01
Nickel	1.4E-02	1.3E-01	---	---	6.0E-04	6.9E-03	1.3E-01	---	---	2.8E-01
Selenium	1.8E-04	2.8E-03	---	---	4.3E-05	4.7E-05	9.1E-04	---	---	3.9E-03
Thallium	3.4E-05	2.5E-04	---	---	5.4E-07	9.9E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.6E-04	---	---	2.2E-04	8.9E-04	3.2E-02	---	---	3.4E-02
Vanadium	7.5E-03	3.1E-02	---	---	3.3E-04	3.1E-03	5.3E-02	---	---	9.5E-02
Zinc	2.1E-02	1.0E+00	---	---	7.6E-04	7.4E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	9.0E-06	---	---	8.9E-07	3.1E-05	2.8E-04	---	6.3E-05	7.3E-04	1.1E-03
Arsenic	1.1E-04	---	---	3.5E-05	3.7E-04	4.3E-03	---	4.2E-02	1.8E-02	6.4E-02
Barium	1.0E-04	---	---	7.0E-04	7.0E-04	5.0E-03	---	2.2E-02	3.8E-02	6.6E-02
Beryllium	1.4E-05	---	---	2.6E-05	2.9E-05	6.9E-04	---	2.9E-03	3.4E-03	7.0E-03
Cadmium	2.0E-05	---	---	9.0E-04	1.6E-06	4.8E-04	---	1.7E-02	1.7E-03	2.1E-02
Chromium (Total)	1.7E-03	---	---	7.2E-03	4.6E-04	2.0E-02	---	1.1E-01	1.6E-02	1.5E-01
Cobalt	2.9E-04	---	---	3.2E-04	6.5E-05	7.4E-03	---	5.6E-04	4.6E-03	1.3E-02
Copper	8.9E-04	---	---	2.3E-02	2.9E-04	1.6E-02	---	6.4E-01	5.4E-01	1.2E+00
Lead	5.7E-04	---	---	6.8E-03	3.6E-05	1.3E-02	---	3.7E-02	4.7E-03	6.2E-02
Manganese	7.5E-04	---	---	1.5E-03	5.4E-03	3.9E-02	---	1.9E-01	7.7E-02	3.1E-01
Molybdenum	2.3E-05	---	---	2.5E-04	3.0E-04	1.2E-03	---	2.1E-02	2.3E-01	2.5E-01
Nickel	1.7E-03	---	---	8.7E-03	8.9E-04	5.9E-02	---	1.7E-01	5.2E-02	2.9E-01
Selenium	2.2E-05	---	---	1.0E-03	6.4E-05	4.0E-04	---	8.0E-03	1.5E-01	1.6E-01
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	8.4E-05	---	5.3E-04	4.4E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	3.2E-04	7.5E-03	---	4.0E-03	2.8E-02	4.0E-02
Vanadium	9.4E-04	---	---	5.8E-04	4.9E-04	2.6E-02	---	1.5E-02	5.5E-02	9.8E-02
Zinc	2.6E-03	---	---	2.3E-01	1.1E-03	6.3E-02	---	3.0E+00	1.0E+01	1.4E+01

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.8E-05	8.5E-04	8.0E-06	3.3E-05	---	---	---	---	1.1E-03
Arsenic	1.8E-03	1.3E-04	1.8E-03	3.1E-04	4.0E-04	---	---	---	---	4.4E-03
Barium	1.7E-03	3.2E-03	8.7E-04	6.4E-03	7.5E-04	---	---	---	---	1.3E-02
Beryllium	2.3E-04	2.9E-05	5.8E-05	2.4E-04	3.1E-05	---	---	---	---	5.8E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	1.8E-06	---	---	---	---	2.7E-02
Chromium (Total)	2.8E-02	3.7E-03	4.9E-02	6.5E-02	4.9E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	5.3E-04	3.4E-03	2.9E-03	7.0E-05	---	---	---	---	1.2E-02
Copper	1.5E-02	1.6E-02	4.4E-02	2.1E-01	3.1E-04	---	---	---	---	2.9E-01
Lead	9.6E-03	1.6E-04	2.6E-02	6.2E-02	3.9E-05	---	---	---	---	9.7E-02
Manganese	1.3E-02	4.6E-02	4.7E-03	1.4E-02	5.8E-03	---	---	---	---	8.4E-02
Molybdenum	3.9E-04	9.5E-03	2.1E-03	2.3E-03	3.2E-04	---	---	---	---	1.5E-02
Nickel	2.8E-02	9.8E-03	1.7E-01	7.9E-02	9.5E-04	---	---	---	---	2.9E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.3E-03	6.9E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.6E-06	1.9E-05	2.2E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.6E-05	1.3E-04	4.4E-05	3.4E-04	---	---	---	---	1.2E-03
Vanadium	1.6E-02	9.5E-04	3.7E-03	5.2E-03	5.2E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	3.4E-02	1.2E+00	2.1E+00	1.2E-03	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.9E-04	1.2E-03	---	---	3.7E-05	---	---	---	---	2.1E-03
Arsenic	1.1E-02	1.2E-02	---	---	4.4E-04	---	---	---	---	2.3E-02
Barium	1.0E-02	3.7E-01	---	---	8.3E-04	---	---	---	---	3.8E-01
Beryllium	1.4E-03	6.6E-03	---	---	3.4E-05	---	---	---	---	8.0E-03
Cadmium	2.0E-03	1.6E-02	---	---	2.0E-06	---	---	---	---	1.8E-02
Chromium (Total)	1.7E-01	3.2E-01	---	---	5.5E-04	---	---	---	---	4.9E-01
Cobalt	2.9E-02	5.2E-02	---	---	7.8E-05	---	---	---	---	8.1E-02
Copper	8.9E-02	7.1E-01	---	---	3.5E-04	---	---	---	---	8.0E-01
Lead	5.7E-02	4.1E-02	---	---	4.3E-05	---	---	---	---	9.8E-02
Manganese	7.5E-02	1.6E+00	---	---	6.4E-03	---	---	---	---	1.7E+00
Molybdenum	2.3E-03	2.7E-01	---	---	3.6E-04	---	---	---	---	2.7E-01
Nickel	1.7E-01	5.0E-01	---	---	1.1E-03	---	---	---	---	6.7E-01
Selenium	2.2E-03	1.0E-02	---	---	7.6E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	9.0E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	3.8E-04	---	---	---	---	6.6E-03
Vanadium	9.3E-02	1.1E-01	---	---	5.8E-04	---	---	---	---	2.1E-01
Zinc	2.6E-01	3.7E+00	---	---	1.4E-03	---	---	---	---	4.0E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.3E-04	5.2E-04	---	---	2.5E-05	---	---	---	---	6.8E-04
Arsenic	1.5E-03	5.3E-03	---	---	3.0E-04	---	---	---	---	7.1E-03
Barium	1.4E-03	1.7E-01	---	---	5.6E-04	---	---	---	---	1.7E-01
Beryllium	1.9E-04	3.0E-03	---	---	2.3E-05	---	---	---	---	3.2E-03
Cadmium	2.8E-04	7.4E-03	---	---	1.3E-06	---	---	---	---	7.7E-03
Chromium (Total)	2.4E-02	1.5E-01	---	---	3.7E-04	---	---	---	---	1.7E-01
Cobalt	4.1E-03	2.3E-02	---	---	5.2E-05	---	---	---	---	2.7E-02
Copper	1.3E-02	3.2E-01	---	---	2.3E-04	---	---	---	---	3.3E-01
Lead	8.1E-03	1.8E-02	---	---	2.9E-05	---	---	---	---	2.6E-02
Manganese	1.1E-02	7.2E-01	---	---	4.3E-03	---	---	---	---	7.4E-01
Molybdenum	3.2E-04	1.2E-01	---	---	2.4E-04	---	---	---	---	1.2E-01
Nickel	2.4E-02	2.3E-01	---	---	7.1E-04	---	---	---	---	2.5E-01
Selenium	3.1E-04	4.6E-03	---	---	5.1E-05	---	---	---	---	5.0E-03
Thallium	6.0E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.6E-04
Uranium	6.0E-04	9.2E-04	---	---	2.6E-04	---	---	---	---	1.8E-03
Vanadium	1.3E-02	5.0E-02	---	---	3.9E-04	---	---	---	---	6.4E-02
Zinc	3.7E-02	1.7E+00	---	---	9.0E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	5.3E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	6.3E-04	---	---	---	---	6.7E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.2E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	4.8E-05	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.8E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	7.7E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	1.1E-04	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	4.9E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	6.1E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.1E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	5.0E-04	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.5E-03	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	1.1E-04	---	---	---	---	5.6E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	5.4E-04	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	8.2E-04	---	---	---	---	3.2E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.9E-03	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	5.3E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	6.3E-04	---	---	---	---	6.7E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.2E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	4.8E-05	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.8E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	7.7E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	1.1E-04	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	4.9E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	6.1E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.1E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	5.0E-04	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.5E-03	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	1.1E-04	---	---	---	---	5.6E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	5.4E-04	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	8.2E-04	---	---	---	---	3.2E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.9E-03	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.3E-05	---	---	6.3E-06	1.4E-05	1.9E-04	---	---	6.0E-04	8.8E-04
Arsenic	7.5E-04	---	---	2.4E-04	1.6E-04	3.0E-03	---	---	1.4E-02	1.8E-02
Barium	7.1E-04	---	---	5.0E-03	3.1E-04	3.4E-03	---	---	3.1E-02	4.0E-02
Beryllium	9.6E-05	---	---	1.8E-04	1.3E-05	4.8E-04	---	---	2.8E-03	3.5E-03
Cadmium	1.4E-04	---	---	6.4E-03	7.2E-07	3.3E-04	---	---	1.4E-03	8.3E-03
Chromium (Total)	1.2E-02	---	---	5.1E-02	2.0E-04	1.4E-02	---	---	1.3E-02	8.9E-02
Cobalt	2.1E-03	---	---	2.3E-03	2.9E-05	5.1E-03	---	---	3.8E-03	1.3E-02
Copper	6.3E-03	---	---	1.6E-01	1.3E-04	1.1E-02	---	---	4.4E-01	6.2E-01
Lead	4.0E-03	---	---	4.8E-02	1.6E-05	9.0E-03	---	---	3.8E-03	6.5E-02
Manganese	5.3E-03	---	---	1.1E-02	2.4E-03	2.7E-02	---	---	6.3E-02	1.1E-01
Molybdenum	1.6E-04	---	---	1.8E-03	1.3E-04	8.6E-04	---	---	1.9E-01	1.9E-01
Nickel	1.2E-02	---	---	6.1E-02	3.9E-04	4.1E-02	---	---	4.3E-02	1.6E-01
Selenium	1.5E-04	---	---	7.2E-03	2.8E-05	2.8E-04	---	---	1.2E-01	1.3E-01
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.9E-05	---	---	3.6E-04	6.2E-04
Uranium	3.0E-04	---	---	3.4E-05	1.4E-04	5.2E-03	---	---	2.3E-02	2.8E-02
Vanadium	6.6E-03	---	---	4.1E-03	2.1E-04	1.8E-02	---	---	4.5E-02	7.4E-02
Zinc	1.8E-02	---	---	1.6E+00	5.0E-04	4.3E-02	---	---	8.6E+00	1.0E+01

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.4E-05	6.0E-02	---	8.5E-05	---	---	---	---	6.1E-02
Arsenic	1.4E-02	1.6E-04	1.3E-01	---	1.0E-03	---	---	---	---	1.4E-01
Barium	1.4E-02	3.8E-03	6.1E-02	---	1.9E-03	---	---	---	---	8.1E-02
Beryllium	1.8E-03	3.4E-05	4.1E-03	---	7.8E-05	---	---	---	---	6.0E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	4.4E-06	---	---	---	---	1.3E+00
Chromium (Total)	2.3E-01	4.4E-03	3.5E+00	---	1.2E-03	---	---	---	---	3.7E+00
Cobalt	3.9E-02	6.3E-04	2.4E-01	---	1.8E-04	---	---	---	---	2.8E-01
Copper	1.2E-01	1.9E-02	3.1E+00	---	7.9E-04	---	---	---	---	3.3E+00
Lead	7.7E-02	1.9E-04	1.8E+00	---	9.8E-05	---	---	---	---	1.9E+00
Manganese	1.0E-01	5.5E-02	3.3E-01	---	1.5E-02	---	---	---	---	5.0E-01
Molybdenum	3.1E-03	1.1E-02	1.5E-01	---	8.1E-04	---	---	---	---	1.6E-01
Nickel	2.3E-01	1.2E-02	1.2E+01	---	2.4E-03	---	---	---	---	1.2E+01
Selenium	2.9E-03	1.6E-04	1.4E-01	---	1.7E-04	---	---	---	---	1.5E-01
Thallium	5.7E-04	6.6E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.7E-03	1.9E-05	9.3E-03	---	8.7E-04	---	---	---	---	1.6E-02
Vanadium	1.3E-01	1.1E-03	2.6E-01	---	1.3E-03	---	---	---	---	3.9E-01
Zinc	3.5E-01	4.1E-02	8.7E+01	---	3.1E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	2.0E-05	5.0E-04	6.4E-05	5.8E-05	1.4E-03	2.1E-03
Arsenic	---	---	---	---	2.4E-04	7.7E-03	2.3E-03	3.8E-02	3.4E-02	8.3E-02
Barium	---	---	---	---	4.5E-04	8.9E-03	1.9E-03	2.0E-02	7.3E-02	1.0E-01
Beryllium	---	---	---	---	1.8E-05	1.2E-03	1.9E-04	2.6E-03	6.5E-03	1.1E-02
Cadmium	---	---	---	---	1.0E-06	8.6E-04	1.0E-04	1.6E-02	3.4E-03	2.0E-02
Chromium (Total)	---	---	---	---	2.9E-04	3.5E-02	2.2E-03	9.7E-02	3.1E-02	1.7E-01
Cobalt	---	---	---	---	4.2E-05	1.3E-02	1.2E-03	5.2E-04	8.9E-03	2.4E-02
Copper	---	---	---	---	1.9E-04	2.8E-02	9.2E-03	5.9E-01	1.0E+00	1.7E+00
Lead	---	---	---	---	2.3E-05	2.3E-02	9.9E-04	3.4E-02	9.1E-03	6.7E-02
Manganese	---	---	---	---	3.4E-03	7.1E-02	4.0E-02	1.7E-01	1.5E-01	4.4E-01
Molybdenum	---	---	---	---	1.9E-04	2.2E-03	7.8E-03	1.9E-02	4.5E-01	4.8E-01
Nickel	---	---	---	---	5.7E-04	1.1E-01	2.0E-02	1.6E-01	1.0E-01	3.8E-01
Selenium	---	---	---	---	4.1E-05	7.2E-04	1.5E-04	7.3E-03	2.9E-01	3.0E-01
Thallium	---	---	---	---	5.2E-07	1.5E-04	2.0E-04	4.9E-04	8.5E-04	1.7E-03
Uranium	---	---	---	---	2.0E-04	1.4E-02	5.1E-03	3.7E-03	5.4E-02	7.6E-02
Vanadium	---	---	---	---	3.1E-04	4.7E-02	8.6E-03	1.4E-02	1.1E-01	1.8E-01
Zinc	---	---	---	---	7.2E-04	1.1E-01	3.9E-02	2.8E+00	2.0E+01	2.3E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	2.5E-05	6.5E-04	4.5E-04	9.1E-04	---	2.0E-03
Arsenic	---	---	---	---	3.0E-04	1.0E-02	1.6E-02	6.1E-01	---	6.3E-01
Barium	---	---	---	---	5.7E-04	1.2E-02	1.4E-02	3.1E-01	---	3.4E-01
Beryllium	---	---	---	---	2.3E-05	1.6E-03	1.4E-03	4.2E-02	---	4.5E-02
Cadmium	---	---	---	---	1.3E-06	1.1E-03	7.2E-04	2.5E-01	---	2.5E-01
Chromium (Total)	---	---	---	---	3.8E-04	4.6E-02	1.5E-02	1.5E+00	---	1.6E+00
Cobalt	---	---	---	---	5.3E-05	1.7E-02	8.2E-03	8.2E-03	---	3.4E-02
Copper	---	---	---	---	2.4E-04	3.7E-02	6.4E-02	9.3E+00	---	9.4E+00
Lead	---	---	---	---	2.9E-05	3.0E-02	6.9E-03	5.4E-01	---	5.7E-01
Manganese	---	---	---	---	4.4E-03	9.2E-02	2.8E-01	2.7E+00	---	3.1E+00
Molybdenum	---	---	---	---	2.4E-04	2.9E-03	5.5E-02	3.0E-01	---	3.6E-01
Nickel	---	---	---	---	7.3E-04	1.4E-01	1.4E-01	2.5E+00	---	2.7E+00
Selenium	---	---	---	---	5.2E-05	9.4E-04	1.0E-03	1.2E-01	---	1.2E-01
Thallium	---	---	---	---	6.6E-07	2.0E-04	1.4E-03	7.7E-03	---	9.3E-03
Uranium	---	---	---	---	2.6E-04	1.8E-02	3.6E-02	5.8E-02	---	1.1E-01
Vanadium	---	---	---	---	4.0E-04	6.1E-02	6.0E-02	2.2E-01	---	3.4E-01
Zinc	---	---	---	---	9.3E-04	1.5E-01	2.7E-01	4.3E+01	---	4.4E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	2.1E-05	8.1E-04	2.4E-03	4.4E-04	---	4.4E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	2.6E-04	1.2E-02	8.8E-02	2.9E-01	---	3.9E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	4.8E-04	1.5E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	2.0E-05	2.0E-03	7.3E-03	2.0E-02	---	2.9E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.1E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	3.2E-04	5.8E-02	8.1E-02	7.3E-01	---	9.2E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	4.5E-05	2.2E-02	4.4E-02	3.9E-03	---	7.4E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	2.0E-04	4.6E-02	3.5E-01	4.5E+00	---	4.9E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.5E-05	3.8E-02	3.7E-02	2.6E-01	---	3.5E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	2.1E-04	3.6E-03	2.9E-01	1.4E-01	---	4.5E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	6.1E-04	1.7E-01	7.6E-01	1.2E+00	---	2.3E+00
Selenium	9.1E-05	1.6E-04	1.4E-03	---	4.4E-05	1.2E-03	5.5E-03	5.5E-02	---	6.4E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	2.2E-04	2.2E-02	1.9E-01	2.8E-02	---	2.5E-01
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	3.3E-04	7.7E-02	3.2E-01	1.0E-01	---	5.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	7.8E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	2.1E-05	8.1E-04	2.4E-03	4.4E-04	---	4.4E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	2.6E-04	1.2E-02	8.8E-02	2.9E-01	---	3.9E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	4.8E-04	1.5E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	2.0E-05	2.0E-03	7.3E-03	2.0E-02	---	2.9E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.1E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	3.2E-04	5.8E-02	8.1E-02	7.3E-01	---	9.2E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	4.5E-05	2.2E-02	4.4E-02	3.9E-03	---	7.4E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	2.0E-04	4.6E-02	3.5E-01	4.5E+00	---	4.9E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.5E-05	3.8E-02	3.7E-02	2.6E-01	---	3.5E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	2.1E-04	3.6E-03	2.9E-01	1.4E-01	---	4.5E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	6.1E-04	1.7E-01	7.6E-01	1.2E+00	---	2.3E+00
Selenium	9.1E-05	1.6E-04	1.4E-03	---	4.4E-05	1.2E-03	5.5E-03	5.5E-02	---	6.4E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	2.2E-04	2.2E-02	1.9E-01	2.8E-02	---	2.5E-01
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	3.3E-04	7.7E-02	3.2E-01	1.0E-01	---	5.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	7.8E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	2.2E-05	---	---	---	---	1.9E-04
Arsenic	1.8E-03	---	---	5.8E-04	2.6E-04	---	---	---	---	2.6E-03
Barium	1.7E-03	---	---	1.2E-02	4.9E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	2.0E-05	---	---	---	---	6.9E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	3.2E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	4.6E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	2.1E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.5E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.8E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	2.1E-04	---	---	---	---	4.8E-03
Nickel	2.8E-02	---	---	1.5E-01	6.3E-04	---	---	---	---	1.8E-01
Selenium	3.7E-04	---	---	1.7E-02	4.5E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	2.3E-04	---	---	---	---	1.0E-03
Vanadium	1.6E-02	---	---	9.7E-03	3.4E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	---	---	3.8E+00	8.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	2.2E-05	---	---	---	---	1.9E-04
Arsenic	1.8E-03	---	---	5.8E-04	2.6E-04	---	---	---	---	2.6E-03
Barium	1.7E-03	---	---	1.2E-02	4.9E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	2.0E-05	---	---	---	---	6.9E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	3.2E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	4.6E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	2.1E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.5E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.8E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	2.1E-04	---	---	---	---	4.8E-03
Nickel	2.8E-02	---	---	1.5E-01	6.3E-04	---	---	---	---	1.8E-01
Selenium	3.7E-04	---	---	1.7E-02	4.5E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	2.3E-04	---	---	---	---	1.0E-03
Vanadium	1.6E-02	---	---	9.7E-03	3.4E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	---	---	3.8E+00	8.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.9E-04	3.6E-05	3.3E-05	---	---	---	---	8.0E-04
Arsenic	2.9E-03	---	1.0E-03	1.4E-03	3.9E-04	---	---	---	---	5.7E-03
Barium	2.8E-03	---	5.0E-04	2.9E-02	7.4E-04	---	---	---	---	3.3E-02
Beryllium	3.7E-04	---	3.3E-05	1.1E-03	3.0E-05	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	1.7E-06	---	---	---	---	4.8E-02
Chromium (Total)	4.6E-02	---	2.8E-02	2.9E-01	4.9E-04	---	---	---	---	3.7E-01
Cobalt	7.9E-03	---	1.9E-03	1.3E-02	6.9E-05	---	---	---	---	2.3E-02
Copper	2.4E-02	---	2.5E-02	9.5E-01	3.1E-04	---	---	---	---	1.0E+00
Lead	1.6E-02	---	1.5E-02	2.8E-01	3.8E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.7E-03	6.3E-02	5.7E-03	---	---	---	---	9.2E-02
Molybdenum	6.3E-04	---	1.2E-03	1.0E-02	3.2E-04	---	---	---	---	1.2E-02
Nickel	4.6E-02	---	9.7E-02	3.6E-01	9.4E-04	---	---	---	---	5.0E-01
Selenium	6.0E-04	---	1.2E-03	4.2E-02	6.8E-05	---	---	---	---	4.4E-02
Thallium	1.2E-04	---	1.1E-05	9.8E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	3.4E-04	---	---	---	---	1.8E-03
Vanadium	2.6E-02	---	2.1E-03	2.4E-02	5.1E-04	---	---	---	---	5.2E-02
Zinc	7.1E-02	---	7.0E-01	9.3E+00	1.2E-03	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	6.7E-05	8.8E-04	7.7E-04	1.0E-03	3.8E-04	2.6E-02
Arsenic	5.2E-03	---	4.7E-02	---	8.0E-04	1.4E-02	2.8E-02	6.9E-01	9.0E-03	7.9E-01
Barium	5.0E-03	---	2.3E-02	---	1.5E-03	1.6E-02	2.3E-02	3.5E-01	1.9E-02	4.4E-01
Beryllium	6.7E-04	---	1.5E-03	---	6.2E-05	2.2E-03	2.3E-03	4.7E-02	1.7E-03	5.6E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.5E-06	1.5E-03	1.2E-03	2.9E-01	8.9E-04	7.6E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	9.9E-04	6.2E-02	2.6E-02	1.7E+00	8.1E-03	3.2E+00
Cobalt	1.4E-02	---	8.8E-02	---	1.4E-04	2.3E-02	1.4E-02	9.3E-03	2.4E-03	1.5E-01
Copper	4.4E-02	---	1.2E+00	---	6.3E-04	5.0E-02	1.1E-01	1.1E+01	2.8E-01	1.2E+01
Lead	2.8E-02	---	6.7E-01	---	7.8E-05	4.1E-02	1.2E-02	6.1E-01	2.4E-03	1.4E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.4E-02	---	6.4E-04	3.9E-03	9.3E-02	3.4E-01	1.2E-01	6.1E-01
Nickel	8.3E-02	---	4.4E+00	---	1.9E-03	1.9E-01	2.4E-01	2.8E+00	2.7E-02	7.8E+00
Selenium	1.1E-03	---	5.3E-02	---	1.4E-04	1.3E-03	1.7E-03	1.3E-01	7.7E-02	2.7E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	6.9E-04	2.4E-02	6.2E-02	6.6E-02	1.4E-02	1.7E-01
Vanadium	4.6E-02	---	9.7E-02	---	1.0E-03	8.3E-02	1.0E-01	2.5E-01	2.8E-02	6.1E-01
Zinc	1.3E-01	---	3.2E+01	---	2.4E-03	2.0E-01	4.6E-01	4.9E+01	5.4E+00	8.8E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	6.7E-05	8.8E-04	7.7E-04	1.0E-03	3.8E-04	2.6E-02
Arsenic	5.2E-03	---	4.7E-02	---	8.0E-04	1.4E-02	2.8E-02	6.9E-01	9.0E-03	7.9E-01
Barium	5.0E-03	---	2.3E-02	---	1.5E-03	1.6E-02	2.3E-02	3.5E-01	1.9E-02	4.4E-01
Beryllium	6.7E-04	---	1.5E-03	---	6.2E-05	2.2E-03	2.3E-03	4.7E-02	1.7E-03	5.6E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.5E-06	1.5E-03	1.2E-03	2.9E-01	8.9E-04	7.6E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	9.9E-04	6.2E-02	2.6E-02	1.7E+00	8.1E-03	3.2E+00
Cobalt	1.4E-02	---	8.8E-02	---	1.4E-04	2.3E-02	1.4E-02	9.3E-03	2.4E-03	1.5E-01
Copper	4.4E-02	---	1.2E+00	---	6.3E-04	5.0E-02	1.1E-01	1.1E+01	2.8E-01	1.2E+01
Lead	2.8E-02	---	6.7E-01	---	7.8E-05	4.1E-02	1.2E-02	6.1E-01	2.4E-03	1.4E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.4E-02	---	6.4E-04	3.9E-03	9.3E-02	3.4E-01	1.2E-01	6.1E-01
Nickel	8.3E-02	---	4.4E+00	---	1.9E-03	1.9E-01	2.4E-01	2.8E+00	2.7E-02	7.8E+00
Selenium	1.1E-03	---	5.3E-02	---	1.4E-04	1.3E-03	1.7E-03	1.3E-01	7.7E-02	2.7E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	6.9E-04	2.4E-02	6.2E-02	6.6E-02	1.4E-02	1.7E-01
Vanadium	4.6E-02	---	9.7E-02	---	1.0E-03	8.3E-02	1.0E-01	2.5E-01	2.8E-02	6.1E-01
Zinc	1.3E-01	---	3.2E+01	---	2.4E-03	2.0E-01	4.6E-01	4.9E+01	5.4E+00	8.8E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.3E-04	1.2E-03	8.7E-04	---	2.7E-05	---	---	---	---	2.4E-03
Arsenic	3.9E-03	1.1E-02	1.8E-03	---	3.2E-04	---	---	---	---	1.7E-02
Barium	3.7E-03	3.3E-01	8.9E-04	---	6.0E-04	---	---	---	---	3.4E-01
Beryllium	5.0E-04	5.8E-03	6.0E-05	---	2.5E-05	---	---	---	---	6.3E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	1.4E-06	---	---	---	---	3.5E-02
Chromium (Total)	6.2E-02	3.0E-01	5.0E-02	---	4.0E-04	---	---	---	---	4.1E-01
Cobalt	1.1E-02	4.7E-02	3.5E-03	---	5.6E-05	---	---	---	---	6.1E-02
Copper	3.3E-02	7.2E-01	4.5E-02	---	2.5E-04	---	---	---	---	8.0E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	3.1E-05	---	---	---	---	8.3E-02
Manganese	2.7E-02	1.7E+00	4.8E-03	---	4.7E-03	---	---	---	---	1.7E+00
Molybdenum	8.4E-04	3.0E-01	2.1E-03	---	2.6E-04	---	---	---	---	3.0E-01
Nickel	6.2E-02	5.0E-01	1.7E-01	---	7.7E-04	---	---	---	---	7.3E-01
Selenium	8.0E-04	9.6E-03	2.1E-03	---	5.5E-05	---	---	---	---	1.3E-02
Thallium	1.5E-04	7.9E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.7E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.8E-04	---	---	---	---	3.8E-03
Vanadium	3.4E-02	1.0E-01	3.8E-03	---	4.2E-04	---	---	---	---	1.4E-01
Zinc	9.5E-02	3.3E+00	1.3E+00	---	9.8E-04	---	---	---	---	4.7E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.5E-04	3.5E-04	2.7E-06	6.5E-06	9.4E-06	---	---	1.9E-05	8.7E-04
Arsenic	1.6E-03	2.4E-03	7.3E-04	1.1E-04	3.9E-05	1.9E-04	---	---	2.3E-04	5.4E-03
Barium	1.5E-03	7.3E-02	3.4E-04	2.1E-03	5.4E-04	4.1E-04	---	---	3.6E-03	8.2E-02
Beryllium	2.1E-04	1.2E-03	2.4E-05	8.1E-05	1.3E-06	2.0E-05	---	---	1.9E-05	1.5E-03
Cadmium	3.1E-04	4.5E-03	7.4E-03	2.8E-03	1.3E-06	4.0E-05	---	---	1.7E-04	1.5E-02
Chromium (Total)	1.6E-02	2.0E-02	1.2E-02	1.5E-02	8.4E-05	1.5E-03	---	---	3.6E-04	6.5E-02
Cobalt	3.6E-03	6.2E-03	1.1E-03	7.9E-04	1.9E-05	3.9E-04	---	---	1.7E-04	1.2E-02
Copper	1.3E-02	2.0E-01	1.8E-02	7.2E-02	7.8E-05	9.4E-04	---	---	1.8E-02	3.2E-01
Lead	9.0E-03	7.3E-03	1.1E-02	2.1E-02	1.8E-05	1.0E-03	---	---	2.9E-04	5.0E-02
Manganese	1.1E-02	5.3E-01	1.9E-03	4.7E-03	4.3E-03	3.3E-03	---	---	7.6E-03	5.6E-01
Molybdenum	3.5E-04	1.0E-01	8.5E-04	7.8E-04	3.2E-06	3.7E-05	---	---	3.1E-04	1.0E-01
Nickel	9.6E-03	2.9E-02	2.5E-02	1.7E-02	5.2E-05	9.4E-04	---	---	3.8E-04	8.3E-02
Selenium	3.4E-04	2.5E-03	8.4E-04	3.2E-03	8.4E-06	3.3E-05	---	---	2.4E-03	9.3E-03
Thallium	6.6E-05	1.7E-04	7.8E-06	7.4E-05	6.5E-07	7.0E-06	---	---	4.3E-05	3.7E-04
Uranium	6.6E-04	4.1E-04	5.5E-05	1.5E-05	1.9E-06	6.1E-05	---	---	2.1E-05	1.2E-03
Vanadium	1.4E-02	1.9E-02	1.5E-03	1.7E-03	4.5E-05	1.3E-03	---	---	6.3E-04	3.8E-02
Zinc	4.0E-02	7.9E-01	5.1E-01	7.2E-01	3.9E-04	5.2E-03	---	---	4.4E-01	2.5E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.2E-05	---	---	5.1E-06	3.0E-06	1.0E-04	---	2.0E-05	1.8E-04	3.7E-04
Arsenic	6.0E-04	---	---	2.0E-04	1.8E-05	2.1E-03	---	2.0E-02	2.2E-03	2.5E-02
Barium	5.6E-04	---	---	3.9E-03	2.5E-04	4.6E-03	---	1.7E-02	3.5E-02	6.1E-02
Beryllium	7.8E-05	---	---	1.5E-04	6.0E-07	2.2E-04	---	7.8E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	6.0E-07	4.4E-04	---	1.4E-02	1.6E-03	2.1E-02
Chromium (Total)	5.8E-03	---	---	2.8E-02	3.9E-05	1.7E-02	---	8.0E-02	3.5E-03	1.3E-01
Cobalt	1.3E-03	---	---	1.5E-03	9.0E-06	4.3E-03	---	2.8E-04	1.6E-03	9.1E-03
Copper	4.9E-03	---	---	1.3E-01	3.6E-05	1.0E-02	---	4.5E-01	1.7E-01	7.7E-01
Lead	3.4E-03	---	---	4.0E-02	8.4E-06	1.1E-02	---	2.8E-02	2.8E-03	8.6E-02
Manganese	4.3E-03	---	---	8.7E-03	2.0E-03	3.7E-02	---	1.5E-01	7.4E-02	2.7E-01
Molybdenum	1.3E-04	---	---	1.5E-03	1.5E-06	4.1E-04	---	5.8E-03	3.0E-03	1.1E-02
Nickel	3.6E-03	---	---	3.2E-02	2.4E-05	1.0E-02	---	4.0E-02	3.6E-03	8.9E-02
Selenium	1.3E-04	---	---	6.0E-03	3.9E-06	3.7E-04	---	6.1E-03	2.4E-02	3.6E-02
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	7.8E-05	---	4.2E-04	4.2E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	9.0E-07	6.8E-04	---	3.1E-04	2.0E-04	1.5E-03
Vanadium	5.2E-03	---	---	3.2E-03	2.1E-05	1.5E-02	---	7.1E-03	6.1E-03	3.6E-02
Zinc	1.5E-02	---	---	1.3E+00	1.8E-04	5.7E-02	---	2.3E+00	4.3E+00	8.0E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.4E-05	---	---	7.2E-06	5.1E-05	6.3E-05	---	---	1.9E-04
Arsenic	4.3E-04	3.5E-04	---	---	4.3E-05	1.0E-03	3.0E-03	---	---	4.8E-03
Barium	4.0E-04	1.1E-02	---	---	6.0E-04	2.3E-03	4.7E-03	---	---	1.9E-02
Beryllium	5.6E-05	2.1E-04	---	---	1.4E-06	1.1E-04	1.6E-04	---	---	5.4E-04
Cadmium	8.4E-05	5.2E-04	---	---	1.4E-06	2.2E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	4.2E-03	3.1E-03	---	---	9.4E-05	8.2E-03	4.8E-03	---	---	2.0E-02
Cobalt	9.7E-04	9.6E-04	---	---	2.2E-05	2.1E-03	1.8E-03	---	---	5.9E-03
Copper	3.5E-03	2.1E-02	---	---	8.6E-05	5.1E-03	1.6E-02	---	---	4.5E-02
Lead	2.4E-03	1.3E-03	---	---	2.0E-05	5.6E-03	2.3E-03	---	---	1.2E-02
Manganese	3.1E-03	4.7E-02	---	---	4.8E-03	1.8E-02	9.7E-02	---	---	1.7E-01
Molybdenum	9.5E-05	8.0E-03	---	---	3.6E-06	2.0E-04	6.7E-03	---	---	1.5E-02
Nickel	2.6E-03	2.9E-03	---	---	5.8E-05	5.1E-03	9.3E-03	---	---	2.0E-02
Selenium	9.2E-05	3.3E-04	---	---	9.4E-06	1.8E-04	3.5E-04	---	---	9.5E-04
Thallium	1.8E-05	2.9E-05	---	---	7.2E-07	3.8E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.5E-05	---	---	2.2E-06	3.3E-04	1.2E-03	---	---	1.8E-03
Vanadium	3.7E-03	3.0E-03	---	---	5.0E-05	7.2E-03	1.2E-02	---	---	2.6E-02
Zinc	1.1E-02	1.2E-01	---	---	4.3E-04	2.8E-02	9.3E-02	---	---	2.5E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	4.9E-05	---	---	---	---	2.2E-03
Barium	1.3E-03	---	---	1.6E-02	6.7E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	9.7E-05	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	2.3E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.4E-03	---	---	---	---	5.1E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	6.5E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.1E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	2.4E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	5.7E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	4.9E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	4.9E-05	---	---	---	---	2.2E-03
Barium	1.3E-03	---	---	1.6E-02	6.7E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	9.7E-05	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	2.3E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.4E-03	---	---	---	---	5.1E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	6.5E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.1E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	2.4E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	5.7E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	4.9E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.4E-04	---	---	5.9E-06	---	---	---	---	4.0E-04
Arsenic	2.9E-03	1.5E-03	---	---	3.5E-05	---	---	---	---	4.4E-03
Barium	2.7E-03	4.8E-02	---	---	4.9E-04	---	---	---	---	5.1E-02
Beryllium	3.7E-04	9.0E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	1.2E-06	---	---	---	---	2.8E-03
Chromium (Total)	2.8E-02	1.3E-02	---	---	7.6E-05	---	---	---	---	4.1E-02
Cobalt	6.4E-03	4.0E-03	---	---	1.8E-05	---	---	---	---	1.0E-02
Copper	2.4E-02	8.7E-02	---	---	7.1E-05	---	---	---	---	1.1E-01
Lead	1.6E-02	5.6E-03	---	---	1.6E-05	---	---	---	---	2.2E-02
Manganese	2.0E-02	2.0E-01	---	---	3.9E-03	---	---	---	---	2.2E-01
Molybdenum	6.3E-04	3.4E-02	---	---	2.9E-06	---	---	---	---	3.4E-02
Nickel	1.7E-02	1.2E-02	---	---	4.7E-05	---	---	---	---	2.9E-02
Selenium	6.1E-04	1.4E-03	---	---	7.6E-06	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.2E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	1.8E-06	---	---	---	---	1.5E-03
Vanadium	2.5E-02	1.3E-02	---	---	4.1E-05	---	---	---	---	3.7E-02
Zinc	7.2E-02	5.0E-01	---	---	3.5E-04	---	---	---	---	5.7E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.0E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.4E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.4E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.1E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	4.8E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.1E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.4E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.2E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	5.1E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.2E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.0E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.0E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.4E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.4E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.1E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	4.8E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.1E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.4E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.2E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	5.1E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.2E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.0E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.7E-04	7.5E-04	---	---	2.1E-05	---	---	---	---	1.0E-03
Arsenic	3.2E-03	5.4E-03	---	---	1.3E-04	---	---	---	---	8.7E-03
Barium	2.9E-03	1.6E-01	---	---	1.7E-03	---	---	---	---	1.7E-01
Beryllium	4.1E-04	2.7E-03	---	---	4.2E-06	---	---	---	---	3.1E-03
Cadmium	6.1E-04	1.0E-02	---	---	4.2E-06	---	---	---	---	1.1E-02
Chromium (Total)	3.0E-02	4.6E-02	---	---	2.7E-04	---	---	---	---	7.6E-02
Cobalt	7.0E-03	1.4E-02	---	---	6.3E-05	---	---	---	---	2.1E-02
Copper	2.6E-02	4.4E-01	---	---	2.5E-04	---	---	---	---	4.6E-01
Lead	1.8E-02	1.7E-02	---	---	5.9E-05	---	---	---	---	3.4E-02
Manganese	2.2E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	6.9E-04	2.2E-01	---	---	1.1E-05	---	---	---	---	2.2E-01
Nickel	1.9E-02	6.4E-02	---	---	1.7E-04	---	---	---	---	8.3E-02
Selenium	6.7E-04	5.5E-03	---	---	2.7E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	3.9E-04	---	---	2.1E-06	---	---	---	---	5.2E-04
Uranium	1.3E-03	9.2E-04	---	---	6.3E-06	---	---	---	---	2.2E-03
Vanadium	2.7E-02	4.3E-02	---	---	1.5E-04	---	---	---	---	7.0E-02
Zinc	7.8E-02	1.8E+00	---	---	1.3E-03	---	---	---	---	1.8E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.0E-05	2.8E-04	---	---	5.4E-06	1.3E-05	1.6E-04	---	---	5.4E-04
Arsenic	8.2E-04	2.9E-03	---	---	3.3E-05	2.6E-04	7.6E-03	---	---	1.2E-02
Barium	7.6E-04	9.5E-02	---	---	4.5E-04	5.8E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.8E-05	4.1E-04	---	---	2.3E-03
Cadmium	1.6E-04	4.4E-03	---	---	1.1E-06	5.6E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	7.9E-03	2.6E-02	---	---	7.1E-05	2.1E-03	1.2E-02	---	---	4.9E-02
Cobalt	1.8E-03	8.0E-03	---	---	1.6E-05	5.5E-04	4.6E-03	---	---	1.5E-02
Copper	6.7E-03	1.7E-01	---	---	6.5E-05	1.3E-03	4.1E-02	---	---	2.2E-01
Lead	4.6E-03	1.1E-02	---	---	1.5E-05	1.5E-03	5.8E-03	---	---	2.3E-02
Manganese	5.8E-03	4.0E-01	---	---	3.6E-03	4.6E-03	2.5E-01	---	---	6.6E-01
Molybdenum	1.8E-04	6.7E-02	---	---	2.7E-06	5.2E-05	1.7E-02	---	---	8.5E-02
Nickel	4.9E-03	2.4E-02	---	---	4.4E-05	1.3E-03	2.4E-02	---	---	5.5E-02
Selenium	1.7E-04	2.7E-03	---	---	7.1E-06	4.6E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.4E-04	---	---	5.4E-07	9.9E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.5E-04	---	---	1.6E-06	8.6E-05	3.1E-03	---	---	4.1E-03
Vanadium	7.0E-03	2.5E-02	---	---	3.8E-05	1.9E-03	3.2E-02	---	---	6.6E-02
Zinc	2.0E-02	1.0E+00	---	---	3.3E-04	7.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.8E-06	---	---	8.6E-07	8.1E-06	1.1E-04	---	2.6E-05	1.9E-04	3.5E-04
Arsenic	1.0E-04	---	---	3.4E-05	4.9E-05	2.2E-03	---	2.6E-02	2.3E-03	3.1E-02
Barium	9.5E-05	---	---	6.6E-04	6.7E-04	4.9E-03	---	2.1E-02	3.6E-02	6.4E-02
Beryllium	1.3E-05	---	---	2.6E-05	1.6E-06	2.4E-04	---	9.9E-04	1.9E-04	1.5E-03
Cadmium	2.0E-05	---	---	9.0E-04	1.6E-06	4.8E-04	---	1.7E-02	1.7E-03	2.1E-02
Chromium (Total)	9.9E-04	---	---	4.8E-03	1.1E-04	1.8E-02	---	1.0E-01	3.6E-03	1.3E-01
Cobalt	2.3E-04	---	---	2.5E-04	2.4E-05	4.7E-03	---	3.6E-04	1.7E-03	7.2E-03
Copper	8.4E-04	---	---	2.3E-02	9.7E-05	1.1E-02	---	5.7E-01	1.8E-01	7.9E-01
Lead	5.7E-04	---	---	6.8E-03	2.3E-05	1.2E-02	---	3.6E-02	3.0E-03	5.8E-02
Manganese	7.2E-04	---	---	1.5E-03	5.4E-03	3.9E-02	---	1.9E-01	7.7E-02	3.1E-01
Molybdenum	2.2E-05	---	---	2.5E-04	4.0E-06	4.4E-04	---	7.4E-03	3.1E-03	1.1E-02
Nickel	6.1E-04	---	---	5.4E-03	6.5E-05	1.1E-02	---	5.1E-02	3.8E-03	7.2E-02
Selenium	2.2E-05	---	---	1.0E-03	1.1E-05	3.9E-04	---	7.8E-03	2.5E-02	3.4E-02
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	8.4E-05	---	5.3E-04	4.4E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	2.4E-06	7.3E-04	---	3.9E-04	2.1E-04	1.4E-03
Vanadium	8.8E-04	---	---	5.4E-04	5.7E-05	1.6E-02	---	9.0E-03	6.4E-03	3.3E-02
Zinc	2.6E-03	---	---	2.3E-01	4.9E-04	6.2E-02	---	3.0E+00	4.5E+00	7.8E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.7E-05	8.3E-04	7.8E-06	8.7E-06	---	---	---	---	1.0E-03
Arsenic	1.7E-03	1.2E-04	1.8E-03	3.1E-04	5.2E-05	---	---	---	---	4.0E-03
Barium	1.6E-03	3.0E-03	8.2E-04	6.0E-03	7.2E-04	---	---	---	---	1.2E-02
Beryllium	2.2E-04	2.7E-05	5.7E-05	2.3E-04	1.7E-06	---	---	---	---	5.4E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	1.7E-06	---	---	---	---	2.7E-02
Chromium (Total)	1.7E-02	8.1E-04	2.9E-02	4.4E-02	1.1E-04	---	---	---	---	9.0E-02
Cobalt	3.8E-03	2.5E-04	2.6E-03	2.3E-03	2.6E-05	---	---	---	---	9.0E-03
Copper	1.4E-02	1.5E-02	4.3E-02	2.1E-01	1.0E-04	---	---	---	---	2.8E-01
Lead	9.6E-03	1.5E-04	2.6E-02	6.2E-02	2.4E-05	---	---	---	---	9.7E-02
Manganese	1.2E-02	4.5E-02	4.6E-03	1.3E-02	5.8E-03	---	---	---	---	8.1E-02
Molybdenum	3.8E-04	9.3E-03	2.0E-03	2.2E-03	4.3E-06	---	---	---	---	1.4E-02
Nickel	1.0E-02	2.3E-03	6.1E-02	4.9E-02	6.9E-05	---	---	---	---	1.2E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.2E-03	1.1E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.4E-06	1.9E-05	2.1E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.5E-05	1.3E-04	4.4E-05	2.6E-06	---	---	---	---	9.0E-04
Vanadium	1.5E-02	7.0E-04	3.5E-03	4.9E-03	6.1E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	3.4E-02	1.2E+00	2.1E+00	5.2E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.7E-04	1.1E-03	---	---	9.6E-06	---	---	---	---	2.0E-03
Arsenic	1.0E-02	1.1E-02	---	---	5.8E-05	---	---	---	---	2.1E-02
Barium	9.5E-03	3.4E-01	---	---	8.0E-04	---	---	---	---	3.5E-01
Beryllium	1.3E-03	6.4E-03	---	---	1.9E-06	---	---	---	---	7.7E-03
Cadmium	2.0E-03	1.6E-02	---	---	1.9E-06	---	---	---	---	1.8E-02
Chromium (Total)	9.8E-02	9.6E-02	---	---	1.3E-04	---	---	---	---	1.9E-01
Cobalt	2.3E-02	2.9E-02	---	---	2.9E-05	---	---	---	---	5.2E-02
Copper	8.3E-02	6.6E-01	---	---	1.2E-04	---	---	---	---	7.4E-01
Lead	5.7E-02	4.0E-02	---	---	2.7E-05	---	---	---	---	9.7E-02
Manganese	7.2E-02	1.5E+00	---	---	6.4E-03	---	---	---	---	1.6E+00
Molybdenum	2.2E-03	2.7E-01	---	---	4.8E-06	---	---	---	---	2.7E-01
Nickel	6.0E-02	9.3E-02	---	---	7.7E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	1.0E-02	---	---	1.3E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	8.8E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	2.9E-06	---	---	---	---	6.1E-03
Vanadium	8.7E-02	9.2E-02	---	---	6.8E-05	---	---	---	---	1.8E-01
Zinc	2.5E-01	3.6E+00	---	---	5.8E-04	---	---	---	---	3.9E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	4.9E-04	---	---	6.4E-06	---	---	---	---	6.2E-04
Arsenic	1.5E-03	4.8E-03	---	---	3.9E-05	---	---	---	---	6.3E-03
Barium	1.3E-03	1.5E-01	---	---	5.3E-04	---	---	---	---	1.6E-01
Beryllium	1.9E-04	2.9E-03	---	---	1.3E-06	---	---	---	---	3.1E-03
Cadmium	2.8E-04	7.4E-03	---	---	1.3E-06	---	---	---	---	7.6E-03
Chromium (Total)	1.4E-02	4.3E-02	---	---	8.4E-05	---	---	---	---	5.7E-02
Cobalt	3.2E-03	1.3E-02	---	---	1.9E-05	---	---	---	---	1.6E-02
Copper	1.2E-02	2.9E-01	---	---	7.7E-05	---	---	---	---	3.1E-01
Lead	8.1E-03	1.8E-02	---	---	1.8E-05	---	---	---	---	2.6E-02
Manganese	1.0E-02	6.9E-01	---	---	4.3E-03	---	---	---	---	7.0E-01
Molybdenum	3.2E-04	1.2E-01	---	---	3.2E-06	---	---	---	---	1.2E-01
Nickel	8.6E-03	4.2E-02	---	---	5.1E-05	---	---	---	---	5.0E-02
Selenium	3.1E-04	4.5E-03	---	---	8.4E-06	---	---	---	---	4.9E-03
Thallium	5.9E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.5E-04
Uranium	5.9E-04	8.9E-04	---	---	1.9E-06	---	---	---	---	1.5E-03
Vanadium	1.2E-02	4.1E-02	---	---	4.5E-05	---	---	---	---	5.4E-02
Zinc	3.6E-02	1.6E+00	---	---	3.9E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	8.2E-05	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.1E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	1.6E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	3.8E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.1E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.1E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.8E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	4.1E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	9.5E-05	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	8.2E-04	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	8.2E-05	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.1E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	1.6E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	3.8E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.1E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.1E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.8E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	4.1E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	9.5E-05	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	8.2E-04	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.2E-05	---	---	6.1E-06	3.5E-06	7.8E-05	---	---	1.6E-04	3.1E-04
Arsenic	7.3E-04	---	---	2.4E-04	2.1E-05	1.6E-03	---	---	1.9E-03	4.4E-03
Barium	6.7E-04	---	---	4.7E-03	2.9E-04	3.4E-03	---	---	3.0E-02	3.9E-02
Beryllium	9.4E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	6.0E-04
Cadmium	1.4E-04	---	---	6.4E-03	7.1E-07	3.3E-04	---	---	1.4E-03	8.2E-03
Chromium (Total)	7.0E-03	---	---	3.4E-02	4.6E-05	1.2E-02	---	---	3.0E-03	5.7E-02
Cobalt	1.6E-03	---	---	1.8E-03	1.1E-05	3.2E-03	---	---	1.4E-03	8.0E-03
Copper	5.9E-03	---	---	1.6E-01	4.2E-05	7.8E-03	---	---	1.5E-01	3.2E-01
Lead	4.0E-03	---	---	4.8E-02	9.9E-06	8.6E-03	---	---	2.4E-03	6.3E-02
Manganese	5.1E-03	---	---	1.0E-02	2.4E-03	2.7E-02	---	---	6.3E-02	1.1E-01
Molybdenum	1.6E-04	---	---	1.7E-03	1.8E-06	3.1E-04	---	---	2.6E-03	4.8E-03
Nickel	4.3E-03	---	---	3.8E-02	2.8E-05	7.8E-03	---	---	3.1E-03	5.3E-02
Selenium	1.5E-04	---	---	7.2E-03	4.6E-06	2.7E-04	---	---	2.0E-02	2.8E-02
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.9E-05	---	---	3.6E-04	6.1E-04
Uranium	3.0E-04	---	---	3.4E-05	1.1E-06	5.1E-04	---	---	1.7E-04	1.0E-03
Vanadium	6.2E-03	---	---	3.8E-03	2.5E-05	1.1E-02	---	---	5.2E-03	2.6E-02
Zinc	1.8E-02	---	---	1.6E+00	2.1E-04	4.3E-02	---	---	3.7E+00	5.3E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.2E-05	5.8E-02	---	2.2E-05	---	---	---	---	6.0E-02
Arsenic	1.4E-02	1.4E-04	1.2E-01	---	1.3E-04	---	---	---	---	1.4E-01
Barium	1.3E-02	3.5E-03	5.8E-02	---	1.8E-03	---	---	---	---	7.6E-02
Beryllium	1.8E-03	3.2E-05	4.0E-03	---	4.4E-06	---	---	---	---	5.8E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	4.4E-06	---	---	---	---	1.3E+00
Chromium (Total)	1.3E-01	9.6E-04	2.0E+00	---	2.9E-04	---	---	---	---	2.2E+00
Cobalt	3.1E-02	3.0E-04	1.9E-01	---	6.6E-05	---	---	---	---	2.2E-01
Copper	1.1E-01	1.8E-02	3.1E+00	---	2.6E-04	---	---	---	---	3.2E+00
Lead	7.7E-02	1.8E-04	1.8E+00	---	6.1E-05	---	---	---	---	1.9E+00
Manganese	9.7E-02	5.3E-02	3.3E-01	---	1.5E-02	---	---	---	---	4.9E-01
Molybdenum	3.0E-03	1.1E-02	1.4E-01	---	1.1E-05	---	---	---	---	1.6E-01
Nickel	8.2E-02	2.7E-03	4.3E+00	---	1.8E-04	---	---	---	---	4.4E+00
Selenium	2.9E-03	1.6E-04	1.4E-01	---	2.9E-05	---	---	---	---	1.5E-01
Thallium	5.6E-04	6.4E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.6E-03	1.8E-05	9.2E-03	---	6.6E-06	---	---	---	---	1.5E-02
Vanadium	1.2E-01	8.3E-04	2.5E-01	---	1.5E-04	---	---	---	---	3.6E-01
Zinc	3.4E-01	4.0E-02	8.6E+01	---	1.3E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	5.2E-06	2.0E-04	2.6E-05	2.4E-05	3.7E-04	6.2E-04
Arsenic	---	---	---	---	3.1E-05	4.0E-03	1.2E-03	2.4E-02	4.4E-03	3.3E-02
Barium	---	---	---	---	4.3E-04	8.9E-03	1.9E-03	2.0E-02	7.0E-02	1.0E-01
Beryllium	---	---	---	---	1.0E-06	4.2E-04	6.6E-05	9.1E-04	3.7E-04	1.8E-03
Cadmium	---	---	---	---	1.0E-06	8.6E-04	1.0E-04	1.6E-02	3.3E-03	2.0E-02
Chromium (Total)	---	---	---	---	6.7E-05	3.2E-02	2.0E-03	9.4E-02	7.0E-03	1.4E-01
Cobalt	---	---	---	---	1.5E-05	8.4E-03	7.4E-04	3.3E-04	3.3E-03	1.3E-02
Copper	---	---	---	---	6.2E-05	2.0E-02	6.5E-03	5.2E-01	3.5E-01	9.0E-01
Lead	---	---	---	---	1.4E-05	2.2E-02	9.4E-04	3.3E-02	5.7E-03	6.1E-02
Manganese	---	---	---	---	3.4E-03	7.1E-02	4.0E-02	1.7E-01	1.5E-01	4.4E-01
Molybdenum	---	---	---	---	2.6E-06	8.0E-04	2.8E-03	6.7E-03	6.1E-03	1.6E-02
Nickel	---	---	---	---	4.1E-05	2.0E-02	3.8E-03	4.6E-02	7.4E-03	7.8E-02
Selenium	---	---	---	---	6.7E-06	7.1E-04	1.4E-04	7.2E-03	4.8E-02	5.6E-02
Thallium	---	---	---	---	5.2E-07	1.5E-04	2.0E-04	4.9E-04	8.5E-04	1.7E-03
Uranium	---	---	---	---	1.5E-06	1.3E-03	5.0E-04	3.6E-04	4.0E-04	2.6E-03
Vanadium	---	---	---	---	3.6E-05	2.8E-02	5.2E-03	8.3E-03	1.2E-02	5.4E-02
Zinc	---	---	---	---	3.1E-04	1.1E-01	3.8E-02	2.7E+00	8.7E+00	1.2E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	6.6E-06	2.6E-04	1.8E-04	3.7E-04	---	8.2E-04
Arsenic	---	---	---	---	4.0E-05	5.3E-03	8.6E-03	3.7E-01	---	3.9E-01
Barium	---	---	---	---	5.5E-04	1.2E-02	1.3E-02	3.1E-01	---	3.4E-01
Beryllium	---	---	---	---	1.3E-06	5.5E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	1.3E-06	1.1E-03	7.2E-04	2.5E-01	---	2.5E-01
Chromium (Total)	---	---	---	---	8.6E-05	4.2E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	2.0E-05	1.1E-02	5.2E-03	5.1E-03	---	2.1E-02
Copper	---	---	---	---	7.9E-05	2.6E-02	4.6E-02	8.2E+00	---	8.3E+00
Lead	---	---	---	---	1.9E-05	2.9E-02	6.6E-03	5.1E-01	---	5.5E-01
Manganese	---	---	---	---	4.4E-03	9.2E-02	2.8E-01	2.7E+00	---	3.1E+00
Molybdenum	---	---	---	---	3.3E-06	1.0E-03	1.9E-02	1.1E-01	---	1.3E-01
Nickel	---	---	---	---	5.3E-05	2.6E-02	2.7E-02	7.3E-01	---	7.8E-01
Selenium	---	---	---	---	8.6E-06	9.2E-04	1.0E-03	1.1E-01	---	1.1E-01
Thallium	---	---	---	---	6.6E-07	2.0E-04	1.4E-03	7.7E-03	---	9.3E-03
Uranium	---	---	---	---	2.0E-06	1.7E-03	3.5E-03	5.6E-03	---	1.1E-02
Vanadium	---	---	---	---	4.6E-05	3.7E-02	3.6E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	4.0E-04	1.4E-01	2.7E-01	4.3E+01	---	4.4E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	3.3E-04	9.9E-04	1.8E-04	---	2.1E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	3.3E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.6E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.1E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.6E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.5E-03	---	4.7E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	6.7E-05	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	1.6E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	1.3E-03	1.1E-01	5.1E-02	---	1.7E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	4.4E-05	3.3E-02	1.5E-01	3.5E-01	---	5.8E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	7.2E-06	1.1E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	1.7E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	3.9E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.3E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	3.3E-04	9.9E-04	1.8E-04	---	2.1E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	3.3E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.6E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.1E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.6E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.5E-03	---	4.7E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	6.7E-05	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	1.6E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	1.3E-03	1.1E-01	5.1E-02	---	1.7E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	4.4E-05	3.3E-02	1.5E-01	3.5E-01	---	5.8E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	7.2E-06	1.1E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	1.7E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	3.9E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.3E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	3.4E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.7E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.1E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	6.9E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	1.6E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.8E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	4.6E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	7.4E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	1.7E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	4.0E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	3.4E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	3.4E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.7E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.1E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	6.9E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	1.6E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.8E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	4.6E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	7.4E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	1.7E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	4.0E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	3.4E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.7E-04	3.5E-05	8.6E-06	---	---	---	---	7.6E-04
Arsenic	2.8E-03	---	1.0E-03	1.4E-03	5.1E-05	---	---	---	---	5.2E-03
Barium	2.6E-03	---	4.7E-04	2.7E-02	7.1E-04	---	---	---	---	3.1E-02
Beryllium	3.6E-04	---	3.2E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	1.7E-06	---	---	---	---	4.8E-02
Chromium (Total)	2.7E-02	---	1.6E-02	2.0E-01	1.1E-04	---	---	---	---	2.4E-01
Cobalt	6.2E-03	---	1.5E-03	1.0E-02	2.6E-05	---	---	---	---	1.8E-02
Copper	2.3E-02	---	2.5E-02	9.4E-01	1.0E-04	---	---	---	---	9.9E-01
Lead	1.6E-02	---	1.5E-02	2.8E-01	2.4E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.6E-03	6.1E-02	5.7E-03	---	---	---	---	8.9E-02
Molybdenum	6.1E-04	---	1.2E-03	1.0E-02	4.3E-06	---	---	---	---	1.2E-02
Nickel	1.7E-02	---	3.5E-02	2.2E-01	6.9E-05	---	---	---	---	2.7E-01
Selenium	5.9E-04	---	1.2E-03	4.2E-02	1.1E-05	---	---	---	---	4.4E-02
Thallium	1.1E-04	---	1.1E-05	9.7E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	2.6E-06	---	---	---	---	1.4E-03
Vanadium	2.4E-02	---	2.0E-03	2.2E-02	6.0E-05	---	---	---	---	4.8E-02
Zinc	7.0E-02	---	7.0E-01	9.3E+00	5.1E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	3.6E-04	3.1E-04	4.2E-04	9.8E-05	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.0E-04	7.1E-03	1.5E-02	4.3E-01	1.2E-03	5.0E-01
Barium	4.7E-03	---	2.1E-02	---	1.4E-03	1.6E-02	2.3E-02	3.5E-01	1.9E-02	4.4E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.5E-06	1.5E-03	1.2E-03	2.9E-01	8.8E-04	7.5E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	1.9E-03	2.6E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.5E-02	8.8E-03	5.8E-03	8.8E-04	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	2.1E-04	3.6E-02	7.8E-02	9.4E+00	9.3E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	4.9E-05	3.9E-02	1.1E-02	5.8E-01	1.5E-03	1.3E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	1.4E-03	3.3E-02	1.2E-01	1.6E-03	2.1E-01
Nickel	3.0E-02	---	1.6E+00	---	1.4E-04	3.6E-02	4.6E-02	8.3E-01	2.0E-03	2.5E+00
Selenium	1.1E-03	---	5.3E-02	---	2.3E-05	1.2E-03	1.7E-03	1.3E-01	1.3E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	5.2E-06	2.3E-03	6.0E-03	6.4E-03	1.1E-04	2.0E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.2E-04	5.0E-02	6.2E-02	1.5E-01	3.3E-03	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.0E-03	2.0E-01	4.6E-01	4.9E+01	2.3E+00	8.4E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	3.6E-04	3.1E-04	4.2E-04	9.8E-05	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.0E-04	7.1E-03	1.5E-02	4.3E-01	1.2E-03	5.0E-01
Barium	4.7E-03	---	2.1E-02	---	1.4E-03	1.6E-02	2.3E-02	3.5E-01	1.9E-02	4.4E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.5E-06	1.5E-03	1.2E-03	2.9E-01	8.8E-04	7.5E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	1.9E-03	2.6E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.5E-02	8.8E-03	5.8E-03	8.8E-04	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	2.1E-04	3.6E-02	7.8E-02	9.4E+00	9.3E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	4.9E-05	3.9E-02	1.1E-02	5.8E-01	1.5E-03	1.3E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	1.4E-03	3.3E-02	1.2E-01	1.6E-03	2.1E-01
Nickel	3.0E-02	---	1.6E+00	---	1.4E-04	3.6E-02	4.6E-02	8.3E-01	2.0E-03	2.5E+00
Selenium	1.1E-03	---	5.3E-02	---	2.3E-05	1.2E-03	1.7E-03	1.3E-01	1.3E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	5.2E-06	2.3E-03	6.0E-03	6.4E-03	1.1E-04	2.0E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.2E-04	5.0E-02	6.2E-02	1.5E-01	3.3E-03	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.0E-03	2.0E-01	4.6E-01	4.9E+01	2.3E+00	8.4E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.2E-04	1.1E-03	8.5E-04	---	7.0E-06	---	---	---	---	2.3E-03
Arsenic	3.8E-03	9.9E-03	1.8E-03	---	4.2E-05	---	---	---	---	1.5E-02
Barium	3.5E-03	3.1E-01	8.4E-04	---	5.8E-04	---	---	---	---	3.1E-01
Beryllium	4.9E-04	5.6E-03	5.8E-05	---	1.4E-06	---	---	---	---	6.1E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	1.4E-06	---	---	---	---	3.5E-02
Chromium (Total)	3.6E-02	8.6E-02	2.9E-02	---	9.1E-05	---	---	---	---	1.5E-01
Cobalt	8.3E-03	2.6E-02	2.7E-03	---	2.1E-05	---	---	---	---	3.7E-02
Copper	3.1E-02	6.6E-01	4.5E-02	---	8.4E-05	---	---	---	---	7.4E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	2.0E-05	---	---	---	---	8.2E-02
Manganese	2.6E-02	1.6E+00	4.7E-03	---	4.7E-03	---	---	---	---	1.7E+00
Molybdenum	8.2E-04	2.9E-01	2.1E-03	---	3.5E-06	---	---	---	---	3.0E-01
Nickel	2.2E-02	9.5E-02	6.3E-02	---	5.6E-05	---	---	---	---	1.8E-01
Selenium	7.9E-04	9.5E-03	2.1E-03	---	9.1E-06	---	---	---	---	1.2E-02
Thallium	1.5E-04	7.8E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.5E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.1E-06	---	---	---	---	3.4E-03
Vanadium	3.2E-02	8.2E-02	3.6E-03	---	4.9E-05	---	---	---	---	1.2E-01
Zinc	9.3E-02	3.3E+00	1.3E+00	---	4.2E-04	---	---	---	---	4.6E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.7E-04	3.5E-04	2.8E-06	2.3E-05	2.1E-05	---	---	6.5E-05	9.8E-04
Arsenic	1.7E-03	2.7E-03	7.5E-04	1.1E-04	2.9E-04	3.5E-04	---	---	1.7E-03	7.6E-03
Barium	1.6E-03	7.8E-02	3.6E-04	2.2E-03	8.6E-04	4.4E-04	---	---	5.7E-03	9.0E-02
Beryllium	2.2E-04	1.2E-03	2.4E-05	8.3E-05	1.6E-05	4.5E-05	---	---	2.3E-04	1.8E-03
Cadmium	3.1E-04	4.6E-03	7.4E-03	2.8E-03	1.4E-06	4.0E-05	---	---	1.8E-04	1.5E-02
Chromium (Total)	2.7E-02	7.5E-02	2.0E-02	2.3E-02	3.6E-04	1.6E-03	---	---	1.5E-03	1.5E-01
Cobalt	4.6E-03	1.2E-02	1.4E-03	1.0E-03	5.1E-05	6.1E-04	---	---	4.5E-04	2.0E-02
Copper	1.4E-02	2.2E-01	1.8E-02	7.3E-02	2.3E-04	1.3E-03	---	---	5.3E-02	3.8E-01
Lead	9.1E-03	7.4E-03	1.1E-02	2.2E-02	3.0E-05	1.1E-03	---	---	4.9E-04	5.0E-02
Manganese	1.2E-02	5.5E-01	2.0E-03	4.9E-03	4.3E-03	3.3E-03	---	---	7.6E-03	5.9E-01
Molybdenum	3.6E-04	1.0E-01	8.6E-04	8.0E-04	2.2E-04	9.7E-05	---	---	2.1E-02	1.3E-01
Nickel	2.7E-02	1.4E-01	7.1E-02	2.7E-02	6.5E-04	4.5E-03	---	---	4.7E-03	2.8E-01
Selenium	3.5E-04	2.5E-03	8.5E-04	3.2E-03	4.9E-05	3.3E-05	---	---	1.4E-02	2.1E-02
Thallium	6.7E-05	1.8E-04	7.8E-06	7.5E-05	6.5E-07	7.0E-06	---	---	4.3E-05	3.8E-04
Uranium	6.6E-04	4.2E-04	5.5E-05	1.5E-05	2.5E-04	6.2E-04	---	---	2.7E-03	4.7E-03
Vanadium	1.5E-02	2.4E-02	1.6E-03	1.8E-03	3.8E-04	2.2E-03	---	---	5.3E-03	5.0E-02
Zinc	4.1E-02	8.0E-01	5.1E-01	7.2E-01	9.1E-04	5.2E-03	---	---	1.0E+00	3.1E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.3E-05	---	---	5.2E-06	1.0E-05	2.4E-04	---	4.6E-05	6.3E-04	9.8E-04
Arsenic	6.2E-04	---	---	2.0E-04	1.4E-04	3.9E-03	---	3.3E-02	1.6E-02	5.4E-02
Barium	5.9E-04	---	---	4.1E-03	4.0E-04	4.9E-03	---	1.8E-02	5.5E-02	8.3E-02
Beryllium	8.0E-05	---	---	1.5E-04	7.3E-06	5.0E-04	---	1.8E-03	2.2E-03	4.7E-03
Cadmium	1.2E-04	---	---	5.3E-03	6.4E-07	4.4E-04	---	1.4E-02	1.7E-03	2.1E-02
Chromium (Total)	1.0E-02	---	---	4.2E-02	1.7E-04	1.8E-02	---	8.3E-02	1.5E-02	1.7E-01
Cobalt	1.7E-03	---	---	1.9E-03	2.4E-05	6.8E-03	---	4.4E-04	4.3E-03	1.5E-02
Copper	5.3E-03	---	---	1.4E-01	1.1E-04	1.5E-02	---	5.0E-01	5.1E-01	1.2E+00
Lead	3.4E-03	---	---	4.0E-02	1.4E-05	1.2E-02	---	2.9E-02	4.7E-03	9.0E-02
Manganese	4.4E-03	---	---	9.1E-03	2.0E-03	3.7E-02	---	1.5E-01	7.4E-02	2.7E-01
Molybdenum	1.4E-04	---	---	1.5E-03	9.9E-05	1.1E-03	---	1.5E-02	2.0E-01	2.2E-01
Nickel	9.9E-03	---	---	5.1E-02	3.0E-04	5.0E-02	---	1.2E-01	4.6E-02	2.8E-01
Selenium	1.3E-04	---	---	6.0E-03	2.3E-05	3.7E-04	---	6.2E-03	1.4E-01	1.5E-01
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	7.8E-05	---	4.2E-04	4.2E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	1.2E-04	6.9E-03	---	3.1E-03	2.6E-02	3.6E-02
Vanadium	5.5E-03	---	---	3.4E-03	1.8E-04	2.4E-02	---	1.2E-02	5.1E-02	9.6E-02
Zinc	1.5E-02	---	---	1.3E+00	4.2E-04	5.8E-02	---	2.4E+00	1.0E+01	1.4E+01

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.8E-05	3.6E-05	---	---	2.5E-05	1.2E-04	1.4E-04	---	---	3.6E-04
Arsenic	4.5E-04	3.9E-04	---	---	3.2E-04	1.9E-03	5.6E-03	---	---	8.7E-03
Barium	4.3E-04	1.2E-02	---	---	9.6E-04	2.4E-03	4.9E-03	---	---	2.1E-02
Beryllium	5.8E-05	2.2E-04	---	---	1.8E-05	2.4E-04	3.6E-04	---	---	9.0E-04
Cadmium	8.4E-05	5.2E-04	---	---	1.5E-06	2.2E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	7.1E-03	1.1E-02	---	---	4.0E-04	9.0E-03	5.2E-03	---	---	3.2E-02
Cobalt	1.2E-03	1.7E-03	---	---	5.7E-05	3.3E-03	2.8E-03	---	---	9.1E-03
Copper	3.8E-03	2.2E-02	---	---	2.6E-04	7.1E-03	2.2E-02	---	---	5.5E-02
Lead	2.4E-03	1.3E-03	---	---	3.4E-05	6.0E-03	2.4E-03	---	---	1.2E-02
Manganese	3.2E-03	4.9E-02	---	---	4.8E-03	1.8E-02	9.7E-02	---	---	1.7E-01
Molybdenum	9.7E-05	8.2E-03	---	---	2.4E-04	5.3E-04	1.8E-02	---	---	2.7E-02
Nickel	7.1E-03	1.6E-02	---	---	7.2E-04	2.5E-02	4.5E-02	---	---	9.3E-02
Selenium	9.2E-05	3.3E-04	---	---	5.4E-05	1.8E-04	3.5E-04	---	---	1.0E-03
Thallium	1.8E-05	3.0E-05	---	---	7.2E-07	3.8E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.7E-05	---	---	2.8E-04	3.4E-03	1.2E-02	---	---	1.6E-02
Vanadium	4.0E-03	3.7E-03	---	---	4.2E-04	1.2E-02	2.1E-02	---	---	4.1E-02
Zinc	1.1E-02	1.2E-01	---	---	1.0E-03	2.9E-02	9.4E-02	---	---	2.6E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	2.8E-05	---	---	---	---	1.7E-04
Arsenic	1.4E-03	---	---	8.5E-04	3.7E-04	---	---	---	---	2.6E-03
Barium	1.3E-03	---	---	1.7E-02	1.1E-03	---	---	---	---	2.0E-02
Beryllium	1.8E-04	---	---	6.4E-04	2.0E-05	---	---	---	---	8.5E-04
Cadmium	2.7E-04	---	---	2.2E-02	1.7E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	4.5E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	6.4E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	2.9E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.4E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	2.7E-04	---	---	---	---	6.8E-03
Nickel	2.3E-02	---	---	2.1E-01	8.1E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	6.1E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.1E-04	---	---	---	---	9.9E-04
Vanadium	1.3E-02	---	---	1.4E-02	4.8E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	1.1E-03	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	2.8E-05	---	---	---	---	1.7E-04
Arsenic	1.4E-03	---	---	8.5E-04	3.7E-04	---	---	---	---	2.6E-03
Barium	1.3E-03	---	---	1.7E-02	1.1E-03	---	---	---	---	2.0E-02
Beryllium	1.8E-04	---	---	6.4E-04	2.0E-05	---	---	---	---	8.5E-04
Cadmium	2.7E-04	---	---	2.2E-02	1.7E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	4.5E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	6.4E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	2.9E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.4E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	2.7E-04	---	---	---	---	6.8E-03
Nickel	2.3E-02	---	---	2.1E-01	8.1E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	6.1E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.1E-04	---	---	---	---	9.9E-04
Vanadium	1.3E-02	---	---	1.4E-02	4.8E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	1.1E-03	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.5E-04	---	---	2.0E-05	---	---	---	---	4.3E-04
Arsenic	3.0E-03	1.6E-03	---	---	2.6E-04	---	---	---	---	4.9E-03
Barium	2.8E-03	5.1E-02	---	---	7.8E-04	---	---	---	---	5.5E-02
Beryllium	3.8E-04	9.3E-04	---	---	1.4E-05	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	1.2E-06	---	---	---	---	2.8E-03
Chromium (Total)	4.8E-02	4.5E-02	---	---	3.3E-04	---	---	---	---	9.2E-02
Cobalt	8.2E-03	7.1E-03	---	---	4.7E-05	---	---	---	---	1.5E-02
Copper	2.5E-02	9.5E-02	---	---	2.1E-04	---	---	---	---	1.2E-01
Lead	1.6E-02	5.7E-03	---	---	2.7E-05	---	---	---	---	2.2E-02
Manganese	2.1E-02	2.1E-01	---	---	3.9E-03	---	---	---	---	2.3E-01
Molybdenum	6.4E-04	3.5E-02	---	---	1.9E-04	---	---	---	---	3.5E-02
Nickel	4.7E-02	6.8E-02	---	---	5.9E-04	---	---	---	---	1.2E-01
Selenium	6.1E-04	1.4E-03	---	---	4.4E-05	---	---	---	---	2.1E-03
Thallium	1.2E-04	1.3E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	2.3E-04	---	---	---	---	1.7E-03
Vanadium	2.6E-02	1.6E-02	---	---	3.5E-04	---	---	---	---	4.2E-02
Zinc	7.3E-02	5.1E-01	---	---	8.2E-04	---	---	---	---	5.8E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	5.9E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	7.7E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	2.3E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	4.2E-05	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.6E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	9.6E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	1.4E-04	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	6.1E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.1E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	5.7E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	1.7E-03	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	1.3E-04	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	6.7E-04	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	1.0E-03	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	2.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	5.9E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	7.7E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	2.3E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	4.2E-05	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	3.6E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	9.6E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	1.4E-04	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	6.1E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.1E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	5.7E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	1.7E-03	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	1.3E-04	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	6.7E-04	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	1.0E-03	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	2.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.8E-04	8.0E-04	---	---	7.3E-05	---	---	---	---	1.2E-03
Arsenic	3.3E-03	6.0E-03	---	---	9.5E-04	---	---	---	---	1.0E-02
Barium	3.1E-03	1.8E-01	---	---	2.8E-03	---	---	---	---	1.8E-01
Beryllium	4.2E-04	2.8E-03	---	---	5.1E-05	---	---	---	---	3.2E-03
Cadmium	6.1E-04	1.0E-02	---	---	4.4E-06	---	---	---	---	1.1E-02
Chromium (Total)	5.2E-02	1.7E-01	---	---	1.2E-03	---	---	---	---	2.2E-01
Cobalt	9.0E-03	2.6E-02	---	---	1.7E-04	---	---	---	---	3.5E-02
Copper	2.7E-02	4.7E-01	---	---	7.4E-04	---	---	---	---	5.0E-01
Lead	1.8E-02	1.7E-02	---	---	9.8E-05	---	---	---	---	3.4E-02
Manganese	2.3E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	7.1E-04	2.3E-01	---	---	7.0E-04	---	---	---	---	2.3E-01
Nickel	5.2E-02	3.1E-01	---	---	2.1E-03	---	---	---	---	3.7E-01
Selenium	6.7E-04	5.5E-03	---	---	1.6E-04	---	---	---	---	6.4E-03
Thallium	1.3E-04	4.0E-04	---	---	2.1E-06	---	---	---	---	5.3E-04
Uranium	1.3E-03	9.5E-04	---	---	8.1E-04	---	---	---	---	3.1E-03
Vanadium	2.9E-02	5.3E-02	---	---	1.2E-03	---	---	---	---	8.3E-02
Zinc	8.0E-02	1.8E+00	---	---	2.9E-03	---	---	---	---	1.9E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.2E-05	3.1E-04	---	---	1.9E-05	3.0E-05	3.7E-04	---	---	8.0E-04
Arsenic	8.5E-04	3.2E-03	---	---	2.5E-04	5.0E-04	1.4E-02	---	---	1.9E-02
Barium	8.1E-04	1.0E-01	---	---	7.2E-04	6.1E-04	1.3E-02	---	---	1.2E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.3E-05	6.3E-05	9.4E-04	---	---	3.0E-03
Cadmium	1.6E-04	4.4E-03	---	---	1.2E-06	5.6E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	1.4E-02	8.9E-02	---	---	3.0E-04	2.3E-03	1.3E-02	---	---	1.2E-01
Cobalt	2.3E-03	1.4E-02	---	---	4.3E-05	8.6E-04	7.2E-03	---	---	2.5E-02
Copper	7.2E-03	1.9E-01	---	---	1.9E-04	1.8E-03	5.7E-02	---	---	2.5E-01
Lead	4.6E-03	1.1E-02	---	---	2.5E-05	1.5E-03	6.2E-03	---	---	2.4E-02
Manganese	6.0E-03	4.1E-01	---	---	3.6E-03	4.6E-03	2.5E-01	---	---	6.8E-01
Molybdenum	1.8E-04	6.9E-02	---	---	1.8E-04	1.4E-04	4.5E-02	---	---	1.1E-01
Nickel	1.4E-02	1.3E-01	---	---	5.4E-04	6.4E-03	1.2E-01	---	---	2.7E-01
Selenium	1.8E-04	2.8E-03	---	---	4.1E-05	4.7E-05	9.1E-04	---	---	3.9E-03
Thallium	3.4E-05	2.5E-04	---	---	5.4E-07	9.9E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.6E-04	---	---	2.1E-04	8.7E-04	3.1E-02	---	---	3.3E-02
Vanadium	7.5E-03	3.1E-02	---	---	3.2E-04	3.1E-03	5.3E-02	---	---	9.5E-02
Zinc	2.1E-02	1.0E+00	---	---	7.6E-04	7.4E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	9.0E-06	---	---	8.9E-07	2.8E-05	2.5E-04	---	5.8E-05	6.6E-04	1.0E-03
Arsenic	1.1E-04	---	---	3.5E-05	3.7E-04	4.2E-03	---	4.2E-02	1.7E-02	6.4E-02
Barium	1.0E-04	---	---	7.0E-04	1.1E-03	5.2E-03	---	2.3E-02	5.8E-02	8.8E-02
Beryllium	1.4E-05	---	---	2.6E-05	2.0E-05	5.4E-04	---	2.3E-03	2.3E-03	5.2E-03
Cadmium	2.0E-05	---	---	9.0E-04	1.7E-06	4.8E-04	---	1.7E-02	1.8E-03	2.1E-02
Chromium (Total)	1.7E-03	---	---	7.2E-03	4.5E-04	2.0E-02	---	1.1E-01	1.6E-02	1.5E-01
Cobalt	2.9E-04	---	---	3.2E-04	6.4E-05	7.3E-03	---	5.6E-04	4.5E-03	1.3E-02
Copper	8.9E-04	---	---	2.3E-02	2.9E-04	1.6E-02	---	6.4E-01	5.3E-01	1.2E+00
Lead	5.7E-04	---	---	6.8E-03	3.8E-05	1.3E-02	---	3.7E-02	4.9E-03	6.3E-02
Manganese	7.5E-04	---	---	1.5E-03	5.4E-03	3.9E-02	---	1.9E-01	7.7E-02	3.1E-01
Molybdenum	2.3E-05	---	---	2.5E-04	2.7E-04	1.2E-03	---	1.9E-02	2.1E-01	2.3E-01
Nickel	1.7E-03	---	---	8.7E-03	8.1E-04	5.4E-02	---	1.6E-01	4.8E-02	2.7E-01
Selenium	2.2E-05	---	---	1.0E-03	6.1E-05	4.0E-04	---	8.0E-03	1.4E-01	1.5E-01
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	8.4E-05	---	5.3E-04	4.4E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	3.1E-04	7.4E-03	---	3.9E-03	2.7E-02	3.9E-02
Vanadium	9.4E-04	---	---	5.8E-04	4.8E-04	2.6E-02	---	1.5E-02	5.4E-02	9.7E-02
Zinc	2.6E-03	---	---	2.3E-01	1.1E-03	6.3E-02	---	3.0E+00	1.0E+01	1.4E+01

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.8E-05	8.5E-04	8.0E-06	3.0E-05	---	---	---	---	1.1E-03
Arsenic	1.8E-03	1.3E-04	1.8E-03	3.1E-04	3.9E-04	---	---	---	---	4.4E-03
Barium	1.7E-03	3.2E-03	8.7E-04	6.4E-03	1.1E-03	---	---	---	---	1.3E-02
Beryllium	2.3E-04	2.9E-05	5.8E-05	2.4E-04	2.1E-05	---	---	---	---	5.7E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	1.8E-06	---	---	---	---	2.7E-02
Chromium (Total)	2.8E-02	3.7E-03	4.9E-02	6.5E-02	4.8E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	5.3E-04	3.4E-03	2.9E-03	6.9E-05	---	---	---	---	1.2E-02
Copper	1.5E-02	1.6E-02	4.4E-02	2.1E-01	3.1E-04	---	---	---	---	2.9E-01
Lead	9.6E-03	1.6E-04	2.6E-02	6.2E-02	4.0E-05	---	---	---	---	9.7E-02
Manganese	1.3E-02	4.6E-02	4.7E-03	1.4E-02	5.8E-03	---	---	---	---	8.4E-02
Molybdenum	3.9E-04	9.5E-03	2.1E-03	2.3E-03	2.9E-04	---	---	---	---	1.5E-02
Nickel	2.8E-02	9.8E-03	1.7E-01	7.9E-02	8.7E-04	---	---	---	---	2.9E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.3E-03	6.5E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.6E-06	1.9E-05	2.2E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.6E-05	1.3E-04	4.4E-05	3.4E-04	---	---	---	---	1.2E-03
Vanadium	1.6E-02	9.5E-04	3.7E-03	5.2E-03	5.1E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	3.4E-02	1.2E+00	2.1E+00	1.2E-03	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.9E-04	1.2E-03	---	---	3.3E-05	---	---	---	---	2.1E-03
Arsenic	1.1E-02	1.2E-02	---	---	4.3E-04	---	---	---	---	2.3E-02
Barium	1.0E-02	3.7E-01	---	---	1.3E-03	---	---	---	---	3.8E-01
Beryllium	1.4E-03	6.6E-03	---	---	2.3E-05	---	---	---	---	8.0E-03
Cadmium	2.0E-03	1.6E-02	---	---	2.0E-06	---	---	---	---	1.8E-02
Chromium (Total)	1.7E-01	3.2E-01	---	---	5.4E-04	---	---	---	---	4.9E-01
Cobalt	2.9E-02	5.2E-02	---	---	7.6E-05	---	---	---	---	8.1E-02
Copper	8.9E-02	7.1E-01	---	---	3.4E-04	---	---	---	---	8.0E-01
Lead	5.7E-02	4.1E-02	---	---	4.5E-05	---	---	---	---	9.8E-02
Manganese	7.5E-02	1.6E+00	---	---	6.4E-03	---	---	---	---	1.7E+00
Molybdenum	2.3E-03	2.7E-01	---	---	3.2E-04	---	---	---	---	2.7E-01
Nickel	1.7E-01	5.0E-01	---	---	9.6E-04	---	---	---	---	6.7E-01
Selenium	2.2E-03	1.0E-02	---	---	7.3E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	9.0E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	3.7E-04	---	---	---	---	6.6E-03
Vanadium	9.3E-02	1.1E-01	---	---	5.7E-04	---	---	---	---	2.1E-01
Zinc	2.6E-01	3.7E+00	---	---	1.4E-03	---	---	---	---	4.0E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.3E-04	5.2E-04	---	---	2.2E-05	---	---	---	---	6.7E-04
Arsenic	1.5E-03	5.3E-03	---	---	2.9E-04	---	---	---	---	7.1E-03
Barium	1.4E-03	1.7E-01	---	---	8.5E-04	---	---	---	---	1.7E-01
Beryllium	1.9E-04	3.0E-03	---	---	1.6E-05	---	---	---	---	3.2E-03
Cadmium	2.8E-04	7.4E-03	---	---	1.4E-06	---	---	---	---	7.7E-03
Chromium (Total)	2.4E-02	1.5E-01	---	---	3.6E-04	---	---	---	---	1.7E-01
Cobalt	4.1E-03	2.3E-02	---	---	5.1E-05	---	---	---	---	2.7E-02
Copper	1.3E-02	3.2E-01	---	---	2.3E-04	---	---	---	---	3.3E-01
Lead	8.1E-03	1.8E-02	---	---	3.0E-05	---	---	---	---	2.6E-02
Manganese	1.1E-02	7.2E-01	---	---	4.3E-03	---	---	---	---	7.4E-01
Molybdenum	3.2E-04	1.2E-01	---	---	2.1E-04	---	---	---	---	1.2E-01
Nickel	2.4E-02	2.3E-01	---	---	6.4E-04	---	---	---	---	2.5E-01
Selenium	3.1E-04	4.6E-03	---	---	4.8E-05	---	---	---	---	5.0E-03
Thallium	6.0E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.6E-04
Uranium	6.0E-04	9.2E-04	---	---	2.5E-04	---	---	---	---	1.8E-03
Vanadium	1.3E-02	5.0E-02	---	---	3.8E-04	---	---	---	---	6.4E-02
Zinc	3.7E-02	1.7E+00	---	---	9.0E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	4.7E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	6.1E-04	---	---	---	---	6.7E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.8E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	3.3E-05	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.9E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	7.6E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	1.1E-04	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	4.8E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	6.4E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.1E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	4.5E-04	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.4E-03	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	1.0E-04	---	---	---	---	5.6E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	5.3E-04	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	8.0E-04	---	---	---	---	3.2E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.9E-03	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	4.7E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	6.1E-04	---	---	---	---	6.7E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.8E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	3.3E-05	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	2.9E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	7.6E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	1.1E-04	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	4.8E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	6.4E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.1E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	4.5E-04	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.4E-03	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	1.0E-04	---	---	---	---	5.6E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	5.3E-04	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	8.0E-04	---	---	---	---	3.2E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.9E-03	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.3E-05	---	---	6.3E-06	1.2E-05	1.8E-04	---	---	5.4E-04	8.0E-04
Arsenic	7.5E-04	---	---	2.4E-04	1.6E-04	2.9E-03	---	---	1.4E-02	1.8E-02
Barium	7.1E-04	---	---	5.0E-03	4.7E-04	3.6E-03	---	---	4.7E-02	5.7E-02
Beryllium	9.6E-05	---	---	1.8E-04	8.6E-06	3.7E-04	---	---	1.9E-03	2.6E-03
Cadmium	1.4E-04	---	---	6.4E-03	7.5E-07	3.3E-04	---	---	1.5E-03	8.3E-03
Chromium (Total)	1.2E-02	---	---	5.1E-02	2.0E-04	1.4E-02	---	---	1.3E-02	8.9E-02
Cobalt	2.1E-03	---	---	2.3E-03	2.8E-05	5.1E-03	---	---	3.7E-03	1.3E-02
Copper	6.3E-03	---	---	1.6E-01	1.3E-04	1.1E-02	---	---	4.4E-01	6.2E-01
Lead	4.0E-03	---	---	4.8E-02	1.7E-05	9.1E-03	---	---	4.0E-03	6.5E-02
Manganese	5.3E-03	---	---	1.1E-02	2.4E-03	2.7E-02	---	---	6.3E-02	1.1E-01
Molybdenum	1.6E-04	---	---	1.8E-03	1.2E-04	8.1E-04	---	---	1.7E-01	1.7E-01
Nickel	1.2E-02	---	---	6.1E-02	3.5E-04	3.8E-02	---	---	3.9E-02	1.5E-01
Selenium	1.5E-04	---	---	7.2E-03	2.7E-05	2.8E-04	---	---	1.2E-01	1.3E-01
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.9E-05	---	---	3.6E-04	6.2E-04
Uranium	3.0E-04	---	---	3.4E-05	1.4E-04	5.1E-03	---	---	2.2E-02	2.8E-02
Vanadium	6.6E-03	---	---	4.1E-03	2.1E-04	1.8E-02	---	---	4.4E-02	7.3E-02
Zinc	1.8E-02	---	---	1.6E+00	5.0E-04	4.3E-02	---	---	8.6E+00	1.0E+01

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.4E-05	6.0E-02	---	7.6E-05	---	---	---	---	6.1E-02
Arsenic	1.4E-02	1.6E-04	1.3E-01	---	9.9E-04	---	---	---	---	1.4E-01
Barium	1.4E-02	3.8E-03	6.1E-02	---	2.9E-03	---	---	---	---	8.2E-02
Beryllium	1.8E-03	3.4E-05	4.1E-03	---	5.3E-05	---	---	---	---	6.0E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	4.6E-06	---	---	---	---	1.3E+00
Chromium (Total)	2.3E-01	4.4E-03	3.5E+00	---	1.2E-03	---	---	---	---	3.7E+00
Cobalt	3.9E-02	6.3E-04	2.4E-01	---	1.7E-04	---	---	---	---	2.8E-01
Copper	1.2E-01	1.9E-02	3.1E+00	---	7.8E-04	---	---	---	---	3.3E+00
Lead	7.7E-02	1.9E-04	1.8E+00	---	1.0E-04	---	---	---	---	1.9E+00
Manganese	1.0E-01	5.5E-02	3.3E-01	---	1.5E-02	---	---	---	---	5.0E-01
Molybdenum	3.1E-03	1.1E-02	1.5E-01	---	7.3E-04	---	---	---	---	1.6E-01
Nickel	2.3E-01	1.2E-02	1.2E+01	---	2.2E-03	---	---	---	---	1.2E+01
Selenium	2.9E-03	1.6E-04	1.4E-01	---	1.7E-04	---	---	---	---	1.5E-01
Thallium	5.7E-04	6.6E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.7E-03	1.9E-05	9.3E-03	---	8.5E-04	---	---	---	---	1.6E-02
Vanadium	1.3E-01	1.1E-03	2.6E-01	---	1.3E-03	---	---	---	---	3.9E-01
Zinc	3.5E-01	4.1E-02	8.7E+01	---	3.1E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	1.8E-05	4.6E-04	5.9E-05	5.3E-05	1.3E-03	1.9E-03
Arsenic	---	---	---	---	2.3E-04	7.6E-03	2.3E-03	3.8E-02	3.3E-02	8.2E-02
Barium	---	---	---	---	6.8E-04	9.4E-03	2.0E-03	2.1E-02	1.1E-01	1.4E-01
Beryllium	---	---	---	---	1.3E-05	9.6E-04	1.5E-04	2.1E-03	4.5E-03	7.7E-03
Cadmium	---	---	---	---	1.1E-06	8.6E-04	1.0E-04	1.6E-02	3.5E-03	2.1E-02
Chromium (Total)	---	---	---	---	2.9E-04	3.5E-02	2.1E-03	9.7E-02	3.0E-02	1.6E-01
Cobalt	---	---	---	---	4.1E-05	1.3E-02	1.2E-03	5.1E-04	8.7E-03	2.4E-02
Copper	---	---	---	---	1.8E-04	2.8E-02	9.1E-03	5.9E-01	1.0E+00	1.7E+00
Lead	---	---	---	---	2.4E-05	2.4E-02	1.0E-03	3.4E-02	9.5E-03	6.8E-02
Manganese	---	---	---	---	3.4E-03	7.1E-02	4.0E-02	1.7E-01	1.5E-01	4.4E-01
Molybdenum	---	---	---	---	1.7E-04	2.1E-03	7.3E-03	1.8E-02	4.0E-01	4.3E-01
Nickel	---	---	---	---	5.2E-04	9.8E-02	1.9E-02	1.4E-01	9.2E-02	3.5E-01
Selenium	---	---	---	---	3.9E-05	7.2E-04	1.5E-04	7.3E-03	2.8E-01	2.9E-01
Thallium	---	---	---	---	5.2E-07	1.5E-04	2.0E-04	4.9E-04	8.5E-04	1.7E-03
Uranium	---	---	---	---	2.0E-04	1.3E-02	5.0E-03	3.6E-03	5.2E-02	7.4E-02
Vanadium	---	---	---	---	3.0E-04	4.7E-02	8.5E-03	1.4E-02	1.0E-01	1.7E-01
Zinc	---	---	---	---	7.2E-04	1.1E-01	3.9E-02	2.8E+00	2.0E+01	2.3E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	2.3E-05	5.9E-04	4.2E-04	8.4E-04	---	1.9E-03
Arsenic	---	---	---	---	3.0E-04	9.9E-03	1.6E-02	6.0E-01	---	6.3E-01
Barium	---	---	---	---	8.8E-04	1.2E-02	1.4E-02	3.3E-01	---	3.6E-01
Beryllium	---	---	---	---	1.6E-05	1.3E-03	1.1E-03	3.3E-02	---	3.5E-02
Cadmium	---	---	---	---	1.4E-06	1.1E-03	7.2E-04	2.5E-01	---	2.5E-01
Chromium (Total)	---	---	---	---	3.7E-04	4.6E-02	1.5E-02	1.5E+00	---	1.6E+00
Cobalt	---	---	---	---	5.2E-05	1.7E-02	8.1E-03	8.1E-03	---	3.3E-02
Copper	---	---	---	---	2.3E-04	3.6E-02	6.4E-02	9.3E+00	---	9.4E+00
Lead	---	---	---	---	3.1E-05	3.1E-02	7.0E-03	5.4E-01	---	5.8E-01
Manganese	---	---	---	---	4.4E-03	9.2E-02	2.8E-01	2.7E+00	---	3.1E+00
Molybdenum	---	---	---	---	2.2E-04	2.7E-03	5.1E-02	2.8E-01	---	3.3E-01
Nickel	---	---	---	---	6.6E-04	1.3E-01	1.3E-01	2.3E+00	---	2.5E+00
Selenium	---	---	---	---	5.0E-05	9.3E-04	1.0E-03	1.1E-01	---	1.2E-01
Thallium	---	---	---	---	6.6E-07	2.0E-04	1.4E-03	7.7E-03	---	9.3E-03
Uranium	---	---	---	---	2.6E-04	1.7E-02	3.5E-02	5.7E-02	---	1.1E-01
Vanadium	---	---	---	---	3.9E-04	6.1E-02	6.0E-02	2.2E-01	---	3.4E-01
Zinc	---	---	---	---	9.3E-04	1.5E-01	2.7E-01	4.3E+01	---	4.4E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	1.9E-05	7.4E-04	2.2E-03	4.0E-04	---	4.1E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	2.5E-04	1.2E-02	8.7E-02	2.9E-01	---	3.9E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	7.4E-04	1.5E-02	7.7E-02	1.6E-01	---	2.5E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.3E-05	1.6E-03	5.7E-03	1.6E-02	---	2.3E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.2E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	3.1E-04	5.8E-02	8.1E-02	7.3E-01	---	9.2E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	4.4E-05	2.1E-02	4.4E-02	3.9E-03	---	7.3E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	2.0E-04	4.6E-02	3.4E-01	4.4E+00	---	4.9E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.6E-05	3.8E-02	3.8E-02	2.6E-01	---	3.5E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	1.8E-04	3.4E-03	2.7E-01	1.3E-01	---	4.2E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	5.6E-04	1.6E-01	7.0E-01	1.1E+00	---	2.1E+00
Selenium	9.1E-05	1.6E-04	1.4E-03	---	4.2E-05	1.2E-03	5.5E-03	5.5E-02	---	6.3E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	2.2E-04	2.2E-02	1.9E-01	2.7E-02	---	2.4E-01
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	3.3E-04	7.6E-02	3.2E-01	1.0E-01	---	5.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	7.8E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	1.9E-05	7.4E-04	2.2E-03	4.0E-04	---	4.1E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	2.5E-04	1.2E-02	8.7E-02	2.9E-01	---	3.9E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	7.4E-04	1.5E-02	7.7E-02	1.6E-01	---	2.5E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.3E-05	1.6E-03	5.7E-03	1.6E-02	---	2.3E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	1.2E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	3.1E-04	5.8E-02	8.1E-02	7.3E-01	---	9.2E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	4.4E-05	2.1E-02	4.4E-02	3.9E-03	---	7.3E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	2.0E-04	4.6E-02	3.4E-01	4.4E+00	---	4.9E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.6E-05	3.8E-02	3.8E-02	2.6E-01	---	3.5E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.7E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	1.8E-04	3.4E-03	2.7E-01	1.3E-01	---	4.2E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	5.6E-04	1.6E-01	7.0E-01	1.1E+00	---	2.1E+00
Selenium	9.1E-05	1.6E-04	1.4E-03	---	4.2E-05	1.2E-03	5.5E-03	5.5E-02	---	6.3E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	2.2E-04	2.2E-02	1.9E-01	2.7E-02	---	2.4E-01
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	3.3E-04	7.6E-02	3.2E-01	1.0E-01	---	5.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	7.8E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	2.0E-05	---	---	---	---	1.9E-04
Arsenic	1.8E-03	---	---	5.8E-04	2.6E-04	---	---	---	---	2.6E-03
Barium	1.7E-03	---	---	1.2E-02	7.6E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.4E-05	---	---	---	---	6.8E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	3.2E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	4.5E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	2.0E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.8E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	1.9E-04	---	---	---	---	4.8E-03
Nickel	2.8E-02	---	---	1.5E-01	5.7E-04	---	---	---	---	1.8E-01
Selenium	3.7E-04	---	---	1.7E-02	4.3E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	2.2E-04	---	---	---	---	1.0E-03
Vanadium	1.6E-02	---	---	9.7E-03	3.4E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	---	---	3.8E+00	8.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	2.0E-05	---	---	---	---	1.9E-04
Arsenic	1.8E-03	---	---	5.8E-04	2.6E-04	---	---	---	---	2.6E-03
Barium	1.7E-03	---	---	1.2E-02	7.6E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.4E-05	---	---	---	---	6.8E-04
Cadmium	3.3E-04	---	---	1.5E-02	1.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	3.2E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	4.5E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	2.0E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.8E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	1.9E-04	---	---	---	---	4.8E-03
Nickel	2.8E-02	---	---	1.5E-01	5.7E-04	---	---	---	---	1.8E-01
Selenium	3.7E-04	---	---	1.7E-02	4.3E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	2.2E-04	---	---	---	---	1.0E-03
Vanadium	1.6E-02	---	---	9.7E-03	3.4E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	---	---	3.8E+00	8.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.9E-04	3.6E-05	3.0E-05	---	---	---	---	8.0E-04
Arsenic	2.9E-03	---	1.0E-03	1.4E-03	3.9E-04	---	---	---	---	5.7E-03
Barium	2.8E-03	---	5.0E-04	2.9E-02	1.1E-03	---	---	---	---	3.3E-02
Beryllium	3.7E-04	---	3.3E-05	1.1E-03	2.1E-05	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	1.8E-06	---	---	---	---	4.8E-02
Chromium (Total)	4.6E-02	---	2.8E-02	2.9E-01	4.8E-04	---	---	---	---	3.7E-01
Cobalt	7.9E-03	---	1.9E-03	1.3E-02	6.8E-05	---	---	---	---	2.3E-02
Copper	2.4E-02	---	2.5E-02	9.5E-01	3.0E-04	---	---	---	---	1.0E+00
Lead	1.6E-02	---	1.5E-02	2.8E-01	4.0E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.7E-03	6.3E-02	5.7E-03	---	---	---	---	9.2E-02
Molybdenum	6.3E-04	---	1.2E-03	1.0E-02	2.8E-04	---	---	---	---	1.2E-02
Nickel	4.6E-02	---	9.7E-02	3.6E-01	8.6E-04	---	---	---	---	5.0E-01
Selenium	6.0E-04	---	1.2E-03	4.2E-02	6.5E-05	---	---	---	---	4.4E-02
Thallium	1.2E-04	---	1.1E-05	9.8E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	3.3E-04	---	---	---	---	1.8E-03
Vanadium	2.6E-02	---	2.1E-03	2.4E-02	5.0E-04	---	---	---	---	5.2E-02
Zinc	7.1E-02	---	7.0E-01	9.3E+00	1.2E-03	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	6.0E-05	8.1E-04	7.1E-04	9.6E-04	3.4E-04	2.5E-02
Arsenic	5.2E-03	---	4.7E-02	---	7.9E-04	1.3E-02	2.8E-02	6.8E-01	8.8E-03	7.9E-01
Barium	5.0E-03	---	2.3E-02	---	2.3E-03	1.7E-02	2.4E-02	3.7E-01	3.0E-02	4.7E-01
Beryllium	6.7E-04	---	1.5E-03	---	4.2E-05	1.7E-03	1.8E-03	3.7E-02	1.2E-03	4.4E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.7E-06	1.5E-03	1.2E-03	2.9E-01	9.3E-04	7.6E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	9.7E-04	6.2E-02	2.6E-02	1.7E+00	8.0E-03	3.2E+00
Cobalt	1.4E-02	---	8.8E-02	---	1.4E-04	2.3E-02	1.4E-02	9.2E-03	2.3E-03	1.5E-01
Copper	4.4E-02	---	1.2E+00	---	6.2E-04	4.9E-02	1.1E-01	1.1E+01	2.7E-01	1.2E+01
Lead	2.8E-02	---	6.7E-01	---	8.1E-05	4.2E-02	1.2E-02	6.1E-01	2.5E-03	1.4E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.4E-02	---	5.8E-04	3.7E-03	8.7E-02	3.2E-01	1.1E-01	5.7E-01
Nickel	8.3E-02	---	4.4E+00	---	1.7E-03	1.7E-01	2.2E-01	2.6E+00	2.4E-02	7.5E+00
Selenium	1.1E-03	---	5.3E-02	---	1.3E-04	1.3E-03	1.7E-03	1.3E-01	7.4E-02	2.6E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	6.8E-04	2.3E-02	6.0E-02	6.5E-02	1.4E-02	1.7E-01
Vanadium	4.6E-02	---	9.7E-02	---	1.0E-03	8.2E-02	1.0E-01	2.5E-01	2.8E-02	6.0E-01
Zinc	1.3E-01	---	3.2E+01	---	2.4E-03	2.0E-01	4.6E-01	4.9E+01	5.4E+00	8.8E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	6.0E-05	8.1E-04	7.1E-04	9.6E-04	3.4E-04	2.5E-02
Arsenic	5.2E-03	---	4.7E-02	---	7.9E-04	1.3E-02	2.8E-02	6.8E-01	8.8E-03	7.9E-01
Barium	5.0E-03	---	2.3E-02	---	2.3E-03	1.7E-02	2.4E-02	3.7E-01	3.0E-02	4.7E-01
Beryllium	6.7E-04	---	1.5E-03	---	4.2E-05	1.7E-03	1.8E-03	3.7E-02	1.2E-03	4.4E-02
Cadmium	9.8E-04	---	4.6E-01	---	3.7E-06	1.5E-03	1.2E-03	2.9E-01	9.3E-04	7.6E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	9.7E-04	6.2E-02	2.6E-02	1.7E+00	8.0E-03	3.2E+00
Cobalt	1.4E-02	---	8.8E-02	---	1.4E-04	2.3E-02	1.4E-02	9.2E-03	2.3E-03	1.5E-01
Copper	4.4E-02	---	1.2E+00	---	6.2E-04	4.9E-02	1.1E-01	1.1E+01	2.7E-01	1.2E+01
Lead	2.8E-02	---	6.7E-01	---	8.1E-05	4.2E-02	1.2E-02	6.1E-01	2.5E-03	1.4E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.2E-01	4.8E-01	3.1E+00	4.0E-02	3.9E+00
Molybdenum	1.1E-03	---	5.4E-02	---	5.8E-04	3.7E-03	8.7E-02	3.2E-01	1.1E-01	5.7E-01
Nickel	8.3E-02	---	4.4E+00	---	1.7E-03	1.7E-01	2.2E-01	2.6E+00	2.4E-02	7.5E+00
Selenium	1.1E-03	---	5.3E-02	---	1.3E-04	1.3E-03	1.7E-03	1.3E-01	7.4E-02	2.6E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	2.2E-04	1.2E-02
Uranium	2.1E-03	---	3.4E-03	---	6.8E-04	2.3E-02	6.0E-02	6.5E-02	1.4E-02	1.7E-01
Vanadium	4.6E-02	---	9.7E-02	---	1.0E-03	8.2E-02	1.0E-01	2.5E-01	2.8E-02	6.0E-01
Zinc	1.3E-01	---	3.2E+01	---	2.4E-03	2.0E-01	4.6E-01	4.9E+01	5.4E+00	8.8E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.3E-04	1.2E-03	8.7E-04	---	2.4E-05	---	---	---	---	2.4E-03
Arsenic	3.9E-03	1.1E-02	1.8E-03	---	3.1E-04	---	---	---	---	1.7E-02
Barium	3.7E-03	3.3E-01	8.9E-04	---	9.3E-04	---	---	---	---	3.4E-01
Beryllium	5.0E-04	5.8E-03	6.0E-05	---	1.7E-05	---	---	---	---	6.3E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	1.5E-06	---	---	---	---	3.5E-02
Chromium (Total)	6.2E-02	3.0E-01	5.0E-02	---	3.9E-04	---	---	---	---	4.1E-01
Cobalt	1.1E-02	4.7E-02	3.5E-03	---	5.5E-05	---	---	---	---	6.1E-02
Copper	3.3E-02	7.2E-01	4.5E-02	---	2.5E-04	---	---	---	---	8.0E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	3.3E-05	---	---	---	---	8.3E-02
Manganese	2.7E-02	1.7E+00	4.8E-03	---	4.7E-03	---	---	---	---	1.7E+00
Molybdenum	8.4E-04	3.0E-01	2.1E-03	---	2.3E-04	---	---	---	---	3.0E-01
Nickel	6.2E-02	5.0E-01	1.7E-01	---	7.0E-04	---	---	---	---	7.3E-01
Selenium	8.0E-04	9.6E-03	2.1E-03	---	5.3E-05	---	---	---	---	1.3E-02
Thallium	1.5E-04	7.9E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.7E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.7E-04	---	---	---	---	3.8E-03
Vanadium	3.4E-02	1.0E-01	3.8E-03	---	4.1E-04	---	---	---	---	1.4E-01
Zinc	9.5E-02	3.3E+00	1.3E+00	---	9.8E-04	---	---	---	---	4.7E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.5E-04	3.5E-04	2.7E-06	6.5E-06	5.6E-06	---	---	2.5E-05	8.7E-04
Arsenic	1.6E-03	2.4E-03	7.3E-04	1.1E-04	5.8E-05	1.4E-04	---	---	3.6E-04	5.5E-03
Barium	1.5E-03	7.3E-02	3.4E-04	2.1E-03	4.9E-04	3.3E-04	---	---	4.6E-03	8.2E-02
Beryllium	2.1E-04	1.2E-03	2.4E-05	8.1E-05	1.3E-06	1.9E-05	---	---	1.9E-05	1.5E-03
Cadmium	3.1E-04	4.5E-03	7.4E-03	2.8E-03	2.5E-06	3.6E-05	---	---	1.6E-04	1.5E-02
Chromium (Total)	1.6E-02	2.0E-02	1.2E-02	1.5E-02	8.4E-05	1.5E-03	---	---	3.6E-04	6.5E-02
Cobalt	3.6E-03	6.2E-03	1.1E-03	7.9E-04	1.9E-05	4.1E-04	---	---	2.7E-04	1.2E-02
Copper	1.3E-02	2.0E-01	1.8E-02	7.2E-02	1.1E-04	5.6E-04	---	---	1.0E-02	3.1E-01
Lead	9.0E-03	7.3E-03	1.1E-02	2.1E-02	3.1E-05	7.0E-04	---	---	6.4E-04	5.0E-02
Manganese	1.1E-02	5.3E-01	1.9E-03	4.7E-03	4.4E-03	4.3E-03	---	---	1.6E-02	5.7E-01
Molybdenum	3.5E-04	1.0E-01	8.5E-04	7.8E-04	3.2E-06	2.3E-05	---	---	3.9E-04	1.0E-01
Nickel	9.6E-03	2.9E-02	2.5E-02	1.7E-02	6.5E-05	8.0E-04	---	---	7.0E-04	8.3E-02
Selenium	3.4E-04	2.5E-03	8.4E-04	3.2E-03	7.8E-06	3.7E-05	---	---	1.7E-03	8.6E-03
Thallium	6.6E-05	1.7E-04	7.8E-06	7.4E-05	6.5E-07	6.1E-06	---	---	5.3E-05	3.8E-04
Uranium	6.6E-04	4.1E-04	5.5E-05	1.5E-05	2.6E-06	5.2E-05	---	---	2.1E-05	1.2E-03
Vanadium	1.4E-02	1.9E-02	1.5E-03	1.7E-03	7.1E-05	1.3E-03	---	---	7.3E-04	3.8E-02
Zinc	4.0E-02	7.9E-01	5.1E-01	7.2E-01	4.5E-04	3.8E-03	---	---	4.9E-01	2.5E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.2E-05	---	---	5.1E-06	3.0E-06	6.3E-05	---	1.2E-05	2.5E-04	3.8E-04
Arsenic	6.0E-04	---	---	2.0E-04	2.7E-05	1.5E-03	---	1.6E-02	3.5E-03	2.2E-02
Barium	5.6E-04	---	---	3.9E-03	2.3E-04	3.7E-03	---	1.3E-02	4.5E-02	6.6E-02
Beryllium	7.8E-05	---	---	1.5E-04	6.0E-07	2.1E-04	---	7.4E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	1.2E-06	4.0E-04	---	1.3E-02	1.5E-03	2.0E-02
Chromium (Total)	5.8E-03	---	---	2.8E-02	3.9E-05	1.6E-02	---	7.9E-02	3.5E-03	1.3E-01
Cobalt	1.3E-03	---	---	1.5E-03	9.0E-06	4.6E-03	---	3.0E-04	2.6E-03	1.0E-02
Copper	4.9E-03	---	---	1.3E-01	5.1E-05	6.3E-03	---	3.7E-01	1.0E-01	6.2E-01
Lead	3.4E-03	---	---	4.0E-02	1.4E-05	7.8E-03	---	2.1E-02	6.2E-03	7.8E-02
Manganese	4.3E-03	---	---	8.7E-03	2.0E-03	4.8E-02	---	2.0E-01	1.5E-01	4.1E-01
Molybdenum	1.3E-04	---	---	1.5E-03	1.5E-06	2.6E-04	---	3.6E-03	3.7E-03	9.2E-03
Nickel	3.6E-03	---	---	3.2E-02	3.0E-05	8.9E-03	---	3.4E-02	6.8E-03	8.5E-02
Selenium	1.3E-04	---	---	6.0E-03	3.6E-06	4.1E-04	---	6.8E-03	1.6E-02	3.0E-02
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	6.8E-05	---	3.6E-04	5.1E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	1.2E-06	5.7E-04	---	2.6E-04	2.1E-04	1.3E-03
Vanadium	5.2E-03	---	---	3.2E-03	3.3E-05	1.4E-02	---	6.8E-03	7.1E-03	3.6E-02
Zinc	1.5E-02	---	---	1.3E+00	2.1E-04	4.2E-02	---	2.2E+00	4.7E+00	8.3E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.4E-05	---	---	7.2E-06	3.1E-05	6.3E-05	---	---	1.7E-04
Arsenic	4.3E-04	3.5E-04	---	---	6.5E-05	7.4E-04	3.0E-03	---	---	4.6E-03
Barium	4.0E-04	1.1E-02	---	---	5.4E-04	1.8E-03	4.7E-03	---	---	1.9E-02
Beryllium	5.6E-05	2.1E-04	---	---	1.4E-06	1.0E-04	1.6E-04	---	---	5.3E-04
Cadmium	8.4E-05	5.2E-04	---	---	2.8E-06	1.9E-04	2.5E-04	---	---	1.0E-03
Chromium (Total)	4.2E-03	3.1E-03	---	---	9.4E-05	7.9E-03	4.8E-03	---	---	2.0E-02
Cobalt	9.7E-04	9.6E-04	---	---	2.2E-05	2.3E-03	1.8E-03	---	---	6.0E-03
Copper	3.5E-03	2.1E-02	---	---	1.2E-04	3.1E-03	1.6E-02	---	---	4.3E-02
Lead	2.4E-03	1.3E-03	---	---	3.4E-05	3.8E-03	2.3E-03	---	---	9.9E-03
Manganese	3.1E-03	4.7E-02	---	---	4.9E-03	2.4E-02	9.7E-02	---	---	1.8E-01
Molybdenum	9.5E-05	8.0E-03	---	---	3.6E-06	1.3E-04	6.7E-03	---	---	1.5E-02
Nickel	2.6E-03	2.9E-03	---	---	7.2E-05	4.4E-03	9.3E-03	---	---	1.9E-02
Selenium	9.2E-05	3.3E-04	---	---	8.6E-06	2.0E-04	3.5E-04	---	---	9.7E-04
Thallium	1.8E-05	2.9E-05	---	---	7.2E-07	3.3E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.5E-05	---	---	2.9E-06	2.8E-04	1.2E-03	---	---	1.7E-03
Vanadium	3.7E-03	3.0E-03	---	---	7.9E-05	6.9E-03	1.2E-02	---	---	2.6E-02
Zinc	1.1E-02	1.2E-01	---	---	5.0E-04	2.1E-02	9.3E-02	---	---	2.4E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	7.3E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.6E-02	6.1E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	1.4E-04	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.5E-03	---	---	---	---	5.2E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	8.1E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	9.7E-06	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	8.8E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	5.7E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	7.3E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.6E-02	6.1E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	1.4E-04	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.5E-03	---	---	---	---	5.2E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	8.1E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	9.7E-06	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	8.8E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	5.7E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.4E-04	---	---	5.9E-06	---	---	---	---	4.0E-04
Arsenic	2.9E-03	1.5E-03	---	---	5.3E-05	---	---	---	---	4.4E-03
Barium	2.7E-03	4.8E-02	---	---	4.4E-04	---	---	---	---	5.1E-02
Beryllium	3.7E-04	9.0E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	2.3E-06	---	---	---	---	2.8E-03
Chromium (Total)	2.8E-02	1.3E-02	---	---	7.6E-05	---	---	---	---	4.1E-02
Cobalt	6.4E-03	4.0E-03	---	---	1.8E-05	---	---	---	---	1.0E-02
Copper	2.4E-02	8.7E-02	---	---	1.0E-04	---	---	---	---	1.1E-01
Lead	1.6E-02	5.6E-03	---	---	2.8E-05	---	---	---	---	2.2E-02
Manganese	2.0E-02	2.0E-01	---	---	4.0E-03	---	---	---	---	2.2E-01
Molybdenum	6.3E-04	3.4E-02	---	---	2.9E-06	---	---	---	---	3.4E-02
Nickel	1.7E-02	1.2E-02	---	---	5.9E-05	---	---	---	---	2.9E-02
Selenium	6.1E-04	1.4E-03	---	---	7.1E-06	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.2E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	2.4E-06	---	---	---	---	1.5E-03
Vanadium	2.5E-02	1.3E-02	---	---	6.4E-05	---	---	---	---	3.7E-02
Zinc	7.2E-02	5.0E-01	---	---	4.1E-04	---	---	---	---	5.7E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.5E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.3E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.9E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.1E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.2E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.7E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.1E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.9E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.2E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.5E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.3E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.9E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.1E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.2E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.7E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.1E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.9E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.2E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.7E-04	7.5E-04	---	---	2.1E-05	---	---	---	---	1.0E-03
Arsenic	3.2E-03	5.4E-03	---	---	1.9E-04	---	---	---	---	8.8E-03
Barium	2.9E-03	1.6E-01	---	---	1.6E-03	---	---	---	---	1.7E-01
Beryllium	4.1E-04	2.7E-03	---	---	4.2E-06	---	---	---	---	3.1E-03
Cadmium	6.1E-04	1.0E-02	---	---	8.2E-06	---	---	---	---	1.1E-02
Chromium (Total)	3.0E-02	4.6E-02	---	---	2.7E-04	---	---	---	---	7.6E-02
Cobalt	7.0E-03	1.4E-02	---	---	6.3E-05	---	---	---	---	2.1E-02
Copper	2.6E-02	4.4E-01	---	---	3.6E-04	---	---	---	---	4.6E-01
Lead	1.8E-02	1.7E-02	---	---	9.9E-05	---	---	---	---	3.4E-02
Manganese	2.2E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	6.9E-04	2.2E-01	---	---	1.1E-05	---	---	---	---	2.2E-01
Nickel	1.9E-02	6.4E-02	---	---	2.1E-04	---	---	---	---	8.3E-02
Selenium	6.7E-04	5.5E-03	---	---	2.5E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	3.9E-04	---	---	2.1E-06	---	---	---	---	5.2E-04
Uranium	1.3E-03	9.2E-04	---	---	8.4E-06	---	---	---	---	2.2E-03
Vanadium	2.7E-02	4.3E-02	---	---	2.3E-04	---	---	---	---	7.0E-02
Zinc	7.8E-02	1.8E+00	---	---	1.5E-03	---	---	---	---	1.8E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.0E-05	2.8E-04	---	---	5.4E-06	7.9E-06	1.6E-04	---	---	5.3E-04
Arsenic	8.2E-04	2.9E-03	---	---	4.9E-05	1.9E-04	7.6E-03	---	---	1.2E-02
Barium	7.6E-04	9.5E-02	---	---	4.1E-04	4.6E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.6E-05	4.1E-04	---	---	2.3E-03
Cadmium	1.6E-04	4.4E-03	---	---	2.1E-06	5.0E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	7.9E-03	2.6E-02	---	---	7.1E-05	2.0E-03	1.2E-02	---	---	4.9E-02
Cobalt	1.8E-03	8.0E-03	---	---	1.6E-05	5.8E-04	4.6E-03	---	---	1.5E-02
Copper	6.7E-03	1.7E-01	---	---	9.2E-05	7.9E-04	4.1E-02	---	---	2.2E-01
Lead	4.6E-03	1.1E-02	---	---	2.6E-05	9.9E-04	5.8E-03	---	---	2.3E-02
Manganese	5.8E-03	4.0E-01	---	---	3.7E-03	6.1E-03	2.5E-01	---	---	6.6E-01
Molybdenum	1.8E-04	6.7E-02	---	---	2.7E-06	3.3E-05	1.7E-02	---	---	8.5E-02
Nickel	4.9E-03	2.4E-02	---	---	5.4E-05	1.1E-03	2.4E-02	---	---	5.4E-02
Selenium	1.7E-04	2.7E-03	---	---	6.5E-06	5.2E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.4E-04	---	---	5.4E-07	8.6E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.5E-04	---	---	2.2E-06	7.3E-05	3.1E-03	---	---	4.1E-03
Vanadium	7.0E-03	2.5E-02	---	---	5.9E-05	1.8E-03	3.2E-02	---	---	6.6E-02
Zinc	2.0E-02	1.0E+00	---	---	3.8E-04	5.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.8E-06	---	---	8.6E-07	8.1E-06	6.7E-05	---	1.5E-05	2.6E-04	3.6E-04
Arsenic	1.0E-04	---	---	3.4E-05	7.3E-05	1.6E-03	---	2.0E-02	3.6E-03	2.6E-02
Barium	9.5E-05	---	---	6.6E-04	6.1E-04	3.9E-03	---	1.7E-02	4.7E-02	6.9E-02
Beryllium	1.3E-05	---	---	2.6E-05	1.6E-06	2.2E-04	---	9.4E-04	1.9E-04	1.4E-03
Cadmium	2.0E-05	---	---	9.0E-04	3.2E-06	4.3E-04	---	1.6E-02	1.6E-03	1.9E-02
Chromium (Total)	9.9E-04	---	---	4.8E-03	1.1E-04	1.7E-02	---	1.0E-01	3.6E-03	1.3E-01
Cobalt	2.3E-04	---	---	2.5E-04	2.4E-05	4.9E-03	---	3.8E-04	2.8E-03	8.6E-03
Copper	8.4E-04	---	---	2.3E-02	1.4E-04	6.7E-03	---	4.7E-01	1.0E-01	6.1E-01
Lead	5.7E-04	---	---	6.8E-03	3.8E-05	8.4E-03	---	2.6E-02	6.5E-03	4.8E-02
Manganese	7.2E-04	---	---	1.5E-03	5.5E-03	5.2E-02	---	2.5E-01	1.6E-01	4.7E-01
Molybdenum	2.2E-05	---	---	2.5E-04	4.0E-06	2.8E-04	---	4.7E-03	3.9E-03	9.1E-03
Nickel	6.1E-04	---	---	5.4E-03	8.1E-05	9.6E-03	---	4.3E-02	7.1E-03	6.6E-02
Selenium	2.2E-05	---	---	1.0E-03	9.7E-06	4.4E-04	---	8.7E-03	1.7E-02	2.7E-02
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	7.3E-05	---	4.6E-04	5.3E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	3.2E-06	6.2E-04	---	3.3E-04	2.2E-04	1.2E-03
Vanadium	8.8E-04	---	---	5.4E-04	8.8E-05	1.5E-02	---	8.7E-03	7.4E-03	3.3E-02
Zinc	2.6E-03	---	---	2.3E-01	5.7E-04	4.5E-02	---	2.8E+00	5.0E+00	8.0E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.7E-05	8.3E-04	7.8E-06	8.7E-06	---	---	---	---	1.0E-03
Arsenic	1.7E-03	1.2E-04	1.8E-03	3.1E-04	7.8E-05	---	---	---	---	4.0E-03
Barium	1.6E-03	3.0E-03	8.2E-04	6.0E-03	6.5E-04	---	---	---	---	1.2E-02
Beryllium	2.2E-04	2.7E-05	5.7E-05	2.3E-04	1.7E-06	---	---	---	---	5.4E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	3.4E-06	---	---	---	---	2.7E-02
Chromium (Total)	1.7E-02	8.1E-04	2.9E-02	4.4E-02	1.1E-04	---	---	---	---	9.0E-02
Cobalt	3.8E-03	2.5E-04	2.6E-03	2.3E-03	2.6E-05	---	---	---	---	9.0E-03
Copper	1.4E-02	1.5E-02	4.3E-02	2.1E-01	1.5E-04	---	---	---	---	2.8E-01
Lead	9.6E-03	1.5E-04	2.6E-02	6.2E-02	4.1E-05	---	---	---	---	9.7E-02
Manganese	1.2E-02	4.5E-02	4.6E-03	1.3E-02	5.9E-03	---	---	---	---	8.1E-02
Molybdenum	3.8E-04	9.3E-03	2.0E-03	2.2E-03	4.3E-06	---	---	---	---	1.4E-02
Nickel	1.0E-02	2.3E-03	6.1E-02	4.9E-02	8.7E-05	---	---	---	---	1.2E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.2E-03	1.0E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.4E-06	1.9E-05	2.1E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.5E-05	1.3E-04	4.4E-05	3.5E-06	---	---	---	---	9.0E-04
Vanadium	1.5E-02	7.0E-04	3.5E-03	4.9E-03	9.4E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	3.4E-02	1.2E+00	2.1E+00	6.1E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.7E-04	1.1E-03	---	---	9.6E-06	---	---	---	---	2.0E-03
Arsenic	1.0E-02	1.1E-02	---	---	8.7E-05	---	---	---	---	2.1E-02
Barium	9.5E-03	3.4E-01	---	---	7.2E-04	---	---	---	---	3.5E-01
Beryllium	1.3E-03	6.4E-03	---	---	1.9E-06	---	---	---	---	7.7E-03
Cadmium	2.0E-03	1.6E-02	---	---	3.8E-06	---	---	---	---	1.8E-02
Chromium (Total)	9.8E-02	9.6E-02	---	---	1.3E-04	---	---	---	---	1.9E-01
Cobalt	2.3E-02	2.9E-02	---	---	2.9E-05	---	---	---	---	5.2E-02
Copper	8.3E-02	6.6E-01	---	---	1.6E-04	---	---	---	---	7.4E-01
Lead	5.7E-02	4.0E-02	---	---	4.5E-05	---	---	---	---	9.7E-02
Manganese	7.2E-02	1.5E+00	---	---	6.6E-03	---	---	---	---	1.6E+00
Molybdenum	2.2E-03	2.7E-01	---	---	4.8E-06	---	---	---	---	2.7E-01
Nickel	6.0E-02	9.3E-02	---	---	9.6E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	1.0E-02	---	---	1.2E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	8.8E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	3.9E-06	---	---	---	---	6.1E-03
Vanadium	8.7E-02	9.2E-02	---	---	1.1E-04	---	---	---	---	1.8E-01
Zinc	2.5E-01	3.6E+00	---	---	6.8E-04	---	---	---	---	3.9E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	4.9E-04	---	---	6.4E-06	---	---	---	---	6.2E-04
Arsenic	1.5E-03	4.8E-03	---	---	5.8E-05	---	---	---	---	6.4E-03
Barium	1.3E-03	1.5E-01	---	---	4.8E-04	---	---	---	---	1.6E-01
Beryllium	1.9E-04	2.9E-03	---	---	1.3E-06	---	---	---	---	3.1E-03
Cadmium	2.8E-04	7.4E-03	---	---	2.5E-06	---	---	---	---	7.6E-03
Chromium (Total)	1.4E-02	4.3E-02	---	---	8.4E-05	---	---	---	---	5.7E-02
Cobalt	3.2E-03	1.3E-02	---	---	1.9E-05	---	---	---	---	1.6E-02
Copper	1.2E-02	2.9E-01	---	---	1.1E-04	---	---	---	---	3.1E-01
Lead	8.1E-03	1.8E-02	---	---	3.0E-05	---	---	---	---	2.6E-02
Manganese	1.0E-02	6.9E-01	---	---	4.4E-03	---	---	---	---	7.0E-01
Molybdenum	3.2E-04	1.2E-01	---	---	3.2E-06	---	---	---	---	1.2E-01
Nickel	8.6E-03	4.2E-02	---	---	6.4E-05	---	---	---	---	5.0E-02
Selenium	3.1E-04	4.5E-03	---	---	7.7E-06	---	---	---	---	4.9E-03
Thallium	5.9E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.5E-04
Uranium	5.9E-04	8.9E-04	---	---	2.6E-06	---	---	---	---	1.5E-03
Vanadium	1.2E-02	4.1E-02	---	---	7.0E-05	---	---	---	---	5.4E-02
Zinc	3.6E-02	1.6E+00	---	---	4.5E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	1.2E-04	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.0E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	2.3E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	6.4E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.3E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.4E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.6E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	1.5E-04	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	9.5E-04	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	1.2E-04	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.0E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	2.3E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	6.4E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.3E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.4E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.6E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	1.5E-04	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	9.5E-04	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.2E-05	---	---	6.1E-06	3.5E-06	4.7E-05	---	---	2.1E-04	3.3E-04
Arsenic	7.3E-04	---	---	2.4E-04	3.2E-05	1.1E-03	---	---	3.0E-03	5.1E-03
Barium	6.7E-04	---	---	4.7E-03	2.7E-04	2.7E-03	---	---	3.8E-02	4.7E-02
Beryllium	9.4E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	5.9E-04
Cadmium	1.4E-04	---	---	6.4E-03	1.4E-06	3.0E-04	---	---	1.3E-03	8.1E-03
Chromium (Total)	7.0E-03	---	---	3.4E-02	4.6E-05	1.2E-02	---	---	3.0E-03	5.6E-02
Cobalt	1.6E-03	---	---	1.8E-03	1.1E-05	3.4E-03	---	---	2.3E-03	9.1E-03
Copper	5.9E-03	---	---	1.6E-01	6.0E-05	4.7E-03	---	---	8.6E-02	2.6E-01
Lead	4.0E-03	---	---	4.8E-02	1.7E-05	5.9E-03	---	---	5.3E-03	6.3E-02
Manganese	5.1E-03	---	---	1.0E-02	2.4E-03	3.6E-02	---	---	1.3E-01	1.9E-01
Molybdenum	1.6E-04	---	---	1.7E-03	1.8E-06	2.0E-04	---	---	3.2E-03	5.3E-03
Nickel	4.3E-03	---	---	3.8E-02	3.5E-05	6.6E-03	---	---	5.9E-03	5.5E-02
Selenium	1.5E-04	---	---	7.2E-03	4.2E-06	3.0E-04	---	---	1.4E-02	2.2E-02
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.1E-05	---	---	4.4E-04	6.8E-04
Uranium	3.0E-04	---	---	3.4E-05	1.4E-06	4.3E-04	---	---	1.8E-04	9.4E-04
Vanadium	6.2E-03	---	---	3.8E-03	3.9E-05	1.1E-02	---	---	6.1E-03	2.7E-02
Zinc	1.8E-02	---	---	1.6E+00	2.5E-04	3.1E-02	---	---	4.1E+00	5.7E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.2E-05	5.8E-02	---	2.2E-05	---	---	---	---	6.0E-02
Arsenic	1.4E-02	1.4E-04	1.2E-01	---	2.0E-04	---	---	---	---	1.4E-01
Barium	1.3E-02	3.5E-03	5.8E-02	---	1.6E-03	---	---	---	---	7.6E-02
Beryllium	1.8E-03	3.2E-05	4.0E-03	---	4.4E-06	---	---	---	---	5.8E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	8.6E-06	---	---	---	---	1.3E+00
Chromium (Total)	1.3E-01	9.6E-04	2.0E+00	---	2.9E-04	---	---	---	---	2.2E+00
Cobalt	3.1E-02	3.0E-04	1.9E-01	---	6.6E-05	---	---	---	---	2.2E-01
Copper	1.1E-01	1.8E-02	3.1E+00	---	3.7E-04	---	---	---	---	3.2E+00
Lead	7.7E-02	1.8E-04	1.8E+00	---	1.0E-04	---	---	---	---	1.9E+00
Manganese	9.7E-02	5.3E-02	3.3E-01	---	1.5E-02	---	---	---	---	4.9E-01
Molybdenum	3.0E-03	1.1E-02	1.4E-01	---	1.1E-05	---	---	---	---	1.6E-01
Nickel	8.2E-02	2.7E-03	4.3E+00	---	2.2E-04	---	---	---	---	4.4E+00
Selenium	2.9E-03	1.6E-04	1.4E-01	---	2.6E-05	---	---	---	---	1.5E-01
Thallium	5.6E-04	6.4E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.6E-03	1.8E-05	9.2E-03	---	8.8E-06	---	---	---	---	1.5E-02
Vanadium	1.2E-01	8.3E-04	2.5E-01	---	2.4E-04	---	---	---	---	3.6E-01
Zinc	3.4E-01	4.0E-02	8.6E+01	---	1.5E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	5.2E-06	1.2E-04	2.6E-05	1.4E-05	5.0E-04	6.6E-04
Arsenic	---	---	---	---	4.6E-05	2.9E-03	1.2E-03	1.9E-02	7.0E-03	3.0E-02
Barium	---	---	---	---	3.9E-04	7.1E-03	1.9E-03	1.6E-02	9.0E-02	1.2E-01
Beryllium	---	---	---	---	1.0E-06	4.0E-04	6.6E-05	8.7E-04	3.7E-04	1.7E-03
Cadmium	---	---	---	---	2.0E-06	7.7E-04	1.0E-04	1.5E-02	3.1E-03	1.9E-02
Chromium (Total)	---	---	---	---	6.7E-05	3.1E-02	2.0E-03	9.3E-02	7.0E-03	1.3E-01
Cobalt	---	---	---	---	1.5E-05	8.9E-03	7.4E-04	3.5E-04	5.3E-03	1.5E-02
Copper	---	---	---	---	8.8E-05	1.2E-02	6.5E-03	4.3E-01	2.0E-01	6.6E-01
Lead	---	---	---	---	2.4E-05	1.5E-02	9.4E-04	2.4E-02	1.3E-02	5.3E-02
Manganese	---	---	---	---	3.5E-03	9.3E-02	4.0E-02	2.3E-01	3.1E-01	6.8E-01
Molybdenum	---	---	---	---	2.6E-06	5.0E-04	2.8E-03	4.3E-03	7.5E-03	1.5E-02
Nickel	---	---	---	---	5.2E-05	1.7E-02	3.8E-03	3.9E-02	1.4E-02	7.4E-02
Selenium	---	---	---	---	6.2E-06	7.9E-04	1.4E-04	8.0E-03	3.3E-02	4.2E-02
Thallium	---	---	---	---	5.2E-07	1.3E-04	2.0E-04	4.2E-04	1.0E-03	1.8E-03
Uranium	---	---	---	---	2.1E-06	1.1E-03	5.0E-04	3.0E-04	4.2E-04	2.3E-03
Vanadium	---	---	---	---	5.6E-05	2.7E-02	5.2E-03	8.0E-03	1.4E-02	5.5E-02
Zinc	---	---	---	---	3.6E-04	8.1E-02	3.8E-02	2.6E+00	9.6E+00	1.2E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	6.6E-06	1.6E-04	1.8E-04	2.2E-04	---	5.7E-04
Arsenic	---	---	---	---	6.0E-05	3.8E-03	8.6E-03	2.9E-01	---	3.1E-01
Barium	---	---	---	---	5.0E-04	9.2E-03	1.3E-02	2.5E-01	---	2.7E-01
Beryllium	---	---	---	---	1.3E-06	5.3E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	2.6E-06	1.0E-03	7.2E-04	2.3E-01	---	2.4E-01
Chromium (Total)	---	---	---	---	8.6E-05	4.1E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	2.0E-05	1.2E-02	5.2E-03	5.4E-03	---	2.2E-02
Copper	---	---	---	---	1.1E-04	1.6E-02	4.6E-02	6.9E+00	---	6.9E+00
Lead	---	---	---	---	3.1E-05	2.0E-02	6.6E-03	3.8E-01	---	4.0E-01
Manganese	---	---	---	---	4.5E-03	1.2E-01	2.8E-01	3.6E+00	---	4.0E+00
Molybdenum	---	---	---	---	3.3E-06	6.6E-04	1.9E-02	6.7E-02	---	8.7E-02
Nickel	---	---	---	---	6.6E-05	2.2E-02	2.7E-02	6.2E-01	---	6.7E-01
Selenium	---	---	---	---	7.9E-06	1.0E-03	1.0E-03	1.3E-01	---	1.3E-01
Thallium	---	---	---	---	6.6E-07	1.7E-04	1.4E-03	6.6E-03	---	8.2E-03
Uranium	---	---	---	---	2.6E-06	1.4E-03	3.5E-03	4.8E-03	---	9.7E-03
Vanadium	---	---	---	---	7.2E-05	3.5E-02	3.6E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	4.6E-04	1.1E-01	2.7E-01	4.0E+01	---	4.1E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	2.0E-04	9.9E-04	1.1E-04	---	1.9E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	5.0E-05	4.8E-03	4.6E-02	1.4E-01	---	1.9E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.2E-04	1.1E-02	7.3E-02	1.2E-01	---	2.1E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.1E-02	7.4E-02	7.0E-01	---	8.5E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.6E-03	---	4.8E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	9.4E-05	2.0E-02	2.5E-01	3.3E+00	---	3.6E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	2.6E-05	2.5E-02	3.6E-02	1.8E-01	---	2.6E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	8.2E-04	1.1E-01	3.2E-02	---	1.5E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	5.6E-05	2.8E-02	1.5E-01	3.0E-01	---	5.2E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	6.7E-06	1.3E-03	5.4E-03	6.0E-02	---	6.9E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.1E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	2.2E-06	1.8E-03	1.9E-02	2.3E-03	---	2.3E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	6.1E-05	4.4E-02	1.9E-01	6.0E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.9E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	2.0E-04	9.9E-04	1.1E-04	---	1.9E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	5.0E-05	4.8E-03	4.6E-02	1.4E-01	---	1.9E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.2E-04	1.1E-02	7.3E-02	1.2E-01	---	2.1E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.1E-02	7.4E-02	7.0E-01	---	8.5E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.6E-03	---	4.8E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	9.4E-05	2.0E-02	2.5E-01	3.3E+00	---	3.6E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	2.6E-05	2.5E-02	3.6E-02	1.8E-01	---	2.6E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	8.2E-04	1.1E-01	3.2E-02	---	1.5E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	5.6E-05	2.8E-02	1.5E-01	3.0E-01	---	5.2E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	6.7E-06	1.3E-03	5.4E-03	6.0E-02	---	6.9E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.1E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	2.2E-06	1.8E-03	1.9E-02	2.3E-03	---	2.3E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	6.1E-05	4.4E-02	1.9E-01	6.0E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.9E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	5.1E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.3E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	9.7E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.9E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	5.7E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	6.9E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	6.2E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	4.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	5.1E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.3E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	9.7E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.9E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	5.7E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	6.9E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	6.2E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	4.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.7E-04	3.5E-05	8.6E-06	---	---	---	---	7.6E-04
Arsenic	2.8E-03	---	1.0E-03	1.4E-03	7.7E-05	---	---	---	---	5.3E-03
Barium	2.6E-03	---	4.7E-04	2.7E-02	6.4E-04	---	---	---	---	3.1E-02
Beryllium	3.6E-04	---	3.2E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	3.3E-06	---	---	---	---	4.8E-02
Chromium (Total)	2.7E-02	---	1.6E-02	2.0E-01	1.1E-04	---	---	---	---	2.4E-01
Cobalt	6.2E-03	---	1.5E-03	1.0E-02	2.6E-05	---	---	---	---	1.8E-02
Copper	2.3E-02	---	2.5E-02	9.4E-01	1.5E-04	---	---	---	---	9.9E-01
Lead	1.6E-02	---	1.5E-02	2.8E-01	4.0E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.6E-03	6.1E-02	5.8E-03	---	---	---	---	8.9E-02
Molybdenum	6.1E-04	---	1.2E-03	1.0E-02	4.3E-06	---	---	---	---	1.2E-02
Nickel	1.7E-02	---	3.5E-02	2.2E-01	8.6E-05	---	---	---	---	2.7E-01
Selenium	5.9E-04	---	1.2E-03	4.2E-02	1.0E-05	---	---	---	---	4.3E-02
Thallium	1.1E-04	---	1.1E-05	9.7E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	3.4E-06	---	---	---	---	1.4E-03
Vanadium	2.4E-02	---	2.0E-03	2.2E-02	9.3E-05	---	---	---	---	4.8E-02
Zinc	7.0E-02	---	7.0E-01	9.3E+00	6.0E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	2.1E-04	3.1E-04	2.5E-04	1.3E-04	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.6E-04	5.2E-03	1.5E-02	3.3E-01	1.9E-03	4.1E-01
Barium	4.7E-03	---	2.1E-02	---	1.3E-03	1.2E-02	2.3E-02	2.8E-01	2.4E-02	3.7E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.5E-02	2.3E-02	1.7E+00	1.9E-03	2.5E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.6E-02	8.8E-03	6.2E-03	1.4E-03	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	3.0E-04	2.1E-02	7.8E-02	7.8E+00	5.4E-02	9.1E+00
Lead	2.8E-02	---	6.7E-01	---	8.2E-05	2.7E-02	1.1E-02	4.3E-01	3.3E-03	1.2E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	8.9E-04	3.3E-02	7.6E-02	2.0E-03	1.7E-01
Nickel	3.0E-02	---	1.6E+00	---	1.7E-04	3.0E-02	4.6E-02	7.1E-01	3.7E-03	2.4E+00
Selenium	1.1E-03	---	5.3E-02	---	2.1E-05	1.4E-03	1.7E-03	1.4E-01	8.8E-03	2.1E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.3E-04	2.4E-03	7.6E-03	2.7E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.0E-03	6.0E-03	5.4E-03	1.1E-04	1.9E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.9E-04	4.8E-02	6.2E-02	1.4E-01	3.8E-03	3.9E-01
Zinc	1.3E-01	---	3.2E+01	---	1.2E-03	1.4E-01	4.6E-01	4.6E+01	2.5E+00	8.1E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	2.1E-04	3.1E-04	2.5E-04	1.3E-04	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.6E-04	5.2E-03	1.5E-02	3.3E-01	1.9E-03	4.1E-01
Barium	4.7E-03	---	2.1E-02	---	1.3E-03	1.2E-02	2.3E-02	2.8E-01	2.4E-02	3.7E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.5E-02	2.3E-02	1.7E+00	1.9E-03	2.5E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.6E-02	8.8E-03	6.2E-03	1.4E-03	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	3.0E-04	2.1E-02	7.8E-02	7.8E+00	5.4E-02	9.1E+00
Lead	2.8E-02	---	6.7E-01	---	8.2E-05	2.7E-02	1.1E-02	4.3E-01	3.3E-03	1.2E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	8.9E-04	3.3E-02	7.6E-02	2.0E-03	1.7E-01
Nickel	3.0E-02	---	1.6E+00	---	1.7E-04	3.0E-02	4.6E-02	7.1E-01	3.7E-03	2.4E+00
Selenium	1.1E-03	---	5.3E-02	---	2.1E-05	1.4E-03	1.7E-03	1.4E-01	8.8E-03	2.1E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.3E-04	2.4E-03	7.6E-03	2.7E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.0E-03	6.0E-03	5.4E-03	1.1E-04	1.9E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.9E-04	4.8E-02	6.2E-02	1.4E-01	3.8E-03	3.9E-01
Zinc	1.3E-01	---	3.2E+01	---	1.2E-03	1.4E-01	4.6E-01	4.6E+01	2.5E+00	8.1E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.2E-04	1.1E-03	8.5E-04	---	7.0E-06	---	---	---	---	2.3E-03
Arsenic	3.8E-03	9.9E-03	1.8E-03	---	6.3E-05	---	---	---	---	1.6E-02
Barium	3.5E-03	3.1E-01	8.4E-04	---	5.2E-04	---	---	---	---	3.1E-01
Beryllium	4.9E-04	5.6E-03	5.8E-05	---	1.4E-06	---	---	---	---	6.1E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	2.7E-06	---	---	---	---	3.5E-02
Chromium (Total)	3.6E-02	8.6E-02	2.9E-02	---	9.1E-05	---	---	---	---	1.5E-01
Cobalt	8.3E-03	2.6E-02	2.7E-03	---	2.1E-05	---	---	---	---	3.7E-02
Copper	3.1E-02	6.6E-01	4.5E-02	---	1.2E-04	---	---	---	---	7.4E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	3.3E-05	---	---	---	---	8.2E-02
Manganese	2.6E-02	1.6E+00	4.7E-03	---	4.8E-03	---	---	---	---	1.7E+00
Molybdenum	8.2E-04	2.9E-01	2.1E-03	---	3.5E-06	---	---	---	---	3.0E-01
Nickel	2.2E-02	9.5E-02	6.3E-02	---	7.0E-05	---	---	---	---	1.8E-01
Selenium	7.9E-04	9.5E-03	2.1E-03	---	8.4E-06	---	---	---	---	1.2E-02
Thallium	1.5E-04	7.8E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.5E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.8E-06	---	---	---	---	3.4E-03
Vanadium	3.2E-02	8.2E-02	3.6E-03	---	7.6E-05	---	---	---	---	1.2E-01
Zinc	9.3E-02	3.3E+00	1.3E+00	---	4.9E-04	---	---	---	---	4.6E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.7E-04	3.5E-04	2.8E-06	8.5E-06	6.8E-06	---	---	3.3E-05	9.2E-04
Arsenic	1.7E-03	2.7E-03	7.5E-04	1.1E-04	6.6E-05	1.4E-04	---	---	4.0E-04	5.9E-03
Barium	1.6E-03	7.8E-02	3.6E-04	2.2E-03	5.2E-04	3.3E-04	---	---	4.9E-03	8.8E-02
Beryllium	2.2E-04	1.2E-03	2.4E-05	8.3E-05	1.3E-06	1.9E-05	---	---	1.9E-05	1.6E-03
Cadmium	3.1E-04	4.6E-03	7.4E-03	2.8E-03	2.5E-06	3.6E-05	---	---	1.6E-04	1.5E-02
Chromium (Total)	2.7E-02	7.5E-02	2.0E-02	2.3E-02	9.3E-05	1.5E-03	---	---	3.9E-04	1.5E-01
Cobalt	4.6E-03	1.2E-02	1.4E-03	1.0E-03	2.1E-05	4.2E-04	---	---	2.9E-04	1.9E-02
Copper	1.4E-02	2.2E-01	1.8E-02	7.3E-02	1.1E-04	5.7E-04	---	---	1.1E-02	3.3E-01
Lead	9.1E-03	7.4E-03	1.1E-02	2.2E-02	3.1E-05	7.0E-04	---	---	6.4E-04	5.0E-02
Manganese	1.2E-02	5.5E-01	2.0E-03	4.9E-03	4.4E-03	4.3E-03	---	---	1.6E-02	6.0E-01
Molybdenum	3.6E-04	1.0E-01	8.6E-04	8.0E-04	1.9E-05	2.7E-05	---	---	2.2E-03	1.1E-01
Nickel	2.7E-02	1.4E-01	7.1E-02	2.7E-02	9.1E-05	9.2E-04	---	---	9.9E-04	2.7E-01
Selenium	3.5E-04	2.5E-03	8.5E-04	3.2E-03	1.0E-05	3.7E-05	---	---	2.2E-03	9.2E-03
Thallium	6.7E-05	1.8E-04	7.8E-06	7.5E-05	6.6E-07	6.2E-06	---	---	5.4E-05	3.9E-04
Uranium	6.6E-04	4.2E-04	5.5E-05	1.5E-05	1.0E-05	6.5E-05	---	---	8.5E-05	1.3E-03
Vanadium	1.5E-02	2.4E-02	1.6E-03	1.8E-03	8.1E-05	1.3E-03	---	---	8.3E-04	4.4E-02
Zinc	4.1E-02	8.0E-01	5.1E-01	7.2E-01	4.7E-04	3.8E-03	---	---	5.0E-01	2.6E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.3E-05	---	---	5.2E-06	3.9E-06	7.5E-05	---	1.5E-05	3.2E-04	4.7E-04
Arsenic	6.2E-04	---	---	2.0E-04	3.1E-05	1.6E-03	---	1.6E-02	3.9E-03	2.3E-02
Barium	5.9E-04	---	---	4.1E-03	2.4E-04	3.7E-03	---	1.4E-02	4.8E-02	7.0E-02
Beryllium	8.0E-05	---	---	1.5E-04	6.0E-07	2.1E-04	---	7.4E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	1.2E-06	4.0E-04	---	1.3E-02	1.5E-03	2.0E-02
Chromium (Total)	1.0E-02	---	---	4.2E-02	4.3E-05	1.6E-02	---	7.9E-02	3.8E-03	1.5E-01
Cobalt	1.7E-03	---	---	1.9E-03	9.6E-06	4.7E-03	---	3.0E-04	2.8E-03	1.1E-02
Copper	5.3E-03	---	---	1.4E-01	5.3E-05	6.3E-03	---	3.7E-01	1.0E-01	6.3E-01
Lead	3.4E-03	---	---	4.0E-02	1.4E-05	7.8E-03	---	2.1E-02	6.2E-03	7.8E-02
Manganese	4.4E-03	---	---	9.1E-03	2.0E-03	4.8E-02	---	2.0E-01	1.5E-01	4.1E-01
Molybdenum	1.4E-04	---	---	1.5E-03	8.7E-06	3.0E-04	---	4.2E-03	2.2E-02	2.8E-02
Nickel	9.9E-03	---	---	5.1E-02	4.2E-05	1.0E-02	---	3.9E-02	9.6E-03	1.2E-01
Selenium	1.3E-04	---	---	6.0E-03	4.7E-06	4.1E-04	---	6.8E-03	2.1E-02	3.5E-02
Thallium	2.5E-05	---	---	1.4E-04	3.1E-07	6.8E-05	---	3.6E-04	5.2E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	4.8E-06	7.2E-04	---	3.3E-04	8.2E-04	2.2E-03
Vanadium	5.5E-03	---	---	3.4E-03	3.7E-05	1.4E-02	---	6.9E-03	8.1E-03	3.8E-02
Zinc	1.5E-02	---	---	1.3E+00	2.2E-04	4.2E-02	---	2.2E+00	4.9E+00	8.5E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.8E-05	3.6E-05	---	---	9.4E-06	3.7E-05	7.6E-05	---	---	2.0E-04
Arsenic	4.5E-04	3.9E-04	---	---	7.3E-05	7.7E-04	3.1E-03	---	---	4.7E-03
Barium	4.3E-04	1.2E-02	---	---	5.8E-04	1.8E-03	4.7E-03	---	---	2.0E-02
Beryllium	5.8E-05	2.2E-04	---	---	1.4E-06	1.0E-04	1.6E-04	---	---	5.4E-04
Cadmium	8.4E-05	5.2E-04	---	---	2.8E-06	1.9E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	7.1E-03	1.1E-02	---	---	1.0E-04	8.0E-03	4.8E-03	---	---	3.1E-02
Cobalt	1.2E-03	1.7E-03	---	---	2.3E-05	2.3E-03	1.8E-03	---	---	7.0E-03
Copper	3.8E-03	2.2E-02	---	---	1.3E-04	3.1E-03	1.6E-02	---	---	4.5E-02
Lead	2.4E-03	1.3E-03	---	---	3.4E-05	3.8E-03	2.3E-03	---	---	9.9E-03
Manganese	3.2E-03	4.9E-02	---	---	4.9E-03	2.4E-02	9.7E-02	---	---	1.8E-01
Molybdenum	9.7E-05	8.2E-03	---	---	2.1E-05	1.5E-04	7.7E-03	---	---	1.6E-02
Nickel	7.1E-03	1.6E-02	---	---	1.0E-04	5.0E-03	1.1E-02	---	---	3.9E-02
Selenium	9.2E-05	3.3E-04	---	---	1.1E-05	2.0E-04	3.5E-04	---	---	9.8E-04
Thallium	1.8E-05	3.0E-05	---	---	7.3E-07	3.4E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.7E-05	---	---	1.1E-05	3.6E-04	1.5E-03	---	---	2.1E-03
Vanadium	4.0E-03	3.7E-03	---	---	8.9E-05	7.0E-03	1.3E-02	---	---	2.7E-02
Zinc	1.1E-02	1.2E-01	---	---	5.2E-04	2.1E-02	9.3E-02	---	---	2.5E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	1.1E-05	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.5E-04	8.3E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.7E-02	6.5E-04	---	---	---	---	1.9E-02
Beryllium	1.8E-04	---	---	6.4E-04	1.6E-06	---	---	---	---	8.3E-04
Cadmium	2.7E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	1.2E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	2.6E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	1.4E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.5E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	2.4E-05	---	---	---	---	6.5E-03
Nickel	2.3E-02	---	---	2.1E-01	1.1E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.3E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.2E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	1.3E-05	---	---	---	---	6.9E-04
Vanadium	1.3E-02	---	---	1.4E-02	1.0E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	5.8E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	1.1E-05	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.5E-04	8.3E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.7E-02	6.5E-04	---	---	---	---	1.9E-02
Beryllium	1.8E-04	---	---	6.4E-04	1.6E-06	---	---	---	---	8.3E-04
Cadmium	2.7E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	1.2E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	2.6E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	1.4E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.5E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	2.4E-05	---	---	---	---	6.5E-03
Nickel	2.3E-02	---	---	2.1E-01	1.1E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.3E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.2E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	1.3E-05	---	---	---	---	6.9E-04
Vanadium	1.3E-02	---	---	1.4E-02	1.0E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	5.8E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.5E-04	---	---	7.6E-06	---	---	---	---	4.1E-04
Arsenic	3.0E-03	1.6E-03	---	---	6.0E-05	---	---	---	---	4.7E-03
Barium	2.8E-03	5.1E-02	---	---	4.7E-04	---	---	---	---	5.4E-02
Beryllium	3.8E-04	9.3E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	2.3E-06	---	---	---	---	2.8E-03
Chromium (Total)	4.8E-02	4.5E-02	---	---	8.4E-05	---	---	---	---	9.2E-02
Cobalt	8.2E-03	7.1E-03	---	---	1.9E-05	---	---	---	---	1.5E-02
Copper	2.5E-02	9.5E-02	---	---	1.0E-04	---	---	---	---	1.2E-01
Lead	1.6E-02	5.7E-03	---	---	2.8E-05	---	---	---	---	2.2E-02
Manganese	2.1E-02	2.1E-01	---	---	4.0E-03	---	---	---	---	2.3E-01
Molybdenum	6.4E-04	3.5E-02	---	---	1.7E-05	---	---	---	---	3.5E-02
Nickel	4.7E-02	6.8E-02	---	---	8.2E-05	---	---	---	---	1.2E-01
Selenium	6.1E-04	1.4E-03	---	---	9.2E-06	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.3E-04	---	---	6.0E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	9.3E-06	---	---	---	---	1.5E-03
Vanadium	2.6E-02	1.6E-02	---	---	7.3E-05	---	---	---	---	4.2E-02
Zinc	7.3E-02	5.1E-01	---	---	4.2E-04	---	---	---	---	5.8E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	2.2E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	1.7E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	1.4E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	3.4E-06	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	2.5E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	5.5E-05	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	3.0E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.1E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.2E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	5.0E-05	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	2.4E-04	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	2.7E-05	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	2.7E-05	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	2.1E-04	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	1.2E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	2.2E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	1.7E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	1.4E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	3.4E-06	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	2.5E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	5.5E-05	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	3.0E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.1E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.2E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	5.0E-05	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	2.4E-04	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	2.7E-05	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	2.7E-05	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	2.1E-04	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	1.2E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.8E-04	8.0E-04	---	---	2.7E-05	---	---	---	---	1.1E-03
Arsenic	3.3E-03	6.0E-03	---	---	2.1E-04	---	---	---	---	9.5E-03
Barium	3.1E-03	1.8E-01	---	---	1.7E-03	---	---	---	---	1.8E-01
Beryllium	4.2E-04	2.8E-03	---	---	4.2E-06	---	---	---	---	3.2E-03
Cadmium	6.1E-04	1.0E-02	---	---	8.2E-06	---	---	---	---	1.1E-02
Chromium (Total)	5.2E-02	1.7E-01	---	---	3.0E-04	---	---	---	---	2.2E-01
Cobalt	9.0E-03	2.6E-02	---	---	6.7E-05	---	---	---	---	3.5E-02
Copper	2.7E-02	4.7E-01	---	---	3.7E-04	---	---	---	---	5.0E-01
Lead	1.8E-02	1.7E-02	---	---	9.9E-05	---	---	---	---	3.4E-02
Manganese	2.3E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	7.1E-04	2.3E-01	---	---	6.1E-05	---	---	---	---	2.3E-01
Nickel	5.2E-02	3.1E-01	---	---	2.9E-04	---	---	---	---	3.7E-01
Selenium	6.7E-04	5.5E-03	---	---	3.3E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	4.0E-04	---	---	2.1E-06	---	---	---	---	5.3E-04
Uranium	1.3E-03	9.5E-04	---	---	3.3E-05	---	---	---	---	2.3E-03
Vanadium	2.9E-02	5.3E-02	---	---	2.6E-04	---	---	---	---	8.2E-02
Zinc	8.0E-02	1.8E+00	---	---	1.5E-03	---	---	---	---	1.9E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.2E-05	3.1E-04	---	---	7.1E-06	9.5E-06	2.0E-04	---	---	5.9E-04
Arsenic	8.5E-04	3.2E-03	---	---	5.5E-05	2.0E-04	7.8E-03	---	---	1.2E-02
Barium	8.1E-04	1.0E-01	---	---	4.4E-04	4.7E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.6E-05	4.1E-04	---	---	2.4E-03
Cadmium	1.6E-04	4.4E-03	---	---	2.1E-06	5.0E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	1.4E-02	8.9E-02	---	---	7.8E-05	2.1E-03	1.2E-02	---	---	1.2E-01
Cobalt	2.3E-03	1.4E-02	---	---	1.7E-05	5.9E-04	4.7E-03	---	---	2.2E-02
Copper	7.2E-03	1.9E-01	---	---	9.6E-05	8.0E-04	4.1E-02	---	---	2.4E-01
Lead	4.6E-03	1.1E-02	---	---	2.6E-05	9.9E-04	5.8E-03	---	---	2.3E-02
Manganese	6.0E-03	4.1E-01	---	---	3.7E-03	6.1E-03	2.5E-01	---	---	6.8E-01
Molybdenum	1.8E-04	6.9E-02	---	---	1.6E-05	3.8E-05	2.0E-02	---	---	8.9E-02
Nickel	1.4E-02	1.3E-01	---	---	7.6E-05	1.3E-03	2.8E-02	---	---	1.8E-01
Selenium	1.8E-04	2.8E-03	---	---	8.5E-06	5.2E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.5E-04	---	---	5.5E-07	8.7E-06	1.3E-03	---	---	1.5E-03
Uranium	3.4E-04	5.6E-04	---	---	8.6E-06	9.2E-05	3.9E-03	---	---	4.9E-03
Vanadium	7.5E-03	3.1E-02	---	---	6.7E-05	1.8E-03	3.3E-02	---	---	7.3E-02
Zinc	2.1E-02	1.0E+00	---	---	3.9E-04	5.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	9.0E-06	---	---	8.9E-07	1.1E-05	8.1E-05	---	1.9E-05	3.3E-04	4.5E-04
Arsenic	1.1E-04	---	---	3.5E-05	8.3E-05	1.7E-03	---	2.1E-02	4.1E-03	2.7E-02
Barium	1.0E-04	---	---	7.0E-04	6.5E-04	4.0E-03	---	1.7E-02	5.0E-02	7.3E-02
Beryllium	1.4E-05	---	---	2.6E-05	1.6E-06	2.2E-04	---	9.4E-04	1.9E-04	1.4E-03
Cadmium	2.0E-05	---	---	9.0E-04	3.2E-06	4.3E-04	---	1.6E-02	1.6E-03	1.9E-02
Chromium (Total)	1.7E-03	---	---	7.2E-03	1.2E-04	1.7E-02	---	1.0E-01	4.0E-03	1.3E-01
Cobalt	2.9E-04	---	---	3.2E-04	2.6E-05	5.0E-03	---	3.8E-04	2.9E-03	9.0E-03
Copper	8.9E-04	---	---	2.3E-02	1.4E-04	6.8E-03	---	4.8E-01	1.1E-01	6.2E-01
Lead	5.7E-04	---	---	6.8E-03	3.8E-05	8.4E-03	---	2.6E-02	6.5E-03	4.9E-02
Manganese	7.5E-04	---	---	1.5E-03	5.5E-03	5.2E-02	---	2.5E-01	1.6E-01	4.7E-01
Molybdenum	2.3E-05	---	---	2.5E-04	2.4E-05	3.2E-04	---	5.3E-03	2.3E-02	2.9E-02
Nickel	1.7E-03	---	---	8.7E-03	1.1E-04	1.1E-02	---	5.0E-02	1.0E-02	8.1E-02
Selenium	2.2E-05	---	---	1.0E-03	1.3E-05	4.4E-04	---	8.7E-03	2.2E-02	3.3E-02
Thallium	4.2E-06	---	---	2.4E-05	8.2E-07	7.4E-05	---	4.6E-04	5.4E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	1.3E-05	7.8E-04	---	4.2E-04	8.6E-04	2.1E-03
Vanadium	9.4E-04	---	---	5.8E-04	1.0E-04	1.5E-02	---	8.8E-03	8.5E-03	3.4E-02
Zinc	2.6E-03	---	---	2.3E-01	5.8E-04	4.5E-02	---	2.8E+00	5.1E+00	8.2E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.8E-05	8.5E-04	8.0E-06	1.1E-05	---	---	---	---	1.0E-03
Arsenic	1.8E-03	1.3E-04	1.8E-03	3.1E-04	8.8E-05	---	---	---	---	4.1E-03
Barium	1.7E-03	3.2E-03	8.7E-04	6.4E-03	6.9E-04	---	---	---	---	1.3E-02
Beryllium	2.3E-04	2.9E-05	5.8E-05	2.4E-04	1.7E-06	---	---	---	---	5.6E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	3.4E-06	---	---	---	---	2.7E-02
Chromium (Total)	2.8E-02	3.7E-03	4.9E-02	6.5E-02	1.2E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	5.3E-04	3.4E-03	2.9E-03	2.8E-05	---	---	---	---	1.2E-02
Copper	1.5E-02	1.6E-02	4.4E-02	2.1E-01	1.5E-04	---	---	---	---	2.9E-01
Lead	9.6E-03	1.6E-04	2.6E-02	6.2E-02	4.1E-05	---	---	---	---	9.7E-02
Manganese	1.3E-02	4.6E-02	4.7E-03	1.4E-02	5.9E-03	---	---	---	---	8.4E-02
Molybdenum	3.9E-04	9.5E-03	2.1E-03	2.3E-03	2.5E-05	---	---	---	---	1.4E-02
Nickel	2.8E-02	9.8E-03	1.7E-01	7.9E-02	1.2E-04	---	---	---	---	2.9E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.3E-03	1.4E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.6E-06	1.9E-05	2.2E-04	8.8E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.6E-05	1.3E-04	4.4E-05	1.4E-05	---	---	---	---	9.1E-04
Vanadium	1.6E-02	9.5E-04	3.7E-03	5.2E-03	1.1E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	3.4E-02	1.2E+00	2.1E+00	6.2E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.9E-04	1.2E-03	---	---	1.3E-05	---	---	---	---	2.1E-03
Arsenic	1.1E-02	1.2E-02	---	---	9.8E-05	---	---	---	---	2.2E-02
Barium	1.0E-02	3.7E-01	---	---	7.7E-04	---	---	---	---	3.8E-01
Beryllium	1.4E-03	6.6E-03	---	---	1.9E-06	---	---	---	---	8.0E-03
Cadmium	2.0E-03	1.6E-02	---	---	3.8E-06	---	---	---	---	1.8E-02
Chromium (Total)	1.7E-01	3.2E-01	---	---	1.4E-04	---	---	---	---	4.9E-01
Cobalt	2.9E-02	5.2E-02	---	---	3.1E-05	---	---	---	---	8.1E-02
Copper	8.9E-02	7.1E-01	---	---	1.7E-04	---	---	---	---	8.0E-01
Lead	5.7E-02	4.1E-02	---	---	4.5E-05	---	---	---	---	9.8E-02
Manganese	7.5E-02	1.6E+00	---	---	6.6E-03	---	---	---	---	1.7E+00
Molybdenum	2.3E-03	2.7E-01	---	---	2.8E-05	---	---	---	---	2.7E-01
Nickel	1.7E-01	5.0E-01	---	---	1.4E-04	---	---	---	---	6.7E-01
Selenium	2.2E-03	1.0E-02	---	---	1.5E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	9.0E-04	---	---	9.8E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	1.5E-05	---	---	---	---	6.2E-03
Vanadium	9.3E-02	1.1E-01	---	---	1.2E-04	---	---	---	---	2.1E-01
Zinc	2.6E-01	3.7E+00	---	---	6.9E-04	---	---	---	---	3.9E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.3E-04	5.2E-04	---	---	8.4E-06	---	---	---	---	6.6E-04
Arsenic	1.5E-03	5.3E-03	---	---	6.6E-05	---	---	---	---	6.9E-03
Barium	1.4E-03	1.7E-01	---	---	5.2E-04	---	---	---	---	1.7E-01
Beryllium	1.9E-04	3.0E-03	---	---	1.3E-06	---	---	---	---	3.2E-03
Cadmium	2.8E-04	7.4E-03	---	---	2.5E-06	---	---	---	---	7.7E-03
Chromium (Total)	2.4E-02	1.5E-01	---	---	9.2E-05	---	---	---	---	1.7E-01
Cobalt	4.1E-03	2.3E-02	---	---	2.1E-05	---	---	---	---	2.7E-02
Copper	1.3E-02	3.2E-01	---	---	1.1E-04	---	---	---	---	3.3E-01
Lead	8.1E-03	1.8E-02	---	---	3.0E-05	---	---	---	---	2.6E-02
Manganese	1.1E-02	7.2E-01	---	---	4.4E-03	---	---	---	---	7.4E-01
Molybdenum	3.2E-04	1.2E-01	---	---	1.9E-05	---	---	---	---	1.2E-01
Nickel	2.4E-02	2.3E-01	---	---	9.0E-05	---	---	---	---	2.5E-01
Selenium	3.1E-04	4.6E-03	---	---	1.0E-05	---	---	---	---	4.9E-03
Thallium	6.0E-05	4.0E-04	---	---	6.6E-07	---	---	---	---	4.6E-04
Uranium	6.0E-04	9.2E-04	---	---	1.0E-05	---	---	---	---	1.5E-03
Vanadium	1.3E-02	5.0E-02	---	---	8.0E-05	---	---	---	---	6.4E-02
Zinc	3.7E-02	1.7E+00	---	---	4.6E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	1.8E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	1.4E-04	---	---	---	---	6.6E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.1E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	1.9E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	4.3E-05	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	2.4E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	6.4E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.3E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	4.0E-05	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.9E-04	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	2.1E-05	---	---	---	---	5.5E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	2.2E-05	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	1.7E-04	---	---	---	---	3.1E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	9.8E-04	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	1.8E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	1.4E-04	---	---	---	---	6.6E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.1E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	1.9E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	4.3E-05	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	2.4E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	6.4E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.3E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	4.0E-05	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.9E-04	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	2.1E-05	---	---	---	---	5.5E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	2.2E-05	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	1.7E-04	---	---	---	---	3.1E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	9.8E-04	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.3E-05	---	---	6.3E-06	4.6E-06	5.6E-05	---	---	2.7E-04	4.0E-04
Arsenic	7.5E-04	---	---	2.4E-04	3.6E-05	1.2E-03	---	---	3.4E-03	5.6E-03
Barium	7.1E-04	---	---	5.0E-03	2.8E-04	2.8E-03	---	---	4.1E-02	5.0E-02
Beryllium	9.6E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	5.9E-04
Cadmium	1.4E-04	---	---	6.4E-03	1.4E-06	3.0E-04	---	---	1.3E-03	8.1E-03
Chromium (Total)	1.2E-02	---	---	5.1E-02	5.1E-05	1.2E-02	---	---	3.3E-03	7.8E-02
Cobalt	2.1E-03	---	---	2.3E-03	1.1E-05	3.5E-03	---	---	2.4E-03	1.0E-02
Copper	6.3E-03	---	---	1.6E-01	6.2E-05	4.7E-03	---	---	8.9E-02	2.6E-01
Lead	4.0E-03	---	---	4.8E-02	1.7E-05	5.9E-03	---	---	5.3E-03	6.3E-02
Manganese	5.3E-03	---	---	1.1E-02	2.4E-03	3.6E-02	---	---	1.3E-01	1.9E-01
Molybdenum	1.6E-04	---	---	1.8E-03	1.0E-05	2.2E-04	---	---	1.9E-02	2.1E-02
Nickel	1.2E-02	---	---	6.1E-02	5.0E-05	7.6E-03	---	---	8.2E-03	8.9E-02
Selenium	1.5E-04	---	---	7.2E-03	5.6E-06	3.0E-04	---	---	1.8E-02	2.6E-02
Thallium	3.0E-05	---	---	1.7E-04	3.6E-07	5.1E-05	---	---	4.5E-04	6.9E-04
Uranium	3.0E-04	---	---	3.4E-05	5.6E-06	5.4E-04	---	---	7.0E-04	1.6E-03
Vanadium	6.6E-03	---	---	4.1E-03	4.4E-05	1.1E-02	---	---	6.9E-03	2.8E-02
Zinc	1.8E-02	---	---	1.6E+00	2.5E-04	3.1E-02	---	---	4.2E+00	5.8E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.4E-05	6.0E-02	---	2.9E-05	---	---	---	---	6.1E-02
Arsenic	1.4E-02	1.6E-04	1.3E-01	---	2.2E-04	---	---	---	---	1.4E-01
Barium	1.4E-02	3.8E-03	6.1E-02	---	1.8E-03	---	---	---	---	8.1E-02
Beryllium	1.8E-03	3.4E-05	4.1E-03	---	4.4E-06	---	---	---	---	6.0E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	8.6E-06	---	---	---	---	1.3E+00
Chromium (Total)	2.3E-01	4.4E-03	3.5E+00	---	3.1E-04	---	---	---	---	3.7E+00
Cobalt	3.9E-02	6.3E-04	2.4E-01	---	7.0E-05	---	---	---	---	2.8E-01
Copper	1.2E-01	1.9E-02	3.1E+00	---	3.9E-04	---	---	---	---	3.3E+00
Lead	7.7E-02	1.9E-04	1.8E+00	---	1.0E-04	---	---	---	---	1.9E+00
Manganese	1.0E-01	5.5E-02	3.3E-01	---	1.5E-02	---	---	---	---	5.0E-01
Molybdenum	3.1E-03	1.1E-02	1.5E-01	---	6.4E-05	---	---	---	---	1.6E-01
Nickel	2.3E-01	1.2E-02	1.2E+01	---	3.1E-04	---	---	---	---	1.2E+01
Selenium	2.9E-03	1.6E-04	1.4E-01	---	3.4E-05	---	---	---	---	1.5E-01
Thallium	5.7E-04	6.6E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.7E-03	1.9E-05	9.3E-03	---	3.5E-05	---	---	---	---	1.5E-02
Vanadium	1.3E-01	1.1E-03	2.6E-01	---	2.7E-04	---	---	---	---	3.9E-01
Zinc	3.5E-01	4.1E-02	8.7E+01	---	1.6E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	6.7E-06	1.5E-04	3.1E-05	1.7E-05	6.5E-04	8.5E-04
Arsenic	---	---	---	---	5.3E-05	3.0E-03	1.3E-03	1.9E-02	7.9E-03	3.1E-02
Barium	---	---	---	---	4.1E-04	7.1E-03	1.9E-03	1.6E-02	9.6E-02	1.2E-01
Beryllium	---	---	---	---	1.0E-06	4.0E-04	6.6E-05	8.7E-04	3.7E-04	1.7E-03
Cadmium	---	---	---	---	2.0E-06	7.7E-04	1.0E-04	1.5E-02	3.1E-03	1.9E-02
Chromium (Total)	---	---	---	---	7.4E-05	3.1E-02	2.0E-03	9.3E-02	7.7E-03	1.3E-01
Cobalt	---	---	---	---	1.6E-05	9.0E-03	7.5E-04	3.5E-04	5.7E-03	1.6E-02
Copper	---	---	---	---	9.1E-05	1.2E-02	6.6E-03	4.4E-01	2.1E-01	6.7E-01
Lead	---	---	---	---	2.4E-05	1.5E-02	9.4E-04	2.4E-02	1.3E-02	5.3E-02
Manganese	---	---	---	---	3.5E-03	9.3E-02	4.0E-02	2.3E-01	3.1E-01	6.8E-01
Molybdenum	---	---	---	---	1.5E-05	5.8E-04	3.2E-03	4.9E-03	4.4E-02	5.3E-02
Nickel	---	---	---	---	7.2E-05	2.0E-02	4.4E-03	4.5E-02	1.9E-02	8.9E-02
Selenium	---	---	---	---	8.1E-06	7.9E-04	1.4E-04	8.0E-03	4.3E-02	5.2E-02
Thallium	---	---	---	---	5.3E-07	1.3E-04	2.0E-04	4.2E-04	1.1E-03	1.8E-03
Uranium	---	---	---	---	8.2E-06	1.4E-03	6.3E-04	3.8E-04	1.7E-03	4.1E-03
Vanadium	---	---	---	---	6.4E-05	2.8E-02	5.2E-03	8.1E-03	1.6E-02	5.7E-02
Zinc	---	---	---	---	3.7E-04	8.1E-02	3.8E-02	2.6E+00	9.8E+00	1.3E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	8.6E-06	1.9E-04	2.2E-04	2.7E-04	---	6.9E-04
Arsenic	---	---	---	---	6.7E-05	3.9E-03	8.8E-03	3.0E-01	---	3.1E-01
Barium	---	---	---	---	5.3E-04	9.3E-03	1.4E-02	2.5E-01	---	2.7E-01
Beryllium	---	---	---	---	1.3E-06	5.3E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	2.6E-06	1.0E-03	7.2E-04	2.3E-01	---	2.4E-01
Chromium (Total)	---	---	---	---	9.5E-05	4.1E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	2.1E-05	1.2E-02	5.2E-03	5.5E-03	---	2.3E-02
Copper	---	---	---	---	1.2E-04	1.6E-02	4.6E-02	6.9E+00	---	6.9E+00
Lead	---	---	---	---	3.1E-05	2.0E-02	6.6E-03	3.8E-01	---	4.0E-01
Manganese	---	---	---	---	4.5E-03	1.2E-01	2.8E-01	3.6E+00	---	4.0E+00
Molybdenum	---	---	---	---	1.9E-05	7.5E-04	2.2E-02	7.7E-02	---	1.0E-01
Nickel	---	---	---	---	9.3E-05	2.6E-02	3.1E-02	7.2E-01	---	7.7E-01
Selenium	---	---	---	---	1.0E-05	1.0E-03	1.0E-03	1.3E-01	---	1.3E-01
Thallium	---	---	---	---	6.7E-07	1.7E-04	1.4E-03	6.7E-03	---	8.3E-03
Uranium	---	---	---	---	1.1E-05	1.8E-03	4.4E-03	6.0E-03	---	1.2E-02
Vanadium	---	---	---	---	8.2E-05	3.6E-02	3.7E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	4.8E-04	1.1E-01	2.7E-01	4.0E+01	---	4.1E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	7.2E-06	2.4E-04	1.2E-03	1.3E-04	---	2.2E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	5.7E-05	4.9E-03	4.8E-02	1.4E-01	---	2.0E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	4.5E-04	1.2E-02	7.3E-02	1.2E-01	---	2.1E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	7.9E-05	5.1E-02	7.4E-02	7.0E-01	---	8.7E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	1.8E-05	1.5E-02	2.8E-02	2.7E-03	---	5.0E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	9.8E-05	2.0E-02	2.5E-01	3.3E+00	---	3.6E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.6E-05	2.5E-02	3.6E-02	1.8E-01	---	2.6E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	1.6E-05	9.4E-04	1.2E-01	3.7E-02	---	1.7E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	7.8E-05	3.2E-02	1.7E-01	3.4E-01	---	6.8E-01
Selenium	9.1E-05	1.6E-04	1.4E-03	---	8.7E-06	1.3E-03	5.4E-03	6.0E-02	---	6.9E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.7E-07	2.2E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	8.8E-06	2.3E-03	2.4E-02	2.9E-03	---	2.9E-02
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	6.9E-05	4.5E-02	2.0E-01	6.1E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.0E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	7.2E-06	2.4E-04	1.2E-03	1.3E-04	---	2.2E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	5.7E-05	4.9E-03	4.8E-02	1.4E-01	---	2.0E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	4.5E-04	1.2E-02	7.3E-02	1.2E-01	---	2.1E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	7.9E-05	5.1E-02	7.4E-02	7.0E-01	---	8.7E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	1.8E-05	1.5E-02	2.8E-02	2.7E-03	---	5.0E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	9.8E-05	2.0E-02	2.5E-01	3.3E+00	---	3.6E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.6E-05	2.5E-02	3.6E-02	1.8E-01	---	2.6E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	1.6E-05	9.4E-04	1.2E-01	3.7E-02	---	1.7E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	7.8E-05	3.2E-02	1.7E-01	3.4E-01	---	6.8E-01
Selenium	9.1E-05	1.6E-04	1.4E-03	---	8.7E-06	1.3E-03	5.4E-03	6.0E-02	---	6.9E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.7E-07	2.2E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	8.8E-06	2.3E-03	2.4E-02	2.9E-03	---	2.9E-02
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	6.9E-05	4.5E-02	2.0E-01	6.1E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.0E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	7.4E-06	---	---	---	---	1.7E-04
Arsenic	1.8E-03	---	---	5.8E-04	5.8E-05	---	---	---	---	2.4E-03
Barium	1.7E-03	---	---	1.2E-02	4.6E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.1E-06	---	---	---	---	6.7E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	8.2E-05	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	1.8E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	1.0E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.9E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	1.7E-05	---	---	---	---	4.6E-03
Nickel	2.8E-02	---	---	1.5E-01	8.0E-05	---	---	---	---	1.7E-01
Selenium	3.7E-04	---	---	1.7E-02	9.0E-06	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.8E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	9.1E-06	---	---	---	---	8.0E-04
Vanadium	1.6E-02	---	---	9.7E-03	7.1E-05	---	---	---	---	2.5E-02
Zinc	4.4E-02	---	---	3.8E+00	4.1E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	7.4E-06	---	---	---	---	1.7E-04
Arsenic	1.8E-03	---	---	5.8E-04	5.8E-05	---	---	---	---	2.4E-03
Barium	1.7E-03	---	---	1.2E-02	4.6E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.1E-06	---	---	---	---	6.7E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	8.2E-05	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	1.8E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	1.0E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.9E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	1.7E-05	---	---	---	---	4.6E-03
Nickel	2.8E-02	---	---	1.5E-01	8.0E-05	---	---	---	---	1.7E-01
Selenium	3.7E-04	---	---	1.7E-02	9.0E-06	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.8E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	9.1E-06	---	---	---	---	8.0E-04
Vanadium	1.6E-02	---	---	9.7E-03	7.1E-05	---	---	---	---	2.5E-02
Zinc	4.4E-02	---	---	3.8E+00	4.1E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.9E-04	3.6E-05	1.1E-05	---	---	---	---	7.8E-04
Arsenic	2.9E-03	---	1.0E-03	1.4E-03	8.7E-05	---	---	---	---	5.4E-03
Barium	2.8E-03	---	5.0E-04	2.9E-02	6.9E-04	---	---	---	---	3.3E-02
Beryllium	3.7E-04	---	3.3E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	3.3E-06	---	---	---	---	4.8E-02
Chromium (Total)	4.6E-02	---	2.8E-02	2.9E-01	1.2E-04	---	---	---	---	3.7E-01
Cobalt	7.9E-03	---	1.9E-03	1.3E-02	2.7E-05	---	---	---	---	2.3E-02
Copper	2.4E-02	---	2.5E-02	9.5E-01	1.5E-04	---	---	---	---	1.0E+00
Lead	1.6E-02	---	1.5E-02	2.8E-01	4.0E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.7E-03	6.3E-02	5.8E-03	---	---	---	---	9.2E-02
Molybdenum	6.3E-04	---	1.2E-03	1.0E-02	2.5E-05	---	---	---	---	1.2E-02
Nickel	4.6E-02	---	9.7E-02	3.6E-01	1.2E-04	---	---	---	---	5.0E-01
Selenium	6.0E-04	---	1.2E-03	4.2E-02	1.3E-05	---	---	---	---	4.4E-02
Thallium	1.2E-04	---	1.1E-05	9.8E-04	8.7E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	1.4E-05	---	---	---	---	1.4E-03
Vanadium	2.6E-02	---	2.1E-03	2.4E-02	1.1E-04	---	---	---	---	5.1E-02
Zinc	7.1E-02	---	7.0E-01	9.3E+00	6.2E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	2.3E-05	2.6E-04	3.8E-04	3.0E-04	1.7E-04	2.4E-02
Arsenic	5.2E-03	---	4.7E-02	---	1.8E-04	5.3E-03	1.5E-02	3.4E-01	2.1E-03	4.2E-01
Barium	5.0E-03	---	2.3E-02	---	1.4E-03	1.3E-02	2.3E-02	2.8E-01	2.6E-02	3.7E-01
Beryllium	6.7E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	2.5E-04	5.5E-02	2.4E-02	1.7E+00	2.0E-03	3.1E+00
Cobalt	1.4E-02	---	8.8E-02	---	5.6E-05	1.6E-02	8.9E-03	6.3E-03	1.5E-03	1.3E-01
Copper	4.4E-02	---	1.2E+00	---	3.1E-04	2.2E-02	7.9E-02	7.8E+00	5.6E-02	9.2E+00
Lead	2.8E-02	---	6.7E-01	---	8.2E-05	2.7E-02	1.1E-02	4.3E-01	3.3E-03	1.2E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.4E-02	---	5.1E-05	1.0E-03	3.8E-02	8.8E-02	1.2E-02	1.9E-01
Nickel	8.3E-02	---	4.4E+00	---	2.4E-04	3.5E-02	5.3E-02	8.1E-01	5.1E-03	5.4E+00
Selenium	1.1E-03	---	5.3E-02	---	2.7E-05	1.4E-03	1.7E-03	1.4E-01	1.2E-02	2.1E-01
Thallium	2.1E-04	---	4.9E-04	---	1.8E-06	2.3E-04	2.4E-03	7.6E-03	2.8E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	2.8E-05	2.5E-03	7.5E-03	6.8E-03	4.4E-04	2.3E-02
Vanadium	4.6E-02	---	9.7E-02	---	2.2E-04	4.9E-02	6.3E-02	1.5E-01	4.3E-03	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.3E-03	1.4E-01	4.6E-01	4.6E+01	2.6E+00	8.1E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	2.3E-05	2.6E-04	3.8E-04	3.0E-04	1.7E-04	2.4E-02
Arsenic	5.2E-03	---	4.7E-02	---	1.8E-04	5.3E-03	1.5E-02	3.4E-01	2.1E-03	4.2E-01
Barium	5.0E-03	---	2.3E-02	---	1.4E-03	1.3E-02	2.3E-02	2.8E-01	2.6E-02	3.7E-01
Beryllium	6.7E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	2.5E-04	5.5E-02	2.4E-02	1.7E+00	2.0E-03	3.1E+00
Cobalt	1.4E-02	---	8.8E-02	---	5.6E-05	1.6E-02	8.9E-03	6.3E-03	1.5E-03	1.3E-01
Copper	4.4E-02	---	1.2E+00	---	3.1E-04	2.2E-02	7.9E-02	7.8E+00	5.6E-02	9.2E+00
Lead	2.8E-02	---	6.7E-01	---	8.2E-05	2.7E-02	1.1E-02	4.3E-01	3.3E-03	1.2E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.4E-02	---	5.1E-05	1.0E-03	3.8E-02	8.8E-02	1.2E-02	1.9E-01
Nickel	8.3E-02	---	4.4E+00	---	2.4E-04	3.5E-02	5.3E-02	8.1E-01	5.1E-03	5.4E+00
Selenium	1.1E-03	---	5.3E-02	---	2.7E-05	1.4E-03	1.7E-03	1.4E-01	1.2E-02	2.1E-01
Thallium	2.1E-04	---	4.9E-04	---	1.8E-06	2.3E-04	2.4E-03	7.6E-03	2.8E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	2.8E-05	2.5E-03	7.5E-03	6.8E-03	4.4E-04	2.3E-02
Vanadium	4.6E-02	---	9.7E-02	---	2.2E-04	4.9E-02	6.3E-02	1.5E-01	4.3E-03	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.3E-03	1.4E-01	4.6E-01	4.6E+01	2.6E+00	8.1E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.3E-04	1.2E-03	8.7E-04	---	9.1E-06	---	---	---	---	2.4E-03
Arsenic	3.9E-03	1.1E-02	1.8E-03	---	7.1E-05	---	---	---	---	1.7E-02
Barium	3.7E-03	3.3E-01	8.9E-04	---	5.6E-04	---	---	---	---	3.4E-01
Beryllium	5.0E-04	5.8E-03	6.0E-05	---	1.4E-06	---	---	---	---	6.3E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	2.7E-06	---	---	---	---	3.5E-02
Chromium (Total)	6.2E-02	3.0E-01	5.0E-02	---	1.0E-04	---	---	---	---	4.1E-01
Cobalt	1.1E-02	4.7E-02	3.5E-03	---	2.2E-05	---	---	---	---	6.1E-02
Copper	3.3E-02	7.2E-01	4.5E-02	---	1.2E-04	---	---	---	---	8.0E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	3.3E-05	---	---	---	---	8.3E-02
Manganese	2.7E-02	1.7E+00	4.8E-03	---	4.8E-03	---	---	---	---	1.7E+00
Molybdenum	8.4E-04	3.0E-01	2.1E-03	---	2.0E-05	---	---	---	---	3.0E-01
Nickel	6.2E-02	5.0E-01	1.7E-01	---	9.8E-05	---	---	---	---	7.3E-01
Selenium	8.0E-04	9.6E-03	2.1E-03	---	1.1E-05	---	---	---	---	1.2E-02
Thallium	1.5E-04	7.9E-04	1.9E-05	---	7.1E-07	---	---	---	---	9.7E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	1.1E-05	---	---	---	---	3.5E-03
Vanadium	3.4E-02	1.0E-01	3.8E-03	---	8.7E-05	---	---	---	---	1.4E-01
Zinc	9.5E-02	3.3E+00	1.3E+00	---	5.0E-04	---	---	---	---	4.7E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.5E-04	3.5E-04	2.7E-06	6.5E-06	5.6E-06	---	---	2.5E-05	8.7E-04
Arsenic	1.6E-03	2.4E-03	7.3E-04	1.1E-04	5.8E-05	1.4E-04	---	---	3.6E-04	5.5E-03
Barium	1.5E-03	7.3E-02	3.4E-04	2.1E-03	4.9E-04	3.3E-04	---	---	4.6E-03	8.2E-02
Beryllium	2.1E-04	1.2E-03	2.4E-05	8.1E-05	1.3E-06	1.9E-05	---	---	1.9E-05	1.5E-03
Cadmium	3.1E-04	4.5E-03	7.4E-03	2.8E-03	2.5E-06	3.6E-05	---	---	1.6E-04	1.5E-02
Chromium (Total)	1.6E-02	2.0E-02	1.2E-02	1.5E-02	8.4E-05	1.5E-03	---	---	3.6E-04	6.5E-02
Cobalt	3.6E-03	6.2E-03	1.1E-03	7.9E-04	1.9E-05	4.1E-04	---	---	2.7E-04	1.2E-02
Copper	1.3E-02	2.0E-01	1.8E-02	7.2E-02	1.1E-04	5.6E-04	---	---	1.0E-02	3.1E-01
Lead	9.0E-03	7.3E-03	1.1E-02	2.1E-02	3.1E-05	7.0E-04	---	---	6.4E-04	5.0E-02
Manganese	1.1E-02	5.3E-01	1.9E-03	4.7E-03	4.4E-03	4.3E-03	---	---	1.6E-02	5.7E-01
Molybdenum	3.5E-04	1.0E-01	8.5E-04	7.8E-04	3.2E-06	2.3E-05	---	---	3.9E-04	1.0E-01
Nickel	9.6E-03	2.9E-02	2.5E-02	1.7E-02	6.5E-05	8.0E-04	---	---	7.0E-04	8.3E-02
Selenium	3.4E-04	2.5E-03	8.4E-04	3.2E-03	7.8E-06	3.7E-05	---	---	1.7E-03	8.6E-03
Thallium	6.6E-05	1.7E-04	7.8E-06	7.4E-05	6.5E-07	6.1E-06	---	---	5.3E-05	3.8E-04
Uranium	6.6E-04	4.1E-04	5.5E-05	1.5E-05	2.6E-06	5.2E-05	---	---	2.1E-05	1.2E-03
Vanadium	1.4E-02	1.9E-02	1.5E-03	1.7E-03	7.1E-05	1.3E-03	---	---	7.3E-04	3.8E-02
Zinc	4.0E-02	7.9E-01	5.1E-01	7.2E-01	4.5E-04	3.8E-03	---	---	4.9E-01	2.5E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.2E-05	---	---	5.1E-06	3.0E-06	6.3E-05	---	1.2E-05	2.5E-04	3.8E-04
Arsenic	6.0E-04	---	---	2.0E-04	2.7E-05	1.5E-03	---	1.6E-02	3.5E-03	2.2E-02
Barium	5.6E-04	---	---	3.9E-03	2.3E-04	3.7E-03	---	1.3E-02	4.5E-02	6.6E-02
Beryllium	7.8E-05	---	---	1.5E-04	6.0E-07	2.1E-04	---	7.4E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	1.2E-06	4.0E-04	---	1.3E-02	1.5E-03	2.0E-02
Chromium (Total)	5.8E-03	---	---	2.8E-02	3.9E-05	1.6E-02	---	7.9E-02	3.5E-03	1.3E-01
Cobalt	1.3E-03	---	---	1.5E-03	9.0E-06	4.6E-03	---	3.0E-04	2.6E-03	1.0E-02
Copper	4.9E-03	---	---	1.3E-01	5.1E-05	6.3E-03	---	3.7E-01	1.0E-01	6.2E-01
Lead	3.4E-03	---	---	4.0E-02	1.4E-05	7.8E-03	---	2.1E-02	6.2E-03	7.8E-02
Manganese	4.3E-03	---	---	8.7E-03	2.0E-03	4.8E-02	---	2.0E-01	1.5E-01	4.1E-01
Molybdenum	1.3E-04	---	---	1.5E-03	1.5E-06	2.6E-04	---	3.6E-03	3.7E-03	9.2E-03
Nickel	3.6E-03	---	---	3.2E-02	3.0E-05	8.9E-03	---	3.4E-02	6.8E-03	8.5E-02
Selenium	1.3E-04	---	---	6.0E-03	3.6E-06	4.1E-04	---	6.8E-03	1.6E-02	3.0E-02
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	6.8E-05	---	3.6E-04	5.1E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	1.2E-06	5.7E-04	---	2.6E-04	2.1E-04	1.3E-03
Vanadium	5.2E-03	---	---	3.2E-03	3.3E-05	1.4E-02	---	6.8E-03	7.1E-03	3.6E-02
Zinc	1.5E-02	---	---	1.3E+00	2.1E-04	4.2E-02	---	2.2E+00	4.7E+00	8.3E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.4E-05	---	---	7.2E-06	3.1E-05	6.3E-05	---	---	1.7E-04
Arsenic	4.3E-04	3.5E-04	---	---	6.5E-05	7.4E-04	3.0E-03	---	---	4.6E-03
Barium	4.0E-04	1.1E-02	---	---	5.4E-04	1.8E-03	4.7E-03	---	---	1.9E-02
Beryllium	5.6E-05	2.1E-04	---	---	1.4E-06	1.0E-04	1.6E-04	---	---	5.3E-04
Cadmium	8.4E-05	5.2E-04	---	---	2.8E-06	1.9E-04	2.5E-04	---	---	1.0E-03
Chromium (Total)	4.2E-03	3.1E-03	---	---	9.4E-05	7.9E-03	4.8E-03	---	---	2.0E-02
Cobalt	9.7E-04	9.6E-04	---	---	2.2E-05	2.3E-03	1.8E-03	---	---	6.0E-03
Copper	3.5E-03	2.1E-02	---	---	1.2E-04	3.1E-03	1.6E-02	---	---	4.3E-02
Lead	2.4E-03	1.3E-03	---	---	3.4E-05	3.8E-03	2.3E-03	---	---	9.9E-03
Manganese	3.1E-03	4.7E-02	---	---	4.9E-03	2.4E-02	9.7E-02	---	---	1.8E-01
Molybdenum	9.5E-05	8.0E-03	---	---	3.6E-06	1.3E-04	6.7E-03	---	---	1.5E-02
Nickel	2.6E-03	2.9E-03	---	---	7.2E-05	4.4E-03	9.3E-03	---	---	1.9E-02
Selenium	9.2E-05	3.3E-04	---	---	8.6E-06	2.0E-04	3.5E-04	---	---	9.7E-04
Thallium	1.8E-05	2.9E-05	---	---	7.2E-07	3.3E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.5E-05	---	---	2.9E-06	2.8E-04	1.2E-03	---	---	1.7E-03
Vanadium	3.7E-03	3.0E-03	---	---	7.9E-05	6.9E-03	1.2E-02	---	---	2.6E-02
Zinc	1.1E-02	1.2E-01	---	---	5.0E-04	2.1E-02	9.3E-02	---	---	2.4E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	7.3E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.6E-02	6.1E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	1.4E-04	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.5E-03	---	---	---	---	5.2E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	8.1E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	9.7E-06	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	8.8E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	5.7E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	7.3E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.6E-02	6.1E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	2.4E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	1.4E-04	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	3.8E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	5.5E-03	---	---	---	---	5.2E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	8.1E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	9.7E-06	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	8.8E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	5.7E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.4E-04	---	---	5.9E-06	---	---	---	---	4.0E-04
Arsenic	2.9E-03	1.5E-03	---	---	5.3E-05	---	---	---	---	4.4E-03
Barium	2.7E-03	4.8E-02	---	---	4.4E-04	---	---	---	---	5.1E-02
Beryllium	3.7E-04	9.0E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	2.3E-06	---	---	---	---	2.8E-03
Chromium (Total)	2.8E-02	1.3E-02	---	---	7.6E-05	---	---	---	---	4.1E-02
Cobalt	6.4E-03	4.0E-03	---	---	1.8E-05	---	---	---	---	1.0E-02
Copper	2.4E-02	8.7E-02	---	---	1.0E-04	---	---	---	---	1.1E-01
Lead	1.6E-02	5.6E-03	---	---	2.8E-05	---	---	---	---	2.2E-02
Manganese	2.0E-02	2.0E-01	---	---	4.0E-03	---	---	---	---	2.2E-01
Molybdenum	6.3E-04	3.4E-02	---	---	2.9E-06	---	---	---	---	3.4E-02
Nickel	1.7E-02	1.2E-02	---	---	5.9E-05	---	---	---	---	2.9E-02
Selenium	6.1E-04	1.4E-03	---	---	7.1E-06	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.2E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	2.4E-06	---	---	---	---	1.5E-03
Vanadium	2.5E-02	1.3E-02	---	---	6.4E-05	---	---	---	---	3.7E-02
Zinc	7.2E-02	5.0E-01	---	---	4.1E-04	---	---	---	---	5.7E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.5E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.3E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.9E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.1E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.2E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.7E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.1E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.9E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.2E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.5E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.3E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	5.1E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	2.9E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	8.1E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	1.2E-02	---	---	---	---	9.6E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.7E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	2.1E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.9E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.2E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.7E-04	7.5E-04	---	---	2.1E-05	---	---	---	---	1.0E-03
Arsenic	3.2E-03	5.4E-03	---	---	1.9E-04	---	---	---	---	8.8E-03
Barium	2.9E-03	1.6E-01	---	---	1.6E-03	---	---	---	---	1.7E-01
Beryllium	4.1E-04	2.7E-03	---	---	4.2E-06	---	---	---	---	3.1E-03
Cadmium	6.1E-04	1.0E-02	---	---	8.2E-06	---	---	---	---	1.1E-02
Chromium (Total)	3.0E-02	4.6E-02	---	---	2.7E-04	---	---	---	---	7.6E-02
Cobalt	7.0E-03	1.4E-02	---	---	6.3E-05	---	---	---	---	2.1E-02
Copper	2.6E-02	4.4E-01	---	---	3.6E-04	---	---	---	---	4.6E-01
Lead	1.8E-02	1.7E-02	---	---	9.9E-05	---	---	---	---	3.4E-02
Manganese	2.2E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	6.9E-04	2.2E-01	---	---	1.1E-05	---	---	---	---	2.2E-01
Nickel	1.9E-02	6.4E-02	---	---	2.1E-04	---	---	---	---	8.3E-02
Selenium	6.7E-04	5.5E-03	---	---	2.5E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	3.9E-04	---	---	2.1E-06	---	---	---	---	5.2E-04
Uranium	1.3E-03	9.2E-04	---	---	8.4E-06	---	---	---	---	2.2E-03
Vanadium	2.7E-02	4.3E-02	---	---	2.3E-04	---	---	---	---	7.0E-02
Zinc	7.8E-02	1.8E+00	---	---	1.5E-03	---	---	---	---	1.8E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.0E-05	2.8E-04	---	---	5.4E-06	7.9E-06	1.6E-04	---	---	5.3E-04
Arsenic	8.2E-04	2.9E-03	---	---	4.9E-05	1.9E-04	7.6E-03	---	---	1.2E-02
Barium	7.6E-04	9.5E-02	---	---	4.1E-04	4.6E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.6E-05	4.1E-04	---	---	2.3E-03
Cadmium	1.6E-04	4.4E-03	---	---	2.1E-06	5.0E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	7.9E-03	2.6E-02	---	---	7.1E-05	2.0E-03	1.2E-02	---	---	4.9E-02
Cobalt	1.8E-03	8.0E-03	---	---	1.6E-05	5.8E-04	4.6E-03	---	---	1.5E-02
Copper	6.7E-03	1.7E-01	---	---	9.2E-05	7.9E-04	4.1E-02	---	---	2.2E-01
Lead	4.6E-03	1.1E-02	---	---	2.6E-05	9.9E-04	5.8E-03	---	---	2.3E-02
Manganese	5.8E-03	4.0E-01	---	---	3.7E-03	6.1E-03	2.5E-01	---	---	6.6E-01
Molybdenum	1.8E-04	6.7E-02	---	---	2.7E-06	3.3E-05	1.7E-02	---	---	8.5E-02
Nickel	4.9E-03	2.4E-02	---	---	5.4E-05	1.1E-03	2.4E-02	---	---	5.4E-02
Selenium	1.7E-04	2.7E-03	---	---	6.5E-06	5.2E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.4E-04	---	---	5.4E-07	8.6E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.5E-04	---	---	2.2E-06	7.3E-05	3.1E-03	---	---	4.1E-03
Vanadium	7.0E-03	2.5E-02	---	---	5.9E-05	1.8E-03	3.2E-02	---	---	6.6E-02
Zinc	2.0E-02	1.0E+00	---	---	3.8E-04	5.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.8E-06	---	---	8.6E-07	8.1E-06	6.7E-05	---	1.5E-05	2.6E-04	3.6E-04
Arsenic	1.0E-04	---	---	3.4E-05	7.3E-05	1.6E-03	---	2.0E-02	3.6E-03	2.6E-02
Barium	9.5E-05	---	---	6.6E-04	6.1E-04	3.9E-03	---	1.7E-02	4.7E-02	6.9E-02
Beryllium	1.3E-05	---	---	2.6E-05	1.6E-06	2.2E-04	---	9.4E-04	1.9E-04	1.4E-03
Cadmium	2.0E-05	---	---	9.0E-04	3.2E-06	4.3E-04	---	1.6E-02	1.6E-03	1.9E-02
Chromium (Total)	9.9E-04	---	---	4.8E-03	1.1E-04	1.7E-02	---	1.0E-01	3.6E-03	1.3E-01
Cobalt	2.3E-04	---	---	2.5E-04	2.4E-05	4.9E-03	---	3.8E-04	2.8E-03	8.6E-03
Copper	8.4E-04	---	---	2.3E-02	1.4E-04	6.7E-03	---	4.7E-01	1.0E-01	6.1E-01
Lead	5.7E-04	---	---	6.8E-03	3.8E-05	8.4E-03	---	2.6E-02	6.5E-03	4.8E-02
Manganese	7.2E-04	---	---	1.5E-03	5.5E-03	5.2E-02	---	2.5E-01	1.6E-01	4.7E-01
Molybdenum	2.2E-05	---	---	2.5E-04	4.0E-06	2.8E-04	---	4.7E-03	3.9E-03	9.1E-03
Nickel	6.1E-04	---	---	5.4E-03	8.1E-05	9.6E-03	---	4.3E-02	7.1E-03	6.6E-02
Selenium	2.2E-05	---	---	1.0E-03	9.7E-06	4.4E-04	---	8.7E-03	1.7E-02	2.7E-02
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	7.3E-05	---	4.6E-04	5.3E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	3.2E-06	6.2E-04	---	3.3E-04	2.2E-04	1.2E-03
Vanadium	8.8E-04	---	---	5.4E-04	8.8E-05	1.5E-02	---	8.7E-03	7.4E-03	3.3E-02
Zinc	2.6E-03	---	---	2.3E-01	5.7E-04	4.5E-02	---	2.8E+00	5.0E+00	8.0E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.7E-05	8.3E-04	7.8E-06	8.7E-06	---	---	---	---	1.0E-03
Arsenic	1.7E-03	1.2E-04	1.8E-03	3.1E-04	7.8E-05	---	---	---	---	4.0E-03
Barium	1.6E-03	3.0E-03	8.2E-04	6.0E-03	6.5E-04	---	---	---	---	1.2E-02
Beryllium	2.2E-04	2.7E-05	5.7E-05	2.3E-04	1.7E-06	---	---	---	---	5.4E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	3.4E-06	---	---	---	---	2.7E-02
Chromium (Total)	1.7E-02	8.1E-04	2.9E-02	4.4E-02	1.1E-04	---	---	---	---	9.0E-02
Cobalt	3.8E-03	2.5E-04	2.6E-03	2.3E-03	2.6E-05	---	---	---	---	9.0E-03
Copper	1.4E-02	1.5E-02	4.3E-02	2.1E-01	1.5E-04	---	---	---	---	2.8E-01
Lead	9.6E-03	1.5E-04	2.6E-02	6.2E-02	4.1E-05	---	---	---	---	9.7E-02
Manganese	1.2E-02	4.5E-02	4.6E-03	1.3E-02	5.9E-03	---	---	---	---	8.1E-02
Molybdenum	3.8E-04	9.3E-03	2.0E-03	2.2E-03	4.3E-06	---	---	---	---	1.4E-02
Nickel	1.0E-02	2.3E-03	6.1E-02	4.9E-02	8.7E-05	---	---	---	---	1.2E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.2E-03	1.0E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.4E-06	1.9E-05	2.1E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.5E-05	1.3E-04	4.4E-05	3.5E-06	---	---	---	---	9.0E-04
Vanadium	1.5E-02	7.0E-04	3.5E-03	4.9E-03	9.4E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	3.4E-02	1.2E+00	2.1E+00	6.1E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.7E-04	1.1E-03	---	---	9.6E-06	---	---	---	---	2.0E-03
Arsenic	1.0E-02	1.1E-02	---	---	8.7E-05	---	---	---	---	2.1E-02
Barium	9.5E-03	3.4E-01	---	---	7.2E-04	---	---	---	---	3.5E-01
Beryllium	1.3E-03	6.4E-03	---	---	1.9E-06	---	---	---	---	7.7E-03
Cadmium	2.0E-03	1.6E-02	---	---	3.8E-06	---	---	---	---	1.8E-02
Chromium (Total)	9.8E-02	9.6E-02	---	---	1.3E-04	---	---	---	---	1.9E-01
Cobalt	2.3E-02	2.9E-02	---	---	2.9E-05	---	---	---	---	5.2E-02
Copper	8.3E-02	6.6E-01	---	---	1.6E-04	---	---	---	---	7.4E-01
Lead	5.7E-02	4.0E-02	---	---	4.5E-05	---	---	---	---	9.7E-02
Manganese	7.2E-02	1.5E+00	---	---	6.6E-03	---	---	---	---	1.6E+00
Molybdenum	2.2E-03	2.7E-01	---	---	4.8E-06	---	---	---	---	2.7E-01
Nickel	6.0E-02	9.3E-02	---	---	9.6E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	1.0E-02	---	---	1.2E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	8.8E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	3.9E-06	---	---	---	---	6.1E-03
Vanadium	8.7E-02	9.2E-02	---	---	1.1E-04	---	---	---	---	1.8E-01
Zinc	2.5E-01	3.6E+00	---	---	6.8E-04	---	---	---	---	3.9E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	4.9E-04	---	---	6.4E-06	---	---	---	---	6.2E-04
Arsenic	1.5E-03	4.8E-03	---	---	5.8E-05	---	---	---	---	6.4E-03
Barium	1.3E-03	1.5E-01	---	---	4.8E-04	---	---	---	---	1.6E-01
Beryllium	1.9E-04	2.9E-03	---	---	1.3E-06	---	---	---	---	3.1E-03
Cadmium	2.8E-04	7.4E-03	---	---	2.5E-06	---	---	---	---	7.6E-03
Chromium (Total)	1.4E-02	4.3E-02	---	---	8.4E-05	---	---	---	---	5.7E-02
Cobalt	3.2E-03	1.3E-02	---	---	1.9E-05	---	---	---	---	1.6E-02
Copper	1.2E-02	2.9E-01	---	---	1.1E-04	---	---	---	---	3.1E-01
Lead	8.1E-03	1.8E-02	---	---	3.0E-05	---	---	---	---	2.6E-02
Manganese	1.0E-02	6.9E-01	---	---	4.4E-03	---	---	---	---	7.0E-01
Molybdenum	3.2E-04	1.2E-01	---	---	3.2E-06	---	---	---	---	1.2E-01
Nickel	8.6E-03	4.2E-02	---	---	6.4E-05	---	---	---	---	5.0E-02
Selenium	3.1E-04	4.5E-03	---	---	7.7E-06	---	---	---	---	4.9E-03
Thallium	5.9E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.5E-04
Uranium	5.9E-04	8.9E-04	---	---	2.6E-06	---	---	---	---	1.5E-03
Vanadium	1.2E-02	4.1E-02	---	---	7.0E-05	---	---	---	---	5.4E-02
Zinc	3.6E-02	1.6E+00	---	---	4.5E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	1.2E-04	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.0E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	2.3E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	6.4E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.3E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.4E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.6E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	1.5E-04	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	9.5E-04	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	1.2E-04	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.0E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	4.1E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	2.3E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	6.4E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	9.3E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.4E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	1.6E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	1.5E-04	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	9.5E-04	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.2E-05	---	---	6.1E-06	3.5E-06	4.7E-05	---	---	2.1E-04	3.3E-04
Arsenic	7.3E-04	---	---	2.4E-04	3.2E-05	1.1E-03	---	---	3.0E-03	5.1E-03
Barium	6.7E-04	---	---	4.7E-03	2.7E-04	2.7E-03	---	---	3.8E-02	4.7E-02
Beryllium	9.4E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	5.9E-04
Cadmium	1.4E-04	---	---	6.4E-03	1.4E-06	3.0E-04	---	---	1.3E-03	8.1E-03
Chromium (Total)	7.0E-03	---	---	3.4E-02	4.6E-05	1.2E-02	---	---	3.0E-03	5.6E-02
Cobalt	1.6E-03	---	---	1.8E-03	1.1E-05	3.4E-03	---	---	2.3E-03	9.1E-03
Copper	5.9E-03	---	---	1.6E-01	6.0E-05	4.7E-03	---	---	8.6E-02	2.6E-01
Lead	4.0E-03	---	---	4.8E-02	1.7E-05	5.9E-03	---	---	5.3E-03	6.3E-02
Manganese	5.1E-03	---	---	1.0E-02	2.4E-03	3.6E-02	---	---	1.3E-01	1.9E-01
Molybdenum	1.6E-04	---	---	1.7E-03	1.8E-06	2.0E-04	---	---	3.2E-03	5.3E-03
Nickel	4.3E-03	---	---	3.8E-02	3.5E-05	6.6E-03	---	---	5.9E-03	5.5E-02
Selenium	1.5E-04	---	---	7.2E-03	4.2E-06	3.0E-04	---	---	1.4E-02	2.2E-02
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.1E-05	---	---	4.4E-04	6.8E-04
Uranium	3.0E-04	---	---	3.4E-05	1.4E-06	4.3E-04	---	---	1.8E-04	9.4E-04
Vanadium	6.2E-03	---	---	3.8E-03	3.9E-05	1.1E-02	---	---	6.1E-03	2.7E-02
Zinc	1.8E-02	---	---	1.6E+00	2.5E-04	3.1E-02	---	---	4.1E+00	5.7E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.2E-05	5.8E-02	---	2.2E-05	---	---	---	---	6.0E-02
Arsenic	1.4E-02	1.4E-04	1.2E-01	---	2.0E-04	---	---	---	---	1.4E-01
Barium	1.3E-02	3.5E-03	5.8E-02	---	1.6E-03	---	---	---	---	7.6E-02
Beryllium	1.8E-03	3.2E-05	4.0E-03	---	4.4E-06	---	---	---	---	5.8E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	8.6E-06	---	---	---	---	1.3E+00
Chromium (Total)	1.3E-01	9.6E-04	2.0E+00	---	2.9E-04	---	---	---	---	2.2E+00
Cobalt	3.1E-02	3.0E-04	1.9E-01	---	6.6E-05	---	---	---	---	2.2E-01
Copper	1.1E-01	1.8E-02	3.1E+00	---	3.7E-04	---	---	---	---	3.2E+00
Lead	7.7E-02	1.8E-04	1.8E+00	---	1.0E-04	---	---	---	---	1.9E+00
Manganese	9.7E-02	5.3E-02	3.3E-01	---	1.5E-02	---	---	---	---	4.9E-01
Molybdenum	3.0E-03	1.1E-02	1.4E-01	---	1.1E-05	---	---	---	---	1.6E-01
Nickel	8.2E-02	2.7E-03	4.3E+00	---	2.2E-04	---	---	---	---	4.4E+00
Selenium	2.9E-03	1.6E-04	1.4E-01	---	2.6E-05	---	---	---	---	1.5E-01
Thallium	5.6E-04	6.4E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.6E-03	1.8E-05	9.2E-03	---	8.8E-06	---	---	---	---	1.5E-02
Vanadium	1.2E-01	8.3E-04	2.5E-01	---	2.4E-04	---	---	---	---	3.6E-01
Zinc	3.4E-01	4.0E-02	8.6E+01	---	1.5E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	5.2E-06	1.2E-04	2.6E-05	1.4E-05	5.0E-04	6.6E-04
Arsenic	---	---	---	---	4.6E-05	2.9E-03	1.2E-03	1.9E-02	7.0E-03	3.0E-02
Barium	---	---	---	---	3.9E-04	7.1E-03	1.9E-03	1.6E-02	9.0E-02	1.2E-01
Beryllium	---	---	---	---	1.0E-06	4.0E-04	6.6E-05	8.7E-04	3.7E-04	1.7E-03
Cadmium	---	---	---	---	2.0E-06	7.7E-04	1.0E-04	1.5E-02	3.1E-03	1.9E-02
Chromium (Total)	---	---	---	---	6.7E-05	3.1E-02	2.0E-03	9.3E-02	7.0E-03	1.3E-01
Cobalt	---	---	---	---	1.5E-05	8.9E-03	7.4E-04	3.5E-04	5.3E-03	1.5E-02
Copper	---	---	---	---	8.8E-05	1.2E-02	6.5E-03	4.3E-01	2.0E-01	6.6E-01
Lead	---	---	---	---	2.4E-05	1.5E-02	9.4E-04	2.4E-02	1.3E-02	5.3E-02
Manganese	---	---	---	---	3.5E-03	9.3E-02	4.0E-02	2.3E-01	3.1E-01	6.8E-01
Molybdenum	---	---	---	---	2.6E-06	5.0E-04	2.8E-03	4.3E-03	7.5E-03	1.5E-02
Nickel	---	---	---	---	5.2E-05	1.7E-02	3.8E-03	3.9E-02	1.4E-02	7.4E-02
Selenium	---	---	---	---	6.2E-06	7.9E-04	1.4E-04	8.0E-03	3.3E-02	4.2E-02
Thallium	---	---	---	---	5.2E-07	1.3E-04	2.0E-04	4.2E-04	1.0E-03	1.8E-03
Uranium	---	---	---	---	2.1E-06	1.1E-03	5.0E-04	3.0E-04	4.2E-04	2.3E-03
Vanadium	---	---	---	---	5.6E-05	2.7E-02	5.2E-03	8.0E-03	1.4E-02	5.5E-02
Zinc	---	---	---	---	3.6E-04	8.1E-02	3.8E-02	2.6E+00	9.6E+00	1.2E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	6.6E-06	1.6E-04	1.8E-04	2.2E-04	---	5.7E-04
Arsenic	---	---	---	---	6.0E-05	3.8E-03	8.6E-03	2.9E-01	---	3.1E-01
Barium	---	---	---	---	5.0E-04	9.2E-03	1.3E-02	2.5E-01	---	2.7E-01
Beryllium	---	---	---	---	1.3E-06	5.3E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	2.6E-06	1.0E-03	7.2E-04	2.3E-01	---	2.4E-01
Chromium (Total)	---	---	---	---	8.6E-05	4.1E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	2.0E-05	1.2E-02	5.2E-03	5.4E-03	---	2.2E-02
Copper	---	---	---	---	1.1E-04	1.6E-02	4.6E-02	6.9E+00	---	6.9E+00
Lead	---	---	---	---	3.1E-05	2.0E-02	6.6E-03	3.8E-01	---	4.0E-01
Manganese	---	---	---	---	4.5E-03	1.2E-01	2.8E-01	3.6E+00	---	4.0E+00
Molybdenum	---	---	---	---	3.3E-06	6.6E-04	1.9E-02	6.7E-02	---	8.7E-02
Nickel	---	---	---	---	6.6E-05	2.2E-02	2.7E-02	6.2E-01	---	6.7E-01
Selenium	---	---	---	---	7.9E-06	1.0E-03	1.0E-03	1.3E-01	---	1.3E-01
Thallium	---	---	---	---	6.6E-07	1.7E-04	1.4E-03	6.6E-03	---	8.2E-03
Uranium	---	---	---	---	2.6E-06	1.4E-03	3.5E-03	4.8E-03	---	9.7E-03
Vanadium	---	---	---	---	7.2E-05	3.5E-02	3.6E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	4.6E-04	1.1E-01	2.7E-01	4.0E+01	---	4.1E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	2.0E-04	9.9E-04	1.1E-04	---	1.9E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	5.0E-05	4.8E-03	4.6E-02	1.4E-01	---	1.9E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.2E-04	1.1E-02	7.3E-02	1.2E-01	---	2.1E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.1E-02	7.4E-02	7.0E-01	---	8.5E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.6E-03	---	4.8E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	9.4E-05	2.0E-02	2.5E-01	3.3E+00	---	3.6E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	2.6E-05	2.5E-02	3.6E-02	1.8E-01	---	2.6E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	8.2E-04	1.1E-01	3.2E-02	---	1.5E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	5.6E-05	2.8E-02	1.5E-01	3.0E-01	---	5.2E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	6.7E-06	1.3E-03	5.4E-03	6.0E-02	---	6.9E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.1E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	2.2E-06	1.8E-03	1.9E-02	2.3E-03	---	2.3E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	6.1E-05	4.4E-02	1.9E-01	6.0E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.9E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	2.0E-04	9.9E-04	1.1E-04	---	1.9E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	5.0E-05	4.8E-03	4.6E-02	1.4E-01	---	1.9E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.2E-04	1.1E-02	7.3E-02	1.2E-01	---	2.1E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.1E-02	7.4E-02	7.0E-01	---	8.5E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.7E-05	1.4E-02	2.8E-02	2.6E-03	---	4.8E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	9.4E-05	2.0E-02	2.5E-01	3.3E+00	---	3.6E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	2.6E-05	2.5E-02	3.6E-02	1.8E-01	---	2.6E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	8.2E-04	1.1E-01	3.2E-02	---	1.5E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	5.6E-05	2.8E-02	1.5E-01	3.0E-01	---	5.2E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	6.7E-06	1.3E-03	5.4E-03	6.0E-02	---	6.9E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.1E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	2.2E-06	1.8E-03	1.9E-02	2.3E-03	---	2.3E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	6.1E-05	4.4E-02	1.9E-01	6.0E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	3.9E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	5.1E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.3E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	9.7E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.9E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	5.7E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	6.9E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	6.2E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	4.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	5.1E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.3E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.7E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	9.7E-05	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.7E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	3.9E-03	---	---	---	---	4.1E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	5.7E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	6.9E-06	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	6.2E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	4.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.7E-04	3.5E-05	8.6E-06	---	---	---	---	7.6E-04
Arsenic	2.8E-03	---	1.0E-03	1.4E-03	7.7E-05	---	---	---	---	5.3E-03
Barium	2.6E-03	---	4.7E-04	2.7E-02	6.4E-04	---	---	---	---	3.1E-02
Beryllium	3.6E-04	---	3.2E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	3.3E-06	---	---	---	---	4.8E-02
Chromium (Total)	2.7E-02	---	1.6E-02	2.0E-01	1.1E-04	---	---	---	---	2.4E-01
Cobalt	6.2E-03	---	1.5E-03	1.0E-02	2.6E-05	---	---	---	---	1.8E-02
Copper	2.3E-02	---	2.5E-02	9.4E-01	1.5E-04	---	---	---	---	9.9E-01
Lead	1.6E-02	---	1.5E-02	2.8E-01	4.0E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.6E-03	6.1E-02	5.8E-03	---	---	---	---	8.9E-02
Molybdenum	6.1E-04	---	1.2E-03	1.0E-02	4.3E-06	---	---	---	---	1.2E-02
Nickel	1.7E-02	---	3.5E-02	2.2E-01	8.6E-05	---	---	---	---	2.7E-01
Selenium	5.9E-04	---	1.2E-03	4.2E-02	1.0E-05	---	---	---	---	4.3E-02
Thallium	1.1E-04	---	1.1E-05	9.7E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	3.4E-06	---	---	---	---	1.4E-03
Vanadium	2.4E-02	---	2.0E-03	2.2E-02	9.3E-05	---	---	---	---	4.8E-02
Zinc	7.0E-02	---	7.0E-01	9.3E+00	6.0E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	2.1E-04	3.1E-04	2.5E-04	1.3E-04	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.6E-04	5.2E-03	1.5E-02	3.3E-01	1.9E-03	4.1E-01
Barium	4.7E-03	---	2.1E-02	---	1.3E-03	1.2E-02	2.3E-02	2.8E-01	2.4E-02	3.7E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.5E-02	2.3E-02	1.7E+00	1.9E-03	2.5E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.6E-02	8.8E-03	6.2E-03	1.4E-03	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	3.0E-04	2.1E-02	7.8E-02	7.8E+00	5.4E-02	9.1E+00
Lead	2.8E-02	---	6.7E-01	---	8.2E-05	2.7E-02	1.1E-02	4.3E-01	3.3E-03	1.2E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	8.9E-04	3.3E-02	7.6E-02	2.0E-03	1.7E-01
Nickel	3.0E-02	---	1.6E+00	---	1.7E-04	3.0E-02	4.6E-02	7.1E-01	3.7E-03	2.4E+00
Selenium	1.1E-03	---	5.3E-02	---	2.1E-05	1.4E-03	1.7E-03	1.4E-01	8.8E-03	2.1E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.3E-04	2.4E-03	7.6E-03	2.7E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.0E-03	6.0E-03	5.4E-03	1.1E-04	1.9E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.9E-04	4.8E-02	6.2E-02	1.4E-01	3.8E-03	3.9E-01
Zinc	1.3E-01	---	3.2E+01	---	1.2E-03	1.4E-01	4.6E-01	4.6E+01	2.5E+00	8.1E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	2.1E-04	3.1E-04	2.5E-04	1.3E-04	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.6E-04	5.2E-03	1.5E-02	3.3E-01	1.9E-03	4.1E-01
Barium	4.7E-03	---	2.1E-02	---	1.3E-03	1.2E-02	2.3E-02	2.8E-01	2.4E-02	3.7E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.5E-02	2.3E-02	1.7E+00	1.9E-03	2.5E+00
Cobalt	1.1E-02	---	6.9E-02	---	5.2E-05	1.6E-02	8.8E-03	6.2E-03	1.4E-03	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	3.0E-04	2.1E-02	7.8E-02	7.8E+00	5.4E-02	9.1E+00
Lead	2.8E-02	---	6.7E-01	---	8.2E-05	2.7E-02	1.1E-02	4.3E-01	3.3E-03	1.2E+00
Manganese	3.6E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	8.9E-04	3.3E-02	7.6E-02	2.0E-03	1.7E-01
Nickel	3.0E-02	---	1.6E+00	---	1.7E-04	3.0E-02	4.6E-02	7.1E-01	3.7E-03	2.4E+00
Selenium	1.1E-03	---	5.3E-02	---	2.1E-05	1.4E-03	1.7E-03	1.4E-01	8.8E-03	2.1E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.3E-04	2.4E-03	7.6E-03	2.7E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.0E-03	6.0E-03	5.4E-03	1.1E-04	1.9E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.9E-04	4.8E-02	6.2E-02	1.4E-01	3.8E-03	3.9E-01
Zinc	1.3E-01	---	3.2E+01	---	1.2E-03	1.4E-01	4.6E-01	4.6E+01	2.5E+00	8.1E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.2E-04	1.1E-03	8.5E-04	---	7.0E-06	---	---	---	---	2.3E-03
Arsenic	3.8E-03	9.9E-03	1.8E-03	---	6.3E-05	---	---	---	---	1.6E-02
Barium	3.5E-03	3.1E-01	8.4E-04	---	5.2E-04	---	---	---	---	3.1E-01
Beryllium	4.9E-04	5.6E-03	5.8E-05	---	1.4E-06	---	---	---	---	6.1E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	2.7E-06	---	---	---	---	3.5E-02
Chromium (Total)	3.6E-02	8.6E-02	2.9E-02	---	9.1E-05	---	---	---	---	1.5E-01
Cobalt	8.3E-03	2.6E-02	2.7E-03	---	2.1E-05	---	---	---	---	3.7E-02
Copper	3.1E-02	6.6E-01	4.5E-02	---	1.2E-04	---	---	---	---	7.4E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	3.3E-05	---	---	---	---	8.2E-02
Manganese	2.6E-02	1.6E+00	4.7E-03	---	4.8E-03	---	---	---	---	1.7E+00
Molybdenum	8.2E-04	2.9E-01	2.1E-03	---	3.5E-06	---	---	---	---	3.0E-01
Nickel	2.2E-02	9.5E-02	6.3E-02	---	7.0E-05	---	---	---	---	1.8E-01
Selenium	7.9E-04	9.5E-03	2.1E-03	---	8.4E-06	---	---	---	---	1.2E-02
Thallium	1.5E-04	7.8E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.5E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.8E-06	---	---	---	---	3.4E-03
Vanadium	3.2E-02	8.2E-02	3.6E-03	---	7.6E-05	---	---	---	---	1.2E-01
Zinc	9.3E-02	3.3E+00	1.3E+00	---	4.9E-04	---	---	---	---	4.6E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.7E-04	3.5E-04	2.8E-06	1.1E-05	8.1E-06	---	---	4.2E-05	9.3E-04
Arsenic	1.7E-03	2.7E-03	7.5E-04	1.1E-04	1.2E-04	1.7E-04	---	---	7.3E-04	6.3E-03
Barium	1.6E-03	7.8E-02	3.6E-04	2.2E-03	7.4E-04	3.5E-04	---	---	7.0E-03	9.1E-02
Beryllium	2.2E-04	1.2E-03	2.4E-05	8.3E-05	1.3E-06	1.9E-05	---	---	1.9E-05	1.6E-03
Cadmium	3.1E-04	4.6E-03	7.4E-03	2.8E-03	2.5E-06	3.6E-05	---	---	1.6E-04	1.5E-02
Chromium (Total)	2.7E-02	7.5E-02	2.0E-02	2.3E-02	1.5E-04	1.5E-03	---	---	6.5E-04	1.5E-01
Cobalt	4.6E-03	1.2E-02	1.4E-03	1.0E-03	2.8E-05	4.6E-04	---	---	3.9E-04	1.9E-02
Copper	1.4E-02	2.2E-01	1.8E-02	7.3E-02	1.4E-04	6.3E-04	---	---	1.3E-02	3.4E-01
Lead	9.1E-03	7.4E-03	1.1E-02	2.2E-02	3.4E-05	7.2E-04	---	---	7.1E-04	5.0E-02
Manganese	1.2E-02	5.5E-01	2.0E-03	4.9E-03	4.4E-03	4.3E-03	---	---	1.6E-02	6.0E-01
Molybdenum	3.6E-04	1.0E-01	8.6E-04	8.0E-04	7.2E-05	3.9E-05	---	---	8.6E-03	1.2E-01
Nickel	2.7E-02	1.4E-01	7.1E-02	2.7E-02	2.2E-04	1.5E-03	---	---	2.4E-03	2.7E-01
Selenium	3.5E-04	2.5E-03	8.5E-04	3.2E-03	1.8E-05	3.7E-05	---	---	4.0E-03	1.1E-02
Thallium	6.7E-05	1.8E-04	7.8E-06	7.5E-05	6.5E-07	6.1E-06	---	---	5.3E-05	3.9E-04
Uranium	6.6E-04	4.2E-04	5.5E-05	1.5E-05	6.5E-05	1.6E-04	---	---	5.3E-04	1.9E-03
Vanadium	1.5E-02	2.4E-02	1.6E-03	1.8E-03	1.5E-04	1.4E-03	---	---	1.6E-03	4.5E-02
Zinc	4.1E-02	8.0E-01	5.1E-01	7.2E-01	5.7E-04	3.8E-03	---	---	6.1E-01	2.7E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.3E-05	---	---	5.2E-06	4.9E-06	9.0E-05	---	1.7E-05	4.0E-04	5.7E-04
Arsenic	6.2E-04	---	---	2.0E-04	5.5E-05	1.9E-03	---	1.9E-02	7.0E-03	2.8E-02
Barium	5.9E-04	---	---	4.1E-03	3.4E-04	3.9E-03	---	1.4E-02	6.8E-02	9.1E-02
Beryllium	8.0E-05	---	---	1.5E-04	6.0E-07	2.1E-04	---	7.4E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	1.2E-06	4.0E-04	---	1.3E-02	1.5E-03	2.0E-02
Chromium (Total)	1.0E-02	---	---	4.2E-02	7.1E-05	1.6E-02	---	8.0E-02	6.3E-03	1.5E-01
Cobalt	1.7E-03	---	---	1.9E-03	1.3E-05	5.1E-03	---	3.3E-04	3.7E-03	1.3E-02
Copper	5.3E-03	---	---	1.4E-01	6.6E-05	7.0E-03	---	3.9E-01	1.3E-01	6.6E-01
Lead	3.4E-03	---	---	4.0E-02	1.6E-05	8.0E-03	---	2.1E-02	6.9E-03	7.9E-02
Manganese	4.4E-03	---	---	9.1E-03	2.0E-03	4.8E-02	---	2.0E-01	1.5E-01	4.1E-01
Molybdenum	1.4E-04	---	---	1.5E-03	3.3E-05	4.3E-04	---	6.0E-03	8.3E-02	9.1E-02
Nickel	9.9E-03	---	---	5.1E-02	1.0E-04	1.7E-02	---	5.7E-02	2.3E-02	1.6E-01
Selenium	1.3E-04	---	---	6.0E-03	8.4E-06	4.1E-04	---	6.9E-03	3.8E-02	5.2E-02
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	6.8E-05	---	3.6E-04	5.1E-04	1.1E-03
Uranium	2.5E-04	---	---	2.8E-05	3.0E-05	1.8E-03	---	8.0E-04	5.2E-03	8.0E-03
Vanadium	5.5E-03	---	---	3.4E-03	7.0E-05	1.6E-02	---	7.7E-03	1.5E-02	4.8E-02
Zinc	1.5E-02	---	---	1.3E+00	2.6E-04	4.2E-02	---	2.2E+00	5.9E+00	9.5E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.8E-05	3.6E-05	---	---	1.2E-05	4.4E-05	9.1E-05	---	---	2.2E-04
Arsenic	4.5E-04	3.9E-04	---	---	1.3E-04	9.1E-04	3.6E-03	---	---	5.5E-03
Barium	4.3E-04	1.2E-02	---	---	8.2E-04	1.9E-03	4.9E-03	---	---	2.0E-02
Beryllium	5.8E-05	2.2E-04	---	---	1.4E-06	1.0E-04	1.6E-04	---	---	5.4E-04
Cadmium	8.4E-05	5.2E-04	---	---	2.8E-06	1.9E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	7.1E-03	1.1E-02	---	---	1.7E-04	8.1E-03	4.8E-03	---	---	3.1E-02
Cobalt	1.2E-03	1.7E-03	---	---	3.1E-05	2.5E-03	2.0E-03	---	---	7.4E-03
Copper	3.8E-03	2.2E-02	---	---	1.6E-04	3.4E-03	1.8E-02	---	---	4.7E-02
Lead	2.4E-03	1.3E-03	---	---	3.8E-05	3.9E-03	2.3E-03	---	---	1.0E-02
Manganese	3.2E-03	4.9E-02	---	---	4.9E-03	2.4E-02	9.7E-02	---	---	1.8E-01
Molybdenum	9.7E-05	8.2E-03	---	---	8.0E-05	2.1E-04	1.1E-02	---	---	2.0E-02
Nickel	7.1E-03	1.6E-02	---	---	2.4E-04	8.4E-03	1.8E-02	---	---	5.0E-02
Selenium	9.2E-05	3.3E-04	---	---	2.0E-05	2.0E-04	3.5E-04	---	---	9.9E-04
Thallium	1.8E-05	3.0E-05	---	---	7.2E-07	3.3E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.7E-05	---	---	7.2E-05	8.7E-04	3.7E-03	---	---	4.9E-03
Vanadium	4.0E-03	3.7E-03	---	---	1.7E-04	7.8E-03	1.4E-02	---	---	3.0E-02
Zinc	1.1E-02	1.2E-01	---	---	6.3E-04	2.1E-02	9.3E-02	---	---	2.5E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	1.3E-05	---	---	---	---	1.6E-04
Arsenic	1.4E-03	---	---	8.5E-04	1.5E-04	---	---	---	---	2.4E-03
Barium	1.3E-03	---	---	1.7E-02	9.3E-04	---	---	---	---	2.0E-02
Beryllium	1.8E-04	---	---	6.4E-04	1.6E-06	---	---	---	---	8.3E-04
Cadmium	2.7E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	1.9E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	3.4E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	1.8E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	4.2E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.5E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	9.0E-05	---	---	---	---	6.6E-03
Nickel	2.3E-02	---	---	2.1E-01	2.8E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	2.3E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	8.1E-05	---	---	---	---	7.6E-04
Vanadium	1.3E-02	---	---	1.4E-02	1.9E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	7.1E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	1.3E-05	---	---	---	---	1.6E-04
Arsenic	1.4E-03	---	---	8.5E-04	1.5E-04	---	---	---	---	2.4E-03
Barium	1.3E-03	---	---	1.7E-02	9.3E-04	---	---	---	---	2.0E-02
Beryllium	1.8E-04	---	---	6.4E-04	1.6E-06	---	---	---	---	8.3E-04
Cadmium	2.7E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	1.9E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	3.4E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	1.8E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	4.2E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	5.5E-03	---	---	---	---	5.3E-02
Molybdenum	3.1E-04	---	---	6.2E-03	9.0E-05	---	---	---	---	6.6E-03
Nickel	2.3E-02	---	---	2.1E-01	2.8E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	2.3E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	8.1E-05	---	---	---	---	7.6E-04
Vanadium	1.3E-02	---	---	1.4E-02	1.9E-04	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	7.1E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.5E-04	---	---	9.7E-06	---	---	---	---	4.2E-04
Arsenic	3.0E-03	1.6E-03	---	---	1.1E-04	---	---	---	---	4.7E-03
Barium	2.8E-03	5.1E-02	---	---	6.7E-04	---	---	---	---	5.5E-02
Beryllium	3.8E-04	9.3E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	2.3E-06	---	---	---	---	2.8E-03
Chromium (Total)	4.8E-02	4.5E-02	---	---	1.4E-04	---	---	---	---	9.2E-02
Cobalt	8.2E-03	7.1E-03	---	---	2.5E-05	---	---	---	---	1.5E-02
Copper	2.5E-02	9.5E-02	---	---	1.3E-04	---	---	---	---	1.2E-01
Lead	1.6E-02	5.7E-03	---	---	3.1E-05	---	---	---	---	2.2E-02
Manganese	2.1E-02	2.1E-01	---	---	4.0E-03	---	---	---	---	2.3E-01
Molybdenum	6.4E-04	3.5E-02	---	---	6.5E-05	---	---	---	---	3.5E-02
Nickel	4.7E-02	6.8E-02	---	---	2.0E-04	---	---	---	---	1.2E-01
Selenium	6.1E-04	1.4E-03	---	---	1.7E-05	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.3E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	5.9E-05	---	---	---	---	1.5E-03
Vanadium	2.6E-02	1.6E-02	---	---	1.4E-04	---	---	---	---	4.2E-02
Zinc	7.3E-02	5.1E-01	---	---	5.2E-04	---	---	---	---	5.8E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	2.8E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	3.1E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	2.0E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	3.4E-06	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	4.1E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	7.3E-05	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	3.8E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	9.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.2E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	1.9E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	5.8E-04	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	4.8E-05	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	1.7E-04	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	4.0E-04	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	1.5E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	2.8E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	3.1E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	2.0E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	3.4E-06	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	6.7E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	4.1E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	7.3E-05	---	---	---	---	3.7E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	3.8E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	9.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	1.2E-02	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	1.9E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	5.8E-04	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	4.8E-05	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	1.7E-04	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	4.0E-04	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	1.5E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.8E-04	8.0E-04	---	---	3.5E-05	---	---	---	---	1.1E-03
Arsenic	3.3E-03	6.0E-03	---	---	3.8E-04	---	---	---	---	9.7E-03
Barium	3.1E-03	1.8E-01	---	---	2.4E-03	---	---	---	---	1.8E-01
Beryllium	4.2E-04	2.8E-03	---	---	4.2E-06	---	---	---	---	3.2E-03
Cadmium	6.1E-04	1.0E-02	---	---	8.2E-06	---	---	---	---	1.1E-02
Chromium (Total)	5.2E-02	1.7E-01	---	---	5.0E-04	---	---	---	---	2.2E-01
Cobalt	9.0E-03	2.6E-02	---	---	8.9E-05	---	---	---	---	3.5E-02
Copper	2.7E-02	4.7E-01	---	---	4.6E-04	---	---	---	---	5.0E-01
Lead	1.8E-02	1.7E-02	---	---	1.1E-04	---	---	---	---	3.4E-02
Manganese	2.3E-02	1.2E+00	---	---	1.4E-02	---	---	---	---	1.2E+00
Molybdenum	7.1E-04	2.3E-01	---	---	2.3E-04	---	---	---	---	2.3E-01
Nickel	5.2E-02	3.1E-01	---	---	7.1E-04	---	---	---	---	3.7E-01
Selenium	6.7E-04	5.5E-03	---	---	5.9E-05	---	---	---	---	6.3E-03
Thallium	1.3E-04	4.0E-04	---	---	2.1E-06	---	---	---	---	5.3E-04
Uranium	1.3E-03	9.5E-04	---	---	2.1E-04	---	---	---	---	2.5E-03
Vanadium	2.9E-02	5.3E-02	---	---	4.9E-04	---	---	---	---	8.3E-02
Zinc	8.0E-02	1.8E+00	---	---	1.8E-03	---	---	---	---	1.9E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.2E-05	3.1E-04	---	---	8.9E-06	1.1E-05	2.3E-04	---	---	6.3E-04
Arsenic	8.5E-04	3.2E-03	---	---	1.0E-04	2.3E-04	9.3E-03	---	---	1.4E-02
Barium	8.1E-04	1.0E-01	---	---	6.2E-04	4.9E-04	1.3E-02	---	---	1.2E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.6E-05	4.1E-04	---	---	2.4E-03
Cadmium	1.6E-04	4.4E-03	---	---	2.1E-06	5.0E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	1.4E-02	8.9E-02	---	---	1.3E-04	2.1E-03	1.2E-02	---	---	1.2E-01
Cobalt	2.3E-03	1.4E-02	---	---	2.3E-05	6.4E-04	5.1E-03	---	---	2.2E-02
Copper	7.2E-03	1.9E-01	---	---	1.2E-04	8.8E-04	4.5E-02	---	---	2.4E-01
Lead	4.6E-03	1.1E-02	---	---	2.9E-05	1.0E-03	6.0E-03	---	---	2.3E-02
Manganese	6.0E-03	4.1E-01	---	---	3.7E-03	6.1E-03	2.5E-01	---	---	6.8E-01
Molybdenum	1.8E-04	6.9E-02	---	---	6.1E-05	5.4E-05	2.8E-02	---	---	9.7E-02
Nickel	1.4E-02	1.3E-01	---	---	1.8E-04	2.2E-03	4.6E-02	---	---	2.0E-01
Selenium	1.8E-04	2.8E-03	---	---	1.5E-05	5.2E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.5E-04	---	---	5.4E-07	8.6E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.6E-04	---	---	5.4E-05	2.2E-04	9.6E-03	---	---	1.1E-02
Vanadium	7.5E-03	3.1E-02	---	---	1.3E-04	2.0E-03	3.6E-02	---	---	7.7E-02
Zinc	2.1E-02	1.0E+00	---	---	4.8E-04	5.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	9.0E-06	---	---	8.9E-07	1.3E-05	9.6E-05	---	2.2E-05	4.2E-04	5.6E-04
Arsenic	1.1E-04	---	---	3.5E-05	1.5E-04	2.0E-03	---	2.4E-02	7.4E-03	3.3E-02
Barium	1.0E-04	---	---	7.0E-04	9.3E-04	4.2E-03	---	1.8E-02	7.1E-02	9.5E-02
Beryllium	1.4E-05	---	---	2.6E-05	1.6E-06	2.2E-04	---	9.4E-04	1.9E-04	1.4E-03
Cadmium	2.0E-05	---	---	9.0E-04	3.2E-06	4.3E-04	---	1.6E-02	1.6E-03	1.9E-02
Chromium (Total)	1.7E-03	---	---	7.2E-03	1.9E-04	1.8E-02	---	1.0E-01	6.6E-03	1.4E-01
Cobalt	2.9E-04	---	---	3.2E-04	3.4E-05	5.5E-03	---	4.2E-04	3.9E-03	1.0E-02
Copper	8.9E-04	---	---	2.3E-02	1.8E-04	7.5E-03	---	4.9E-01	1.4E-01	6.6E-01
Lead	5.7E-04	---	---	6.8E-03	4.2E-05	8.6E-03	---	2.7E-02	7.2E-03	5.0E-02
Manganese	7.5E-04	---	---	1.5E-03	5.5E-03	5.2E-02	---	2.5E-01	1.6E-01	4.7E-01
Molybdenum	2.3E-05	---	---	2.5E-04	9.0E-05	4.6E-04	---	7.7E-03	8.7E-02	9.5E-02
Nickel	1.7E-03	---	---	8.7E-03	2.8E-04	1.8E-02	---	7.3E-02	2.4E-02	1.3E-01
Selenium	2.2E-05	---	---	1.0E-03	2.3E-05	4.4E-04	---	8.7E-03	4.0E-02	5.0E-02
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	7.3E-05	---	4.6E-04	5.3E-04	1.1E-03
Uranium	4.2E-05	---	---	4.8E-06	8.1E-05	1.9E-03	---	1.0E-03	5.4E-03	8.5E-03
Vanadium	9.4E-04	---	---	5.8E-04	1.9E-04	1.7E-02	---	9.8E-03	1.6E-02	4.4E-02
Zinc	2.6E-03	---	---	2.3E-01	7.1E-04	4.5E-02	---	2.8E+00	6.2E+00	9.3E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.8E-05	8.5E-04	8.0E-06	1.4E-05	---	---	---	---	1.1E-03
Arsenic	1.8E-03	1.3E-04	1.8E-03	3.1E-04	1.6E-04	---	---	---	---	4.2E-03
Barium	1.7E-03	3.2E-03	8.7E-04	6.4E-03	9.9E-04	---	---	---	---	1.3E-02
Beryllium	2.3E-04	2.9E-05	5.8E-05	2.4E-04	1.7E-06	---	---	---	---	5.6E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	3.4E-06	---	---	---	---	2.7E-02
Chromium (Total)	2.8E-02	3.7E-03	4.9E-02	6.5E-02	2.1E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	5.3E-04	3.4E-03	2.9E-03	3.7E-05	---	---	---	---	1.2E-02
Copper	1.5E-02	1.6E-02	4.4E-02	2.1E-01	1.9E-04	---	---	---	---	2.9E-01
Lead	9.6E-03	1.6E-04	2.6E-02	6.2E-02	4.5E-05	---	---	---	---	9.8E-02
Manganese	1.3E-02	4.6E-02	4.7E-03	1.4E-02	5.9E-03	---	---	---	---	8.4E-02
Molybdenum	3.9E-04	9.5E-03	2.1E-03	2.3E-03	9.6E-05	---	---	---	---	1.4E-02
Nickel	2.8E-02	9.8E-03	1.7E-01	7.9E-02	2.9E-04	---	---	---	---	2.9E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.3E-03	2.4E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.6E-06	1.9E-05	2.2E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.6E-05	1.3E-04	4.4E-05	8.7E-05	---	---	---	---	9.9E-04
Vanadium	1.6E-02	9.5E-04	3.7E-03	5.2E-03	2.0E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	3.4E-02	1.2E+00	2.1E+00	7.6E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.9E-04	1.2E-03	---	---	1.6E-05	---	---	---	---	2.1E-03
Arsenic	1.1E-02	1.2E-02	---	---	1.8E-04	---	---	---	---	2.3E-02
Barium	1.0E-02	3.7E-01	---	---	1.1E-03	---	---	---	---	3.8E-01
Beryllium	1.4E-03	6.6E-03	---	---	1.9E-06	---	---	---	---	8.0E-03
Cadmium	2.0E-03	1.6E-02	---	---	3.8E-06	---	---	---	---	1.8E-02
Chromium (Total)	1.7E-01	3.2E-01	---	---	2.3E-04	---	---	---	---	4.9E-01
Cobalt	2.9E-02	5.2E-02	---	---	4.1E-05	---	---	---	---	8.1E-02
Copper	8.9E-02	7.1E-01	---	---	2.1E-04	---	---	---	---	8.0E-01
Lead	5.7E-02	4.1E-02	---	---	5.1E-05	---	---	---	---	9.8E-02
Manganese	7.5E-02	1.6E+00	---	---	6.6E-03	---	---	---	---	1.7E+00
Molybdenum	2.3E-03	2.7E-01	---	---	1.1E-04	---	---	---	---	2.7E-01
Nickel	1.7E-01	5.0E-01	---	---	3.3E-04	---	---	---	---	6.7E-01
Selenium	2.2E-03	1.0E-02	---	---	2.7E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	9.0E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	9.6E-05	---	---	---	---	6.3E-03
Vanadium	9.3E-02	1.1E-01	---	---	2.2E-04	---	---	---	---	2.1E-01
Zinc	2.6E-01	3.7E+00	---	---	8.5E-04	---	---	---	---	4.0E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.3E-04	5.2E-04	---	---	1.1E-05	---	---	---	---	6.6E-04
Arsenic	1.5E-03	5.3E-03	---	---	1.2E-04	---	---	---	---	6.9E-03
Barium	1.4E-03	1.7E-01	---	---	7.4E-04	---	---	---	---	1.7E-01
Beryllium	1.9E-04	3.0E-03	---	---	1.3E-06	---	---	---	---	3.2E-03
Cadmium	2.8E-04	7.4E-03	---	---	2.5E-06	---	---	---	---	7.7E-03
Chromium (Total)	2.4E-02	1.5E-01	---	---	1.5E-04	---	---	---	---	1.7E-01
Cobalt	4.1E-03	2.3E-02	---	---	2.7E-05	---	---	---	---	2.7E-02
Copper	1.3E-02	3.2E-01	---	---	1.4E-04	---	---	---	---	3.3E-01
Lead	8.1E-03	1.8E-02	---	---	3.4E-05	---	---	---	---	2.6E-02
Manganese	1.1E-02	7.2E-01	---	---	4.4E-03	---	---	---	---	7.4E-01
Molybdenum	3.2E-04	1.2E-01	---	---	7.2E-05	---	---	---	---	1.2E-01
Nickel	2.4E-02	2.3E-01	---	---	2.2E-04	---	---	---	---	2.5E-01
Selenium	3.1E-04	4.6E-03	---	---	1.8E-05	---	---	---	---	4.9E-03
Thallium	6.0E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.6E-04
Uranium	6.0E-04	9.2E-04	---	---	6.4E-05	---	---	---	---	1.6E-03
Vanadium	1.3E-02	5.0E-02	---	---	1.5E-04	---	---	---	---	6.4E-02
Zinc	3.7E-02	1.7E+00	---	---	5.7E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	2.2E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	2.5E-04	---	---	---	---	6.7E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.6E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	3.2E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	5.8E-05	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	3.0E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	7.1E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.3E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	1.5E-04	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	4.6E-04	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	3.8E-05	---	---	---	---	5.5E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	1.4E-04	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	3.2E-04	---	---	---	---	3.1E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.2E-03	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	2.2E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	2.5E-04	---	---	---	---	6.7E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.6E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.3E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	3.2E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	5.8E-05	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	3.0E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	7.1E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	9.3E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	1.5E-04	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	4.6E-04	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	3.8E-05	---	---	---	---	5.5E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	1.4E-04	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	3.2E-04	---	---	---	---	3.1E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.2E-03	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.3E-05	---	---	6.3E-06	5.8E-06	6.7E-05	---	---	3.5E-04	4.9E-04
Arsenic	7.5E-04	---	---	2.4E-04	6.5E-05	1.4E-03	---	---	6.0E-03	8.5E-03
Barium	7.1E-04	---	---	5.0E-03	4.1E-04	2.9E-03	---	---	5.8E-02	6.7E-02
Beryllium	9.6E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	5.9E-04
Cadmium	1.4E-04	---	---	6.4E-03	1.4E-06	3.0E-04	---	---	1.3E-03	8.1E-03
Chromium (Total)	1.2E-02	---	---	5.1E-02	8.4E-05	1.2E-02	---	---	5.4E-03	8.0E-02
Cobalt	2.1E-03	---	---	2.3E-03	1.5E-05	3.8E-03	---	---	3.2E-03	1.1E-02
Copper	6.3E-03	---	---	1.6E-01	7.8E-05	5.2E-03	---	---	1.1E-01	2.9E-01
Lead	4.0E-03	---	---	4.8E-02	1.9E-05	6.0E-03	---	---	5.9E-03	6.4E-02
Manganese	5.3E-03	---	---	1.1E-02	2.4E-03	3.6E-02	---	---	1.3E-01	1.9E-01
Molybdenum	1.6E-04	---	---	1.8E-03	3.9E-05	3.2E-04	---	---	7.1E-02	7.4E-02
Nickel	1.2E-02	---	---	6.1E-02	1.2E-04	1.3E-02	---	---	2.0E-02	1.1E-01
Selenium	1.5E-04	---	---	7.2E-03	9.9E-06	3.1E-04	---	---	3.3E-02	4.1E-02
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.1E-05	---	---	4.4E-04	6.9E-04
Uranium	3.0E-04	---	---	3.4E-05	3.5E-05	1.3E-03	---	---	4.4E-03	6.1E-03
Vanadium	6.6E-03	---	---	4.1E-03	8.2E-05	1.2E-02	---	---	1.3E-02	3.6E-02
Zinc	1.8E-02	---	---	1.6E+00	3.1E-04	3.1E-02	---	---	5.1E+00	6.7E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.4E-05	6.0E-02	---	3.6E-05	---	---	---	---	6.1E-02
Arsenic	1.4E-02	1.6E-04	1.3E-01	---	4.0E-04	---	---	---	---	1.4E-01
Barium	1.4E-02	3.8E-03	6.1E-02	---	2.5E-03	---	---	---	---	8.1E-02
Beryllium	1.8E-03	3.4E-05	4.1E-03	---	4.4E-06	---	---	---	---	6.0E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	8.6E-06	---	---	---	---	1.3E+00
Chromium (Total)	2.3E-01	4.4E-03	3.5E+00	---	5.2E-04	---	---	---	---	3.7E+00
Cobalt	3.9E-02	6.3E-04	2.4E-01	---	9.3E-05	---	---	---	---	2.8E-01
Copper	1.2E-01	1.9E-02	3.1E+00	---	4.8E-04	---	---	---	---	3.3E+00
Lead	7.7E-02	1.9E-04	1.8E+00	---	1.2E-04	---	---	---	---	1.9E+00
Manganese	1.0E-01	5.5E-02	3.3E-01	---	1.5E-02	---	---	---	---	5.0E-01
Molybdenum	3.1E-03	1.1E-02	1.5E-01	---	2.4E-04	---	---	---	---	1.6E-01
Nickel	2.3E-01	1.2E-02	1.2E+01	---	7.5E-04	---	---	---	---	1.2E+01
Selenium	2.9E-03	1.6E-04	1.4E-01	---	6.2E-05	---	---	---	---	1.5E-01
Thallium	5.7E-04	6.6E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.7E-03	1.9E-05	9.3E-03	---	2.2E-04	---	---	---	---	1.5E-02
Vanadium	1.3E-01	1.1E-03	2.6E-01	---	5.1E-04	---	---	---	---	3.9E-01
Zinc	3.5E-01	4.1E-02	8.7E+01	---	1.9E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	8.5E-06	1.7E-04	3.7E-05	2.0E-05	8.2E-04	1.1E-03
Arsenic	---	---	---	---	9.4E-05	3.6E-03	1.5E-03	2.2E-02	1.4E-02	4.1E-02
Barium	---	---	---	---	5.9E-04	7.5E-03	2.0E-03	1.7E-02	1.4E-01	1.6E-01
Beryllium	---	---	---	---	1.0E-06	4.0E-04	6.6E-05	8.7E-04	3.7E-04	1.7E-03
Cadmium	---	---	---	---	2.0E-06	7.7E-04	1.0E-04	1.5E-02	3.1E-03	1.9E-02
Chromium (Total)	---	---	---	---	1.2E-04	3.2E-02	2.0E-03	9.3E-02	1.3E-02	1.4E-01
Cobalt	---	---	---	---	2.2E-05	9.8E-03	8.1E-04	3.8E-04	7.5E-03	1.9E-02
Copper	---	---	---	---	1.1E-04	1.3E-02	7.3E-03	4.5E-01	2.6E-01	7.4E-01
Lead	---	---	---	---	2.7E-05	1.5E-02	9.6E-04	2.4E-02	1.4E-02	5.5E-02
Manganese	---	---	---	---	3.5E-03	9.3E-02	4.0E-02	2.3E-01	3.1E-01	6.8E-01
Molybdenum	---	---	---	---	5.7E-05	8.3E-04	4.6E-03	7.0E-03	1.7E-01	1.8E-01
Nickel	---	---	---	---	1.8E-04	3.3E-02	7.4E-03	6.7E-02	4.7E-02	1.5E-01
Selenium	---	---	---	---	1.5E-05	7.9E-04	1.4E-04	8.0E-03	7.8E-02	8.7E-02
Thallium	---	---	---	---	5.2E-07	1.3E-04	2.0E-04	4.2E-04	1.0E-03	1.8E-03
Uranium	---	---	---	---	5.2E-05	3.4E-03	1.5E-03	9.4E-04	1.0E-02	1.6E-02
Vanadium	---	---	---	---	1.2E-04	3.1E-02	5.8E-03	9.0E-03	3.1E-02	7.6E-02
Zinc	---	---	---	---	4.5E-04	8.1E-02	3.9E-02	2.6E+00	1.2E+01	1.5E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	1.1E-05	2.3E-04	2.6E-04	3.2E-04	---	8.2E-04
Arsenic	---	---	---	---	1.2E-04	4.7E-03	1.1E-02	3.4E-01	---	3.6E-01
Barium	---	---	---	---	7.6E-04	9.7E-03	1.4E-02	2.6E-01	---	2.9E-01
Beryllium	---	---	---	---	1.3E-06	5.3E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	2.6E-06	1.0E-03	7.2E-04	2.3E-01	---	2.4E-01
Chromium (Total)	---	---	---	---	1.6E-04	4.1E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	2.8E-05	1.3E-02	5.7E-03	6.0E-03	---	2.5E-02
Copper	---	---	---	---	1.5E-04	1.7E-02	5.1E-02	7.1E+00	---	7.2E+00
Lead	---	---	---	---	3.5E-05	2.0E-02	6.7E-03	3.8E-01	---	4.1E-01
Manganese	---	---	---	---	4.5E-03	1.2E-01	2.8E-01	3.6E+00	---	4.0E+00
Molybdenum	---	---	---	---	7.4E-05	1.1E-03	3.2E-02	1.1E-01	---	1.4E-01
Nickel	---	---	---	---	2.2E-04	4.3E-02	5.2E-02	1.1E+00	---	1.1E+00
Selenium	---	---	---	---	1.9E-05	1.0E-03	1.0E-03	1.3E-01	---	1.3E-01
Thallium	---	---	---	---	6.6E-07	1.7E-04	1.4E-03	6.6E-03	---	8.2E-03
Uranium	---	---	---	---	6.6E-05	4.5E-03	1.1E-02	1.5E-02	---	3.0E-02
Vanadium	---	---	---	---	1.5E-04	4.0E-02	4.1E-02	1.4E-01	---	2.2E-01
Zinc	---	---	---	---	5.8E-04	1.1E-01	2.7E-01	4.1E+01	---	4.1E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	9.1E-06	2.8E-04	1.4E-03	1.5E-04	---	2.5E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	1.0E-04	5.8E-03	5.7E-02	1.6E-01	---	2.3E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	6.4E-04	1.2E-02	7.7E-02	1.3E-01	---	2.2E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	1.3E-04	5.2E-02	7.6E-02	7.1E-01	---	8.8E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	2.4E-05	1.6E-02	3.1E-02	2.9E-03	---	5.4E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	1.2E-04	2.2E-02	2.7E-01	3.4E+00	---	3.8E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.9E-05	2.5E-02	3.6E-02	1.8E-01	---	2.7E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	6.2E-05	1.4E-03	1.7E-01	5.3E-02	---	2.4E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	1.9E-04	5.4E-02	2.8E-01	5.1E-01	---	9.7E-01
Selenium	9.1E-05	1.6E-04	1.4E-03	---	1.6E-05	1.3E-03	5.4E-03	6.1E-02	---	6.9E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.6E-07	2.1E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	5.6E-05	5.6E-03	5.8E-02	7.1E-03	---	7.1E-02
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	1.3E-04	5.0E-02	2.2E-01	6.8E-02	---	3.4E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.9E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	9.1E-06	2.8E-04	1.4E-03	1.5E-04	---	2.5E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	1.0E-04	5.8E-03	5.7E-02	1.6E-01	---	2.3E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	6.4E-04	1.2E-02	7.7E-02	1.3E-01	---	2.2E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.1E-06	6.6E-04	2.5E-03	6.5E-03	---	9.8E-03
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.2E-06	1.2E-03	3.9E-03	1.1E-01	---	1.3E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	1.3E-04	5.2E-02	7.6E-02	7.1E-01	---	8.8E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	2.4E-05	1.6E-02	3.1E-02	2.9E-03	---	5.4E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	1.2E-04	2.2E-02	2.7E-01	3.4E+00	---	3.8E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.9E-05	2.5E-02	3.6E-02	1.8E-01	---	2.7E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	3.8E-03	1.5E-01	1.5E+00	1.7E+00	---	3.5E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	6.2E-05	1.4E-03	1.7E-01	5.3E-02	---	2.4E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	1.9E-04	5.4E-02	2.8E-01	5.1E-01	---	9.7E-01
Selenium	9.1E-05	1.6E-04	1.4E-03	---	1.6E-05	1.3E-03	5.4E-03	6.1E-02	---	6.9E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	5.6E-07	2.1E-04	7.6E-03	3.2E-03	---	1.1E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	5.6E-05	5.6E-03	5.8E-02	7.1E-03	---	7.1E-02
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	1.3E-04	5.0E-02	2.2E-01	6.8E-02	---	3.4E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.9E-04	1.3E-01	1.5E+00	1.9E+01	---	2.2E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	9.4E-06	---	---	---	---	1.8E-04
Arsenic	1.8E-03	---	---	5.8E-04	1.0E-04	---	---	---	---	2.5E-03
Barium	1.7E-03	---	---	1.2E-02	6.5E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.1E-06	---	---	---	---	6.7E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	1.4E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	2.4E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	1.3E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	3.0E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.9E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	6.4E-05	---	---	---	---	4.7E-03
Nickel	2.8E-02	---	---	1.5E-01	1.9E-04	---	---	---	---	1.7E-01
Selenium	3.7E-04	---	---	1.7E-02	1.6E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	5.7E-05	---	---	---	---	8.5E-04
Vanadium	1.6E-02	---	---	9.7E-03	1.3E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	---	---	3.8E+00	5.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	9.4E-06	---	---	---	---	1.8E-04
Arsenic	1.8E-03	---	---	5.8E-04	1.0E-04	---	---	---	---	2.5E-03
Barium	1.7E-03	---	---	1.2E-02	6.5E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.1E-06	---	---	---	---	6.7E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.2E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	1.4E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	2.4E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	1.3E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	3.0E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	3.9E-03	---	---	---	---	4.2E-02
Molybdenum	3.9E-04	---	---	4.2E-03	6.4E-05	---	---	---	---	4.7E-03
Nickel	2.8E-02	---	---	1.5E-01	1.9E-04	---	---	---	---	1.7E-01
Selenium	3.7E-04	---	---	1.7E-02	1.6E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	5.7E-05	---	---	---	---	8.5E-04
Vanadium	1.6E-02	---	---	9.7E-03	1.3E-04	---	---	---	---	2.6E-02
Zinc	4.4E-02	---	---	3.8E+00	5.0E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.9E-04	3.6E-05	1.4E-05	---	---	---	---	7.8E-04
Arsenic	2.9E-03	---	1.0E-03	1.4E-03	1.6E-04	---	---	---	---	5.5E-03
Barium	2.8E-03	---	5.0E-04	2.9E-02	9.8E-04	---	---	---	---	3.3E-02
Beryllium	3.7E-04	---	3.3E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	3.3E-06	---	---	---	---	4.8E-02
Chromium (Total)	4.6E-02	---	2.8E-02	2.9E-01	2.0E-04	---	---	---	---	3.7E-01
Cobalt	7.9E-03	---	1.9E-03	1.3E-02	3.6E-05	---	---	---	---	2.3E-02
Copper	2.4E-02	---	2.5E-02	9.5E-01	1.9E-04	---	---	---	---	1.0E+00
Lead	1.6E-02	---	1.5E-02	2.8E-01	4.5E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.7E-03	6.3E-02	5.8E-03	---	---	---	---	9.2E-02
Molybdenum	6.3E-04	---	1.2E-03	1.0E-02	9.5E-05	---	---	---	---	1.2E-02
Nickel	4.6E-02	---	9.7E-02	3.6E-01	2.9E-04	---	---	---	---	5.0E-01
Selenium	6.0E-04	---	1.2E-03	4.2E-02	2.4E-05	---	---	---	---	4.4E-02
Thallium	1.2E-04	---	1.1E-05	9.8E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	8.6E-05	---	---	---	---	1.5E-03
Vanadium	2.6E-02	---	2.1E-03	2.4E-02	2.0E-04	---	---	---	---	5.1E-02
Zinc	7.1E-02	---	7.0E-01	9.3E+00	7.5E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	2.9E-05	3.1E-04	4.5E-04	3.6E-04	2.2E-04	2.4E-02
Arsenic	5.2E-03	---	4.7E-02	---	3.2E-04	6.3E-03	1.8E-02	3.9E-01	3.8E-03	4.7E-01
Barium	5.0E-03	---	2.3E-02	---	2.0E-03	1.3E-02	2.4E-02	3.0E-01	3.7E-02	4.0E-01
Beryllium	6.7E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	4.1E-04	5.6E-02	2.4E-02	1.7E+00	3.4E-03	3.1E+00
Cobalt	1.4E-02	---	8.8E-02	---	7.4E-05	1.7E-02	9.7E-03	6.9E-03	2.0E-03	1.4E-01
Copper	4.4E-02	---	1.2E+00	---	3.9E-04	2.4E-02	8.7E-02	8.1E+00	7.0E-02	9.5E+00
Lead	2.8E-02	---	6.7E-01	---	9.1E-05	2.7E-02	1.1E-02	4.4E-01	3.7E-03	1.2E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.4E-02	---	1.9E-04	1.5E-03	5.5E-02	1.3E-01	4.5E-02	2.8E-01
Nickel	8.3E-02	---	4.4E+00	---	5.9E-04	5.8E-02	8.8E-02	1.2E+00	1.2E-02	5.8E+00
Selenium	1.1E-03	---	5.3E-02	---	4.9E-05	1.4E-03	1.7E-03	1.4E-01	2.1E-02	2.2E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.3E-04	2.4E-03	7.6E-03	2.7E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	1.7E-04	6.1E-03	1.8E-02	1.7E-02	2.8E-03	5.0E-02
Vanadium	4.6E-02	---	9.7E-02	---	4.1E-04	5.4E-02	6.9E-02	1.6E-01	8.2E-03	4.4E-01
Zinc	1.3E-01	---	3.2E+01	---	1.5E-03	1.4E-01	4.6E-01	4.6E+01	3.2E+00	8.2E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	2.9E-05	3.1E-04	4.5E-04	3.6E-04	2.2E-04	2.4E-02
Arsenic	5.2E-03	---	4.7E-02	---	3.2E-04	6.3E-03	1.8E-02	3.9E-01	3.8E-03	4.7E-01
Barium	5.0E-03	---	2.3E-02	---	2.0E-03	1.3E-02	2.4E-02	3.0E-01	3.7E-02	4.0E-01
Beryllium	6.7E-04	---	1.5E-03	---	3.5E-06	7.1E-04	7.9E-04	1.6E-02	9.8E-05	1.9E-02
Cadmium	9.8E-04	---	4.6E-01	---	6.8E-06	1.4E-03	1.2E-03	2.7E-01	8.3E-04	7.3E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	4.1E-04	5.6E-02	2.4E-02	1.7E+00	3.4E-03	3.1E+00
Cobalt	1.4E-02	---	8.8E-02	---	7.4E-05	1.7E-02	9.7E-03	6.9E-03	2.0E-03	1.4E-01
Copper	4.4E-02	---	1.2E+00	---	3.9E-04	2.4E-02	8.7E-02	8.1E+00	7.0E-02	9.5E+00
Lead	2.8E-02	---	6.7E-01	---	9.1E-05	2.7E-02	1.1E-02	4.4E-01	3.7E-03	1.2E+00
Manganese	3.7E-02	---	1.2E-01	---	1.2E-02	1.6E-01	4.8E-01	4.1E+00	8.3E-02	5.0E+00
Molybdenum	1.1E-03	---	5.4E-02	---	1.9E-04	1.5E-03	5.5E-02	1.3E-01	4.5E-02	2.8E-01
Nickel	8.3E-02	---	4.4E+00	---	5.9E-04	5.8E-02	8.8E-02	1.2E+00	1.2E-02	5.8E+00
Selenium	1.1E-03	---	5.3E-02	---	4.9E-05	1.4E-03	1.7E-03	1.4E-01	2.1E-02	2.2E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.3E-04	2.4E-03	7.6E-03	2.7E-04	1.1E-02
Uranium	2.1E-03	---	3.4E-03	---	1.7E-04	6.1E-03	1.8E-02	1.7E-02	2.8E-03	5.0E-02
Vanadium	4.6E-02	---	9.7E-02	---	4.1E-04	5.4E-02	6.9E-02	1.6E-01	8.2E-03	4.4E-01
Zinc	1.3E-01	---	3.2E+01	---	1.5E-03	1.4E-01	4.6E-01	4.6E+01	3.2E+00	8.2E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.3E-04	1.2E-03	8.7E-04	---	1.1E-05	---	---	---	---	2.4E-03
Arsenic	3.9E-03	1.1E-02	1.8E-03	---	1.3E-04	---	---	---	---	1.7E-02
Barium	3.7E-03	3.3E-01	8.9E-04	---	8.0E-04	---	---	---	---	3.4E-01
Beryllium	5.0E-04	5.8E-03	6.0E-05	---	1.4E-06	---	---	---	---	6.3E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	2.7E-06	---	---	---	---	3.5E-02
Chromium (Total)	6.2E-02	3.0E-01	5.0E-02	---	1.7E-04	---	---	---	---	4.1E-01
Cobalt	1.1E-02	4.7E-02	3.5E-03	---	3.0E-05	---	---	---	---	6.1E-02
Copper	3.3E-02	7.2E-01	4.5E-02	---	1.5E-04	---	---	---	---	8.0E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	3.7E-05	---	---	---	---	8.3E-02
Manganese	2.7E-02	1.7E+00	4.8E-03	---	4.8E-03	---	---	---	---	1.7E+00
Molybdenum	8.4E-04	3.0E-01	2.1E-03	---	7.8E-05	---	---	---	---	3.0E-01
Nickel	6.2E-02	5.0E-01	1.7E-01	---	2.4E-04	---	---	---	---	7.3E-01
Selenium	8.0E-04	9.6E-03	2.1E-03	---	2.0E-05	---	---	---	---	1.3E-02
Thallium	1.5E-04	7.9E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.7E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	7.0E-05	---	---	---	---	3.6E-03
Vanadium	3.4E-02	1.0E-01	3.8E-03	---	1.6E-04	---	---	---	---	1.4E-01
Zinc	9.5E-02	3.3E+00	1.3E+00	---	6.1E-04	---	---	---	---	4.7E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.5E-04	3.5E-04	2.7E-06	6.5E-06	9.4E-06	---	---	1.9E-05	8.7E-04
Arsenic	1.6E-03	2.4E-03	7.3E-04	1.1E-04	4.5E-05	1.9E-04	---	---	2.1E-04	5.3E-03
Barium	1.5E-03	7.3E-02	3.4E-04	2.1E-03	4.7E-04	4.1E-04	---	---	2.1E-03	8.0E-02
Beryllium	2.1E-04	1.2E-03	2.4E-05	8.1E-05	1.3E-06	2.0E-05	---	---	1.9E-05	1.5E-03
Cadmium	3.1E-04	4.5E-03	7.4E-03	2.8E-03	2.7E-06	4.0E-05	---	---	5.0E-04	1.6E-02
Chromium (Total)	1.6E-02	2.0E-02	1.2E-02	1.5E-02	8.4E-05	1.5E-03	---	---	9.4E-05	6.5E-02
Cobalt	3.6E-03	6.2E-03	1.1E-03	7.9E-04	1.3E-05	3.9E-04	---	---	1.3E-04	1.2E-02
Copper	1.3E-02	2.0E-01	1.8E-02	7.2E-02	1.5E-04	9.4E-04	---	---	1.5E-02	3.2E-01
Lead	9.0E-03	7.3E-03	1.1E-02	2.1E-02	2.7E-05	1.0E-03	---	---	1.5E-03	5.1E-02
Manganese	1.1E-02	5.3E-01	1.9E-03	4.7E-03	2.6E-03	3.3E-03	---	---	1.1E-02	5.6E-01
Molybdenum	3.5E-04	1.0E-01	8.5E-04	7.8E-04	3.2E-06	3.7E-05	---	---	2.4E-04	1.0E-01
Nickel	9.6E-03	2.9E-02	2.5E-02	1.7E-02	5.8E-05	9.4E-04	---	---	3.8E-04	8.3E-02
Selenium	3.4E-04	2.5E-03	8.4E-04	3.2E-03	1.2E-05	3.3E-05	---	---	2.4E-03	9.3E-03
Thallium	6.6E-05	1.7E-04	7.8E-06	7.4E-05	6.5E-07	7.0E-06	---	---	1.0E-04	4.3E-04
Uranium	6.6E-04	4.1E-04	5.5E-05	1.5E-05	2.6E-06	6.1E-05	---	---	6.2E-06	1.2E-03
Vanadium	1.4E-02	1.9E-02	1.5E-03	1.7E-03	5.2E-05	1.3E-03	---	---	1.9E-04	3.8E-02
Zinc	4.0E-02	7.9E-01	5.1E-01	7.2E-01	5.2E-04	5.2E-03	---	---	4.2E-01	2.5E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.2E-05	---	---	5.1E-06	3.0E-06	1.0E-04	---	2.0E-05	1.8E-04	3.7E-04
Arsenic	6.0E-04	---	---	2.0E-04	2.1E-05	2.1E-03	---	2.0E-02	2.0E-03	2.5E-02
Barium	5.6E-04	---	---	3.9E-03	2.2E-04	4.6E-03	---	1.7E-02	2.0E-02	4.6E-02
Beryllium	7.8E-05	---	---	1.5E-04	6.0E-07	2.2E-04	---	7.8E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	1.3E-06	4.4E-04	---	1.4E-02	4.8E-03	2.4E-02
Chromium (Total)	5.8E-03	---	---	2.8E-02	3.9E-05	1.7E-02	---	8.0E-02	9.1E-04	1.3E-01
Cobalt	1.3E-03	---	---	1.5E-03	6.0E-06	4.3E-03	---	2.8E-04	1.2E-03	8.7E-03
Copper	4.9E-03	---	---	1.3E-01	6.9E-05	1.0E-02	---	4.5E-01	1.4E-01	7.4E-01
Lead	3.4E-03	---	---	4.0E-02	1.2E-05	1.1E-02	---	2.8E-02	1.5E-02	9.8E-02
Manganese	4.3E-03	---	---	8.7E-03	1.2E-03	3.7E-02	---	1.5E-01	1.0E-01	3.0E-01
Molybdenum	1.3E-04	---	---	1.5E-03	1.5E-06	4.1E-04	---	5.8E-03	2.3E-03	1.0E-02
Nickel	3.6E-03	---	---	3.2E-02	2.7E-05	1.0E-02	---	4.0E-02	3.6E-03	8.9E-02
Selenium	1.3E-04	---	---	6.0E-03	5.7E-06	3.7E-04	---	6.1E-03	2.3E-02	3.6E-02
Thallium	2.5E-05	---	---	1.4E-04	3.0E-07	7.8E-05	---	4.2E-04	9.6E-04	1.6E-03
Uranium	2.5E-04	---	---	2.8E-05	1.2E-06	6.8E-04	---	3.1E-04	6.0E-05	1.3E-03
Vanadium	5.2E-03	---	---	3.2E-03	2.4E-05	1.5E-02	---	7.1E-03	1.8E-03	3.2E-02
Zinc	1.5E-02	---	---	1.3E+00	2.4E-04	5.7E-02	---	2.3E+00	4.1E+00	7.9E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.4E-05	---	---	7.2E-06	5.1E-05	6.3E-05	---	---	1.9E-04
Arsenic	4.3E-04	3.5E-04	---	---	5.0E-05	1.0E-03	3.0E-03	---	---	4.8E-03
Barium	4.0E-04	1.1E-02	---	---	5.3E-04	2.3E-03	4.7E-03	---	---	1.9E-02
Beryllium	5.6E-05	2.1E-04	---	---	1.4E-06	1.1E-04	1.6E-04	---	---	5.4E-04
Cadmium	8.4E-05	5.2E-04	---	---	3.0E-06	2.2E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	4.2E-03	3.1E-03	---	---	9.4E-05	8.2E-03	4.8E-03	---	---	2.0E-02
Cobalt	9.7E-04	9.6E-04	---	---	1.4E-05	2.1E-03	1.8E-03	---	---	5.8E-03
Copper	3.5E-03	2.1E-02	---	---	1.7E-04	5.1E-03	1.6E-02	---	---	4.5E-02
Lead	2.4E-03	1.3E-03	---	---	3.0E-05	5.6E-03	2.3E-03	---	---	1.2E-02
Manganese	3.1E-03	4.7E-02	---	---	2.8E-03	1.8E-02	9.7E-02	---	---	1.7E-01
Molybdenum	9.5E-05	8.0E-03	---	---	3.6E-06	2.0E-04	6.7E-03	---	---	1.5E-02
Nickel	2.6E-03	2.9E-03	---	---	6.5E-05	5.1E-03	9.3E-03	---	---	2.0E-02
Selenium	9.2E-05	3.3E-04	---	---	1.4E-05	1.8E-04	3.5E-04	---	---	9.6E-04
Thallium	1.8E-05	2.9E-05	---	---	7.2E-07	3.8E-05	4.9E-04	---	---	5.7E-04
Uranium	1.8E-04	6.5E-05	---	---	2.9E-06	3.3E-04	1.2E-03	---	---	1.8E-03
Vanadium	3.7E-03	3.0E-03	---	---	5.8E-05	7.2E-03	1.2E-02	---	---	2.6E-02
Zinc	1.1E-02	1.2E-01	---	---	5.8E-04	2.8E-02	9.3E-02	---	---	2.5E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	5.7E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.6E-02	5.9E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	3.4E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	1.6E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	1.9E-04	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	3.3E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	3.2E-03	---	---	---	---	4.9E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	7.3E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.5E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	6.5E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	6.5E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.1E-05	8.1E-06	---	---	---	---	1.5E-04
Arsenic	1.4E-03	---	---	8.3E-04	5.7E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.6E-02	5.9E-04	---	---	---	---	1.8E-02
Beryllium	1.8E-04	---	---	6.3E-04	1.6E-06	---	---	---	---	8.1E-04
Cadmium	2.6E-04	---	---	2.2E-02	3.4E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.3E-02	---	---	1.2E-01	1.1E-04	---	---	---	---	1.3E-01
Cobalt	3.1E-03	---	---	6.2E-03	1.6E-05	---	---	---	---	9.2E-03
Copper	1.1E-02	---	---	5.6E-01	1.9E-04	---	---	---	---	5.7E-01
Lead	7.6E-03	---	---	1.7E-01	3.3E-05	---	---	---	---	1.7E-01
Manganese	9.7E-03	---	---	3.6E-02	3.2E-03	---	---	---	---	4.9E-02
Molybdenum	3.0E-04	---	---	6.1E-03	4.0E-06	---	---	---	---	6.4E-03
Nickel	8.1E-03	---	---	1.3E-01	7.3E-05	---	---	---	---	1.4E-01
Selenium	2.9E-04	---	---	2.5E-02	1.5E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.1E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.2E-02	---	---	1.3E-02	6.5E-05	---	---	---	---	2.5E-02
Zinc	3.4E-02	---	---	5.6E+00	6.5E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.4E-04	---	---	5.9E-06	---	---	---	---	4.0E-04
Arsenic	2.9E-03	1.5E-03	---	---	4.1E-05	---	---	---	---	4.4E-03
Barium	2.7E-03	4.8E-02	---	---	4.3E-04	---	---	---	---	5.1E-02
Beryllium	3.7E-04	9.0E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	2.5E-06	---	---	---	---	2.8E-03
Chromium (Total)	2.8E-02	1.3E-02	---	---	7.6E-05	---	---	---	---	4.1E-02
Cobalt	6.4E-03	4.0E-03	---	---	1.2E-05	---	---	---	---	1.0E-02
Copper	2.4E-02	8.7E-02	---	---	1.4E-04	---	---	---	---	1.1E-01
Lead	1.6E-02	5.6E-03	---	---	2.4E-05	---	---	---	---	2.2E-02
Manganese	2.0E-02	2.0E-01	---	---	2.3E-03	---	---	---	---	2.2E-01
Molybdenum	6.3E-04	3.4E-02	---	---	2.9E-06	---	---	---	---	3.4E-02
Nickel	1.7E-02	1.2E-02	---	---	5.3E-05	---	---	---	---	2.9E-02
Selenium	6.1E-04	1.4E-03	---	---	1.1E-05	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.2E-04	---	---	5.9E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	2.4E-06	---	---	---	---	1.5E-03
Vanadium	2.5E-02	1.3E-02	---	---	4.7E-05	---	---	---	---	3.7E-02
Zinc	7.2E-02	5.0E-01	---	---	4.7E-04	---	---	---	---	5.7E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.2E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.3E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	7.2E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	3.4E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	3.9E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	7.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	6.8E-03	---	---	---	---	9.5E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.5E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	3.3E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.4E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-03	2.9E-04	7.4E-02	---	1.7E-05	---	---	---	---	7.5E-02
Arsenic	1.8E-02	3.1E-03	1.6E-01	---	1.2E-04	---	---	---	---	1.8E-01
Barium	1.7E-02	9.8E-02	7.3E-02	---	1.3E-03	---	---	---	---	1.9E-01
Beryllium	2.3E-03	1.9E-03	5.0E-03	---	3.4E-06	---	---	---	---	9.2E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	7.2E-06	---	---	---	---	1.6E+00
Chromium (Total)	1.7E-01	2.7E-02	2.5E+00	---	2.2E-04	---	---	---	---	2.7E+00
Cobalt	4.0E-02	8.3E-03	2.3E-01	---	3.4E-05	---	---	---	---	2.8E-01
Copper	1.5E-01	1.8E-01	3.9E+00	---	3.9E-04	---	---	---	---	4.2E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	7.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.1E-01	4.1E-01	---	6.8E-03	---	---	---	---	9.5E-01
Molybdenum	4.0E-03	6.9E-02	1.8E-01	---	8.6E-06	---	---	---	---	2.5E-01
Nickel	1.1E-01	2.5E-02	5.4E+00	---	1.5E-04	---	---	---	---	5.6E+00
Selenium	3.8E-03	2.8E-03	1.8E-01	---	3.3E-05	---	---	---	---	1.9E-01
Thallium	7.4E-04	2.5E-04	1.7E-03	---	1.7E-06	---	---	---	---	2.6E-03
Uranium	7.4E-03	5.7E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.5E-01	2.6E-02	3.1E-01	---	1.4E-04	---	---	---	---	4.9E-01
Zinc	4.5E-01	1.0E+00	1.1E+02	---	1.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.7E-04	7.5E-04	---	---	2.1E-05	---	---	---	---	1.0E-03
Arsenic	3.2E-03	5.4E-03	---	---	1.5E-04	---	---	---	---	8.8E-03
Barium	2.9E-03	1.6E-01	---	---	1.5E-03	---	---	---	---	1.7E-01
Beryllium	4.1E-04	2.7E-03	---	---	4.2E-06	---	---	---	---	3.1E-03
Cadmium	6.1E-04	1.0E-02	---	---	8.8E-06	---	---	---	---	1.1E-02
Chromium (Total)	3.0E-02	4.6E-02	---	---	2.7E-04	---	---	---	---	7.6E-02
Cobalt	7.0E-03	1.4E-02	---	---	4.2E-05	---	---	---	---	2.1E-02
Copper	2.6E-02	4.4E-01	---	---	4.8E-04	---	---	---	---	4.6E-01
Lead	1.8E-02	1.7E-02	---	---	8.6E-05	---	---	---	---	3.4E-02
Manganese	2.2E-02	1.2E+00	---	---	8.3E-03	---	---	---	---	1.2E+00
Molybdenum	6.9E-04	2.2E-01	---	---	1.1E-05	---	---	---	---	2.2E-01
Nickel	1.9E-02	6.4E-02	---	---	1.9E-04	---	---	---	---	8.3E-02
Selenium	6.7E-04	5.5E-03	---	---	4.0E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	3.9E-04	---	---	2.1E-06	---	---	---	---	5.2E-04
Uranium	1.3E-03	9.2E-04	---	---	8.4E-06	---	---	---	---	2.2E-03
Vanadium	2.7E-02	4.3E-02	---	---	1.7E-04	---	---	---	---	7.0E-02
Zinc	7.8E-02	1.8E+00	---	---	1.7E-03	---	---	---	---	1.8E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.0E-05	2.8E-04	---	---	5.4E-06	1.3E-05	1.6E-04	---	---	5.4E-04
Arsenic	8.2E-04	2.9E-03	---	---	3.8E-05	2.6E-04	7.6E-03	---	---	1.2E-02
Barium	7.6E-04	9.5E-02	---	---	4.0E-04	5.8E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.8E-05	4.1E-04	---	---	2.3E-03
Cadmium	1.6E-04	4.4E-03	---	---	2.3E-06	5.6E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	7.9E-03	2.6E-02	---	---	7.1E-05	2.1E-03	1.2E-02	---	---	4.9E-02
Cobalt	1.8E-03	8.0E-03	---	---	1.1E-05	5.5E-04	4.6E-03	---	---	1.5E-02
Copper	6.7E-03	1.7E-01	---	---	1.3E-04	1.3E-03	4.1E-02	---	---	2.2E-01
Lead	4.6E-03	1.1E-02	---	---	2.2E-05	1.5E-03	5.8E-03	---	---	2.3E-02
Manganese	5.8E-03	4.0E-01	---	---	2.1E-03	4.6E-03	2.5E-01	---	---	6.6E-01
Molybdenum	1.8E-04	6.7E-02	---	---	2.7E-06	5.2E-05	1.7E-02	---	---	8.5E-02
Nickel	4.9E-03	2.4E-02	---	---	4.9E-05	1.3E-03	2.4E-02	---	---	5.5E-02
Selenium	1.7E-04	2.7E-03	---	---	1.0E-05	4.6E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.4E-04	---	---	5.4E-07	9.9E-06	1.2E-03	---	---	1.5E-03
Uranium	3.4E-04	5.5E-04	---	---	2.2E-06	8.6E-05	3.1E-03	---	---	4.1E-03
Vanadium	7.0E-03	2.5E-02	---	---	4.4E-05	1.9E-03	3.2E-02	---	---	6.6E-02
Zinc	2.0E-02	1.0E+00	---	---	4.4E-04	7.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.8E-06	---	---	8.6E-07	8.1E-06	1.1E-04	---	2.6E-05	1.9E-04	3.5E-04
Arsenic	1.0E-04	---	---	3.4E-05	5.7E-05	2.2E-03	---	2.6E-02	2.1E-03	3.0E-02
Barium	9.5E-05	---	---	6.6E-04	5.9E-04	4.9E-03	---	2.1E-02	2.1E-02	4.9E-02
Beryllium	1.3E-05	---	---	2.6E-05	1.6E-06	2.4E-04	---	9.9E-04	1.9E-04	1.5E-03
Cadmium	2.0E-05	---	---	9.0E-04	3.4E-06	4.8E-04	---	1.7E-02	5.1E-03	2.4E-02
Chromium (Total)	9.9E-04	---	---	4.8E-03	1.1E-04	1.8E-02	---	1.0E-01	9.5E-04	1.3E-01
Cobalt	2.3E-04	---	---	2.5E-04	1.6E-05	4.7E-03	---	3.6E-04	1.3E-03	6.8E-03
Copper	8.4E-04	---	---	2.3E-02	1.9E-04	1.1E-02	---	5.7E-01	1.5E-01	7.6E-01
Lead	5.7E-04	---	---	6.8E-03	3.3E-05	1.2E-02	---	3.6E-02	1.6E-02	7.1E-02
Manganese	7.2E-04	---	---	1.5E-03	3.2E-03	3.9E-02	---	1.9E-01	1.1E-01	3.4E-01
Molybdenum	2.2E-05	---	---	2.5E-04	4.0E-06	4.4E-04	---	7.4E-03	2.5E-03	1.1E-02
Nickel	6.1E-04	---	---	5.4E-03	7.3E-05	1.1E-02	---	5.1E-02	3.8E-03	7.2E-02
Selenium	2.2E-05	---	---	1.0E-03	1.5E-05	3.9E-04	---	7.8E-03	2.4E-02	3.3E-02
Thallium	4.2E-06	---	---	2.4E-05	8.1E-07	8.4E-05	---	5.3E-04	1.0E-03	1.7E-03
Uranium	4.2E-05	---	---	4.8E-06	3.2E-06	7.3E-04	---	3.9E-04	6.3E-05	1.2E-03
Vanadium	8.8E-04	---	---	5.4E-04	6.5E-05	1.6E-02	---	9.0E-03	1.9E-03	2.8E-02
Zinc	2.6E-03	---	---	2.3E-01	6.5E-04	6.2E-02	---	3.0E+00	4.3E+00	7.6E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.7E-05	8.3E-04	7.8E-06	8.7E-06	---	---	---	---	1.0E-03
Arsenic	1.7E-03	1.2E-04	1.8E-03	3.1E-04	6.1E-05	---	---	---	---	4.0E-03
Barium	1.6E-03	3.0E-03	8.2E-04	6.0E-03	6.3E-04	---	---	---	---	1.2E-02
Beryllium	2.2E-04	2.7E-05	5.7E-05	2.3E-04	1.7E-06	---	---	---	---	5.4E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	3.6E-06	---	---	---	---	2.7E-02
Chromium (Total)	1.7E-02	8.1E-04	2.9E-02	4.4E-02	1.1E-04	---	---	---	---	9.0E-02
Cobalt	3.8E-03	2.5E-04	2.6E-03	2.3E-03	1.7E-05	---	---	---	---	9.0E-03
Copper	1.4E-02	1.5E-02	4.3E-02	2.1E-01	2.0E-04	---	---	---	---	2.8E-01
Lead	9.6E-03	1.5E-04	2.6E-02	6.2E-02	3.6E-05	---	---	---	---	9.7E-02
Manganese	1.2E-02	4.5E-02	4.6E-03	1.3E-02	3.4E-03	---	---	---	---	7.8E-02
Molybdenum	3.8E-04	9.3E-03	2.0E-03	2.2E-03	4.3E-06	---	---	---	---	1.4E-02
Nickel	1.0E-02	2.3E-03	6.1E-02	4.9E-02	7.8E-05	---	---	---	---	1.2E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.2E-03	1.6E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.4E-06	1.9E-05	2.1E-04	8.7E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.5E-05	1.3E-04	4.4E-05	3.5E-06	---	---	---	---	9.0E-04
Vanadium	1.5E-02	7.0E-04	3.5E-03	4.9E-03	6.9E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	3.4E-02	1.2E+00	2.1E+00	6.9E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.7E-04	1.1E-03	---	---	9.6E-06	---	---	---	---	2.0E-03
Arsenic	1.0E-02	1.1E-02	---	---	6.8E-05	---	---	---	---	2.1E-02
Barium	9.5E-03	3.4E-01	---	---	7.0E-04	---	---	---	---	3.5E-01
Beryllium	1.3E-03	6.4E-03	---	---	1.9E-06	---	---	---	---	7.7E-03
Cadmium	2.0E-03	1.6E-02	---	---	4.1E-06	---	---	---	---	1.8E-02
Chromium (Total)	9.8E-02	9.6E-02	---	---	1.3E-04	---	---	---	---	1.9E-01
Cobalt	2.3E-02	2.9E-02	---	---	1.9E-05	---	---	---	---	5.2E-02
Copper	8.3E-02	6.6E-01	---	---	2.2E-04	---	---	---	---	7.4E-01
Lead	5.7E-02	4.0E-02	---	---	4.0E-05	---	---	---	---	9.7E-02
Manganese	7.2E-02	1.5E+00	---	---	3.8E-03	---	---	---	---	1.6E+00
Molybdenum	2.2E-03	2.7E-01	---	---	4.8E-06	---	---	---	---	2.7E-01
Nickel	6.0E-02	9.3E-02	---	---	8.7E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	1.0E-02	---	---	1.8E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	8.8E-04	---	---	9.6E-07	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	3.9E-06	---	---	---	---	6.1E-03
Vanadium	8.7E-02	9.2E-02	---	---	7.7E-05	---	---	---	---	1.8E-01
Zinc	2.5E-01	3.6E+00	---	---	7.7E-04	---	---	---	---	3.9E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	4.9E-04	---	---	6.4E-06	---	---	---	---	6.2E-04
Arsenic	1.5E-03	4.8E-03	---	---	4.5E-05	---	---	---	---	6.3E-03
Barium	1.3E-03	1.5E-01	---	---	4.7E-04	---	---	---	---	1.6E-01
Beryllium	1.9E-04	2.9E-03	---	---	1.3E-06	---	---	---	---	3.1E-03
Cadmium	2.8E-04	7.4E-03	---	---	2.7E-06	---	---	---	---	7.6E-03
Chromium (Total)	1.4E-02	4.3E-02	---	---	8.4E-05	---	---	---	---	5.7E-02
Cobalt	3.2E-03	1.3E-02	---	---	1.3E-05	---	---	---	---	1.6E-02
Copper	1.2E-02	2.9E-01	---	---	1.5E-04	---	---	---	---	3.1E-01
Lead	8.1E-03	1.8E-02	---	---	2.6E-05	---	---	---	---	2.6E-02
Manganese	1.0E-02	6.9E-01	---	---	2.5E-03	---	---	---	---	7.0E-01
Molybdenum	3.2E-04	1.2E-01	---	---	3.2E-06	---	---	---	---	1.2E-01
Nickel	8.6E-03	4.2E-02	---	---	5.8E-05	---	---	---	---	5.0E-02
Selenium	3.1E-04	4.5E-03	---	---	1.2E-05	---	---	---	---	4.9E-03
Thallium	5.9E-05	4.0E-04	---	---	6.4E-07	---	---	---	---	4.5E-04
Uranium	5.9E-04	8.9E-04	---	---	2.6E-06	---	---	---	---	1.5E-03
Vanadium	1.2E-02	4.1E-02	---	---	5.1E-05	---	---	---	---	5.4E-02
Zinc	3.6E-02	1.6E+00	---	---	5.1E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	9.5E-05	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.0E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	2.7E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	3.1E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	5.6E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	5.4E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.2E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	2.6E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	1.1E-04	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	1.1E-03	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.7E-03	1.5E-03	1.8E-02	---	1.4E-05	---	---	---	---	2.1E-02
Arsenic	2.0E-02	6.2E-03	3.8E-02	---	9.5E-05	---	---	---	---	6.4E-02
Barium	1.9E-02	1.6E-01	1.8E-02	---	1.0E-03	---	---	---	---	2.0E-01
Beryllium	2.6E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.3E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	1.9E-01	4.4E-02	6.2E-01	---	1.8E-04	---	---	---	---	8.5E-01
Cobalt	4.5E-02	1.4E-02	5.7E-02	---	2.7E-05	---	---	---	---	1.1E-01
Copper	1.6E-01	8.0E-01	9.3E-01	---	3.1E-04	---	---	---	---	1.9E+00
Lead	1.1E-01	8.2E-03	5.5E-01	---	5.6E-05	---	---	---	---	6.7E-01
Manganese	1.4E-01	2.4E+00	9.9E-02	---	5.4E-03	---	---	---	---	2.6E+00
Molybdenum	4.4E-03	5.0E-01	4.4E-02	---	6.8E-06	---	---	---	---	5.5E-01
Nickel	1.2E-01	1.2E-01	1.3E+00	---	1.2E-04	---	---	---	---	1.6E+00
Selenium	4.2E-03	7.3E-03	4.3E-02	---	2.6E-05	---	---	---	---	5.5E-02
Thallium	8.2E-04	2.9E-04	4.0E-04	---	1.4E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.0E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.7E-01	3.8E-02	7.5E-02	---	1.1E-04	---	---	---	---	2.8E-01
Zinc	5.0E-01	1.8E+00	2.6E+01	---	1.1E-03	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.2E-05	---	---	6.1E-06	3.5E-06	7.8E-05	---	---	1.6E-04	3.1E-04
Arsenic	7.3E-04	---	---	2.4E-04	2.5E-05	1.6E-03	---	---	1.7E-03	4.3E-03
Barium	6.7E-04	---	---	4.7E-03	2.6E-04	3.4E-03	---	---	1.7E-02	2.6E-02
Beryllium	9.4E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	6.0E-04
Cadmium	1.4E-04	---	---	6.4E-03	1.5E-06	3.3E-04	---	---	4.1E-03	1.1E-02
Chromium (Total)	7.0E-03	---	---	3.4E-02	4.6E-05	1.2E-02	---	---	7.8E-04	5.4E-02
Cobalt	1.6E-03	---	---	1.8E-03	7.1E-06	3.2E-03	---	---	1.1E-03	7.7E-03
Copper	5.9E-03	---	---	1.6E-01	8.1E-05	7.8E-03	---	---	1.2E-01	3.0E-01
Lead	4.0E-03	---	---	4.8E-02	1.5E-05	8.6E-03	---	---	1.3E-02	7.3E-02
Manganese	5.1E-03	---	---	1.0E-02	1.4E-03	2.7E-02	---	---	9.0E-02	1.3E-01
Molybdenum	1.6E-04	---	---	1.7E-03	1.8E-06	3.1E-04	---	---	2.0E-03	4.2E-03
Nickel	4.3E-03	---	---	3.8E-02	3.2E-05	7.8E-03	---	---	3.1E-03	5.3E-02
Selenium	1.5E-04	---	---	7.2E-03	6.7E-06	2.7E-04	---	---	2.0E-02	2.7E-02
Thallium	3.0E-05	---	---	1.7E-04	3.5E-07	5.9E-05	---	---	8.3E-04	1.1E-03
Uranium	3.0E-04	---	---	3.4E-05	1.4E-06	5.1E-04	---	---	5.1E-05	8.9E-04
Vanadium	6.2E-03	---	---	3.8E-03	2.8E-05	1.1E-02	---	---	1.6E-03	2.2E-02
Zinc	1.8E-02	---	---	1.6E+00	2.8E-04	4.3E-02	---	---	3.5E+00	5.2E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.2E-05	5.8E-02	---	2.2E-05	---	---	---	---	6.0E-02
Arsenic	1.4E-02	1.4E-04	1.2E-01	---	1.5E-04	---	---	---	---	1.4E-01
Barium	1.3E-02	3.5E-03	5.8E-02	---	1.6E-03	---	---	---	---	7.6E-02
Beryllium	1.8E-03	3.2E-05	4.0E-03	---	4.4E-06	---	---	---	---	5.8E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	9.2E-06	---	---	---	---	1.3E+00
Chromium (Total)	1.3E-01	9.6E-04	2.0E+00	---	2.9E-04	---	---	---	---	2.2E+00
Cobalt	3.1E-02	3.0E-04	1.9E-01	---	4.4E-05	---	---	---	---	2.2E-01
Copper	1.1E-01	1.8E-02	3.1E+00	---	5.0E-04	---	---	---	---	3.2E+00
Lead	7.7E-02	1.8E-04	1.8E+00	---	9.0E-05	---	---	---	---	1.9E+00
Manganese	9.7E-02	5.3E-02	3.3E-01	---	8.7E-03	---	---	---	---	4.8E-01
Molybdenum	3.0E-03	1.1E-02	1.4E-01	---	1.1E-05	---	---	---	---	1.6E-01
Nickel	8.2E-02	2.7E-03	4.3E+00	---	2.0E-04	---	---	---	---	4.4E+00
Selenium	2.9E-03	1.6E-04	1.4E-01	---	4.2E-05	---	---	---	---	1.5E-01
Thallium	5.6E-04	6.4E-06	1.3E-03	---	2.2E-06	---	---	---	---	1.9E-03
Uranium	5.6E-03	1.8E-05	9.2E-03	---	8.8E-06	---	---	---	---	1.5E-02
Vanadium	1.2E-01	8.3E-04	2.5E-01	---	1.8E-04	---	---	---	---	3.6E-01
Zinc	3.4E-01	4.0E-02	8.6E+01	---	1.8E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	5.2E-06	2.0E-04	2.6E-05	2.4E-05	3.7E-04	6.2E-04
Arsenic	---	---	---	---	3.6E-05	4.0E-03	1.2E-03	2.4E-02	4.1E-03	3.3E-02
Barium	---	---	---	---	3.8E-04	8.9E-03	1.9E-03	2.0E-02	4.0E-02	7.1E-02
Beryllium	---	---	---	---	1.0E-06	4.2E-04	6.6E-05	9.1E-04	3.7E-04	1.8E-03
Cadmium	---	---	---	---	2.2E-06	8.6E-04	1.0E-04	1.6E-02	9.8E-03	2.7E-02
Chromium (Total)	---	---	---	---	6.7E-05	3.2E-02	2.0E-03	9.4E-02	1.8E-03	1.3E-01
Cobalt	---	---	---	---	1.0E-05	8.4E-03	7.4E-04	3.3E-04	2.5E-03	1.2E-02
Copper	---	---	---	---	1.2E-04	2.0E-02	6.5E-03	5.2E-01	2.9E-01	8.4E-01
Lead	---	---	---	---	2.1E-05	2.2E-02	9.4E-04	3.3E-02	3.0E-02	8.6E-02
Manganese	---	---	---	---	2.0E-03	7.1E-02	4.0E-02	1.7E-01	2.1E-01	5.0E-01
Molybdenum	---	---	---	---	2.6E-06	8.0E-04	2.8E-03	6.7E-03	4.7E-03	1.5E-02
Nickel	---	---	---	---	4.6E-05	2.0E-02	3.8E-03	4.6E-02	7.4E-03	7.8E-02
Selenium	---	---	---	---	9.8E-06	7.1E-04	1.4E-04	7.2E-03	4.7E-02	5.5E-02
Thallium	---	---	---	---	5.2E-07	1.5E-04	2.0E-04	4.9E-04	2.0E-03	2.8E-03
Uranium	---	---	---	---	2.1E-06	1.3E-03	5.0E-04	3.6E-04	1.2E-04	2.3E-03
Vanadium	---	---	---	---	4.1E-05	2.8E-02	5.2E-03	8.3E-03	3.7E-03	4.5E-02
Zinc	---	---	---	---	4.1E-04	1.1E-01	3.8E-02	2.7E+00	8.3E+00	1.1E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	6.6E-06	2.6E-04	1.8E-04	3.7E-04	---	8.2E-04
Arsenic	---	---	---	---	4.6E-05	5.3E-03	8.6E-03	3.7E-01	---	3.9E-01
Barium	---	---	---	---	4.8E-04	1.2E-02	1.3E-02	3.1E-01	---	3.4E-01
Beryllium	---	---	---	---	1.3E-06	5.5E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	2.8E-06	1.1E-03	7.2E-04	2.5E-01	---	2.5E-01
Chromium (Total)	---	---	---	---	8.6E-05	4.2E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	1.3E-05	1.1E-02	5.2E-03	5.1E-03	---	2.1E-02
Copper	---	---	---	---	1.5E-04	2.6E-02	4.6E-02	8.2E+00	---	8.3E+00
Lead	---	---	---	---	2.7E-05	2.9E-02	6.6E-03	5.1E-01	---	5.5E-01
Manganese	---	---	---	---	2.6E-03	9.2E-02	2.8E-01	2.7E+00	---	3.1E+00
Molybdenum	---	---	---	---	3.3E-06	1.0E-03	1.9E-02	1.1E-01	---	1.3E-01
Nickel	---	---	---	---	6.0E-05	2.6E-02	2.7E-02	7.3E-01	---	7.8E-01
Selenium	---	---	---	---	1.3E-05	9.2E-04	1.0E-03	1.1E-01	---	1.1E-01
Thallium	---	---	---	---	6.6E-07	2.0E-04	1.4E-03	7.7E-03	---	9.3E-03
Uranium	---	---	---	---	2.6E-06	1.7E-03	3.5E-03	5.6E-03	---	1.1E-02
Vanadium	---	---	---	---	5.3E-05	3.7E-02	3.6E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	5.3E-04	1.4E-01	2.7E-01	4.3E+01	---	4.4E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	3.3E-04	9.9E-04	1.8E-04	---	2.1E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	3.9E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.1E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.3E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.6E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.1E-05	1.4E-02	2.8E-02	2.5E-03	---	4.7E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	1.3E-04	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	2.3E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	2.2E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	1.3E-03	1.1E-01	5.1E-02	---	1.7E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	5.0E-05	3.3E-02	1.5E-01	3.5E-01	---	5.8E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	1.1E-05	1.1E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	2.2E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	4.4E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.4E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.6E-05	3.1E-05	5.7E-04	---	5.6E-06	3.3E-04	9.9E-04	1.8E-04	---	2.1E-03
Arsenic	4.3E-04	1.3E-04	1.2E-03	---	3.9E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.0E-04	3.4E-03	5.6E-04	---	4.1E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.5E-05	3.1E-05	3.9E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.3E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	4.1E-03	9.3E-04	2.0E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.6E-01
Cobalt	9.5E-04	2.9E-04	1.8E-03	---	1.1E-05	1.4E-02	2.8E-02	2.5E-03	---	4.7E-02
Copper	3.5E-03	1.7E-02	3.0E-02	---	1.3E-04	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.7E-04	1.8E-02	---	2.3E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.0E-03	5.1E-02	3.2E-03	---	2.2E-03	1.1E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.3E-05	1.1E-02	1.4E-03	---	2.8E-06	1.3E-03	1.1E-01	5.1E-02	---	1.7E-01
Nickel	2.5E-03	2.6E-03	4.2E-02	---	5.0E-05	3.3E-02	1.5E-01	3.5E-01	---	5.8E-01
Selenium	9.0E-05	1.5E-04	1.4E-03	---	1.1E-05	1.1E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.7E-05	6.2E-06	1.3E-05	---	5.6E-07	2.5E-04	7.6E-03	3.7E-03	---	1.2E-02
Uranium	1.7E-04	1.7E-05	9.0E-05	---	2.2E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.6E-03	8.0E-04	2.4E-03	---	4.4E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.4E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	4.0E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.2E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.4E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.1E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	1.3E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.3E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	2.3E-03	---	---	---	---	3.9E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	5.1E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	1.1E-05	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	4.6E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	4.6E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	5.7E-06	---	---	---	---	1.7E-04
Arsenic	1.7E-03	---	---	5.7E-04	4.0E-05	---	---	---	---	2.3E-03
Barium	1.6E-03	---	---	1.1E-02	4.2E-04	---	---	---	---	1.3E-02
Beryllium	2.2E-04	---	---	4.3E-04	1.1E-06	---	---	---	---	6.6E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.4E-06	---	---	---	---	1.5E-02
Chromium (Total)	1.7E-02	---	---	8.1E-02	7.4E-05	---	---	---	---	9.8E-02
Cobalt	3.8E-03	---	---	4.2E-03	1.1E-05	---	---	---	---	8.1E-03
Copper	1.4E-02	---	---	3.9E-01	1.3E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.3E-05	---	---	---	---	1.2E-01
Manganese	1.2E-02	---	---	2.5E-02	2.3E-03	---	---	---	---	3.9E-02
Molybdenum	3.8E-04	---	---	4.2E-03	2.9E-06	---	---	---	---	4.5E-03
Nickel	1.0E-02	---	---	9.1E-02	5.1E-05	---	---	---	---	1.0E-01
Selenium	3.6E-04	---	---	1.7E-02	1.1E-05	---	---	---	---	1.7E-02
Thallium	7.0E-05	---	---	4.0E-04	5.7E-07	---	---	---	---	4.7E-04
Uranium	7.0E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.5E-02	---	---	9.1E-03	4.6E-05	---	---	---	---	2.4E-02
Zinc	4.3E-02	---	---	3.8E+00	4.6E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.7E-04	3.5E-05	8.6E-06	---	---	---	---	7.6E-04
Arsenic	2.8E-03	---	1.0E-03	1.4E-03	6.0E-05	---	---	---	---	5.2E-03
Barium	2.6E-03	---	4.7E-04	2.7E-02	6.3E-04	---	---	---	---	3.1E-02
Beryllium	3.6E-04	---	3.2E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	3.6E-06	---	---	---	---	4.8E-02
Chromium (Total)	2.7E-02	---	1.6E-02	2.0E-01	1.1E-04	---	---	---	---	2.4E-01
Cobalt	6.2E-03	---	1.5E-03	1.0E-02	1.7E-05	---	---	---	---	1.8E-02
Copper	2.3E-02	---	2.5E-02	9.4E-01	2.0E-04	---	---	---	---	9.9E-01
Lead	1.6E-02	---	1.5E-02	2.8E-01	3.5E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.6E-03	6.1E-02	3.4E-03	---	---	---	---	8.7E-02
Molybdenum	6.1E-04	---	1.2E-03	1.0E-02	4.3E-06	---	---	---	---	1.2E-02
Nickel	1.7E-02	---	3.5E-02	2.2E-01	7.7E-05	---	---	---	---	2.7E-01
Selenium	5.9E-04	---	1.2E-03	4.2E-02	1.6E-05	---	---	---	---	4.4E-02
Thallium	1.1E-04	---	1.1E-05	9.7E-04	8.6E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	3.4E-06	---	---	---	---	1.4E-03
Vanadium	2.4E-02	---	2.0E-03	2.2E-02	6.9E-05	---	---	---	---	4.8E-02
Zinc	7.0E-02	---	7.0E-01	9.3E+00	6.9E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	3.6E-04	3.1E-04	4.2E-04	9.8E-05	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.2E-04	7.1E-03	1.5E-02	4.3E-01	1.1E-03	5.0E-01
Barium	4.7E-03	---	2.1E-02	---	1.3E-03	1.6E-02	2.3E-02	3.5E-01	1.1E-02	4.3E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	7.3E-06	1.5E-03	1.2E-03	2.9E-01	2.6E-03	7.6E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	4.9E-04	2.6E+00
Cobalt	1.1E-02	---	6.9E-02	---	3.5E-05	1.5E-02	8.8E-03	5.8E-03	6.6E-04	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	4.0E-04	3.6E-02	7.8E-02	9.4E+00	7.8E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	7.1E-05	3.9E-02	1.1E-02	5.8E-01	8.0E-03	1.3E+00
Manganese	3.6E-02	---	1.2E-01	---	6.9E-03	1.2E-01	4.8E-01	3.1E+00	5.6E-02	3.9E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	1.4E-03	3.3E-02	1.2E-01	1.3E-03	2.1E-01
Nickel	3.0E-02	---	1.6E+00	---	1.6E-04	3.6E-02	4.6E-02	8.3E-01	2.0E-03	2.5E+00
Selenium	1.1E-03	---	5.3E-02	---	3.3E-05	1.2E-03	1.7E-03	1.3E-01	1.2E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	5.2E-04	1.3E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.3E-03	6.0E-03	6.4E-03	3.2E-05	2.0E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.4E-04	5.0E-02	6.2E-02	1.5E-01	9.8E-04	3.9E-01
Zinc	1.3E-01	---	3.2E+01	---	1.4E-03	2.0E-01	4.6E-01	4.9E+01	2.2E+00	8.4E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.3E-04	---	2.2E-02	---	1.7E-05	3.6E-04	3.1E-04	4.2E-04	9.8E-05	2.3E-02
Arsenic	5.1E-03	---	4.6E-02	---	1.2E-04	7.1E-03	1.5E-02	4.3E-01	1.1E-03	5.0E-01
Barium	4.7E-03	---	2.1E-02	---	1.3E-03	1.6E-02	2.3E-02	3.5E-01	1.1E-02	4.3E-01
Beryllium	6.6E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	7.3E-06	1.5E-03	1.2E-03	2.9E-01	2.6E-03	7.6E-01
Chromium (Total)	4.9E-02	---	7.5E-01	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	4.9E-04	2.6E+00
Cobalt	1.1E-02	---	6.9E-02	---	3.5E-05	1.5E-02	8.8E-03	5.8E-03	6.6E-04	1.1E-01
Copper	4.1E-02	---	1.1E+00	---	4.0E-04	3.6E-02	7.8E-02	9.4E+00	7.8E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	7.1E-05	3.9E-02	1.1E-02	5.8E-01	8.0E-03	1.3E+00
Manganese	3.6E-02	---	1.2E-01	---	6.9E-03	1.2E-01	4.8E-01	3.1E+00	5.6E-02	3.9E+00
Molybdenum	1.1E-03	---	5.3E-02	---	8.7E-06	1.4E-03	3.3E-02	1.2E-01	1.3E-03	2.1E-01
Nickel	3.0E-02	---	1.6E+00	---	1.6E-04	3.6E-02	4.6E-02	8.3E-01	2.0E-03	2.5E+00
Selenium	1.1E-03	---	5.3E-02	---	3.3E-05	1.2E-03	1.7E-03	1.3E-01	1.2E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.7E-06	2.7E-04	2.4E-03	8.7E-03	5.2E-04	1.3E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.3E-03	6.0E-03	6.4E-03	3.2E-05	2.0E-02
Vanadium	4.3E-02	---	9.1E-02	---	1.4E-04	5.0E-02	6.2E-02	1.5E-01	9.8E-04	3.9E-01
Zinc	1.3E-01	---	3.2E+01	---	1.4E-03	2.0E-01	4.6E-01	4.9E+01	2.2E+00	8.4E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.2E-04	1.1E-03	8.5E-04	---	7.0E-06	---	---	---	---	2.3E-03
Arsenic	3.8E-03	9.9E-03	1.8E-03	---	4.9E-05	---	---	---	---	1.5E-02
Barium	3.5E-03	3.1E-01	8.4E-04	---	5.1E-04	---	---	---	---	3.1E-01
Beryllium	4.9E-04	5.6E-03	5.8E-05	---	1.4E-06	---	---	---	---	6.1E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	2.9E-06	---	---	---	---	3.5E-02
Chromium (Total)	3.6E-02	8.6E-02	2.9E-02	---	9.1E-05	---	---	---	---	1.5E-01
Cobalt	8.3E-03	2.6E-02	2.7E-03	---	1.4E-05	---	---	---	---	3.7E-02
Copper	3.1E-02	6.6E-01	4.5E-02	---	1.6E-04	---	---	---	---	7.4E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	2.9E-05	---	---	---	---	8.2E-02
Manganese	2.6E-02	1.6E+00	4.7E-03	---	2.8E-03	---	---	---	---	1.7E+00
Molybdenum	8.2E-04	2.9E-01	2.1E-03	---	3.5E-06	---	---	---	---	3.0E-01
Nickel	2.2E-02	9.5E-02	6.3E-02	---	6.3E-05	---	---	---	---	1.8E-01
Selenium	7.9E-04	9.5E-03	2.1E-03	---	1.3E-05	---	---	---	---	1.2E-02
Thallium	1.5E-04	7.8E-04	1.9E-05	---	7.0E-07	---	---	---	---	9.5E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.8E-06	---	---	---	---	3.4E-03
Vanadium	3.2E-02	8.2E-02	3.6E-03	---	5.6E-05	---	---	---	---	1.2E-01
Zinc	9.3E-02	3.3E+00	1.3E+00	---	5.6E-04	---	---	---	---	4.6E+00

Average Daily Doses for the American Black Bear Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.4E-04	3.7E-04	3.5E-04	2.8E-06	1.2E-05	1.3E-05	---	---	3.4E-05	9.3E-04
Arsenic	1.7E-03	2.7E-03	7.5E-04	1.1E-04	4.6E-05	1.9E-04	---	---	2.1E-04	5.7E-03
Barium	1.6E-03	7.8E-02	3.6E-04	2.2E-03	4.8E-04	4.1E-04	---	---	2.1E-03	8.5E-02
Beryllium	2.2E-04	1.2E-03	2.4E-05	8.3E-05	1.3E-06	2.0E-05	---	---	1.9E-05	1.6E-03
Cadmium	3.1E-04	4.6E-03	7.4E-03	2.8E-03	2.7E-06	4.0E-05	---	---	5.0E-04	1.6E-02
Chromium (Total)	2.7E-02	7.5E-02	2.0E-02	2.3E-02	8.4E-05	1.5E-03	---	---	9.4E-05	1.5E-01
Cobalt	4.6E-03	1.2E-02	1.4E-03	1.0E-03	1.4E-05	4.0E-04	---	---	1.4E-04	1.9E-02
Copper	1.4E-02	2.2E-01	1.8E-02	7.3E-02	1.5E-04	9.4E-04	---	---	1.5E-02	3.4E-01
Lead	9.1E-03	7.4E-03	1.1E-02	2.2E-02	2.7E-05	1.0E-03	---	---	1.5E-03	5.1E-02
Manganese	1.2E-02	5.5E-01	2.0E-03	4.9E-03	2.6E-03	3.3E-03	---	---	1.1E-02	5.9E-01
Molybdenum	3.6E-04	1.0E-01	8.6E-04	8.0E-04	4.1E-05	4.8E-05	---	---	3.1E-03	1.1E-01
Nickel	2.7E-02	1.4E-01	7.1E-02	2.7E-02	8.0E-05	1.1E-03	---	---	5.2E-04	2.7E-01
Selenium	3.5E-04	2.5E-03	8.5E-04	3.2E-03	1.6E-05	3.3E-05	---	---	3.1E-03	1.0E-02
Thallium	6.7E-05	1.8E-04	7.8E-06	7.5E-05	7.1E-07	7.3E-06	---	---	1.1E-04	4.4E-04
Uranium	6.6E-04	4.2E-04	5.5E-05	1.5E-05	2.6E-06	6.1E-05	---	---	6.2E-06	1.2E-03
Vanadium	1.5E-02	2.4E-02	1.6E-03	1.8E-03	5.2E-05	1.3E-03	---	---	1.9E-04	4.4E-02
Zinc	4.1E-02	8.0E-01	5.1E-01	7.2E-01	5.2E-04	5.2E-03	---	---	4.2E-01	2.5E+00

Average Daily Doses for the American Mink Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	5.3E-05	---	---	5.2E-06	5.4E-06	1.5E-04	---	2.8E-05	3.3E-04	5.6E-04
Arsenic	6.2E-04	---	---	2.0E-04	2.1E-05	2.1E-03	---	2.0E-02	2.0E-03	2.5E-02
Barium	5.9E-04	---	---	4.1E-03	2.2E-04	4.6E-03	---	1.7E-02	2.0E-02	4.6E-02
Beryllium	8.0E-05	---	---	1.5E-04	6.0E-07	2.2E-04	---	7.8E-04	1.8E-04	1.4E-03
Cadmium	1.2E-04	---	---	5.3E-03	1.3E-06	4.4E-04	---	1.4E-02	4.8E-03	2.4E-02
Chromium (Total)	1.0E-02	---	---	4.2E-02	3.9E-05	1.7E-02	---	8.0E-02	9.1E-04	1.5E-01
Cobalt	1.7E-03	---	---	1.9E-03	6.4E-06	4.4E-03	---	2.8E-04	1.3E-03	9.6E-03
Copper	5.3E-03	---	---	1.4E-01	6.9E-05	1.0E-02	---	4.5E-01	1.4E-01	7.4E-01
Lead	3.4E-03	---	---	4.0E-02	1.2E-05	1.1E-02	---	2.8E-02	1.5E-02	9.8E-02
Manganese	4.4E-03	---	---	9.1E-03	1.2E-03	3.7E-02	---	1.5E-01	1.1E-01	3.1E-01
Molybdenum	1.4E-04	---	---	1.5E-03	1.9E-05	5.3E-04	---	7.4E-03	3.0E-02	4.0E-02
Nickel	9.9E-03	---	---	5.1E-02	3.7E-05	1.2E-02	---	4.5E-02	5.0E-03	1.2E-01
Selenium	1.3E-04	---	---	6.0E-03	7.4E-06	3.7E-04	---	6.1E-03	3.0E-02	4.3E-02
Thallium	2.5E-05	---	---	1.4E-04	3.3E-07	8.2E-05	---	4.3E-04	1.1E-03	1.7E-03
Uranium	2.5E-04	---	---	2.8E-05	1.2E-06	6.8E-04	---	3.1E-04	6.0E-05	1.3E-03
Vanadium	5.5E-03	---	---	3.4E-03	2.4E-05	1.5E-02	---	7.1E-03	1.8E-03	3.2E-02
Zinc	1.5E-02	---	---	1.3E+00	2.4E-04	5.7E-02	---	2.3E+00	4.1E+00	7.9E+00

Average Daily Doses for the Beaver Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.8E-05	3.6E-05	---	---	1.3E-05	7.2E-05	8.9E-05	---	---	2.5E-04
Arsenic	4.5E-04	3.9E-04	---	---	5.1E-05	1.0E-03	3.0E-03	---	---	4.9E-03
Barium	4.3E-04	1.2E-02	---	---	5.3E-04	2.3E-03	4.7E-03	---	---	2.0E-02
Beryllium	5.8E-05	2.2E-04	---	---	1.4E-06	1.1E-04	1.6E-04	---	---	5.5E-04
Cadmium	8.4E-05	5.2E-04	---	---	3.0E-06	2.2E-04	2.5E-04	---	---	1.1E-03
Chromium (Total)	7.1E-03	1.1E-02	---	---	9.4E-05	8.2E-03	4.8E-03	---	---	3.1E-02
Cobalt	1.2E-03	1.7E-03	---	---	1.5E-05	2.2E-03	1.8E-03	---	---	6.9E-03
Copper	3.8E-03	2.2E-02	---	---	1.7E-04	5.1E-03	1.6E-02	---	---	4.7E-02
Lead	2.4E-03	1.3E-03	---	---	3.0E-05	5.6E-03	2.3E-03	---	---	1.2E-02
Manganese	3.2E-03	4.9E-02	---	---	2.9E-03	1.8E-02	9.7E-02	---	---	1.7E-01
Molybdenum	9.7E-05	8.2E-03	---	---	4.6E-05	2.6E-04	8.7E-03	---	---	1.7E-02
Nickel	7.1E-03	1.6E-02	---	---	8.9E-05	5.8E-03	1.1E-02	---	---	4.0E-02
Selenium	9.2E-05	3.3E-04	---	---	1.8E-05	1.8E-04	3.5E-04	---	---	9.7E-04
Thallium	1.8E-05	3.0E-05	---	---	7.9E-07	4.0E-05	5.1E-04	---	---	5.9E-04
Uranium	1.8E-04	6.7E-05	---	---	2.9E-06	3.3E-04	1.2E-03	---	---	1.8E-03
Vanadium	4.0E-03	3.7E-03	---	---	5.8E-05	7.2E-03	1.2E-02	---	---	2.7E-02
Zinc	1.1E-02	1.2E-01	---	---	5.8E-04	2.8E-02	9.3E-02	---	---	2.5E-01

Average Daily Doses for the Bobcat Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	1.5E-05	---	---	---	---	1.6E-04
Arsenic	1.4E-03	---	---	8.5E-04	5.7E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.7E-02	5.9E-04	---	---	---	---	1.9E-02
Beryllium	1.8E-04	---	---	6.4E-04	1.6E-06	---	---	---	---	8.3E-04
Cadmium	2.7E-04	---	---	2.2E-02	3.4E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	1.1E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	1.7E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	1.9E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.3E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	3.2E-03	---	---	---	---	5.1E-02
Molybdenum	3.1E-04	---	---	6.2E-03	5.2E-05	---	---	---	---	6.6E-03
Nickel	2.3E-02	---	---	2.1E-01	1.0E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	2.0E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.9E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.3E-02	---	---	1.4E-02	6.5E-05	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	6.5E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Bobcat (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-04	---	---	2.2E-05	1.5E-05	---	---	---	---	1.6E-04
Arsenic	1.4E-03	---	---	8.5E-04	5.7E-05	---	---	---	---	2.3E-03
Barium	1.3E-03	---	---	1.7E-02	5.9E-04	---	---	---	---	1.9E-02
Beryllium	1.8E-04	---	---	6.4E-04	1.6E-06	---	---	---	---	8.3E-04
Cadmium	2.7E-04	---	---	2.2E-02	3.4E-06	---	---	---	---	2.2E-02
Chromium (Total)	2.3E-02	---	---	1.8E-01	1.1E-04	---	---	---	---	2.0E-01
Cobalt	3.9E-03	---	---	7.9E-03	1.7E-05	---	---	---	---	1.2E-02
Copper	1.2E-02	---	---	5.7E-01	1.9E-04	---	---	---	---	5.8E-01
Lead	7.6E-03	---	---	1.7E-01	3.3E-05	---	---	---	---	1.8E-01
Manganese	1.0E-02	---	---	3.8E-02	3.2E-03	---	---	---	---	5.1E-02
Molybdenum	3.1E-04	---	---	6.2E-03	5.2E-05	---	---	---	---	6.6E-03
Nickel	2.3E-02	---	---	2.1E-01	1.0E-04	---	---	---	---	2.4E-01
Selenium	2.9E-04	---	---	2.5E-02	2.0E-05	---	---	---	---	2.5E-02
Thallium	5.6E-05	---	---	5.8E-04	8.9E-07	---	---	---	---	6.4E-04
Uranium	5.6E-04	---	---	1.2E-04	3.2E-06	---	---	---	---	6.8E-04
Vanadium	1.3E-02	---	---	1.4E-02	6.5E-05	---	---	---	---	2.7E-02
Zinc	3.5E-02	---	---	5.6E+00	6.5E-04	---	---	---	---	5.6E+00

Average Daily Doses for the Boreal Caribou Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.5E-04	1.5E-04	---	---	1.1E-05	---	---	---	---	4.2E-04
Arsenic	3.0E-03	1.6E-03	---	---	4.2E-05	---	---	---	---	4.7E-03
Barium	2.8E-03	5.1E-02	---	---	4.3E-04	---	---	---	---	5.4E-02
Beryllium	3.8E-04	9.3E-04	---	---	1.2E-06	---	---	---	---	1.3E-03
Cadmium	5.6E-04	2.2E-03	---	---	2.5E-06	---	---	---	---	2.8E-03
Chromium (Total)	4.8E-02	4.5E-02	---	---	7.6E-05	---	---	---	---	9.2E-02
Cobalt	8.2E-03	7.1E-03	---	---	1.3E-05	---	---	---	---	1.5E-02
Copper	2.5E-02	9.5E-02	---	---	1.4E-04	---	---	---	---	1.2E-01
Lead	1.6E-02	5.7E-03	---	---	2.4E-05	---	---	---	---	2.2E-02
Manganese	2.1E-02	2.1E-01	---	---	2.4E-03	---	---	---	---	2.3E-01
Molybdenum	6.4E-04	3.5E-02	---	---	3.7E-05	---	---	---	---	3.5E-02
Nickel	4.7E-02	6.8E-02	---	---	7.3E-05	---	---	---	---	1.2E-01
Selenium	6.1E-04	1.4E-03	---	---	1.5E-05	---	---	---	---	2.0E-03
Thallium	1.2E-04	1.3E-04	---	---	6.5E-07	---	---	---	---	2.4E-04
Uranium	1.2E-03	2.8E-04	---	---	2.4E-06	---	---	---	---	1.5E-03
Vanadium	2.6E-02	1.6E-02	---	---	4.7E-05	---	---	---	---	4.2E-02
Zinc	7.3E-02	5.1E-01	---	---	4.7E-04	---	---	---	---	5.8E-01

Average Daily Doses for the Common (Masked) Shrew Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	3.1E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	1.2E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	1.3E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	3.4E-06	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	7.2E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	2.2E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	3.7E-05	---	---	---	---	3.6E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	3.9E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	7.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	6.9E-03	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	1.1E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	2.1E-04	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	4.2E-05	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.9E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	1.4E-04	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	1.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.6E-03	3.2E-04	7.6E-02	---	3.1E-05	---	---	---	---	7.7E-02
Arsenic	1.9E-02	3.4E-03	1.6E-01	---	1.2E-04	---	---	---	---	1.8E-01
Barium	1.8E-02	1.0E-01	7.7E-02	---	1.3E-03	---	---	---	---	2.0E-01
Beryllium	2.4E-03	1.9E-03	5.2E-03	---	3.4E-06	---	---	---	---	9.5E-03
Cadmium	3.5E-03	4.5E-03	1.6E+00	---	7.2E-06	---	---	---	---	1.6E+00
Chromium (Total)	3.0E-01	9.2E-02	4.3E+00	---	2.2E-04	---	---	---	---	4.7E+00
Cobalt	5.1E-02	1.5E-02	3.0E-01	---	3.7E-05	---	---	---	---	3.6E-01
Copper	1.6E-01	1.9E-01	3.9E+00	---	3.9E-04	---	---	---	---	4.3E+00
Lead	1.0E-01	1.2E-02	2.3E+00	---	7.0E-05	---	---	---	---	2.4E+00
Manganese	1.3E-01	4.3E-01	4.2E-01	---	6.9E-03	---	---	---	---	9.9E-01
Molybdenum	4.0E-03	7.1E-02	1.8E-01	---	1.1E-04	---	---	---	---	2.6E-01
Nickel	3.0E-01	1.4E-01	1.5E+01	---	2.1E-04	---	---	---	---	1.5E+01
Selenium	3.9E-03	2.9E-03	1.8E-01	---	4.2E-05	---	---	---	---	1.9E-01
Thallium	7.5E-04	2.6E-04	1.7E-03	---	1.9E-06	---	---	---	---	2.7E-03
Uranium	7.4E-03	5.8E-04	1.2E-02	---	6.9E-06	---	---	---	---	2.0E-02
Vanadium	1.7E-01	3.2E-02	3.3E-01	---	1.4E-04	---	---	---	---	5.3E-01
Zinc	4.6E-01	1.0E+00	1.1E+02	---	1.4E-03	---	---	---	---	1.1E+02

Average Daily Doses for the Meadow Vole Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.8E-04	8.0E-04	---	---	3.8E-05	---	---	---	---	1.1E-03
Arsenic	3.3E-03	6.0E-03	---	---	1.5E-04	---	---	---	---	9.4E-03
Barium	3.1E-03	1.8E-01	---	---	1.5E-03	---	---	---	---	1.8E-01
Beryllium	4.2E-04	2.8E-03	---	---	4.2E-06	---	---	---	---	3.2E-03
Cadmium	6.1E-04	1.0E-02	---	---	8.8E-06	---	---	---	---	1.1E-02
Chromium (Total)	5.2E-02	1.7E-01	---	---	2.7E-04	---	---	---	---	2.2E-01
Cobalt	9.0E-03	2.6E-02	---	---	4.5E-05	---	---	---	---	3.5E-02
Copper	2.7E-02	4.7E-01	---	---	4.8E-04	---	---	---	---	5.0E-01
Lead	1.8E-02	1.7E-02	---	---	8.6E-05	---	---	---	---	3.4E-02
Manganese	2.3E-02	1.2E+00	---	---	8.4E-03	---	---	---	---	1.2E+00
Molybdenum	7.1E-04	2.3E-01	---	---	1.3E-04	---	---	---	---	2.3E-01
Nickel	5.2E-02	3.1E-01	---	---	2.6E-04	---	---	---	---	3.7E-01
Selenium	6.7E-04	5.5E-03	---	---	5.2E-05	---	---	---	---	6.2E-03
Thallium	1.3E-04	4.0E-04	---	---	2.3E-06	---	---	---	---	5.3E-04
Uranium	1.3E-03	9.5E-04	---	---	8.4E-06	---	---	---	---	2.2E-03
Vanadium	2.9E-02	5.3E-02	---	---	1.7E-04	---	---	---	---	8.2E-02
Zinc	8.0E-02	1.8E+00	---	---	1.7E-03	---	---	---	---	1.9E+00

Average Daily Doses for the Moose Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	7.2E-05	3.1E-04	---	---	9.7E-06	1.9E-05	2.3E-04	---	---	6.4E-04
Arsenic	8.5E-04	3.2E-03	---	---	3.9E-05	2.6E-04	7.6E-03	---	---	1.2E-02
Barium	8.1E-04	1.0E-01	---	---	4.0E-04	5.8E-04	1.2E-02	---	---	1.1E-01
Beryllium	1.1E-04	1.8E-03	---	---	1.1E-06	2.8E-05	4.1E-04	---	---	2.4E-03
Cadmium	1.6E-04	4.4E-03	---	---	2.3E-06	5.6E-05	6.4E-04	---	---	5.2E-03
Chromium (Total)	1.4E-02	8.9E-02	---	---	7.1E-05	2.1E-03	1.2E-02	---	---	1.2E-01
Cobalt	2.3E-03	1.4E-02	---	---	1.2E-05	5.6E-04	4.7E-03	---	---	2.2E-02
Copper	7.2E-03	1.9E-01	---	---	1.3E-04	1.3E-03	4.1E-02	---	---	2.4E-01
Lead	4.6E-03	1.1E-02	---	---	2.2E-05	1.5E-03	5.8E-03	---	---	2.3E-02
Manganese	6.0E-03	4.1E-01	---	---	2.2E-03	4.6E-03	2.5E-01	---	---	6.8E-01
Molybdenum	1.8E-04	6.9E-02	---	---	3.5E-05	6.7E-05	2.2E-02	---	---	9.1E-02
Nickel	1.4E-02	1.3E-01	---	---	6.7E-05	1.5E-03	2.7E-02	---	---	1.8E-01
Selenium	1.8E-04	2.8E-03	---	---	1.3E-05	4.6E-05	8.9E-04	---	---	3.9E-03
Thallium	3.4E-05	2.5E-04	---	---	6.0E-07	1.0E-05	1.3E-03	---	---	1.6E-03
Uranium	3.4E-04	5.6E-04	---	---	2.2E-06	8.6E-05	3.1E-03	---	---	4.1E-03
Vanadium	7.5E-03	3.1E-02	---	---	4.4E-05	1.9E-03	3.2E-02	---	---	7.2E-02
Zinc	2.1E-02	1.0E+00	---	---	4.4E-04	7.3E-03	2.4E-01	---	---	1.3E+00

Average Daily Doses for the Northern River Otter Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	9.0E-06	---	---	8.9E-07	1.5E-05	1.6E-04	---	3.6E-05	3.4E-04	5.6E-04
Arsenic	1.1E-04	---	---	3.5E-05	5.7E-05	2.3E-03	---	2.6E-02	2.1E-03	3.1E-02
Barium	1.0E-04	---	---	7.0E-04	5.9E-04	4.9E-03	---	2.2E-02	2.1E-02	4.9E-02
Beryllium	1.4E-05	---	---	2.6E-05	1.6E-06	2.4E-04	---	9.9E-04	1.9E-04	1.5E-03
Cadmium	2.0E-05	---	---	9.0E-04	3.4E-06	4.8E-04	---	1.7E-02	5.1E-03	2.4E-02
Chromium (Total)	1.7E-03	---	---	7.2E-03	1.1E-04	1.8E-02	---	1.0E-01	9.5E-04	1.3E-01
Cobalt	2.9E-04	---	---	3.2E-04	1.7E-05	4.7E-03	---	3.6E-04	1.4E-03	7.1E-03
Copper	8.9E-04	---	---	2.3E-02	1.9E-04	1.1E-02	---	5.7E-01	1.5E-01	7.6E-01
Lead	5.7E-04	---	---	6.8E-03	3.3E-05	1.2E-02	---	3.6E-02	1.6E-02	7.1E-02
Manganese	7.5E-04	---	---	1.5E-03	3.2E-03	3.9E-02	---	1.9E-01	1.1E-01	3.5E-01
Molybdenum	2.3E-05	---	---	2.5E-04	5.2E-05	5.7E-04	---	9.5E-03	3.1E-02	4.2E-02
Nickel	1.7E-03	---	---	8.7E-03	1.0E-04	1.3E-02	---	5.7E-02	5.2E-03	8.6E-02
Selenium	2.2E-05	---	---	1.0E-03	2.0E-05	3.9E-04	---	7.8E-03	3.1E-02	4.1E-02
Thallium	4.2E-06	---	---	2.4E-05	8.9E-07	8.8E-05	---	5.5E-04	1.1E-03	1.8E-03
Uranium	4.2E-05	---	---	4.8E-06	3.2E-06	7.3E-04	---	3.9E-04	6.3E-05	1.2E-03
Vanadium	9.4E-04	---	---	5.8E-04	6.5E-05	1.6E-02	---	9.0E-03	1.9E-03	2.8E-02
Zinc	2.6E-03	---	---	2.3E-01	6.5E-04	6.2E-02	---	3.0E+00	4.3E+00	7.6E+00

Average Daily Doses for the Red Fox Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	2.8E-05	8.5E-04	8.0E-06	1.6E-05	---	---	---	---	1.1E-03
Arsenic	1.8E-03	1.3E-04	1.8E-03	3.1E-04	6.1E-05	---	---	---	---	4.1E-03
Barium	1.7E-03	3.2E-03	8.7E-04	6.4E-03	6.3E-04	---	---	---	---	1.3E-02
Beryllium	2.3E-04	2.9E-05	5.8E-05	2.4E-04	1.7E-06	---	---	---	---	5.6E-04
Cadmium	3.3E-04	3.1E-04	1.8E-02	8.2E-03	3.6E-06	---	---	---	---	2.7E-02
Chromium (Total)	2.8E-02	3.7E-03	4.9E-02	6.5E-02	1.1E-04	---	---	---	---	1.5E-01
Cobalt	4.9E-03	5.3E-04	3.4E-03	2.9E-03	1.9E-05	---	---	---	---	1.2E-02
Copper	1.5E-02	1.6E-02	4.4E-02	2.1E-01	2.0E-04	---	---	---	---	2.9E-01
Lead	9.6E-03	1.6E-04	2.6E-02	6.2E-02	3.6E-05	---	---	---	---	9.7E-02
Manganese	1.3E-02	4.6E-02	4.7E-03	1.4E-02	3.5E-03	---	---	---	---	8.1E-02
Molybdenum	3.9E-04	9.5E-03	2.1E-03	2.3E-03	5.5E-05	---	---	---	---	1.4E-02
Nickel	2.8E-02	9.8E-03	1.7E-01	7.9E-02	1.1E-04	---	---	---	---	2.9E-01
Selenium	3.7E-04	1.4E-04	2.0E-03	9.3E-03	2.1E-05	---	---	---	---	1.2E-02
Thallium	7.1E-05	5.6E-06	1.9E-05	2.2E-04	9.5E-07	---	---	---	---	3.1E-04
Uranium	7.1E-04	1.6E-05	1.3E-04	4.4E-05	3.5E-06	---	---	---	---	9.0E-04
Vanadium	1.6E-02	9.5E-04	3.7E-03	5.2E-03	6.9E-05	---	---	---	---	2.6E-02
Zinc	4.4E-02	3.4E-02	1.2E+00	2.1E+00	6.9E-04	---	---	---	---	3.4E+00

Average Daily Doses for the Snowshoe Hare Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	8.9E-04	1.2E-03	---	---	1.7E-05	---	---	---	---	2.1E-03
Arsenic	1.1E-02	1.2E-02	---	---	6.8E-05	---	---	---	---	2.2E-02
Barium	1.0E-02	3.7E-01	---	---	7.1E-04	---	---	---	---	3.8E-01
Beryllium	1.4E-03	6.6E-03	---	---	1.9E-06	---	---	---	---	8.0E-03
Cadmium	2.0E-03	1.6E-02	---	---	4.1E-06	---	---	---	---	1.8E-02
Chromium (Total)	1.7E-01	3.2E-01	---	---	1.3E-04	---	---	---	---	4.9E-01
Cobalt	2.9E-02	5.2E-02	---	---	2.1E-05	---	---	---	---	8.1E-02
Copper	8.9E-02	7.1E-01	---	---	2.2E-04	---	---	---	---	8.0E-01
Lead	5.7E-02	4.1E-02	---	---	4.0E-05	---	---	---	---	9.8E-02
Manganese	7.5E-02	1.6E+00	---	---	3.9E-03	---	---	---	---	1.7E+00
Molybdenum	2.3E-03	2.7E-01	---	---	6.2E-05	---	---	---	---	2.7E-01
Nickel	1.7E-01	5.0E-01	---	---	1.2E-04	---	---	---	---	6.7E-01
Selenium	2.2E-03	1.0E-02	---	---	2.4E-05	---	---	---	---	1.2E-02
Thallium	4.2E-04	9.0E-04	---	---	1.1E-06	---	---	---	---	1.3E-03
Uranium	4.2E-03	2.0E-03	---	---	3.9E-06	---	---	---	---	6.2E-03
Vanadium	9.3E-02	1.1E-01	---	---	7.7E-05	---	---	---	---	2.1E-01
Zinc	2.6E-01	3.7E+00	---	---	7.7E-04	---	---	---	---	4.0E+00

Average Daily Doses for the White-tailed Deer Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.3E-04	5.2E-04	---	---	1.2E-05	---	---	---	---	6.6E-04
Arsenic	1.5E-03	5.3E-03	---	---	4.6E-05	---	---	---	---	6.9E-03
Barium	1.4E-03	1.7E-01	---	---	4.7E-04	---	---	---	---	1.7E-01
Beryllium	1.9E-04	3.0E-03	---	---	1.3E-06	---	---	---	---	3.2E-03
Cadmium	2.8E-04	7.4E-03	---	---	2.7E-06	---	---	---	---	7.7E-03
Chromium (Total)	2.4E-02	1.5E-01	---	---	8.4E-05	---	---	---	---	1.7E-01
Cobalt	4.1E-03	2.3E-02	---	---	1.4E-05	---	---	---	---	2.7E-02
Copper	1.3E-02	3.2E-01	---	---	1.5E-04	---	---	---	---	3.3E-01
Lead	8.1E-03	1.8E-02	---	---	2.6E-05	---	---	---	---	2.6E-02
Manganese	1.1E-02	7.2E-01	---	---	2.6E-03	---	---	---	---	7.3E-01
Molybdenum	3.2E-04	1.2E-01	---	---	4.1E-05	---	---	---	---	1.2E-01
Nickel	2.4E-02	2.3E-01	---	---	8.0E-05	---	---	---	---	2.5E-01
Selenium	3.1E-04	4.6E-03	---	---	1.6E-05	---	---	---	---	4.9E-03
Thallium	6.0E-05	4.0E-04	---	---	7.1E-07	---	---	---	---	4.6E-04
Uranium	6.0E-04	9.2E-04	---	---	2.6E-06	---	---	---	---	1.5E-03
Vanadium	1.3E-02	5.0E-02	---	---	5.1E-05	---	---	---	---	6.4E-02
Zinc	3.7E-02	1.7E+00	---	---	5.1E-04	---	---	---	---	1.7E+00

Average Daily Doses for the American Robin Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	2.4E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	9.7E-05	---	---	---	---	6.6E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.0E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	1.8E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	2.9E-05	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	3.1E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	5.6E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	5.5E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	8.7E-05	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.7E-04	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	3.4E-05	---	---	---	---	5.5E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.5E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	1.1E-04	---	---	---	---	3.1E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.1E-03	---	---	---	---	2.9E+01

Average Daily Doses for the American Robin (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.8E-03	1.5E-03	1.8E-02	---	2.4E-05	---	---	---	---	2.2E-02
Arsenic	2.1E-02	7.0E-03	3.9E-02	---	9.7E-05	---	---	---	---	6.6E-02
Barium	2.0E-02	1.7E-01	1.9E-02	---	1.0E-03	---	---	---	---	2.1E-01
Beryllium	2.7E-03	1.5E-03	1.2E-03	---	2.7E-06	---	---	---	---	5.5E-03
Cadmium	3.9E-03	1.6E-02	3.8E-01	---	5.7E-06	---	---	---	---	4.0E-01
Chromium (Total)	3.3E-01	2.0E-01	1.1E+00	---	1.8E-04	---	---	---	---	1.6E+00
Cobalt	5.7E-02	2.9E-02	7.2E-02	---	2.9E-05	---	---	---	---	1.6E-01
Copper	1.7E-01	8.6E-01	9.5E-01	---	3.1E-04	---	---	---	---	2.0E+00
Lead	1.1E-01	8.6E-03	5.6E-01	---	5.6E-05	---	---	---	---	6.8E-01
Manganese	1.5E-01	2.5E+00	1.0E-01	---	5.5E-03	---	---	---	---	2.8E+00
Molybdenum	4.5E-03	5.1E-01	4.4E-02	---	8.7E-05	---	---	---	---	5.6E-01
Nickel	3.3E-01	5.3E-01	3.6E+00	---	1.7E-04	---	---	---	---	4.5E+00
Selenium	4.3E-03	7.3E-03	4.4E-02	---	3.4E-05	---	---	---	---	5.5E-02
Thallium	8.3E-04	3.0E-04	4.0E-04	---	1.5E-06	---	---	---	---	1.5E-03
Uranium	8.2E-03	8.4E-04	2.8E-03	---	5.5E-06	---	---	---	---	1.2E-02
Vanadium	1.8E-01	5.1E-02	8.0E-02	---	1.1E-04	---	---	---	---	3.1E-01
Zinc	5.1E-01	1.8E+00	2.6E+01	---	1.1E-03	---	---	---	---	2.9E+01

Average Daily Doses for the Bald Eagle Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	6.3E-05	---	---	6.3E-06	6.3E-06	1.1E-04	---	---	2.8E-04	4.7E-04
Arsenic	7.5E-04	---	---	2.4E-04	2.5E-05	1.6E-03	---	---	1.8E-03	4.3E-03
Barium	7.1E-04	---	---	5.0E-03	2.6E-04	3.4E-03	---	---	1.7E-02	2.7E-02
Beryllium	9.6E-05	---	---	1.8E-04	7.1E-07	1.6E-04	---	---	1.6E-04	6.0E-04
Cadmium	1.4E-04	---	---	6.4E-03	1.5E-06	3.3E-04	---	---	4.1E-03	1.1E-02
Chromium (Total)	1.2E-02	---	---	5.1E-02	4.6E-05	1.2E-02	---	---	7.8E-04	7.6E-02
Cobalt	2.1E-03	---	---	2.3E-03	7.6E-06	3.3E-03	---	---	1.1E-03	8.8E-03
Copper	6.3E-03	---	---	1.6E-01	8.1E-05	7.8E-03	---	---	1.2E-01	3.0E-01
Lead	4.0E-03	---	---	4.8E-02	1.5E-05	8.6E-03	---	---	1.3E-02	7.3E-02
Manganese	5.3E-03	---	---	1.1E-02	1.4E-03	2.7E-02	---	---	9.1E-02	1.4E-01
Molybdenum	1.6E-04	---	---	1.8E-03	2.3E-05	4.0E-04	---	---	2.6E-02	2.8E-02
Nickel	1.2E-02	---	---	6.1E-02	4.4E-05	8.9E-03	---	---	4.3E-03	8.7E-02
Selenium	1.5E-04	---	---	7.2E-03	8.7E-06	2.7E-04	---	---	2.6E-02	3.3E-02
Thallium	3.0E-05	---	---	1.7E-04	3.9E-07	6.1E-05	---	---	9.1E-04	1.2E-03
Uranium	3.0E-04	---	---	3.4E-05	1.4E-06	5.1E-04	---	---	5.1E-05	8.9E-04
Vanadium	6.6E-03	---	---	4.1E-03	2.8E-05	1.1E-02	---	---	1.6E-03	2.3E-02
Zinc	1.8E-02	---	---	1.6E+00	2.8E-04	4.3E-02	---	---	3.5E+00	5.2E+00

Average Daily Doses for the Barn Swallow Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.2E-03	3.4E-05	6.0E-02	---	3.9E-05	---	---	---	---	6.1E-02
Arsenic	1.4E-02	1.6E-04	1.3E-01	---	1.6E-04	---	---	---	---	1.4E-01
Barium	1.4E-02	3.8E-03	6.1E-02	---	1.6E-03	---	---	---	---	8.0E-02
Beryllium	1.8E-03	3.4E-05	4.1E-03	---	4.4E-06	---	---	---	---	6.0E-03
Cadmium	2.7E-03	3.6E-04	1.3E+00	---	9.2E-06	---	---	---	---	1.3E+00
Chromium (Total)	2.3E-01	4.4E-03	3.5E+00	---	2.9E-04	---	---	---	---	3.7E+00
Cobalt	3.9E-02	6.3E-04	2.4E-01	---	4.7E-05	---	---	---	---	2.8E-01
Copper	1.2E-01	1.9E-02	3.1E+00	---	5.0E-04	---	---	---	---	3.3E+00
Lead	7.7E-02	1.9E-04	1.8E+00	---	9.0E-05	---	---	---	---	1.9E+00
Manganese	1.0E-01	5.5E-02	3.3E-01	---	8.8E-03	---	---	---	---	5.0E-01
Molybdenum	3.1E-03	1.1E-02	1.5E-01	---	1.4E-04	---	---	---	---	1.6E-01
Nickel	2.3E-01	1.2E-02	1.2E+01	---	2.7E-04	---	---	---	---	1.2E+01
Selenium	2.9E-03	1.6E-04	1.4E-01	---	5.4E-05	---	---	---	---	1.5E-01
Thallium	5.7E-04	6.6E-06	1.3E-03	---	2.4E-06	---	---	---	---	1.9E-03
Uranium	5.7E-03	1.9E-05	9.3E-03	---	8.8E-06	---	---	---	---	1.5E-02
Vanadium	1.3E-01	1.1E-03	2.6E-01	---	1.8E-04	---	---	---	---	3.9E-01
Zinc	3.5E-01	4.1E-02	8.7E+01	---	1.8E-03	---	---	---	---	8.7E+01

Average Daily Doses for the Common Merganser Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	9.3E-06	2.8E-04	3.7E-05	3.3E-05	6.6E-04	1.0E-03
Arsenic	---	---	---	---	3.7E-05	4.0E-03	1.2E-03	2.4E-02	4.1E-03	3.3E-02
Barium	---	---	---	---	3.8E-04	8.9E-03	1.9E-03	2.0E-02	4.0E-02	7.1E-02
Beryllium	---	---	---	---	1.0E-06	4.2E-04	6.6E-05	9.1E-04	3.7E-04	1.8E-03
Cadmium	---	---	---	---	2.2E-06	8.6E-04	1.0E-04	1.6E-02	9.8E-03	2.7E-02
Chromium (Total)	---	---	---	---	6.7E-05	3.2E-02	2.0E-03	9.4E-02	1.8E-03	1.3E-01
Cobalt	---	---	---	---	1.1E-05	8.5E-03	7.5E-04	3.3E-04	2.7E-03	1.2E-02
Copper	---	---	---	---	1.2E-04	2.0E-02	6.5E-03	5.2E-01	2.9E-01	8.4E-01
Lead	---	---	---	---	2.1E-05	2.2E-02	9.4E-04	3.3E-02	3.0E-02	8.6E-02
Manganese	---	---	---	---	2.1E-03	7.1E-02	4.0E-02	1.7E-01	2.2E-01	5.0E-01
Molybdenum	---	---	---	---	3.3E-05	1.0E-03	3.6E-03	8.7E-03	6.1E-02	7.4E-02
Nickel	---	---	---	---	6.4E-05	2.3E-02	4.4E-03	5.2E-02	1.0E-02	9.0E-02
Selenium	---	---	---	---	1.3E-05	7.1E-04	1.4E-04	7.2E-03	6.1E-02	6.9E-02
Thallium	---	---	---	---	5.7E-07	1.6E-04	2.1E-04	5.1E-04	2.1E-03	3.0E-03
Uranium	---	---	---	---	2.1E-06	1.3E-03	5.0E-04	3.6E-04	1.2E-04	2.3E-03
Vanadium	---	---	---	---	4.1E-05	2.8E-02	5.2E-03	8.3E-03	3.7E-03	4.5E-02
Zinc	---	---	---	---	4.1E-04	1.1E-01	3.8E-02	2.7E+00	8.3E+00	1.1E+01

Average Daily Doses for the Lesser Scaup Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	---	---	---	---	1.2E-05	3.7E-04	2.6E-04	5.2E-04	---	1.2E-03
Arsenic	---	---	---	---	4.7E-05	5.3E-03	8.6E-03	3.8E-01	---	3.9E-01
Barium	---	---	---	---	4.8E-04	1.2E-02	1.3E-02	3.1E-01	---	3.4E-01
Beryllium	---	---	---	---	1.3E-06	5.5E-04	4.6E-04	1.4E-02	---	1.5E-02
Cadmium	---	---	---	---	2.8E-06	1.1E-03	7.2E-04	2.5E-01	---	2.5E-01
Chromium (Total)	---	---	---	---	8.6E-05	4.2E-02	1.4E-02	1.5E+00	---	1.5E+00
Cobalt	---	---	---	---	1.4E-05	1.1E-02	5.2E-03	5.2E-03	---	2.2E-02
Copper	---	---	---	---	1.5E-04	2.6E-02	4.6E-02	8.2E+00	---	8.3E+00
Lead	---	---	---	---	2.7E-05	2.9E-02	6.6E-03	5.1E-01	---	5.5E-01
Manganese	---	---	---	---	2.7E-03	9.2E-02	2.8E-01	2.7E+00	---	3.1E+00
Molybdenum	---	---	---	---	4.2E-05	1.3E-03	2.5E-02	1.4E-01	---	1.6E-01
Nickel	---	---	---	---	8.2E-05	3.0E-02	3.1E-02	8.2E-01	---	8.8E-01
Selenium	---	---	---	---	1.6E-05	9.2E-04	1.0E-03	1.1E-01	---	1.2E-01
Thallium	---	---	---	---	7.3E-07	2.1E-04	1.5E-03	8.0E-03	---	9.7E-03
Uranium	---	---	---	---	2.6E-06	1.7E-03	3.5E-03	5.6E-03	---	1.1E-02
Vanadium	---	---	---	---	5.3E-05	3.7E-02	3.6E-02	1.3E-01	---	2.0E-01
Zinc	---	---	---	---	5.3E-04	1.4E-01	2.7E-01	4.3E+01	---	4.4E+01

Average Daily Doses for the Mallard Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	1.0E-05	4.6E-04	1.4E-03	2.5E-04	---	2.8E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	3.9E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	4.1E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.3E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.8E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	1.2E-05	1.4E-02	2.8E-02	2.5E-03	---	4.9E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	1.3E-04	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.3E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	2.2E-03	1.2E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	3.5E-05	1.7E-03	1.4E-01	6.6E-02	---	2.2E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	6.9E-05	3.7E-02	1.7E-01	3.9E-01	---	7.3E-01
Selenium	9.1E-05	1.6E-04	1.4E-03	---	1.4E-05	1.2E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	6.1E-07	2.6E-04	7.9E-03	3.8E-03	---	1.2E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	2.2E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	4.4E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.4E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Mallard (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.7E-05	3.3E-05	5.8E-04	---	1.0E-05	4.6E-04	1.4E-03	2.5E-04	---	2.8E-03
Arsenic	4.4E-04	1.5E-04	1.2E-03	---	3.9E-05	6.6E-03	4.6E-02	1.8E-01	---	2.3E-01
Barium	4.2E-04	3.7E-03	6.0E-04	---	4.1E-04	1.4E-02	7.3E-02	1.5E-01	---	2.4E-01
Beryllium	5.7E-05	3.3E-05	4.0E-05	---	1.1E-06	6.9E-04	2.5E-03	6.9E-03	---	1.0E-02
Cadmium	8.2E-05	3.5E-04	1.2E-02	---	2.3E-06	1.4E-03	3.9E-03	1.2E-01	---	1.4E-01
Chromium (Total)	7.0E-03	4.3E-03	3.4E-02	---	7.2E-05	5.3E-02	7.4E-02	7.1E-01	---	8.8E-01
Cobalt	1.2E-03	6.1E-04	2.3E-03	---	1.2E-05	1.4E-02	2.8E-02	2.5E-03	---	4.9E-02
Copper	3.7E-03	1.8E-02	3.0E-02	---	1.3E-04	3.3E-02	2.5E-01	3.9E+00	---	4.3E+00
Lead	2.4E-03	1.8E-04	1.8E-02	---	2.3E-05	3.6E-02	3.6E-02	2.5E-01	---	3.4E-01
Manganese	3.1E-03	5.3E-02	3.2E-03	---	2.2E-03	1.2E-01	1.5E+00	1.3E+00	---	3.0E+00
Molybdenum	9.5E-05	1.1E-02	1.4E-03	---	3.5E-05	1.7E-03	1.4E-01	6.6E-02	---	2.2E-01
Nickel	7.0E-03	1.1E-02	1.2E-01	---	6.9E-05	3.7E-02	1.7E-01	3.9E-01	---	7.3E-01
Selenium	9.1E-05	1.6E-04	1.4E-03	---	1.4E-05	1.2E-03	5.4E-03	5.4E-02	---	6.2E-02
Thallium	1.8E-05	6.4E-06	1.3E-05	---	6.1E-07	2.6E-04	7.9E-03	3.8E-03	---	1.2E-02
Uranium	1.7E-04	1.8E-05	9.0E-05	---	2.2E-06	2.1E-03	1.9E-02	2.7E-03	---	2.4E-02
Vanadium	3.9E-03	1.1E-03	2.6E-03	---	4.4E-05	4.6E-02	1.9E-01	6.3E-02	---	3.1E-01
Zinc	1.1E-02	3.9E-02	8.4E-01	---	4.4E-04	1.8E-01	1.5E+00	2.1E+01	---	2.3E+01

Average Daily Doses for the Red-tailed Hawk Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	1.0E-05	---	---	---	---	1.8E-04
Arsenic	1.8E-03	---	---	5.8E-04	4.1E-05	---	---	---	---	2.4E-03
Barium	1.7E-03	---	---	1.2E-02	4.2E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.1E-06	---	---	---	---	6.7E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.4E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	7.4E-05	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	1.2E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	1.3E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.3E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	2.3E-03	---	---	---	---	4.1E-02
Molybdenum	3.9E-04	---	---	4.2E-03	3.6E-05	---	---	---	---	4.7E-03
Nickel	2.8E-02	---	---	1.5E-01	7.1E-05	---	---	---	---	1.7E-01
Selenium	3.7E-04	---	---	1.7E-02	1.4E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	6.3E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.6E-02	---	---	9.7E-03	4.6E-05	---	---	---	---	2.5E-02
Zinc	4.4E-02	---	---	3.8E+00	4.6E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	1.5E-04	---	---	1.5E-05	1.0E-05	---	---	---	---	1.8E-04
Arsenic	1.8E-03	---	---	5.8E-04	4.1E-05	---	---	---	---	2.4E-03
Barium	1.7E-03	---	---	1.2E-02	4.2E-04	---	---	---	---	1.4E-02
Beryllium	2.3E-04	---	---	4.4E-04	1.1E-06	---	---	---	---	6.7E-04
Cadmium	3.3E-04	---	---	1.5E-02	2.4E-06	---	---	---	---	1.5E-02
Chromium (Total)	2.8E-02	---	---	1.2E-01	7.4E-05	---	---	---	---	1.5E-01
Cobalt	4.9E-03	---	---	5.4E-03	1.2E-05	---	---	---	---	1.0E-02
Copper	1.5E-02	---	---	3.9E-01	1.3E-04	---	---	---	---	4.0E-01
Lead	9.6E-03	---	---	1.1E-01	2.3E-05	---	---	---	---	1.2E-01
Manganese	1.3E-02	---	---	2.6E-02	2.3E-03	---	---	---	---	4.1E-02
Molybdenum	3.9E-04	---	---	4.2E-03	3.6E-05	---	---	---	---	4.7E-03
Nickel	2.8E-02	---	---	1.5E-01	7.1E-05	---	---	---	---	1.7E-01
Selenium	3.7E-04	---	---	1.7E-02	1.4E-05	---	---	---	---	1.8E-02
Thallium	7.1E-05	---	---	4.0E-04	6.3E-07	---	---	---	---	4.7E-04
Uranium	7.1E-04	---	---	8.1E-05	2.3E-06	---	---	---	---	7.9E-04
Vanadium	1.6E-02	---	---	9.7E-03	4.6E-05	---	---	---	---	2.5E-02
Zinc	4.4E-02	---	---	3.8E+00	4.6E-04	---	---	---	---	3.9E+00

Average Daily Doses for the Short-eared Owl Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	2.4E-04	---	4.9E-04	3.6E-05	1.5E-05	---	---	---	---	7.8E-04
Arsenic	2.9E-03	---	1.0E-03	1.4E-03	6.1E-05	---	---	---	---	5.4E-03
Barium	2.8E-03	---	5.0E-04	2.9E-02	6.3E-04	---	---	---	---	3.3E-02
Beryllium	3.7E-04	---	3.3E-05	1.1E-03	1.7E-06	---	---	---	---	1.5E-03
Cadmium	5.4E-04	---	1.0E-02	3.7E-02	3.6E-06	---	---	---	---	4.8E-02
Chromium (Total)	4.6E-02	---	2.8E-02	2.9E-01	1.1E-04	---	---	---	---	3.7E-01
Cobalt	7.9E-03	---	1.9E-03	1.3E-02	1.8E-05	---	---	---	---	2.3E-02
Copper	2.4E-02	---	2.5E-02	9.5E-01	2.0E-04	---	---	---	---	1.0E+00
Lead	1.6E-02	---	1.5E-02	2.8E-01	3.5E-05	---	---	---	---	3.1E-01
Manganese	2.0E-02	---	2.7E-03	6.3E-02	3.4E-03	---	---	---	---	9.0E-02
Molybdenum	6.3E-04	---	1.2E-03	1.0E-02	5.5E-05	---	---	---	---	1.2E-02
Nickel	4.6E-02	---	9.7E-02	3.6E-01	1.1E-04	---	---	---	---	5.0E-01
Selenium	6.0E-04	---	1.2E-03	4.2E-02	2.1E-05	---	---	---	---	4.4E-02
Thallium	1.2E-04	---	1.1E-05	9.8E-04	9.4E-07	---	---	---	---	1.1E-03
Uranium	1.1E-03	---	7.5E-05	2.0E-04	3.4E-06	---	---	---	---	1.4E-03
Vanadium	2.6E-02	---	2.1E-03	2.4E-02	6.9E-05	---	---	---	---	5.1E-02
Zinc	7.1E-02	---	7.0E-01	9.3E+00	6.9E-04	---	---	---	---	1.0E+01

Average Daily Doses for the Spotted Sandpiper Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	3.1E-05	5.0E-04	4.4E-04	5.9E-04	1.8E-04	2.4E-02
Arsenic	5.2E-03	---	4.7E-02	---	1.2E-04	7.1E-03	1.5E-02	4.3E-01	1.1E-03	5.0E-01
Barium	5.0E-03	---	2.3E-02	---	1.3E-03	1.6E-02	2.3E-02	3.5E-01	1.1E-02	4.3E-01
Beryllium	6.7E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	7.3E-06	1.5E-03	1.2E-03	2.9E-01	2.6E-03	7.6E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	4.9E-04	3.1E+00
Cobalt	1.4E-02	---	8.8E-02	---	3.7E-05	1.5E-02	9.0E-03	5.9E-03	7.1E-04	1.3E-01
Copper	4.4E-02	---	1.2E+00	---	4.0E-04	3.6E-02	7.8E-02	9.4E+00	7.8E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	7.1E-05	3.9E-02	1.1E-02	5.8E-01	8.0E-03	1.3E+00
Manganese	3.7E-02	---	1.2E-01	---	7.0E-03	1.2E-01	4.8E-01	3.1E+00	5.7E-02	4.0E+00
Molybdenum	1.1E-03	---	5.4E-02	---	1.1E-04	1.8E-03	4.3E-02	1.6E-01	1.6E-02	2.7E-01
Nickel	8.3E-02	---	4.4E+00	---	2.2E-04	4.1E-02	5.2E-02	9.4E-01	2.7E-03	5.5E+00
Selenium	1.1E-03	---	5.3E-02	---	4.3E-05	1.2E-03	1.7E-03	1.3E-01	1.6E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.9E-06	2.8E-04	2.5E-03	9.1E-03	5.7E-04	1.3E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.3E-03	6.0E-03	6.4E-03	3.2E-05	2.0E-02
Vanadium	4.6E-02	---	9.7E-02	---	1.4E-04	5.0E-02	6.2E-02	1.5E-01	9.8E-04	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.4E-03	2.0E-01	4.6E-01	4.9E+01	2.2E+00	8.4E+01

Average Daily Doses for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	4.4E-04	---	2.2E-02	---	3.1E-05	5.0E-04	4.4E-04	5.9E-04	1.8E-04	2.4E-02
Arsenic	5.2E-03	---	4.7E-02	---	1.2E-04	7.1E-03	1.5E-02	4.3E-01	1.1E-03	5.0E-01
Barium	5.0E-03	---	2.3E-02	---	1.3E-03	1.6E-02	2.3E-02	3.5E-01	1.1E-02	4.3E-01
Beryllium	6.7E-04	---	1.5E-03	---	3.5E-06	7.5E-04	7.9E-04	1.6E-02	9.8E-05	2.0E-02
Cadmium	9.8E-04	---	4.6E-01	---	7.3E-06	1.5E-03	1.2E-03	2.9E-01	2.6E-03	7.6E-01
Chromium (Total)	8.3E-02	---	1.3E+00	---	2.3E-04	5.7E-02	2.3E-02	1.7E+00	4.9E-04	3.1E+00
Cobalt	1.4E-02	---	8.8E-02	---	3.7E-05	1.5E-02	9.0E-03	5.9E-03	7.1E-04	1.3E-01
Copper	4.4E-02	---	1.2E+00	---	4.0E-04	3.6E-02	7.8E-02	9.4E+00	7.8E-02	1.1E+01
Lead	2.8E-02	---	6.7E-01	---	7.1E-05	3.9E-02	1.1E-02	5.8E-01	8.0E-03	1.3E+00
Manganese	3.7E-02	---	1.2E-01	---	7.0E-03	1.2E-01	4.8E-01	3.1E+00	5.7E-02	4.0E+00
Molybdenum	1.1E-03	---	5.4E-02	---	1.1E-04	1.8E-03	4.3E-02	1.6E-01	1.6E-02	2.7E-01
Nickel	8.3E-02	---	4.4E+00	---	2.2E-04	4.1E-02	5.2E-02	9.4E-01	2.7E-03	5.5E+00
Selenium	1.1E-03	---	5.3E-02	---	4.3E-05	1.2E-03	1.7E-03	1.3E-01	1.6E-02	2.0E-01
Thallium	2.1E-04	---	4.9E-04	---	1.9E-06	2.8E-04	2.5E-03	9.1E-03	5.7E-04	1.3E-02
Uranium	2.1E-03	---	3.4E-03	---	7.0E-06	2.3E-03	6.0E-03	6.4E-03	3.2E-05	2.0E-02
Vanadium	4.6E-02	---	9.7E-02	---	1.4E-04	5.0E-02	6.2E-02	1.5E-01	9.8E-04	4.0E-01
Zinc	1.3E-01	---	3.2E+01	---	1.4E-03	2.0E-01	4.6E-01	4.9E+01	2.2E+00	8.4E+01

Average Daily Doses for the Spruce Grouse Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion	Terrestrial Plant Ingestion	Terrestrial Invertebrate Ingestion	Terrestrial Prey Ingestion	Surface Water Ingestion	Freshwater Sediment Ingestion	Freshwater Plant Ingestion	Freshwater Benthic Invertebrate Ingestion	Freshwater Fish Ingestion	Total ADD
	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Average Daily Dose (mg/kg-day)	Total Average Daily Dose (mg/kg-day)
Inorganics										
Antimony	3.3E-04	1.2E-03	8.7E-04	---	1.3E-05	---	---	---	---	2.4E-03
Arsenic	3.9E-03	1.1E-02	1.8E-03	---	4.9E-05	---	---	---	---	1.7E-02
Barium	3.7E-03	3.3E-01	8.9E-04	---	5.1E-04	---	---	---	---	3.4E-01
Beryllium	5.0E-04	5.8E-03	6.0E-05	---	1.4E-06	---	---	---	---	6.3E-03
Cadmium	7.2E-04	1.6E-02	1.8E-02	---	2.9E-06	---	---	---	---	3.5E-02
Chromium (Total)	6.2E-02	3.0E-01	5.0E-02	---	9.1E-05	---	---	---	---	4.1E-01
Cobalt	1.1E-02	4.7E-02	3.5E-03	---	1.5E-05	---	---	---	---	6.1E-02
Copper	3.3E-02	7.2E-01	4.5E-02	---	1.6E-04	---	---	---	---	8.0E-01
Lead	2.1E-02	3.5E-02	2.6E-02	---	2.9E-05	---	---	---	---	8.3E-02
Manganese	2.7E-02	1.7E+00	4.8E-03	---	2.8E-03	---	---	---	---	1.7E+00
Molybdenum	8.4E-04	3.0E-01	2.1E-03	---	4.5E-05	---	---	---	---	3.0E-01
Nickel	6.2E-02	5.0E-01	1.7E-01	---	8.6E-05	---	---	---	---	7.3E-01
Selenium	8.0E-04	9.6E-03	2.1E-03	---	1.7E-05	---	---	---	---	1.3E-02
Thallium	1.5E-04	7.9E-04	1.9E-05	---	7.7E-07	---	---	---	---	9.7E-04
Uranium	1.5E-03	1.8E-03	1.3E-04	---	2.8E-06	---	---	---	---	3.5E-03
Vanadium	3.4E-02	1.0E-01	3.8E-03	---	5.6E-05	---	---	---	---	1.4E-01
Zinc	9.5E-02	3.3E+00	1.3E+00	---	5.6E-04	---	---	---	---	4.7E+00

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.7E-04	2.2E-03	2.2E-03	1.7E-05	4.1E-05	5.9E-05	---	---	1.2E-04	5.5E-03
Arsenic	1.6E-03	2.3E-03	7.0E-04	1.0E-04	3.7E-05	1.8E-04	---	---	2.2E-04	5.2E-03
Barium	2.9E-05	1.4E-03	6.6E-06	4.0E-05	1.0E-05	8.0E-06	---	---	6.9E-05	1.6E-03
Beryllium	1.5E-03	8.3E-03	1.7E-04	5.7E-04	9.1E-06	1.4E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	1.7E-06	5.2E-05	---	---	2.2E-04	2.0E-02
Chromium (Total)	6.5E-03	8.5E-03	5.0E-03	6.4E-03	3.5E-05	6.3E-04	---	---	1.5E-04	2.7E-02
Cobalt	4.9E-04	8.5E-04	1.5E-04	1.1E-04	2.7E-06	5.3E-05	---	---	2.3E-05	1.7E-03
Copper	2.4E-03	3.6E-02	3.2E-03	1.3E-02	1.4E-05	1.7E-04	---	---	3.2E-03	5.7E-02
Lead	1.9E-03	1.5E-03	2.3E-03	4.6E-03	3.9E-06	2.2E-04	---	---	6.2E-05	1.1E-02
Manganese	2.2E-04	1.0E-02	3.7E-05	9.1E-05	8.4E-05	6.4E-05	---	---	1.5E-04	1.1E-02
Molybdenum	9.4E-04	2.7E-01	2.2E-03	2.1E-03	8.6E-06	9.9E-05	---	---	8.2E-04	2.8E-01
Nickel	5.7E-03	1.7E-02	1.5E-02	1.0E-02	3.1E-05	5.5E-04	---	---	2.2E-04	4.9E-02
Selenium	2.4E-03	1.7E-02	5.9E-03	2.2E-02	5.9E-05	2.3E-04	---	---	1.7E-02	6.5E-02
Thallium	1.6E-02	4.3E-02	1.9E-03	1.9E-02	1.6E-04	1.8E-03	---	---	1.1E-02	9.3E-02
Uranium	7.4E-04	4.6E-04	6.1E-05	1.7E-05	2.2E-06	6.9E-05	---	---	2.3E-05	1.4E-03
Vanadium	3.3E-03	4.6E-03	3.5E-04	4.1E-04	1.1E-05	3.2E-04	---	---	1.5E-04	9.1E-03
Zinc	5.3E-04	1.0E-02	6.8E-03	9.5E-03	5.2E-06	6.9E-05	---	---	5.9E-03	3.3E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	6.3E-06	2.2E-04	---	4.2E-05	3.8E-04	7.7E-04
Arsenic	5.8E-04	---	---	1.9E-04	1.7E-05	2.0E-03	---	2.0E-02	2.1E-03	2.4E-02
Barium	1.1E-05	---	---	7.5E-05	4.8E-06	8.9E-05	---	3.3E-04	6.7E-04	1.2E-03
Beryllium	1.8E-04	---	---	3.5E-04	1.4E-06	5.1E-04	---	1.8E-03	4.2E-04	3.3E-03
Cadmium	1.5E-04	---	---	6.9E-03	7.8E-07	5.8E-04	---	1.8E-02	2.1E-03	2.8E-02
Chromium (Total)	2.4E-03	---	---	1.2E-02	1.6E-05	7.0E-03	---	3.3E-02	1.4E-03	5.6E-02
Cobalt	1.8E-04	---	---	2.0E-04	1.2E-06	5.9E-04	---	3.8E-05	2.2E-04	1.2E-03
Copper	8.8E-04	---	---	2.4E-02	6.4E-06	1.9E-03	---	8.0E-02	3.1E-02	1.4E-01
Lead	7.1E-04	---	---	8.5E-03	1.8E-06	2.4E-03	---	5.9E-03	6.0E-04	1.8E-02
Manganese	8.3E-05	---	---	1.7E-04	3.9E-05	7.1E-04	---	2.9E-03	1.4E-03	5.3E-03
Molybdenum	1.2E-04	---	---	1.3E-03	1.3E-06	3.6E-04	---	5.1E-03	2.6E-03	9.5E-03
Nickel	2.1E-03	---	---	1.9E-02	1.4E-05	6.1E-03	---	2.3E-02	2.1E-03	5.2E-02
Selenium	8.9E-04	---	---	4.2E-02	2.7E-05	2.6E-03	---	4.3E-02	1.7E-01	2.5E-01
Thallium	2.0E-03	---	---	1.1E-02	2.5E-05	6.5E-03	---	3.4E-02	3.5E-02	8.9E-02
Uranium	9.2E-05	---	---	1.1E-05	3.4E-07	2.5E-04	---	1.1E-04	7.5E-05	5.4E-04
Vanadium	1.2E-03	---	---	7.6E-04	5.0E-06	3.5E-03	---	1.7E-03	1.5E-03	8.7E-03
Zinc	2.0E-04	---	---	1.8E-02	2.4E-06	7.6E-04	---	3.1E-02	5.7E-02	1.1E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.6E-04	---	---	3.5E-05	2.5E-04	3.1E-04	---	---	9.4E-04
Arsenic	4.2E-04	3.4E-04	---	---	4.2E-05	9.9E-04	2.9E-03	---	---	4.6E-03
Barium	7.8E-06	2.2E-04	---	---	1.2E-05	4.4E-05	9.0E-05	---	---	3.7E-04
Beryllium	3.0E-04	1.2E-03	---	---	7.8E-06	5.8E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	1.9E-06	2.8E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	1.7E-03	1.3E-03	---	---	3.9E-05	3.4E-03	2.0E-03	---	---	8.5E-03
Cobalt	1.3E-04	1.3E-04	---	---	2.9E-06	2.9E-04	2.4E-04	---	---	8.0E-04
Copper	6.3E-04	3.7E-03	---	---	1.5E-05	9.2E-04	2.8E-03	---	---	8.1E-03
Lead	5.1E-04	2.8E-04	---	---	4.3E-06	1.2E-03	4.8E-04	---	---	2.5E-03
Manganese	5.9E-05	9.2E-04	---	---	9.3E-05	3.5E-04	1.9E-03	---	---	3.3E-03
Molybdenum	1.9E-04	1.6E-02	---	---	7.4E-06	4.1E-04	1.4E-02	---	---	3.1E-02
Nickel	1.5E-03	1.7E-03	---	---	3.4E-05	3.0E-03	5.5E-03	---	---	1.2E-02
Selenium	6.4E-04	2.3E-03	---	---	6.5E-05	1.3E-03	2.4E-03	---	---	6.7E-03
Thallium	3.4E-03	5.6E-03	---	---	1.4E-04	7.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.7E-05	---	---	1.9E-06	2.9E-04	1.0E-03	---	---	1.5E-03
Vanadium	8.9E-04	7.3E-04	---	---	1.2E-05	1.7E-03	3.0E-03	---	---	6.4E-03
Zinc	1.4E-04	1.6E-03	---	---	5.7E-06	3.7E-04	1.2E-03	---	---	3.3E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.2E-04	---	---	7.7E-05	2.9E-05	---	---	---	---	5.3E-04
Arsenic	1.3E-03	---	---	8.0E-04	4.7E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.3E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	1.7E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	4.8E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	4.6E-04	---	---	9.3E-03	6.2E-06	---	---	---	---	9.8E-03
Nickel	4.8E-03	---	---	7.8E-02	3.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	7.4E-05	---	---	---	---	1.8E-01
Thallium	8.0E-03	---	---	8.3E-02	1.2E-04	---	---	---	---	9.1E-02
Uranium	3.6E-04	---	---	7.7E-05	1.6E-06	---	---	---	---	4.4E-04
Vanadium	2.8E-03	---	---	3.2E-03	1.4E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	6.4E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.3E-04	8.8E-05	---	---	---	---	1.6E-03
Arsenic	1.3E-03	---	---	8.0E-04	4.7E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.3E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	1.7E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	4.8E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.9E-05	---	---	---	---	2.9E-02
Nickel	4.8E-03	---	---	7.8E-02	3.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	7.4E-05	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.7E-01
Uranium	1.1E-03	---	---	2.3E-04	4.7E-06	---	---	---	---	1.3E-03
Vanadium	2.8E-03	---	---	3.2E-03	1.4E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	6.4E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.8E-03	3.4E-03	---	---	1.4E-04	---	---	---	---	9.3E-03
Arsenic	2.8E-03	1.4E-03	---	---	3.4E-05	---	---	---	---	4.2E-03
Barium	5.2E-05	9.2E-04	---	---	9.4E-06	---	---	---	---	9.8E-04
Beryllium	3.3E-03	7.8E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	1.5E-06	---	---	---	---	3.6E-03
Chromium (Total)	1.2E-02	5.6E-03	---	---	3.2E-05	---	---	---	---	1.7E-02
Cobalt	8.8E-04	5.5E-04	---	---	2.4E-06	---	---	---	---	1.4E-03
Copper	4.2E-03	1.6E-02	---	---	1.3E-05	---	---	---	---	2.0E-02
Lead	3.4E-03	1.2E-03	---	---	3.5E-06	---	---	---	---	4.6E-03
Manganese	3.9E-04	3.9E-03	---	---	7.6E-05	---	---	---	---	4.4E-03
Molybdenum	6.2E-03	3.3E-01	---	---	2.9E-05	---	---	---	---	3.4E-01
Nickel	1.0E-02	7.2E-03	---	---	2.8E-05	---	---	---	---	1.7E-02
Selenium	4.3E-03	9.7E-03	---	---	5.3E-05	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.1E-01	---	---	5.4E-04	---	---	---	---	2.2E-01
Uranium	4.9E-03	1.2E-03	---	---	7.4E-06	---	---	---	---	6.1E-03
Vanadium	5.9E-03	3.1E-03	---	---	9.9E-06	---	---	---	---	9.0E-03
Zinc	9.5E-04	6.7E-03	---	---	4.7E-06	---	---	---	---	7.6E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.6E-03	5.0E-04	1.2E-01	---	2.9E-05	---	---	---	---	1.3E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	9.9E-05	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.7E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	4.5E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	3.7E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.0E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	1.5E-03	2.7E-02	6.9E-02	---	3.3E-06	---	---	---	---	9.7E-02
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	8.1E-05	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.6E-04	---	---	---	---	**1.3E+00**
Thallium	4.9E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.3E-05	1.9E-03	---	8.4E-07	---	---	---	---	3.2E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	2.9E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.4E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.8E-03	1.5E-03	3.7E-01	---	8.7E-05	---	---	---	---	3.8E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	9.9E-05	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.7E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	4.5E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	3.7E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.0E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	4.6E-03	8.0E-02	2.1E-01	---	9.9E-06	---	---	---	---	2.9E-01
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	8.1E-05	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.6E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.8E-04	5.7E-03	---	2.5E-06	---	---	---	---	9.6E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	2.9E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.4E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	1.3E-03	---	---	3.5E-05	---	---	---	---	1.8E-03
Arsenic	3.0E-03	5.2E-03	---	---	1.2E-04	---	---	---	---	8.4E-03
Barium	5.6E-05	3.2E-03	---	---	3.4E-05	---	---	---	---	3.3E-03
Beryllium	7.7E-04	5.0E-03	---	---	7.9E-06	---	---	---	---	5.8E-03
Cadmium	7.9E-04	1.3E-02	---	---	5.5E-06	---	---	---	---	1.4E-02
Chromium (Total)	1.3E-02	1.9E-02	---	---	1.1E-04	---	---	---	---	3.2E-02
Cobalt	9.6E-04	1.9E-03	---	---	8.6E-06	---	---	---	---	2.9E-03
Copper	4.6E-03	7.8E-02	---	---	4.5E-05	---	---	---	---	8.2E-02
Lead	3.7E-03	3.5E-03	---	---	1.3E-05	---	---	---	---	7.3E-03
Manganese	4.3E-04	2.2E-02	---	---	2.7E-04	---	---	---	---	2.3E-02
Molybdenum	2.8E-04	8.8E-02	---	---	4.2E-06	---	---	---	---	8.8E-02
Nickel	1.1E-02	3.8E-02	---	---	9.9E-05	---	---	---	---	4.9E-02
Selenium	4.7E-03	3.8E-02	---	---	1.9E-04	---	---	---	---	4.3E-02
Thallium	8.6E-03	2.6E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.1E-06	---	---	---	---	3.7E-04
Vanadium	6.5E-03	1.0E-02	---	---	3.5E-05	---	---	---	---	1.7E-02
Zinc	1.0E-03	2.3E-02	---	---	1.7E-05	---	---	---	---	2.4E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	6.9E-04	2.8E-03	---	---	5.3E-05	1.3E-04	1.6E-03	---	---	5.3E-03
Arsenic	7.9E-04	2.8E-03	---	---	3.1E-05	2.5E-04	7.3E-03	---	---	1.1E-02
Barium	1.5E-05	1.8E-03	---	---	8.7E-06	1.1E-05	2.3E-04	---	---	2.1E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	3.0E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	1.4E-06	7.3E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	3.3E-03	1.1E-02	---	---	2.9E-05	8.8E-04	5.1E-03	---	---	2.0E-02
Cobalt	2.5E-04	1.1E-03	---	---	2.2E-06	7.5E-05	6.2E-04	---	---	2.0E-03
Copper	1.2E-03	3.1E-02	---	---	1.2E-05	2.4E-04	7.3E-03	---	---	4.0E-02
Lead	9.7E-04	2.4E-03	---	---	3.2E-06	3.1E-04	1.2E-03	---	---	4.9E-03
Manganese	1.1E-04	7.7E-03	---	---	7.0E-05	9.0E-05	4.8E-03	---	---	1.3E-02
Molybdenum	7.4E-04	2.8E-01	---	---	1.1E-05	2.2E-04	7.1E-02	---	---	3.5E-01
Nickel	2.9E-03	1.4E-02	---	---	2.6E-05	7.8E-04	1.4E-02	---	---	3.2E-02
Selenium	1.2E-03	1.9E-02	---	---	4.9E-05	3.2E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.5E-02	---	---	2.1E-04	3.8E-03	4.8E-01	---	---	5.9E-01
Uranium	5.9E-04	9.6E-04	---	---	2.9E-06	1.5E-04	5.4E-03	---	---	7.1E-03
Vanadium	1.7E-03	6.1E-03	---	---	9.2E-06	4.4E-04	7.7E-03	---	---	1.6E-02
Zinc	2.7E-04	1.3E-02	---	---	4.3E-06	9.6E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.2E-05	---	---	3.1E-06	2.9E-05	4.1E-04	---	9.3E-05	6.9E-04	1.3E-03
Arsenic	9.9E-05	---	---	3.2E-05	4.7E-05	2.2E-03	---	2.5E-02	2.2E-03	2.9E-02
Barium	1.8E-06	---	---	1.3E-05	1.3E-05	9.5E-05	---	4.2E-04	7.0E-04	1.2E-03
Beryllium	5.4E-05	---	---	1.0E-04	6.5E-06	9.5E-04	---	4.0E-03	7.7E-04	5.9E-03
Cadmium	2.6E-05	---	---	1.2E-03	2.1E-06	6.2E-04	---	2.3E-02	2.2E-03	2.7E-02
Chromium (Total)	4.1E-04	---	---	2.0E-03	4.4E-05	7.5E-03	---	4.3E-02	1.5E-03	5.4E-02
Cobalt	3.1E-05	---	---	3.4E-05	3.3E-06	6.4E-04	---	4.9E-05	2.3E-04	9.9E-04
Copper	1.5E-04	---	---	4.1E-03	1.7E-05	2.0E-03	---	1.0E-01	3.2E-02	1.4E-01
Lead	1.2E-04	---	---	1.4E-03	4.8E-06	2.6E-03	---	7.6E-03	6.3E-04	1.2E-02
Manganese	1.4E-05	---	---	2.9E-05	1.0E-04	7.6E-04	---	3.7E-03	1.5E-03	6.1E-03
Molybdenum	3.4E-05	---	---	3.8E-04	6.2E-06	6.8E-04	---	1.1E-02	4.8E-03	1.7E-02
Nickel	3.6E-04	---	---	3.2E-03	3.8E-05	6.6E-03	---	3.0E-02	2.2E-03	4.2E-02
Selenium	1.5E-04	---	---	7.1E-03	7.4E-05	2.8E-03	---	5.5E-02	1.7E-01	2.4E-01
Thallium	6.0E-04	---	---	3.4E-03	1.2E-04	1.2E-02	---	7.6E-02	6.3E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	1.6E-06	4.7E-04	---	2.5E-04	1.4E-04	8.9E-04
Vanadium	2.1E-04	---	---	1.3E-04	1.4E-05	3.8E-03	---	2.2E-03	1.5E-03	7.8E-03
Zinc	3.4E-05	---	---	3.0E-03	6.4E-06	8.2E-04	---	4.0E-02	5.9E-02	1.0E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	8.3E-05	2.5E-03	2.4E-05	2.7E-05	---	---	---	---	3.1E-03
Arsenic	1.7E-03	1.1E-04	1.7E-03	2.9E-04	5.0E-05	---	---	---	---	3.8E-03
Barium	3.1E-05	5.7E-05	1.6E-05	1.2E-04	1.4E-05	---	---	---	---	2.3E-04
Beryllium	7.7E-04	9.2E-05	1.9E-04	8.0E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	2.3E-06	---	---	---	---	3.4E-02
Chromium (Total)	6.9E-03	3.4E-04	1.2E-02	1.8E-02	4.7E-05	---	---	---	---	3.8E-02
Cobalt	5.2E-04	3.4E-05	3.6E-04	3.1E-04	3.5E-06	---	---	---	---	1.2E-03
Copper	2.5E-03	2.7E-03	7.8E-03	3.7E-02	1.9E-05	---	---	---	---	5.0E-02
Lead	2.0E-03	3.2E-05	5.5E-03	1.3E-02	5.2E-06	---	---	---	---	2.1E-02
Manganese	2.4E-04	8.7E-04	8.9E-05	2.6E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	4.9E-04	1.2E-02	2.6E-03	2.9E-03	5.6E-06	---	---	---	---	1.8E-02
Nickel	6.0E-03	1.3E-03	3.6E-02	2.9E-02	4.1E-05	---	---	---	---	7.2E-02
Selenium	2.6E-03	9.4E-04	1.4E-02	6.5E-02	7.9E-05	---	---	---	---	8.2E-02
Thallium	8.5E-03	6.5E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.7E-02
Uranium	3.9E-04	8.1E-06	7.2E-05	2.4E-05	1.4E-06	---	---	---	---	4.9E-04
Vanadium	3.5E-03	1.7E-04	8.4E-04	1.2E-03	1.5E-05	---	---	---	---	5.7E-03
Zinc	5.7E-04	4.5E-04	1.6E-02	2.7E-02	6.9E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.0E-03	2.6E-03	---	---	2.3E-05	---	---	---	---	4.6E-03
Arsenic	9.8E-03	1.0E-02	---	---	5.6E-05	---	---	---	---	2.0E-02
Barium	1.8E-04	6.6E-03	---	---	1.5E-05	---	---	---	---	6.8E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.0E-02
Cadmium	2.6E-03	2.1E-02	---	---	2.5E-06	---	---	---	---	2.4E-02
Chromium (Total)	4.1E-02	4.0E-02	---	---	5.2E-05	---	---	---	---	8.1E-02
Cobalt	3.1E-03	4.0E-03	---	---	3.9E-06	---	---	---	---	7.1E-03
Copper	1.5E-02	1.2E-01	---	---	2.1E-05	---	---	---	---	1.3E-01
Lead	1.2E-02	8.5E-03	---	---	5.7E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.0E-02	---	---	1.2E-04	---	---	---	---	3.1E-02
Molybdenum	2.2E-03	2.6E-01	---	---	4.8E-06	---	---	---	---	2.6E-01
Nickel	3.6E-02	5.5E-02	---	---	4.5E-05	---	---	---	---	9.0E-02
Selenium	1.5E-02	7.1E-02	---	---	8.8E-05	---	---	---	---	8.6E-02
Thallium	3.8E-02	8.1E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.3E-04	---	---	1.2E-06	---	---	---	---	2.6E-03
Vanadium	2.1E-02	2.2E-02	---	---	1.6E-05	---	---	---	---	4.3E-02
Zinc	3.4E-03	4.8E-02	---	---	7.7E-06	---	---	---	---	5.1E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-04	3.2E-03	---	---	4.2E-05	---	---	---	---	4.0E-03
Arsenic	1.4E-03	4.7E-03	---	---	3.7E-05	---	---	---	---	6.1E-03
Barium	2.6E-05	3.0E-03	---	---	1.0E-05	---	---	---	---	3.0E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.2E-02
Cadmium	3.6E-04	9.6E-03	---	---	1.7E-06	---	---	---	---	9.9E-03
Chromium (Total)	5.8E-03	1.8E-02	---	---	3.5E-05	---	---	---	---	2.4E-02
Cobalt	4.4E-04	1.8E-03	---	---	2.6E-06	---	---	---	---	2.2E-03
Copper	2.1E-03	5.3E-02	---	---	1.4E-05	---	---	---	---	5.5E-02
Lead	1.7E-03	3.8E-03	---	---	3.8E-06	---	---	---	---	5.5E-03
Manganese	2.0E-04	1.3E-02	---	---	8.3E-05	---	---	---	---	1.4E-02
Molybdenum	8.6E-04	3.2E-01	---	---	8.7E-06	---	---	---	---	3.2E-01
Nickel	5.1E-03	2.5E-02	---	---	3.0E-05	---	---	---	---	3.0E-02
Selenium	2.1E-03	3.2E-02	---	---	5.8E-05	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.8E-04	1.0E-03	---	---	2.2E-06	---	---	---	---	1.7E-03
Vanadium	3.0E-03	9.9E-03	---	---	1.1E-05	---	---	---	---	1.3E-02
Zinc	4.8E-04	2.2E-02	---	---	5.1E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.6E-03	1.4E-03	8.6E-03	---	1.9E-05	---	---	---	---	1.5E-02
Barium	3.6E-04	3.1E-03	3.4E-04	---	2.2E-05	---	---	---	---	3.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.8E-03	7.8E-03	1.8E-01	---	1.3E-06	---	---	---	---	1.9E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	3.6E-02	1.8E-01	2.1E-01	---	3.6E-05	---	---	---	---	4.2E-01
Lead	6.9E-02	5.0E-03	3.4E-01	---	2.3E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	1.2E-04	1.4E-02	1.2E-03	---	1.9E-07	---	---	---	---	1.6E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	1.6E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	6.1E-05	---	---	---	---	1.9E-01
Thallium	2.4E-03	8.7E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.5E-03
Uranium	1.5E-04	1.5E-05	5.3E-05	---	7.7E-08	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	2.8E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.2E-05	---	---	---	---	4.3E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.3E-03	2.6E-02	---	5.6E-05	---	---	---	---	4.4E-02
Barium	1.1E-03	9.3E-03	1.0E-03	---	6.6E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.5E-03	2.3E-02	5.4E-01	---	3.9E-06	---	---	---	---	5.7E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	1.1E-01	5.3E-01	6.2E-01	---	1.1E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.0E-03	3.4E-01	---	2.3E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	3.7E-04	4.3E-02	3.7E-03	---	5.8E-07	---	---	---	---	4.7E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	1.6E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	6.1E-05	---	---	---	---	1.9E-01
Thallium	7.3E-03	2.6E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.5E-05	5.3E-05	---	7.7E-08	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	2.8E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.2E-05	---	---	---	---	4.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.6E-04	---	---	5.4E-05	4.8E-06	3.5E-04	---	---	4.3E-04	1.0E-03
Barium	1.7E-05	---	---	1.2E-04	7.5E-06	8.8E-05	---	---	7.6E-04	9.9E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	3.4E-07	1.6E-04	---	---	6.7E-04	3.9E-03
Chromium (Total)	2.6E-03	---	---	1.3E-02	1.7E-05	4.7E-03	---	---	1.1E-03	2.1E-02
Cobalt	6.4E-04	---	---	7.0E-04	4.2E-06	1.3E-03	---	---	5.5E-04	3.2E-03
Copper	1.7E-03	---	---	4.7E-02	1.2E-05	2.3E-03	---	---	4.3E-02	9.4E-02
Lead	2.5E-03	---	---	2.9E-02	6.1E-06	5.3E-03	---	---	1.5E-03	3.9E-02
Manganese	2.9E-05	---	---	5.8E-05	1.3E-05	1.5E-04	---	---	3.5E-04	6.1E-04
Molybdenum	6.0E-06	---	---	6.6E-05	6.7E-08	1.2E-05	---	---	9.7E-05	1.8E-04
Nickel	6.4E-04	---	---	5.7E-03	4.2E-06	1.2E-03	---	---	4.6E-04	8.0E-03
Selenium	5.3E-04	---	---	2.5E-02	1.6E-05	9.4E-04	---	---	7.0E-02	9.6E-02
Thallium	2.4E-04	---	---	1.4E-03	2.9E-06	4.8E-04	---	---	3.0E-03	5.1E-03
Uranium	7.7E-06	---	---	8.9E-07	2.8E-08	1.3E-05	---	---	4.5E-06	2.6E-05
Vanadium	1.8E-02	---	---	1.1E-02	7.2E-05	3.2E-02	---	---	1.5E-02	7.6E-02
Zinc	2.7E-04	---	---	2.4E-02	3.2E-06	6.5E-04	---	---	5.5E-02	8.1E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.4E-03	9.4E-05	8.4E-02	---	9.0E-05	---	---	---	---	9.4E-02
Barium	7.5E-04	2.1E-04	3.4E-03	---	1.1E-04	---	---	---	---	4.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	6.3E-06	---	---	---	---	**1.8E+00**
Chromium (Total)	5.0E-02	3.6E-04	7.6E-01	---	1.1E-04	---	---	---	---	8.1E-01
Cobalt	1.2E-02	1.2E-04	7.3E-02	---	2.6E-05	---	---	---	---	8.6E-02
Copper	7.5E-02	1.2E-02	**2.0E+00**	---	1.8E-04	---	---	---	---	**2.1E+00**
Lead	4.7E-02	1.1E-04	**1.1E+00**	---	3.8E-05	---	---	---	---	**1.2E+00**
Manganese	5.4E-04	3.0E-04	1.8E-03	---	8.2E-05	---	---	---	---	2.7E-03
Molybdenum	2.6E-04	9.4E-04	1.2E-02	---	9.3E-07	---	---	---	---	1.3E-02
Nickel	1.2E-02	4.0E-04	6.4E-01	---	2.6E-05	---	---	---	---	6.5E-01
Selenium	1.0E-02	5.5E-04	4.9E-01	---	9.8E-05	---	---	---	---	5.0E-01
Thallium	4.9E-03	5.6E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.6E-02
Uranium	1.1E-04	3.3E-07	1.7E-04	---	1.2E-07	---	---	---	---	2.8E-04
Vanadium	3.4E-01	2.4E-03	7.1E-01	---	4.5E-04	---	---	---	---	**1.1E+00**
Zinc	5.2E-03	6.1E-04	**1.3E+00**	---	2.0E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	7.0E-06	9.2E-04	2.8E-04	5.4E-03	1.0E-03	7.6E-03
Barium	---	---	---	---	8.4E-06	1.7E-04	3.7E-05	3.8E-04	1.4E-03	2.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	4.9E-07	4.1E-04	4.9E-05	7.6E-03	1.6E-03	9.7E-03
Chromium (Total)	---	---	---	---	2.5E-05	1.2E-02	7.4E-04	3.5E-02	2.6E-03	5.1E-02
Cobalt	---	---	---	---	6.1E-06	3.3E-03	2.9E-04	1.3E-04	1.3E-03	5.0E-03
Copper	---	---	---	---	1.4E-05	4.5E-03	1.5E-03	1.2E-01	7.8E-02	2.0E-01
Lead	---	---	---	---	8.9E-06	1.4E-02	5.8E-04	2.0E-02	3.5E-03	3.8E-02
Manganese	---	---	---	---	1.9E-05	3.9E-04	2.2E-04	9.7E-04	8.3E-04	2.4E-03
Molybdenum	---	---	---	---	7.3E-08	2.3E-05	7.9E-05	1.9E-04	1.7E-04	4.6E-04
Nickel	---	---	---	---	6.2E-06	3.0E-03	5.7E-04	6.9E-03	1.1E-03	1.2E-02
Selenium	---	---	---	---	2.3E-05	2.4E-03	4.9E-04	2.5E-02	1.7E-01	1.9E-01
Thallium	---	---	---	---	3.2E-06	9.4E-04	1.2E-03	3.0E-03	5.3E-03	1.0E-02
Uranium	---	---	---	---	3.0E-08	2.6E-05	9.8E-06	7.0E-06	7.9E-06	5.1E-05
Vanadium	---	---	---	---	1.1E-04	8.2E-02	1.5E-02	2.4E-02	3.6E-02	1.6E-01
Zinc	---	---	---	---	4.7E-06	1.7E-03	5.8E-04	4.2E-02	1.3E-01	1.7E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	9.0E-06	1.2E-03	2.0E-03	8.5E-02	---	8.8E-02
Barium	---	---	---	---	1.1E-05	2.3E-04	2.6E-04	6.1E-03	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	6.3E-07	5.3E-04	3.4E-04	1.2E-01	---	1.2E-01
Chromium (Total)	---	---	---	---	3.2E-05	1.6E-02	5.2E-03	5.6E-01	---	5.8E-01
Cobalt	---	---	---	---	7.8E-06	4.3E-03	2.0E-03	2.0E-03	---	8.4E-03
Copper	---	---	---	---	1.8E-05	5.8E-03	1.0E-02	**1.8E+00**	---	**1.8E+00**
Lead	---	---	---	---	1.1E-05	1.8E-02	4.0E-03	3.2E-01	---	3.4E-01
Manganese	---	---	---	---	2.5E-05	5.1E-04	1.6E-03	1.5E-02	---	1.7E-02
Molybdenum	---	---	---	---	9.4E-08	2.9E-05	5.5E-04	3.0E-03	---	3.6E-03
Nickel	---	---	---	---	7.9E-06	3.9E-03	4.0E-03	1.1E-01	---	1.2E-01
Selenium	---	---	---	---	3.0E-05	3.2E-03	3.5E-03	3.9E-01	---	4.0E-01
Thallium	---	---	---	---	3.4E-06	1.0E-03	7.2E-03	3.9E-02	---	4.8E-02
Uranium	---	---	---	---	3.7E-08	3.2E-05	6.6E-05	1.1E-04	---	2.0E-04
Vanadium	---	---	---	---	1.3E-04	1.1E-01	1.0E-01	3.8E-01	---	5.9E-01
Zinc	---	---	---	---	6.0E-06	2.2E-03	4.1E-03	6.5E-01	---	6.6E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-05	3.0E-05	2.7E-04	---	7.6E-06	1.5E-03	1.1E-02	4.1E-02	---	5.3E-02
Barium	7.7E-06	6.6E-05	1.1E-05	---	9.0E-06	2.8E-04	1.4E-03	2.9E-03	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	5.3E-07	6.6E-04	1.8E-03	5.8E-02	---	6.6E-02
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.4E-03	1.1E-02	9.7E-04	---	1.9E-02
Copper	7.7E-04	3.8E-03	6.6E-03	---	1.5E-05	7.3E-03	5.5E-02	8.8E-01	---	9.5E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	9.5E-06	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	2.6E-06	3.0E-04	3.9E-05	---	7.9E-08	3.7E-05	3.0E-03	1.4E-03	---	4.8E-03
Nickel	3.8E-04	3.8E-04	6.2E-03	---	6.6E-06	4.9E-03	2.2E-02	5.2E-02	---	8.6E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.5E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	1.0E-04	3.6E-05	7.5E-05	---	3.3E-06	1.4E-03	4.5E-02	2.2E-02	---	6.8E-02
Uranium	3.3E-06	3.2E-07	1.7E-06	---	3.1E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.1E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.0E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.9E-04	9.1E-05	8.2E-04	---	2.3E-05	4.5E-03	3.2E-02	1.2E-01	---	1.6E-01
Barium	2.3E-05	2.0E-04	3.3E-05	---	2.7E-05	8.5E-04	4.2E-03	8.7E-03	---	1.4E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	1.6E-06	2.0E-03	5.5E-03	1.7E-01	---	2.0E-01
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.4E-03	1.1E-02	9.7E-04	---	1.9E-02
Copper	2.3E-03	1.1E-02	2.0E-02	---	4.4E-05	2.2E-02	1.6E-01	**2.6E+00**	---	**2.9E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	9.5E-06	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	7.9E-06	9.1E-04	1.2E-04	---	2.4E-07	1.1E-04	8.9E-03	4.3E-03	---	1.4E-02
Nickel	3.8E-04	3.8E-04	6.2E-03	---	6.6E-06	4.9E-03	2.2E-02	5.2E-02	---	8.6E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.5E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	4.3E-03	1.3E-01	6.5E-02	---	2.0E-01
Uranium	3.3E-06	3.2E-07	1.7E-06	---	3.1E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.1E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.0E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.9E-04	---	---	1.3E-04	7.8E-06	---	---	---	---	5.3E-04
Barium	3.1E-05	---	---	2.2E-04	9.3E-06	---	---	---	---	2.6E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	5.4E-07	---	---	---	---	7.4E-03
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	3.1E-03	---	---	8.6E-02	1.5E-05	---	---	---	---	8.9E-02
Lead	5.9E-03	---	---	7.0E-02	9.8E-06	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.3E-04
Molybdenum	1.1E-05	---	---	1.2E-04	8.1E-08	---	---	---	---	1.3E-04
Nickel	1.5E-03	---	---	1.4E-02	6.8E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.6E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	3.2E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.2E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	5.2E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	3.9E-04	2.3E-05	---	---	---	---	1.6E-03
Barium	9.4E-05	---	---	6.5E-04	2.8E-05	---	---	---	---	7.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	9.4E-03	---	---	2.6E-01	4.6E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	9.8E-06	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.3E-04
Molybdenum	3.2E-05	---	---	3.5E-04	2.4E-07	---	---	---	---	3.9E-04
Nickel	1.5E-03	---	---	1.4E-02	6.8E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.6E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.8E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	3.2E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.2E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	5.2E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.9E-03	---	6.8E-04	9.4E-04	3.5E-05	---	---	---	---	3.6E-03
Barium	1.5E-04	---	2.7E-05	1.6E-03	4.2E-05	---	---	---	---	1.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.4E-02	5.3E-02	2.4E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.0E-02	---	6.2E-03	7.5E-02	4.2E-05	---	---	---	---	9.1E-02
Cobalt	2.5E-03	---	5.9E-04	4.1E-03	1.0E-05	---	---	---	---	7.1E-03
Copper	1.5E-02	---	1.7E-02	6.3E-01	6.9E-05	---	---	---	---	6.6E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	1.5E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.4E-04	3.2E-05	---	---	---	---	5.0E-04
Molybdenum	5.2E-05	---	9.8E-05	8.6E-04	3.6E-07	---	---	---	---	1.0E-03
Nickel	2.5E-03	---	5.2E-03	3.3E-02	1.0E-05	---	---	---	---	4.1E-02
Selenium	2.0E-03	---	4.0E-03	1.4E-01	3.8E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.1E-05	---	1.4E-06	3.7E-06	4.8E-08	---	---	---	---	2.7E-05
Vanadium	6.9E-02	---	5.8E-03	6.4E-02	1.7E-04	---	---	---	---	1.4E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	7.8E-06	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.0E-02	---	2.4E-05	1.6E-03	3.3E-03	9.7E-02	2.7E-04	1.1E-01
Barium	9.2E-05	---	4.2E-04	---	2.8E-05	3.1E-04	4.5E-04	6.9E-03	3.6E-04	8.5E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	1.7E-06	7.2E-04	5.8E-04	1.4E-01	4.2E-04	3.6E-01
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	5.8E-03	3.5E-03	2.3E-03	3.5E-04	4.4E-02
Copper	9.2E-03	---	2.5E-01	---	4.6E-05	7.9E-03	1.7E-02	**2.1E+00**	2.1E-02	**2.4E+00**
Lead	1.7E-02	---	4.1E-01	---	3.0E-05	2.4E-02	6.9E-03	3.6E-01	9.3E-04	8.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	3.1E-05	---	1.5E-03	---	2.5E-07	4.0E-05	9.4E-04	3.4E-03	4.6E-05	6.0E-03
Nickel	4.5E-03	---	2.4E-01	---	2.1E-05	5.3E-03	6.8E-03	1.2E-01	2.9E-04	3.8E-01
Selenium	3.7E-03	---	1.8E-01	---	7.8E-05	4.3E-03	5.9E-03	4.4E-01	4.4E-02	6.8E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	7.7E-04	6.9E-03	2.5E-02	6.5E-04	3.6E-02
Uranium	3.9E-05	---	6.4E-05	---	9.8E-08	4.3E-05	1.1E-04	1.2E-04	2.0E-06	3.8E-04
Vanadium	1.3E-01	---	2.6E-01	---	3.5E-04	1.4E-01	1.8E-01	4.3E-01	9.5E-03	**1.2E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.6E-05	3.0E-03	7.0E-03	7.4E-01	3.5E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.5E-03	---	3.1E-02	---	7.1E-05	4.9E-03	1.0E-02	2.9E-01	8.0E-04	3.4E-01
Barium	2.7E-04	---	1.2E-03	---	8.5E-05	9.2E-04	1.3E-03	2.1E-02	1.1E-03	2.6E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	5.0E-06	2.2E-03	1.7E-03	4.1E-01	1.3E-03	**1.1E+00**
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	5.8E-03	3.5E-03	2.3E-03	3.5E-04	4.4E-02
Copper	2.8E-02	---	7.6E-01	---	1.4E-04	2.4E-02	5.2E-02	**6.2E+00**	6.2E-02	**7.2E+00**
Lead	1.7E-02	---	4.1E-01	---	3.0E-05	2.4E-02	6.9E-03	3.6E-01	9.3E-04	8.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	9.4E-05	---	4.5E-03	---	7.4E-07	1.2E-04	2.8E-03	1.0E-02	1.4E-04	1.8E-02
Nickel	4.5E-03	---	2.4E-01	---	2.1E-05	5.3E-03	6.8E-03	1.2E-01	2.9E-04	3.8E-01
Selenium	3.7E-03	---	1.8E-01	---	7.8E-05	4.3E-03	5.9E-03	4.4E-01	4.4E-02	6.8E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.3E-03	2.1E-02	7.6E-02	2.0E-03	1.1E-01
Uranium	3.9E-05	---	6.4E-05	---	9.8E-08	4.3E-05	1.1E-04	1.2E-04	2.0E-06	3.8E-04
Vanadium	1.3E-01	---	2.6E-01	---	3.5E-04	1.4E-01	1.8E-01	4.3E-01	9.5E-03	**1.2E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.6E-05	3.0E-03	7.0E-03	7.4E-01	3.5E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.5E-04	2.2E-03	4.1E-04	---	9.5E-06	---	---	---	---	3.5E-03
Barium	6.8E-05	6.0E-03	1.6E-05	---	1.1E-05	---	---	---	---	6.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.4E-04	7.6E-03	8.7E-03	---	6.7E-07	---	---	---	---	1.7E-02
Chromium (Total)	1.4E-02	3.2E-02	1.1E-02	---	3.4E-05	---	---	---	---	5.7E-02
Cobalt	3.3E-03	1.0E-02	1.1E-03	---	8.3E-06	---	---	---	---	1.5E-02
Copper	6.8E-03	1.5E-01	9.9E-03	---	1.9E-05	---	---	---	---	1.6E-01
Lead	1.3E-02	2.1E-02	1.6E-02	---	1.2E-05	---	---	---	---	5.0E-02
Manganese	1.5E-04	9.1E-03	2.6E-05	---	2.6E-05	---	---	---	---	9.3E-03
Molybdenum	2.3E-05	8.3E-03	5.9E-05	---	9.9E-08	---	---	---	---	8.4E-03
Nickel	3.3E-03	1.4E-02	9.3E-03	---	8.3E-06	---	---	---	---	2.7E-02
Selenium	2.7E-03	3.3E-02	7.2E-03	---	3.1E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.8E-03	9.4E-05	---	3.5E-06	---	---	---	---	4.7E-03
Uranium	2.9E-05	3.3E-05	2.5E-06	---	3.9E-08	---	---	---	---	6.4E-05
Vanadium	9.3E-02	2.4E-01	1.0E-02	---	1.4E-04	---	---	---	---	3.4E-01
Zinc	1.4E-03	5.0E-02	1.9E-02	---	6.3E-06	---	---	---	---	7.0E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	9.0E-04	2.3E-03	2.2E-03	1.8E-05	1.6E-04	1.5E-04	---	---	4.6E-04	6.2E-03
Arsenic	1.6E-03	2.6E-03	7.2E-04	1.1E-04	2.9E-04	3.4E-04	---	---	1.7E-03	7.3E-03
Barium	3.1E-05	1.5E-03	7.0E-06	4.3E-05	1.1E-05	8.0E-06	---	---	7.2E-05	1.7E-03
Beryllium	1.5E-03	8.6E-03	1.7E-04	5.8E-04	1.6E-04	4.0E-04	---	---	2.3E-03	1.4E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	1.7E-06	5.2E-05	---	---	2.2E-04	2.0E-02
Chromium (Total)	1.1E-02	3.1E-02	8.5E-03	9.4E-03	1.5E-04	6.9E-04	---	---	6.5E-04	6.2E-02
Cobalt	6.3E-04	1.6E-03	1.9E-04	1.4E-04	7.2E-06	8.5E-05	---	---	6.2E-05	2.7E-03
Copper	2.5E-03	3.8E-02	3.3E-03	1.3E-02	4.2E-05	2.3E-04	---	---	9.5E-03	6.7E-02
Lead	1.9E-03	1.6E-03	2.3E-03	4.6E-03	6.1E-06	2.3E-04	---	---	9.8E-05	1.1E-02
Manganese	2.3E-04	1.1E-02	3.8E-05	9.4E-05	8.4E-05	6.4E-05	---	---	1.5E-04	1.1E-02
Molybdenum	9.6E-04	2.8E-01	2.3E-03	2.1E-03	6.4E-04	2.8E-04	---	---	6.1E-02	3.4E-01
Nickel	1.6E-02	8.4E-02	4.2E-02	1.6E-02	4.2E-04	2.9E-03	---	---	3.0E-03	1.6E-01
Selenium	2.4E-03	1.7E-02	5.9E-03	2.3E-02	3.6E-04	2.3E-04	---	---	1.0E-01	1.5E-01
Thallium	1.7E-02	4.4E-02	2.0E-03	1.9E-02	1.6E-04	1.8E-03	---	---	1.1E-02	9.4E-02
Uranium	7.5E-04	4.7E-04	6.2E-05	1.7E-05	2.9E-04	7.1E-04	---	---	3.1E-03	5.4E-03
Vanadium	3.6E-03	5.7E-03	3.7E-04	4.4E-04	9.4E-05	5.3E-04	---	---	1.3E-03	1.2E-02
Zinc	5.4E-04	1.1E-02	6.8E-03	9.5E-03	1.2E-05	6.9E-05	---	---	1.4E-02	4.1E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	2.4E-05	5.4E-04	---	1.0E-04	1.5E-03	2.3E-03
Arsenic	6.0E-04	---	---	2.0E-04	1.3E-04	3.8E-03	---	3.2E-02	1.6E-02	5.3E-02
Barium	1.1E-05	---	---	8.0E-05	5.0E-06	8.9E-05	---	3.3E-04	7.0E-04	1.2E-03
Beryllium	1.9E-04	---	---	3.6E-04	2.5E-05	1.5E-03	---	5.3E-03	7.5E-03	1.5E-02
Cadmium	1.5E-04	---	---	6.9E-03	7.9E-07	5.8E-04	---	1.8E-02	2.2E-03	2.8E-02
Chromium (Total)	4.1E-03	---	---	1.8E-02	7.1E-05	7.6E-03	---	3.5E-02	6.3E-03	7.0E-02
Cobalt	2.3E-04	---	---	2.6E-04	3.3E-06	9.4E-04	---	6.0E-05	6.0E-04	2.1E-03
Copper	9.4E-04	---	---	2.4E-02	1.9E-05	2.6E-03	---	9.0E-02	9.2E-02	2.1E-01
Lead	7.2E-04	---	---	8.5E-03	2.8E-06	2.6E-03	---	6.2E-03	9.5E-04	1.9E-02
Manganese	8.6E-05	---	---	1.8E-04	3.9E-05	7.1E-04	---	2.9E-03	1.4E-03	5.3E-03
Molybdenum	1.2E-04	---	---	1.3E-03	9.8E-05	1.0E-03	---	1.4E-02	2.0E-01	2.1E-01
Nickel	5.8E-03	---	---	3.0E-02	1.9E-04	3.2E-02	---	7.9E-02	2.9E-02	1.8E-01
Selenium	9.0E-04	---	---	4.2E-02	1.7E-04	2.6E-03	---	4.4E-02	1.0E+00	**1.1E+00**
Thallium	2.1E-03	---	---	1.2E-02	2.5E-05	6.5E-03	---	3.4E-02	3.5E-02	8.9E-02
Uranium	9.2E-05	---	---	1.1E-05	4.4E-05	2.6E-03	---	1.2E-03	9.9E-03	1.4E-02
Vanadium	1.3E-03	---	---	8.1E-04	4.3E-05	5.9E-03	---	2.8E-03	1.3E-02	2.3E-02
Zinc	2.0E-04	---	---	1.8E-02	5.6E-06	7.7E-04	---	3.1E-02	1.3E-01	1.8E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.8E-04	---	---	1.3E-04	6.1E-04	7.6E-04	---	---	1.9E-03
Arsenic	4.3E-04	3.7E-04	---	---	3.2E-04	1.9E-03	5.4E-03	---	---	8.4E-03
Barium	8.2E-06	2.3E-04	---	---	1.2E-05	4.4E-05	9.0E-05	---	---	3.9E-04
Beryllium	3.1E-04	1.2E-03	---	---	1.4E-04	1.7E-03	2.5E-03	---	---	5.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	1.9E-06	2.8E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	3.0E-03	4.4E-03	---	---	1.7E-04	3.7E-03	2.2E-03	---	---	1.3E-02
Cobalt	1.7E-04	2.3E-04	---	---	7.9E-06	4.6E-04	3.9E-04	---	---	1.3E-03
Copper	6.7E-04	4.0E-03	---	---	4.6E-05	1.3E-03	4.0E-03	---	---	9.9E-03
Lead	5.1E-04	2.9E-04	---	---	6.8E-06	1.3E-03	5.1E-04	---	---	2.6E-03
Manganese	6.2E-05	9.6E-04	---	---	9.3E-05	3.5E-04	1.9E-03	---	---	3.3E-03
Molybdenum	2.0E-04	1.7E-02	---	---	5.4E-04	1.2E-03	3.9E-02	---	---	5.7E-02
Nickel	4.2E-03	9.4E-03	---	---	4.7E-04	1.6E-02	2.9E-02	---	---	5.9E-02
Selenium	6.5E-04	2.3E-03	---	---	4.0E-04	1.3E-03	2.5E-03	---	---	7.1E-03
Thallium	3.4E-03	5.7E-03	---	---	1.4E-04	7.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.8E-05	---	---	2.5E-04	3.0E-03	1.1E-02	---	---	1.4E-02
Vanadium	9.5E-04	8.8E-04	---	---	1.0E-04	2.9E-03	5.0E-03	---	---	9.8E-03
Zinc	1.5E-04	1.6E-03	---	---	1.3E-05	3.8E-04	1.2E-03	---	---	3.4E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.4E-04	---	---	7.9E-05	1.1E-04	---	---	---	---	6.3E-04
Arsenic	1.4E-03	---	---	8.2E-04	3.6E-04	---	---	---	---	2.5E-03
Barium	2.6E-05	---	---	3.3E-04	1.4E-05	---	---	---	---	3.7E-04
Beryllium	7.4E-04	---	---	2.6E-03	1.2E-04	---	---	---	---	3.5E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	1.9E-04	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	8.9E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	5.2E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	7.7E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	4.7E-04	---	---	9.5E-03	4.6E-04	---	---	---	---	1.0E-02
Nickel	1.3E-02	---	---	1.3E-01	5.2E-04	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	4.5E-04	---	---	---	---	1.8E-01
Thallium	8.1E-03	---	---	8.4E-02	1.2E-04	---	---	---	---	9.2E-02
Uranium	3.6E-04	---	---	7.7E-05	2.1E-04	---	---	---	---	6.5E-04
Vanadium	3.0E-03	---	---	3.4E-03	1.2E-04	---	---	---	---	6.5E-03
Zinc	4.6E-04	---	---	7.4E-02	1.5E-05	---	---	---	---	7.5E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.4E-04	3.4E-04	---	---	---	---	1.9E-03
Arsenic	1.4E-03	---	---	8.2E-04	3.6E-04	---	---	---	---	2.5E-03
Barium	2.6E-05	---	---	3.3E-04	1.4E-05	---	---	---	---	3.7E-04
Beryllium	7.4E-04	---	---	2.6E-03	1.2E-04	---	---	---	---	3.5E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	1.9E-04	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	8.9E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	5.2E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	7.7E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.4E-03	---	---	---	---	3.1E-02
Nickel	1.3E-02	---	---	1.3E-01	5.2E-04	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	4.5E-04	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.8E-01
Uranium	1.1E-03	---	---	2.3E-04	6.3E-04	---	---	---	---	2.0E-03
Vanadium	3.0E-03	---	---	3.4E-03	1.2E-04	---	---	---	---	6.5E-03
Zinc	4.6E-04	---	---	7.4E-02	1.5E-05	---	---	---	---	7.5E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.9E-03	3.6E-03	---	---	5.3E-04	---	---	---	---	1.0E-02
Arsenic	2.9E-03	1.6E-03	---	---	2.6E-04	---	---	---	---	4.7E-03
Barium	5.5E-05	9.8E-04	---	---	9.8E-06	---	---	---	---	1.0E-03
Beryllium	3.3E-03	8.1E-03	---	---	1.8E-04	---	---	---	---	1.2E-02
Cadmium	7.2E-04	2.9E-03	---	---	1.5E-06	---	---	---	---	3.6E-03
Chromium (Total)	2.0E-02	1.9E-02	---	---	1.4E-04	---	---	---	---	3.9E-02
Cobalt	1.1E-03	9.7E-04	---	---	6.5E-06	---	---	---	---	2.1E-03
Copper	4.5E-03	1.7E-02	---	---	3.8E-05	---	---	---	---	2.1E-02
Lead	3.4E-03	1.2E-03	---	---	5.6E-06	---	---	---	---	4.6E-03
Manganese	4.1E-04	4.1E-03	---	---	7.6E-05	---	---	---	---	4.5E-03
Molybdenum	6.4E-03	3.4E-01	---	---	2.1E-03	---	---	---	---	3.5E-01
Nickel	2.8E-02	4.0E-02	---	---	3.8E-04	---	---	---	---	6.8E-02
Selenium	4.3E-03	9.8E-03	---	---	3.2E-04	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.2E-01	---	---	5.4E-04	---	---	---	---	2.3E-01
Uranium	4.9E-03	1.2E-03	---	---	9.8E-04	---	---	---	---	7.1E-03
Vanadium	6.3E-03	3.7E-03	---	---	8.5E-05	---	---	---	---	1.0E-02
Zinc	9.6E-04	6.8E-03	---	---	1.1E-05	---	---	---	---	7.8E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.7E-03	5.4E-04	1.3E-01	---	1.1E-04	---	---	---	---	1.3E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	7.6E-04	---	---	---	---	1.8E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	2.9E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	1.1E-04	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	4.5E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	4.1E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	1.9E-05	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	1.1E-04	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.6E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	1.6E-03	2.7E-02	7.1E-02	---	2.4E-04	---	---	---	---	1.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.1E-03	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	9.5E-04	---	---	---	---	**1.3E+00**
Thallium	5.0E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.5E-05	1.9E-03	---	1.1E-04	---	---	---	---	3.3E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	2.5E-04	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	3.2E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-03	1.6E-03	3.8E-01	---	3.4E-04	---	---	---	---	3.9E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	7.6E-04	---	---	---	---	1.8E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	2.9E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	1.1E-04	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	4.5E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	4.1E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	1.9E-05	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	1.1E-04	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.6E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	4.7E-03	8.2E-02	2.1E-01	---	7.3E-04	---	---	---	---	3.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.1E-03	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	9.5E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.9E-04	5.7E-03	---	3.3E-04	---	---	---	---	1.0E-02
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	2.5E-04	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	3.2E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.7E-04	1.4E-03	---	---	1.4E-04	---	---	---	---	2.0E-03
Arsenic	3.1E-03	5.8E-03	---	---	9.3E-04	---	---	---	---	9.9E-03
Barium	6.0E-05	3.4E-03	---	---	3.5E-05	---	---	---	---	3.5E-03
Beryllium	7.9E-04	5.2E-03	---	---	1.4E-04	---	---	---	---	6.1E-03
Cadmium	7.9E-04	1.3E-02	---	---	5.5E-06	---	---	---	---	1.4E-02
Chromium (Total)	2.2E-02	7.0E-02	---	---	5.0E-04	---	---	---	---	9.2E-02
Cobalt	1.2E-03	3.5E-03	---	---	2.3E-05	---	---	---	---	4.8E-03
Copper	4.9E-03	8.4E-02	---	---	1.3E-04	---	---	---	---	8.9E-02
Lead	3.7E-03	3.6E-03	---	---	2.0E-05	---	---	---	---	7.3E-03
Manganese	4.5E-04	2.3E-02	---	---	2.7E-04	---	---	---	---	2.4E-02
Molybdenum	2.8E-04	9.0E-02	---	---	3.1E-04	---	---	---	---	9.1E-02
Nickel	3.0E-02	1.8E-01	---	---	1.4E-03	---	---	---	---	2.2E-01
Selenium	4.7E-03	3.9E-02	---	---	1.2E-03	---	---	---	---	4.4E-02
Thallium	8.7E-03	2.7E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.4E-04	---	---	---	---	5.2E-04
Vanadium	6.9E-03	1.3E-02	---	---	3.0E-04	---	---	---	---	2.0E-02
Zinc	1.1E-03	2.4E-02	---	---	3.9E-05	---	---	---	---	2.5E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.1E-04	3.0E-03	---	---	2.1E-04	3.2E-04	3.9E-03	---	---	8.2E-03
Arsenic	8.2E-04	3.1E-03	---	---	2.4E-04	4.8E-04	1.4E-02	---	---	1.9E-02
Barium	1.6E-05	2.0E-03	---	---	9.1E-06	1.1E-05	2.3E-04	---	---	2.2E-03
Beryllium	1.2E-03	2.0E-02	---	---	2.1E-04	8.8E-04	1.3E-02	---	---	3.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	1.4E-06	7.3E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	5.6E-03	3.7E-02	---	---	1.3E-04	9.7E-04	5.6E-03	---	---	4.9E-02
Cobalt	3.2E-04	1.9E-03	---	---	6.0E-06	1.2E-04	9.9E-04	---	---	3.4E-03
Copper	1.3E-03	3.4E-02	---	---	3.5E-05	3.3E-04	1.0E-02	---	---	4.5E-02
Lead	9.8E-04	2.4E-03	---	---	5.1E-06	3.3E-04	1.3E-03	---	---	5.0E-03
Manganese	1.2E-04	8.1E-03	---	---	7.0E-05	9.0E-05	4.8E-03	---	---	1.3E-02
Molybdenum	7.6E-04	2.8E-01	---	---	8.3E-04	6.1E-04	2.0E-01	---	---	4.9E-01
Nickel	8.0E-03	7.9E-02	---	---	3.5E-04	4.1E-03	7.4E-02	---	---	1.6E-01
Selenium	1.2E-03	1.9E-02	---	---	3.0E-04	3.3E-04	6.3E-03	---	---	2.8E-02
Thallium	1.3E-02	9.6E-02	---	---	2.1E-04	3.8E-03	4.8E-01	---	---	6.0E-01
Uranium	5.9E-04	9.9E-04	---	---	3.8E-04	1.6E-03	5.6E-02	---	---	6.0E-02
Vanadium	1.8E-03	7.4E-03	---	---	7.8E-05	7.4E-04	1.3E-02	---	---	2.3E-02
Zinc	2.8E-04	1.3E-02	---	---	1.0E-05	9.8E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.3E-05	---	---	3.2E-06	1.1E-04	1.0E-03	---	2.3E-04	2.7E-03	4.1E-03
Arsenic	1.0E-04	---	---	3.3E-05	3.6E-04	4.1E-03	---	4.0E-02	1.7E-02	6.2E-02
Barium	2.0E-06	---	---	1.4E-05	1.4E-05	9.6E-05	---	4.2E-04	7.3E-04	1.3E-03
Beryllium	5.5E-05	---	---	1.1E-04	1.2E-04	2.8E-03	---	1.2E-02	1.4E-02	2.8E-02
Cadmium	2.6E-05	---	---	1.2E-03	2.1E-06	6.2E-04	---	2.3E-02	2.3E-03	2.7E-02
Chromium (Total)	7.1E-04	---	---	3.0E-03	1.9E-04	8.2E-03	---	4.4E-02	6.6E-03	6.3E-02
Cobalt	4.0E-05	---	---	4.4E-05	8.9E-06	1.0E-03	---	7.7E-05	6.3E-04	1.8E-03
Copper	1.6E-04	---	---	4.1E-03	5.2E-05	2.8E-03	---	1.1E-01	9.7E-02	2.2E-01
Lead	1.2E-04	---	---	1.5E-03	7.7E-06	2.8E-03	---	7.9E-03	1.0E-03	1.3E-02
Manganese	1.5E-05	---	---	3.0E-05	1.0E-04	7.6E-04	---	3.7E-03	1.5E-03	6.1E-03
Molybdenum	3.5E-05	---	---	3.9E-04	4.6E-04	1.9E-03	---	3.2E-02	3.6E-01	3.9E-01
Nickel	9.9E-04	---	---	5.1E-03	5.2E-04	3.5E-02	---	1.0E-01	3.1E-02	1.7E-01
Selenium	1.5E-04	---	---	7.1E-03	4.5E-04	2.8E-03	---	5.6E-02	**1.1E+00**	**1.1E+00**
Thallium	6.1E-04	---	---	3.4E-03	1.2E-04	1.2E-02	---	7.6E-02	6.3E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	2.1E-04	4.9E-03	---	2.6E-03	1.8E-02	2.6E-02
Vanadium	2.3E-04	---	---	1.4E-04	1.2E-04	6.3E-03	---	3.6E-03	1.3E-02	2.4E-02
Zinc	3.4E-05	---	---	3.0E-03	1.5E-05	8.3E-04	---	4.0E-02	1.4E-01	1.8E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.6E-04	8.7E-05	2.6E-03	2.5E-05	1.0E-04	---	---	---	---	3.3E-03
Arsenic	1.7E-03	1.3E-04	1.7E-03	3.0E-04	3.8E-04	---	---	---	---	4.2E-03
Barium	3.3E-05	6.2E-05	1.7E-05	1.2E-04	1.4E-05	---	---	---	---	2.5E-04
Beryllium	7.8E-04	9.8E-05	2.0E-04	8.1E-04	1.0E-04	---	---	---	---	2.0E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	2.3E-06	---	---	---	---	3.5E-02
Chromium (Total)	1.2E-02	1.6E-03	2.0E-02	2.7E-02	2.1E-04	---	---	---	---	6.1E-02
Cobalt	6.7E-04	7.2E-05	4.6E-04	4.0E-04	9.5E-06	---	---	---	---	1.6E-03
Copper	2.7E-03	2.9E-03	7.9E-03	3.7E-02	5.6E-05	---	---	---	---	5.1E-02
Lead	2.1E-03	3.4E-05	5.5E-03	1.3E-02	8.2E-06	---	---	---	---	2.1E-02
Manganese	2.5E-04	9.0E-04	9.2E-05	2.7E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	5.0E-04	1.2E-02	2.7E-03	3.0E-03	4.1E-04	---	---	---	---	1.9E-02
Nickel	1.7E-02	5.8E-03	9.9E-02	4.6E-02	5.6E-04	---	---	---	---	1.7E-01
Selenium	2.6E-03	9.5E-04	1.4E-02	6.5E-02	4.8E-04	---	---	---	---	8.3E-02
Thallium	8.6E-03	6.8E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.8E-02
Uranium	3.9E-04	8.5E-06	7.2E-05	2.4E-05	1.9E-04	---	---	---	---	6.8E-04
Vanadium	3.8E-03	2.3E-04	8.9E-04	1.3E-03	1.2E-04	---	---	---	---	6.3E-03
Zinc	5.8E-04	4.6E-04	1.6E-02	2.7E-02	1.6E-05	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.1E-03	2.7E-03	---	---	8.7E-05	---	---	---	---	4.9E-03
Arsenic	1.0E-02	1.1E-02	---	---	4.3E-04	---	---	---	---	2.2E-02
Barium	1.9E-04	7.1E-03	---	---	1.6E-05	---	---	---	---	7.3E-03
Beryllium	3.5E-03	1.7E-02	---	---	8.9E-05	---	---	---	---	2.1E-02
Cadmium	2.6E-03	2.1E-02	---	---	2.5E-06	---	---	---	---	2.4E-02
Chromium (Total)	7.0E-02	1.4E-01	---	---	2.3E-04	---	---	---	---	2.1E-01
Cobalt	3.9E-03	7.1E-03	---	---	1.1E-05	---	---	---	---	1.1E-02
Copper	1.6E-02	1.3E-01	---	---	6.2E-05	---	---	---	---	1.4E-01
Lead	1.2E-02	8.6E-03	---	---	9.1E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.1E-02	---	---	1.2E-04	---	---	---	---	3.3E-02
Molybdenum	2.2E-03	2.7E-01	---	---	3.5E-04	---	---	---	---	2.7E-01
Nickel	9.9E-02	3.0E-01	---	---	6.2E-04	---	---	---	---	4.0E-01
Selenium	1.5E-02	7.2E-02	---	---	5.3E-04	---	---	---	---	8.7E-02
Thallium	3.9E-02	8.3E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.6E-04	---	---	1.6E-04	---	---	---	---	2.8E-03
Vanadium	2.2E-02	2.7E-02	---	---	1.4E-04	---	---	---	---	4.9E-02
Zinc	3.4E-03	4.9E-02	---	---	1.8E-05	---	---	---	---	5.2E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.2E-04	3.4E-03	---	---	1.6E-04	---	---	---	---	4.4E-03
Arsenic	1.4E-03	5.1E-03	---	---	2.8E-04	---	---	---	---	6.8E-03
Barium	2.8E-05	3.2E-03	---	---	1.1E-05	---	---	---	---	3.2E-03
Beryllium	1.4E-03	2.1E-02	---	---	1.6E-04	---	---	---	---	2.3E-02
Cadmium	3.6E-04	9.6E-03	---	---	1.7E-06	---	---	---	---	1.0E-02
Chromium (Total)	1.0E-02	6.1E-02	---	---	1.5E-04	---	---	---	---	7.1E-02
Cobalt	5.6E-04	3.2E-03	---	---	7.1E-06	---	---	---	---	3.7E-03
Copper	2.3E-03	5.7E-02	---	---	4.1E-05	---	---	---	---	5.9E-02
Lead	1.7E-03	3.9E-03	---	---	6.1E-06	---	---	---	---	5.6E-03
Manganese	2.1E-04	1.4E-02	---	---	8.3E-05	---	---	---	---	1.4E-02
Molybdenum	8.8E-04	3.3E-01	---	---	6.5E-04	---	---	---	---	3.3E-01
Nickel	1.4E-02	1.3E-01	---	---	4.2E-04	---	---	---	---	1.5E-01
Selenium	2.2E-03	3.2E-02	---	---	3.6E-04	---	---	---	---	3.5E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.9E-04	1.1E-03	---	---	2.9E-04	---	---	---	---	2.0E-03
Vanadium	3.2E-03	1.2E-02	---	---	9.3E-05	---	---	---	---	1.5E-02
Zinc	4.9E-04	2.2E-02	---	---	1.2E-05	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.7E-03	1.6E-03	8.8E-03	---	1.4E-04	---	---	---	---	1.5E-02
Barium	3.9E-04	3.3E-03	3.6E-04	---	2.3E-05	---	---	---	---	4.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.9E-03	7.8E-03	1.8E-01	---	1.3E-06	---	---	---	---	1.9E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	2.9E-04	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	4.3E-05	---	---	---	---	6.2E-02
Copper	3.9E-02	1.9E-01	2.1E-01	---	1.1E-04	---	---	---	---	4.4E-01
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.7E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	1.3E-04	1.4E-02	1.3E-03	---	1.4E-05	---	---	---	---	1.6E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.2E-04	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	3.7E-04	---	---	---	---	1.9E-01
Thallium	2.5E-03	8.9E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.6E-03
Uranium	1.5E-04	1.6E-05	5.3E-05	---	1.0E-05	---	---	---	---	2.3E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	2.4E-03	---	---	---	---	9.2E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	2.9E-05	---	---	---	---	4.4E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.8E-03	2.6E-02	---	4.3E-04	---	---	---	---	4.6E-02
Barium	1.2E-03	1.0E-02	1.1E-03	---	6.9E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.6E-03	2.4E-02	5.5E-01	---	3.9E-06	---	---	---	---	5.8E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	2.9E-04	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	4.3E-05	---	---	---	---	6.2E-02
Copper	1.2E-01	5.7E-01	6.3E-01	---	3.3E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.7E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	3.8E-04	4.3E-02	3.8E-03	---	4.3E-05	---	---	---	---	4.8E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.2E-04	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	3.7E-04	---	---	---	---	1.9E-01
Thallium	7.4E-03	2.7E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.6E-05	5.3E-05	---	1.0E-05	---	---	---	---	2.3E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	2.4E-03	---	---	---	---	9.2E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	2.9E-05	---	---	---	---	4.4E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.7E-04	---	---	5.5E-05	3.7E-05	6.7E-04	---	---	3.3E-03	4.2E-03
Barium	1.8E-05	---	---	1.3E-04	7.8E-06	8.8E-05	---	---	7.9E-04	1.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	3.4E-07	1.6E-04	---	---	6.8E-04	3.9E-03
Chromium (Total)	4.5E-03	---	---	1.9E-02	7.6E-05	5.1E-03	---	---	4.9E-03	3.4E-02
Cobalt	8.1E-04	---	---	8.9E-04	1.1E-05	2.0E-03	---	---	1.5E-03	5.2E-03
Copper	1.8E-03	---	---	4.8E-02	3.7E-05	3.2E-03	---	---	1.3E-01	1.8E-01
Lead	2.5E-03	---	---	3.0E-02	9.7E-06	5.5E-03	---	---	2.4E-03	4.0E-02
Manganese	3.0E-05	---	---	6.1E-05	1.3E-05	1.5E-04	---	---	3.5E-04	6.1E-04
Molybdenum	6.1E-06	---	---	6.7E-05	4.9E-06	3.3E-05	---	---	7.2E-03	7.3E-03
Nickel	1.8E-03	---	---	9.2E-03	5.8E-05	6.1E-03	---	---	6.4E-03	2.3E-02
Selenium	5.3E-04	---	---	2.5E-02	9.7E-05	9.6E-04	---	---	4.3E-01	4.5E-01
Thallium	2.5E-04	---	---	1.4E-03	2.9E-06	4.8E-04	---	---	3.0E-03	5.1E-03
Uranium	7.8E-06	---	---	8.9E-07	3.7E-06	1.4E-04	---	---	5.9E-04	7.4E-04
Vanadium	1.9E-02	---	---	1.2E-02	6.2E-04	5.3E-02	---	---	1.3E-01	2.1E-01
Zinc	2.8E-04	---	---	2.4E-02	7.5E-06	6.6E-04	---	---	1.3E-01	1.5E-01

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-03	1.1E-04	8.6E-02	---	6.9E-04	---	---	---	---	9.7E-02
Barium	8.0E-04	2.2E-04	3.6E-03	---	1.1E-04	---	---	---	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	6.4E-06	---	---	---	---	**1.8E+00**
Chromium (Total)	8.6E-02	1.7E-03	**1.3E+00**	---	4.7E-04	---	---	---	---	**1.4E+00**
Cobalt	1.5E-02	2.5E-04	9.4E-02	---	7.0E-05	---	---	---	---	1.1E-01
Copper	8.0E-02	1.3E-02	**2.1E+00**	---	5.2E-04	---	---	---	---	**2.2E+00**
Lead	4.7E-02	1.2E-04	**1.1E+00**	---	6.0E-05	---	---	---	---	**1.2E+00**
Manganese	5.7E-04	3.1E-04	1.9E-03	---	8.2E-05	---	---	---	---	2.8E-03
Molybdenum	2.6E-04	9.6E-04	1.2E-02	---	6.9E-05	---	---	---	---	1.4E-02
Nickel	3.4E-02	1.7E-03	**1.8E+00**	---	3.6E-04	---	---	---	---	**1.8E+00**
Selenium	1.0E-02	5.6E-04	5.0E-01	---	6.0E-04	---	---	---	---	5.1E-01
Thallium	4.9E-03	5.8E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.7E-02
Uranium	1.1E-04	3.5E-07	1.7E-04	---	1.6E-05	---	---	---	---	3.0E-04
Vanadium	3.7E-01	3.3E-03	7.6E-01	---	3.8E-03	---	---	---	---	**1.1E+00**
Zinc	5.3E-03	6.2E-04	**1.3E+00**	---	4.6E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	5.4E-05	1.7E-03	5.3E-04	8.7E-03	7.7E-03	1.9E-02
Barium	---	---	---	---	8.7E-06	1.7E-04	3.8E-05	3.9E-04	1.4E-03	2.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	5.0E-07	4.1E-04	4.9E-05	7.6E-03	1.6E-03	9.7E-03
Chromium (Total)	---	---	---	---	1.1E-04	1.3E-02	8.1E-04	3.6E-02	1.1E-02	6.2E-02
Cobalt	---	---	---	---	1.6E-05	5.2E-03	4.6E-04	2.0E-04	3.5E-03	9.4E-03
Copper	---	---	---	---	4.1E-05	6.3E-03	2.0E-03	1.3E-01	2.3E-01	3.7E-01
Lead	---	---	---	---	1.4E-05	1.4E-02	6.1E-04	2.1E-02	5.6E-03	4.1E-02
Manganese	---	---	---	---	1.9E-05	3.9E-04	2.2E-04	9.7E-04	8.3E-04	2.4E-03
Molybdenum	---	---	---	---	5.4E-06	6.3E-05	2.2E-04	5.4E-04	1.3E-02	1.4E-02
Nickel	---	---	---	---	8.5E-05	1.6E-02	3.0E-03	2.3E-02	1.5E-02	5.7E-02
Selenium	---	---	---	---	1.4E-04	2.5E-03	5.0E-04	2.5E-02	1.0E+00	1.0E+00
Thallium	---	---	---	---	3.2E-06	9.4E-04	1.2E-03	3.0E-03	5.3E-03	1.0E-02
Uranium	---	---	---	---	4.0E-06	2.7E-04	1.0E-04	7.2E-05	1.1E-03	1.5E-03
Vanadium	---	---	---	---	9.0E-04	1.4E-01	2.5E-02	4.0E-02	3.1E-01	5.1E-01
Zinc	---	---	---	---	1.1E-05	1.7E-03	5.9E-04	4.2E-02	3.1E-01	3.5E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	6.9E-05	2.3E-03	3.7E-03	1.4E-01	---	1.4E-01
Barium	---	---	---	---	1.1E-05	2.3E-04	2.6E-04	6.1E-03	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	6.4E-07	5.3E-04	3.4E-04	1.2E-01	---	1.2E-01
Chromium (Total)	---	---	---	---	1.4E-04	1.7E-02	5.7E-03	5.8E-01	---	6.0E-01
Cobalt	---	---	---	---	2.1E-05	6.8E-03	3.2E-03	3.2E-03	---	1.3E-02
Copper	---	---	---	---	5.3E-05	8.2E-03	1.4E-02	**2.1E+00**	---	**2.1E+00**
Lead	---	---	---	---	1.8E-05	1.9E-02	4.3E-03	3.3E-01	---	3.5E-01
Manganese	---	---	---	---	2.5E-05	5.1E-04	1.6E-03	1.5E-02	---	1.7E-02
Molybdenum	---	---	---	---	6.9E-06	8.2E-05	1.5E-03	8.4E-03	---	1.0E-02
Nickel	---	---	---	---	1.1E-04	2.1E-02	2.1E-02	3.7E-01	---	4.1E-01
Selenium	---	---	---	---	1.8E-04	3.2E-03	3.5E-03	4.0E-01	---	4.0E-01
Thallium	---	---	---	---	3.4E-06	1.0E-03	7.2E-03	3.9E-02	---	4.8E-02
Uranium	---	---	---	---	4.9E-06	3.3E-04	6.8E-04	1.1E-03	---	2.1E-03
Vanadium	---	---	---	---	1.2E-03	1.8E-01	1.7E-01	6.3E-01	---	9.9E-01
Zinc	---	---	---	---	1.4E-05	2.2E-03	4.1E-03	6.6E-01	---	6.6E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.0E-04	3.4E-05	2.8E-04	---	5.8E-05	2.8E-03	2.0E-02	6.6E-02	---	8.9E-02
Barium	8.2E-06	7.1E-05	1.2E-05	---	9.4E-06	2.8E-04	1.4E-03	2.9E-03	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	5.4E-07	6.7E-04	1.8E-03	5.8E-02	---	6.6E-02
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	1.2E-04	2.2E-02	3.1E-02	2.8E-01	---	3.5E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	1.8E-05	8.5E-03	1.7E-02	1.5E-03	---	2.9E-02
Copper	8.2E-04	4.1E-03	6.7E-03	---	4.4E-05	1.0E-02	7.7E-02	9.9E-01	---	**1.1E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.5E-05	2.3E-02	2.3E-02	1.6E-01	---	2.2E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	2.7E-06	3.1E-04	4.0E-05	---	5.8E-06	1.0E-04	8.3E-03	4.0E-03	---	1.3E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	9.1E-05	2.6E-02	1.1E-01	1.8E-01	---	3.4E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	1.5E-04	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	1.0E-04	3.8E-05	7.6E-05	---	3.3E-06	1.4E-03	4.5E-02	2.2E-02	---	6.8E-02
Uranium	3.3E-06	3.4E-07	1.7E-06	---	4.1E-06	4.1E-04	3.6E-03	5.2E-04	---	4.6E-03
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	9.7E-04	2.2E-01	9.4E-01	3.0E-01	---	**1.5E+00**
Zinc	1.6E-04	6.0E-04	1.3E-02	---	1.2E-05	2.8E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.0E-04	1.0E-04	8.4E-04	---	1.7E-04	8.5E-03	6.0E-02	2.0E-01	---	2.7E-01
Barium	2.5E-05	2.1E-04	3.5E-05	---	2.8E-05	8.5E-04	4.3E-03	8.7E-03	---	1.4E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	1.6E-06	2.0E-03	5.5E-03	1.7E-01	---	2.0E-01
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	1.2E-04	2.2E-02	3.1E-02	2.8E-01	---	3.5E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	1.8E-05	8.5E-03	1.7E-02	1.5E-03	---	2.9E-02
Copper	2.5E-03	1.2E-02	2.0E-02	---	1.3E-04	3.1E-02	2.3E-01	**3.0E+00**	---	**3.3E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.5E-05	2.3E-02	2.3E-02	1.6E-01	---	2.2E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	8.1E-06	9.3E-04	1.2E-04	---	1.7E-05	3.1E-04	2.5E-02	1.2E-02	---	3.9E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	9.1E-05	2.6E-02	1.1E-01	1.8E-01	---	3.4E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	1.5E-04	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	4.3E-03	1.3E-01	6.5E-02	---	2.0E-01
Uranium	3.3E-06	3.4E-07	1.7E-06	---	4.1E-06	4.1E-04	3.6E-03	5.2E-04	---	4.6E-03
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	9.7E-04	2.2E-01	9.4E-01	3.0E-01	---	**1.5E+00**
Zinc	1.6E-04	6.0E-04	1.3E-02	---	1.2E-05	2.8E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.0E-04	---	---	1.3E-04	6.0E-05	---	---	---	---	6.0E-04
Barium	3.3E-05	---	---	2.3E-04	9.6E-06	---	---	---	---	2.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	5.5E-07	---	---	---	---	7.4E-03
Chromium (Total)	1.1E-02	---	---	4.5E-02	1.2E-04	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	1.8E-05	---	---	---	---	4.1E-03
Copper	3.3E-03	---	---	8.6E-02	4.6E-05	---	---	---	---	9.0E-02
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.4E-04
Molybdenum	1.1E-05	---	---	1.2E-04	6.0E-06	---	---	---	---	1.4E-04
Nickel	4.2E-03	---	---	2.2E-02	9.4E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	1.6E-04	---	---	---	---	6.1E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-06	---	---	---	---	1.9E-05
Vanadium	4.6E-02	---	---	2.8E-02	1.0E-03	---	---	---	---	7.5E-02
Zinc	6.6E-04	---	---	5.8E-02	1.2E-05	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	4.0E-04	1.8E-04	---	---	---	---	1.8E-03
Barium	9.9E-05	---	---	6.9E-04	2.9E-05	---	---	---	---	8.2E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	1.7E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.1E-02	---	---	4.5E-02	1.2E-04	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	1.8E-05	---	---	---	---	4.1E-03
Copper	1.0E-02	---	---	2.6E-01	1.4E-04	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.4E-04
Molybdenum	3.3E-05	---	---	3.6E-04	1.8E-05	---	---	---	---	4.1E-04
Nickel	4.2E-03	---	---	2.2E-02	9.4E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	1.6E-04	---	---	---	---	6.1E-02
Thallium	1.2E-03	---	---	6.9E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-06	---	---	---	---	1.9E-05
Vanadium	4.6E-02	---	---	2.8E-02	1.0E-03	---	---	---	---	7.5E-02
Zinc	6.6E-04	---	---	5.8E-02	1.2E-05	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.0E-03	---	7.0E-04	9.7E-04	2.7E-04	---	---	---	---	3.9E-03
Barium	1.6E-04	---	2.9E-05	1.7E-03	4.3E-05	---	---	---	---	1.9E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.5E-02	5.3E-02	2.5E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.7E-02	---	1.1E-02	1.1E-01	1.8E-04	---	---	---	---	1.4E-01
Cobalt	3.1E-03	---	7.6E-04	5.2E-03	2.7E-05	---	---	---	---	9.1E-03
Copper	1.6E-02	---	1.7E-02	6.3E-01	2.1E-04	---	---	---	---	6.7E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.3E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.5E-04	3.2E-05	---	---	---	---	5.1E-04
Molybdenum	5.3E-05	---	1.0E-04	8.8E-04	2.7E-05	---	---	---	---	1.1E-03
Nickel	6.9E-03	---	1.4E-02	5.3E-02	1.4E-04	---	---	---	---	7.5E-02
Selenium	2.1E-03	---	4.0E-03	1.4E-01	2.3E-04	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.2E-05	---	1.4E-06	3.7E-06	6.4E-06	---	---	---	---	3.3E-05
Vanadium	7.4E-02	---	6.2E-03	6.9E-02	1.5E-03	---	---	---	---	1.5E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	1.8E-05	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.1E-02	---	1.8E-04	3.1E-03	6.3E-03	1.6E-01	2.0E-03	1.8E-01
Barium	9.7E-05	---	4.4E-04	---	2.9E-05	3.1E-04	4.5E-04	6.9E-03	3.8E-04	8.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	1.7E-06	7.2E-04	5.8E-04	1.4E-01	4.2E-04	3.6E-01
Chromium (Total)	3.1E-02	---	4.8E-01	---	3.7E-04	2.3E-02	9.7E-03	6.5E-01	3.1E-03	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	5.6E-05	9.3E-03	5.5E-03	3.7E-03	9.3E-04	6.0E-02
Copper	9.8E-03	---	2.6E-01	---	1.4E-04	1.1E-02	2.4E-02	**2.3E+00**	6.2E-02	**2.7E+00**
Lead	1.7E-02	---	4.1E-01	---	4.8E-05	2.5E-02	7.3E-03	3.7E-01	1.5E-03	8.4E-01
Manganese	2.1E-04	---	6.9E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	3.2E-05	---	1.5E-03	---	1.8E-05	1.1E-04	2.6E-03	9.6E-03	3.4E-03	1.7E-02
Nickel	1.2E-02	---	6.6E-01	---	2.9E-04	2.8E-02	3.6E-02	4.2E-01	4.0E-03	**1.2E+00**
Selenium	3.7E-03	---	1.8E-01	---	4.8E-04	4.4E-03	6.0E-03	4.5E-01	2.7E-01	9.2E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	7.7E-04	6.9E-03	2.5E-02	6.5E-04	3.6E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-05	4.5E-04	1.2E-03	1.2E-03	2.7E-04	3.2E-03
Vanadium	1.3E-01	---	2.8E-01	---	3.0E-03	2.4E-01	3.0E-01	7.2E-01	8.2E-02	**1.8E+00**
Zinc	1.9E-03	---	4.9E-01	---	3.7E-05	3.0E-03	7.0E-03	7.5E-01	8.1E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.6E-03	---	3.2E-02	---	5.5E-04	9.2E-03	1.9E-02	4.7E-01	6.1E-03	5.4E-01
Barium	2.9E-04	---	1.3E-03	---	8.8E-05	9.2E-04	1.3E-03	2.1E-02	1.1E-03	2.6E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	5.0E-06	2.2E-03	1.7E-03	4.1E-01	1.3E-03	**1.1E+00**
Chromium (Total)	3.1E-02	---	4.8E-01	---	3.7E-04	2.3E-02	9.7E-03	6.5E-01	3.1E-03	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	5.6E-05	9.3E-03	5.5E-03	3.7E-03	9.3E-04	6.0E-02
Copper	2.9E-02	---	7.7E-01	---	4.2E-04	3.3E-02	7.3E-02	**7.0E+00**	1.9E-01	**8.1E+00**
Lead	1.7E-02	---	4.1E-01	---	4.8E-05	2.5E-02	7.3E-03	3.7E-01	1.5E-03	8.4E-01
Manganese	2.1E-04	---	6.9E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	9.6E-05	---	4.6E-03	---	5.5E-05	3.4E-04	7.9E-03	2.9E-02	1.0E-02	5.2E-02
Nickel	1.2E-02	---	6.6E-01	---	2.9E-04	2.8E-02	3.6E-02	4.2E-01	4.0E-03	**1.2E+00**
Selenium	3.7E-03	---	1.8E-01	---	4.8E-04	4.4E-03	6.0E-03	4.5E-01	2.7E-01	9.2E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.3E-03	2.1E-02	7.6E-02	2.0E-03	1.1E-01
Uranium	3.9E-05	---	6.4E-05	---	1.3E-05	4.5E-04	1.2E-03	1.2E-03	2.7E-04	3.2E-03
Vanadium	1.3E-01	---	2.8E-01	---	3.0E-03	2.4E-01	3.0E-01	7.2E-01	8.2E-02	**1.8E+00**
Zinc	1.9E-03	---	4.9E-01	---	3.7E-05	3.0E-03	7.0E-03	7.5E-01	8.1E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.8E-04	2.5E-03	4.2E-04	---	7.3E-05	---	---	---	---	3.9E-03
Barium	7.2E-05	6.5E-03	1.7E-05	---	1.2E-05	---	---	---	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.5E-04	7.7E-03	8.7E-03	---	6.7E-07	---	---	---	---	1.7E-02
Chromium (Total)	2.3E-02	1.1E-01	1.9E-02	---	1.5E-04	---	---	---	---	1.5E-01
Cobalt	4.2E-03	1.9E-02	1.4E-03	---	2.2E-05	---	---	---	---	2.4E-02
Copper	7.2E-03	1.6E-01	1.0E-02	---	5.6E-05	---	---	---	---	1.8E-01
Lead	1.3E-02	2.2E-02	1.6E-02	---	1.9E-05	---	---	---	---	5.1E-02
Manganese	1.5E-04	9.5E-03	2.7E-05	---	2.6E-05	---	---	---	---	9.7E-03
Molybdenum	2.4E-05	8.5E-03	6.0E-05	---	7.3E-06	---	---	---	---	8.6E-03
Nickel	9.2E-03	7.4E-02	2.6E-02	---	1.1E-04	---	---	---	---	1.1E-01
Selenium	2.8E-03	3.3E-02	7.2E-03	---	1.9E-04	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.9E-03	9.5E-05	---	3.5E-06	---	---	---	---	4.8E-03
Uranium	2.9E-05	3.4E-05	2.5E-06	---	5.2E-06	---	---	---	---	7.1E-05
Vanadium	9.9E-02	2.9E-01	1.1E-02	---	1.2E-03	---	---	---	---	4.1E-01
Zinc	1.4E-03	5.1E-02	1.9E-02	---	1.5E-05	---	---	---	---	7.1E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.7E-04	2.2E-03	2.2E-03	1.7E-05	4.1E-05	5.9E-05	---	---	1.2E-04	5.5E-03
Arsenic	1.6E-03	2.3E-03	7.0E-04	1.0E-04	3.7E-05	1.8E-04	---	---	2.2E-04	5.2E-03
Barium	2.9E-05	1.4E-03	6.6E-06	4.0E-05	1.0E-05	8.0E-06	---	---	6.9E-05	1.6E-03
Beryllium	1.5E-03	8.3E-03	1.7E-04	5.7E-04	9.1E-06	1.4E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	1.7E-06	5.2E-05	---	---	2.2E-04	2.0E-02
Chromium (Total)	6.5E-03	8.5E-03	5.0E-03	6.4E-03	3.5E-05	6.3E-04	---	---	1.5E-04	2.7E-02
Cobalt	4.9E-04	8.5E-04	1.5E-04	1.1E-04	2.7E-06	5.3E-05	---	---	2.3E-05	1.7E-03
Copper	2.4E-03	3.6E-02	3.2E-03	1.3E-02	1.4E-05	1.7E-04	---	---	3.2E-03	5.7E-02
Lead	1.9E-03	1.5E-03	2.3E-03	4.6E-03	3.9E-06	2.2E-04	---	---	6.2E-05	1.1E-02
Manganese	2.2E-04	1.0E-02	3.7E-05	9.1E-05	8.4E-05	6.4E-05	---	---	1.5E-04	1.1E-02
Molybdenum	9.4E-04	2.7E-01	2.2E-03	2.1E-03	8.6E-06	9.9E-05	---	---	8.2E-04	2.8E-01
Nickel	5.7E-03	1.7E-02	1.5E-02	1.0E-02	3.1E-05	5.5E-04	---	---	2.2E-04	4.9E-02
Selenium	2.4E-03	1.7E-02	5.9E-03	2.2E-02	5.9E-05	2.3E-04	---	---	1.7E-02	6.5E-02
Thallium	1.6E-02	4.3E-02	1.9E-03	1.9E-02	1.6E-04	1.8E-03	---	---	1.1E-02	9.3E-02
Uranium	7.4E-04	4.6E-04	6.1E-05	1.7E-05	2.2E-06	6.9E-05	---	---	2.3E-05	1.4E-03
Vanadium	3.3E-03	4.6E-03	3.5E-04	4.1E-04	1.1E-05	3.2E-04	---	---	1.5E-04	9.1E-03
Zinc	5.3E-04	1.0E-02	6.8E-03	9.5E-03	5.2E-06	6.9E-05	---	---	5.9E-03	3.3E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	6.3E-06	2.2E-04	---	4.2E-05	3.8E-04	7.7E-04
Arsenic	5.8E-04	---	---	1.9E-04	1.7E-05	2.0E-03	---	2.0E-02	2.1E-03	2.4E-02
Barium	1.1E-05	---	---	7.5E-05	4.8E-06	8.9E-05	---	3.3E-04	6.7E-04	1.2E-03
Beryllium	1.8E-04	---	---	3.5E-04	1.4E-06	5.1E-04	---	1.8E-03	4.2E-04	3.3E-03
Cadmium	1.5E-04	---	---	6.9E-03	7.8E-07	5.8E-04	---	1.8E-02	2.1E-03	2.8E-02
Chromium (Total)	2.4E-03	---	---	1.2E-02	1.6E-05	7.0E-03	---	3.3E-02	1.4E-03	5.6E-02
Cobalt	1.8E-04	---	---	2.0E-04	1.2E-06	5.9E-04	---	3.8E-05	2.2E-04	1.2E-03
Copper	8.8E-04	---	---	2.4E-02	6.4E-06	1.9E-03	---	8.0E-02	3.1E-02	1.4E-01
Lead	7.1E-04	---	---	8.5E-03	1.8E-06	2.4E-03	---	5.9E-03	6.0E-04	1.8E-02
Manganese	8.3E-05	---	---	1.7E-04	3.9E-05	7.1E-04	---	2.9E-03	1.4E-03	5.3E-03
Molybdenum	1.2E-04	---	---	1.3E-03	1.3E-06	3.6E-04	---	5.1E-03	2.6E-03	9.5E-03
Nickel	2.1E-03	---	---	1.9E-02	1.4E-05	6.1E-03	---	2.3E-02	2.1E-03	5.2E-02
Selenium	8.9E-04	---	---	4.2E-02	2.7E-05	2.6E-03	---	4.3E-02	1.7E-01	2.5E-01
Thallium	2.0E-03	---	---	1.1E-02	2.5E-05	6.5E-03	---	3.4E-02	3.5E-02	8.9E-02
Uranium	9.2E-05	---	---	1.1E-05	3.4E-07	2.5E-04	---	1.1E-04	7.5E-05	5.4E-04
Vanadium	1.2E-03	---	---	7.6E-04	5.0E-06	3.5E-03	---	1.7E-03	1.5E-03	8.7E-03
Zinc	2.0E-04	---	---	1.8E-02	2.4E-06	7.6E-04	---	3.1E-02	5.7E-02	1.1E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.6E-04	---	---	3.5E-05	2.5E-04	3.1E-04	---	---	9.4E-04
Arsenic	4.2E-04	3.4E-04	---	---	4.2E-05	9.9E-04	2.9E-03	---	---	4.6E-03
Barium	7.8E-06	2.2E-04	---	---	1.2E-05	4.4E-05	9.0E-05	---	---	3.7E-04
Beryllium	3.0E-04	1.2E-03	---	---	7.8E-06	5.8E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	1.9E-06	2.8E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	1.7E-03	1.3E-03	---	---	3.9E-05	3.4E-03	2.0E-03	---	---	8.5E-03
Cobalt	1.3E-04	1.3E-04	---	---	2.9E-06	2.9E-04	2.4E-04	---	---	8.0E-04
Copper	6.3E-04	3.7E-03	---	---	1.5E-05	9.2E-04	2.8E-03	---	---	8.1E-03
Lead	5.1E-04	2.8E-04	---	---	4.3E-06	1.2E-03	4.8E-04	---	---	2.5E-03
Manganese	5.9E-05	9.2E-04	---	---	9.3E-05	3.5E-04	1.9E-03	---	---	3.3E-03
Molybdenum	1.9E-04	1.6E-02	---	---	7.4E-06	4.1E-04	1.4E-02	---	---	3.1E-02
Nickel	1.5E-03	1.7E-03	---	---	3.4E-05	3.0E-03	5.5E-03	---	---	1.2E-02
Selenium	6.4E-04	2.3E-03	---	---	6.5E-05	1.3E-03	2.4E-03	---	---	6.7E-03
Thallium	3.4E-03	5.6E-03	---	---	1.4E-04	7.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.7E-05	---	---	1.9E-06	2.9E-04	1.0E-03	---	---	1.5E-03
Vanadium	8.9E-04	7.3E-04	---	---	1.2E-05	1.7E-03	3.0E-03	---	---	6.4E-03
Zinc	1.4E-04	1.6E-03	---	---	5.7E-06	3.7E-04	1.2E-03	---	---	3.3E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.2E-04	---	---	7.7E-05	2.9E-05	---	---	---	---	5.3E-04
Arsenic	1.3E-03	---	---	8.0E-04	4.7E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.3E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	1.7E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	4.8E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	4.6E-04	---	---	9.3E-03	6.2E-06	---	---	---	---	9.8E-03
Nickel	4.8E-03	---	---	7.8E-02	3.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	7.4E-05	---	---	---	---	1.8E-01
Thallium	8.0E-03	---	---	8.3E-02	1.2E-04	---	---	---	---	9.1E-02
Uranium	3.6E-04	---	---	7.7E-05	1.6E-06	---	---	---	---	4.4E-04
Vanadium	2.8E-03	---	---	3.2E-03	1.4E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	6.4E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.3E-04	8.8E-05	---	---	---	---	1.6E-03
Arsenic	1.3E-03	---	---	8.0E-04	4.7E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.3E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	1.7E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	4.8E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.9E-05	---	---	---	---	2.9E-02
Nickel	4.8E-03	---	---	7.8E-02	3.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	7.4E-05	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.7E-01
Uranium	1.1E-03	---	---	2.3E-04	4.7E-06	---	---	---	---	1.3E-03
Vanadium	2.8E-03	---	---	3.2E-03	1.4E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	6.4E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.8E-03	3.4E-03	---	---	1.4E-04	---	---	---	---	9.3E-03
Arsenic	2.8E-03	1.4E-03	---	---	3.4E-05	---	---	---	---	4.2E-03
Barium	5.2E-05	9.2E-04	---	---	9.4E-06	---	---	---	---	9.8E-04
Beryllium	3.3E-03	7.8E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	1.5E-06	---	---	---	---	3.6E-03
Chromium (Total)	1.2E-02	5.6E-03	---	---	3.2E-05	---	---	---	---	1.7E-02
Cobalt	8.8E-04	5.5E-04	---	---	2.4E-06	---	---	---	---	1.4E-03
Copper	4.2E-03	1.6E-02	---	---	1.3E-05	---	---	---	---	2.0E-02
Lead	3.4E-03	1.2E-03	---	---	3.5E-06	---	---	---	---	4.6E-03
Manganese	3.9E-04	3.9E-03	---	---	7.6E-05	---	---	---	---	4.4E-03
Molybdenum	6.2E-03	3.3E-01	---	---	2.9E-05	---	---	---	---	3.4E-01
Nickel	1.0E-02	7.2E-03	---	---	2.8E-05	---	---	---	---	1.7E-02
Selenium	4.3E-03	9.7E-03	---	---	5.3E-05	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.1E-01	---	---	5.4E-04	---	---	---	---	2.2E-01
Uranium	4.9E-03	1.2E-03	---	---	7.4E-06	---	---	---	---	6.1E-03
Vanadium	5.9E-03	3.1E-03	---	---	9.9E-06	---	---	---	---	9.0E-03
Zinc	9.5E-04	6.7E-03	---	---	4.7E-06	---	---	---	---	7.6E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.6E-03	5.0E-04	1.2E-01	---	2.9E-05	---	---	---	---	1.3E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	9.9E-05	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.7E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	4.5E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	3.7E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.0E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	1.5E-03	2.7E-02	6.9E-02	---	3.3E-06	---	---	---	---	9.7E-02
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	8.1E-05	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.6E-04	---	---	---	---	**1.3E+00**
Thallium	4.9E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.3E-05	1.9E-03	---	8.4E-07	---	---	---	---	3.2E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	2.9E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.4E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.8E-03	1.5E-03	3.7E-01	---	8.7E-05	---	---	---	---	3.8E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	9.9E-05	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.7E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	4.5E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	3.7E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.0E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	4.6E-03	8.0E-02	2.1E-01	---	9.9E-06	---	---	---	---	2.9E-01
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	8.1E-05	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.6E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.8E-04	5.7E-03	---	2.5E-06	---	---	---	---	9.6E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	2.9E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.4E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	1.3E-03	---	---	3.5E-05	---	---	---	---	1.8E-03
Arsenic	3.0E-03	5.2E-03	---	---	1.2E-04	---	---	---	---	8.4E-03
Barium	5.6E-05	3.2E-03	---	---	3.4E-05	---	---	---	---	3.3E-03
Beryllium	7.7E-04	5.0E-03	---	---	7.9E-06	---	---	---	---	5.8E-03
Cadmium	7.9E-04	1.3E-02	---	---	5.5E-06	---	---	---	---	1.4E-02
Chromium (Total)	1.3E-02	1.9E-02	---	---	1.1E-04	---	---	---	---	3.2E-02
Cobalt	9.6E-04	1.9E-03	---	---	8.6E-06	---	---	---	---	2.9E-03
Copper	4.6E-03	7.8E-02	---	---	4.5E-05	---	---	---	---	8.2E-02
Lead	3.7E-03	3.5E-03	---	---	1.3E-05	---	---	---	---	7.3E-03
Manganese	4.3E-04	2.2E-02	---	---	2.7E-04	---	---	---	---	2.3E-02
Molybdenum	2.8E-04	8.8E-02	---	---	4.2E-06	---	---	---	---	8.8E-02
Nickel	1.1E-02	3.8E-02	---	---	9.9E-05	---	---	---	---	4.9E-02
Selenium	4.7E-03	3.8E-02	---	---	1.9E-04	---	---	---	---	4.3E-02
Thallium	8.6E-03	2.6E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.1E-06	---	---	---	---	3.7E-04
Vanadium	6.5E-03	1.0E-02	---	---	3.5E-05	---	---	---	---	1.7E-02
Zinc	1.0E-03	2.3E-02	---	---	1.7E-05	---	---	---	---	2.4E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	6.9E-04	2.8E-03	---	---	5.3E-05	1.3E-04	1.6E-03	---	---	5.3E-03
Arsenic	7.9E-04	2.8E-03	---	---	3.1E-05	2.5E-04	7.3E-03	---	---	1.1E-02
Barium	1.5E-05	1.8E-03	---	---	8.7E-06	1.1E-05	2.3E-04	---	---	2.1E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	3.0E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	1.4E-06	7.3E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	3.3E-03	1.1E-02	---	---	2.9E-05	8.8E-04	5.1E-03	---	---	2.0E-02
Cobalt	2.5E-04	1.1E-03	---	---	2.2E-06	7.5E-05	6.2E-04	---	---	2.0E-03
Copper	1.2E-03	3.1E-02	---	---	1.2E-05	2.4E-04	7.3E-03	---	---	4.0E-02
Lead	9.7E-04	2.4E-03	---	---	3.2E-06	3.1E-04	1.2E-03	---	---	4.9E-03
Manganese	1.1E-04	7.7E-03	---	---	7.0E-05	9.0E-05	4.8E-03	---	---	1.3E-02
Molybdenum	7.4E-04	2.8E-01	---	---	1.1E-05	2.2E-04	7.1E-02	---	---	3.5E-01
Nickel	2.9E-03	1.4E-02	---	---	2.6E-05	7.8E-04	1.4E-02	---	---	3.2E-02
Selenium	1.2E-03	1.9E-02	---	---	4.9E-05	3.2E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.5E-02	---	---	2.1E-04	3.8E-03	4.8E-01	---	---	5.9E-01
Uranium	5.9E-04	9.6E-04	---	---	2.9E-06	1.5E-04	5.4E-03	---	---	7.1E-03
Vanadium	1.7E-03	6.1E-03	---	---	9.2E-06	4.4E-04	7.7E-03	---	---	1.6E-02
Zinc	2.7E-04	1.3E-02	---	---	4.3E-06	9.6E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.2E-05	---	---	3.1E-06	2.9E-05	4.1E-04	---	9.3E-05	6.9E-04	1.3E-03
Arsenic	9.9E-05	---	---	3.2E-05	4.7E-05	2.2E-03	---	2.5E-02	2.2E-03	2.9E-02
Barium	1.8E-06	---	---	1.3E-05	1.3E-05	9.5E-05	---	4.2E-04	7.0E-04	1.2E-03
Beryllium	5.4E-05	---	---	1.0E-04	6.5E-06	9.5E-04	---	4.0E-03	7.7E-04	5.9E-03
Cadmium	2.6E-05	---	---	1.2E-03	2.1E-06	6.2E-04	---	2.3E-02	2.2E-03	2.7E-02
Chromium (Total)	4.1E-04	---	---	2.0E-03	4.4E-05	7.5E-03	---	4.3E-02	1.5E-03	5.4E-02
Cobalt	3.1E-05	---	---	3.4E-05	3.3E-06	6.4E-04	---	4.9E-05	2.3E-04	9.9E-04
Copper	1.5E-04	---	---	4.1E-03	1.7E-05	2.0E-03	---	1.0E-01	3.2E-02	1.4E-01
Lead	1.2E-04	---	---	1.4E-03	4.8E-06	2.6E-03	---	7.6E-03	6.3E-04	1.2E-02
Manganese	1.4E-05	---	---	2.9E-05	1.0E-04	7.6E-04	---	3.7E-03	1.5E-03	6.1E-03
Molybdenum	3.4E-05	---	---	3.8E-04	6.2E-06	6.8E-04	---	1.1E-02	4.8E-03	1.7E-02
Nickel	3.6E-04	---	---	3.2E-03	3.8E-05	6.6E-03	---	3.0E-02	2.2E-03	4.2E-02
Selenium	1.5E-04	---	---	7.1E-03	7.4E-05	2.8E-03	---	5.5E-02	1.7E-01	2.4E-01
Thallium	6.0E-04	---	---	3.4E-03	1.2E-04	1.2E-02	---	7.6E-02	6.3E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	1.6E-06	4.7E-04	---	2.5E-04	1.4E-04	8.9E-04
Vanadium	2.1E-04	---	---	1.3E-04	1.4E-05	3.8E-03	---	2.2E-03	1.5E-03	7.8E-03
Zinc	3.4E-05	---	---	3.0E-03	6.4E-06	8.2E-04	---	4.0E-02	5.9E-02	1.0E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	8.3E-05	2.5E-03	2.4E-05	2.7E-05	---	---	---	---	3.1E-03
Arsenic	1.7E-03	1.1E-04	1.7E-03	2.9E-04	5.0E-05	---	---	---	---	3.8E-03
Barium	3.1E-05	5.7E-05	1.6E-05	1.2E-04	1.4E-05	---	---	---	---	2.3E-04
Beryllium	7.7E-04	9.2E-05	1.9E-04	8.0E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	2.3E-06	---	---	---	---	3.4E-02
Chromium (Total)	6.9E-03	3.4E-04	1.2E-02	1.8E-02	4.7E-05	---	---	---	---	3.8E-02
Cobalt	5.2E-04	3.4E-05	3.6E-04	3.1E-04	3.5E-06	---	---	---	---	1.2E-03
Copper	2.5E-03	2.7E-03	7.8E-03	3.7E-02	1.9E-05	---	---	---	---	5.0E-02
Lead	2.0E-03	3.2E-05	5.5E-03	1.3E-02	5.2E-06	---	---	---	---	2.1E-02
Manganese	2.4E-04	8.7E-04	8.9E-05	2.6E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	4.9E-04	1.2E-02	2.6E-03	2.9E-03	5.6E-06	---	---	---	---	1.8E-02
Nickel	6.0E-03	1.3E-03	3.6E-02	2.9E-02	4.1E-05	---	---	---	---	7.2E-02
Selenium	2.6E-03	9.4E-04	1.4E-02	6.5E-02	7.9E-05	---	---	---	---	8.2E-02
Thallium	8.5E-03	6.5E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.7E-02
Uranium	3.9E-04	8.1E-06	7.2E-05	2.4E-05	1.4E-06	---	---	---	---	4.9E-04
Vanadium	3.5E-03	1.7E-04	8.4E-04	1.2E-03	1.5E-05	---	---	---	---	5.7E-03
Zinc	5.7E-04	4.5E-04	1.6E-02	2.7E-02	6.9E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.0E-03	2.6E-03	---	---	2.3E-05	---	---	---	---	4.6E-03
Arsenic	9.8E-03	1.0E-02	---	---	5.6E-05	---	---	---	---	2.0E-02
Barium	1.8E-04	6.6E-03	---	---	1.5E-05	---	---	---	---	6.8E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.0E-02
Cadmium	2.6E-03	2.1E-02	---	---	2.5E-06	---	---	---	---	2.4E-02
Chromium (Total)	4.1E-02	4.0E-02	---	---	5.2E-05	---	---	---	---	8.1E-02
Cobalt	3.1E-03	4.0E-03	---	---	3.9E-06	---	---	---	---	7.1E-03
Copper	1.5E-02	1.2E-01	---	---	2.1E-05	---	---	---	---	1.3E-01
Lead	1.2E-02	8.5E-03	---	---	5.7E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.0E-02	---	---	1.2E-04	---	---	---	---	3.1E-02
Molybdenum	2.2E-03	2.6E-01	---	---	4.8E-06	---	---	---	---	2.6E-01
Nickel	3.6E-02	5.5E-02	---	---	4.5E-05	---	---	---	---	9.0E-02
Selenium	1.5E-02	7.1E-02	---	---	8.8E-05	---	---	---	---	8.6E-02
Thallium	3.8E-02	8.1E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.3E-04	---	---	1.2E-06	---	---	---	---	2.6E-03
Vanadium	2.1E-02	2.2E-02	---	---	1.6E-05	---	---	---	---	4.3E-02
Zinc	3.4E-03	4.8E-02	---	---	7.7E-06	---	---	---	---	5.1E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-04	3.2E-03	---	---	4.2E-05	---	---	---	---	4.0E-03
Arsenic	1.4E-03	4.7E-03	---	---	3.7E-05	---	---	---	---	6.1E-03
Barium	2.6E-05	3.0E-03	---	---	1.0E-05	---	---	---	---	3.0E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.2E-02
Cadmium	3.6E-04	9.6E-03	---	---	1.7E-06	---	---	---	---	9.9E-03
Chromium (Total)	5.8E-03	1.8E-02	---	---	3.5E-05	---	---	---	---	2.4E-02
Cobalt	4.4E-04	1.8E-03	---	---	2.6E-06	---	---	---	---	2.2E-03
Copper	2.1E-03	5.3E-02	---	---	1.4E-05	---	---	---	---	5.5E-02
Lead	1.7E-03	3.8E-03	---	---	3.8E-06	---	---	---	---	5.5E-03
Manganese	2.0E-04	1.3E-02	---	---	8.3E-05	---	---	---	---	1.4E-02
Molybdenum	8.6E-04	3.2E-01	---	---	8.7E-06	---	---	---	---	3.2E-01
Nickel	5.1E-03	2.5E-02	---	---	3.0E-05	---	---	---	---	3.0E-02
Selenium	2.1E-03	3.2E-02	---	---	5.8E-05	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.8E-04	1.0E-03	---	---	2.2E-06	---	---	---	---	1.7E-03
Vanadium	3.0E-03	9.9E-03	---	---	1.1E-05	---	---	---	---	1.3E-02
Zinc	4.8E-04	2.2E-02	---	---	5.1E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.6E-03	1.4E-03	8.6E-03	---	1.9E-05	---	---	---	---	1.5E-02
Barium	3.6E-04	3.1E-03	3.4E-04	---	2.2E-05	---	---	---	---	3.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.8E-03	7.8E-03	1.8E-01	---	1.3E-06	---	---	---	---	1.9E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	3.6E-02	1.8E-01	2.1E-01	---	3.6E-05	---	---	---	---	4.2E-01
Lead	6.9E-02	5.0E-03	3.4E-01	---	2.3E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	1.2E-04	1.4E-02	1.2E-03	---	1.9E-07	---	---	---	---	1.6E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	1.6E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	6.1E-05	---	---	---	---	1.9E-01
Thallium	2.4E-03	8.7E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.5E-03
Uranium	1.5E-04	1.5E-05	5.3E-05	---	7.7E-08	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	2.8E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.2E-05	---	---	---	---	4.3E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.3E-03	2.6E-02	---	5.6E-05	---	---	---	---	4.4E-02
Barium	1.1E-03	9.3E-03	1.0E-03	---	6.6E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.5E-03	2.3E-02	5.4E-01	---	3.9E-06	---	---	---	---	5.7E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	1.1E-01	5.3E-01	6.2E-01	---	1.1E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.0E-03	3.4E-01	---	2.3E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	3.7E-04	4.3E-02	3.7E-03	---	5.8E-07	---	---	---	---	4.7E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	1.6E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	6.1E-05	---	---	---	---	1.9E-01
Thallium	7.3E-03	2.6E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.5E-05	5.3E-05	---	7.7E-08	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	2.8E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.2E-05	---	---	---	---	4.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.6E-04	---	---	5.4E-05	4.8E-06	3.5E-04	---	---	4.3E-04	1.0E-03
Barium	1.7E-05	---	---	1.2E-04	7.5E-06	8.8E-05	---	---	7.6E-04	9.9E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	3.4E-07	1.6E-04	---	---	6.7E-04	3.9E-03
Chromium (Total)	2.6E-03	---	---	1.3E-02	1.7E-05	4.7E-03	---	---	1.1E-03	2.1E-02
Cobalt	6.4E-04	---	---	7.0E-04	4.2E-06	1.3E-03	---	---	5.5E-04	3.2E-03
Copper	1.7E-03	---	---	4.7E-02	1.2E-05	2.3E-03	---	---	4.3E-02	9.4E-02
Lead	2.5E-03	---	---	2.9E-02	6.1E-06	5.3E-03	---	---	1.5E-03	3.9E-02
Manganese	2.9E-05	---	---	5.8E-05	1.3E-05	1.5E-04	---	---	3.5E-04	6.1E-04
Molybdenum	6.0E-06	---	---	6.6E-05	6.7E-08	1.2E-05	---	---	9.7E-05	1.8E-04
Nickel	6.4E-04	---	---	5.7E-03	4.2E-06	1.2E-03	---	---	4.6E-04	8.0E-03
Selenium	5.3E-04	---	---	2.5E-02	1.6E-05	9.4E-04	---	---	7.0E-02	9.6E-02
Thallium	2.4E-04	---	---	1.4E-03	2.9E-06	4.8E-04	---	---	3.0E-03	5.1E-03
Uranium	7.7E-06	---	---	8.9E-07	2.8E-08	1.3E-05	---	---	4.5E-06	2.6E-05
Vanadium	1.8E-02	---	---	1.1E-02	7.2E-05	3.2E-02	---	---	1.5E-02	7.6E-02
Zinc	2.7E-04	---	---	2.4E-02	3.2E-06	6.5E-04	---	---	5.5E-02	8.1E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.4E-03	9.4E-05	8.4E-02	---	9.0E-05	---	---	---	---	9.4E-02
Barium	7.5E-04	2.1E-04	3.4E-03	---	1.1E-04	---	---	---	---	4.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	6.3E-06	---	---	---	---	**1.8E+00**
Chromium (Total)	5.0E-02	3.6E-04	7.6E-01	---	1.1E-04	---	---	---	---	8.1E-01
Cobalt	1.2E-02	1.2E-04	7.3E-02	---	2.6E-05	---	---	---	---	8.6E-02
Copper	7.5E-02	1.2E-02	**2.0E+00**	---	1.8E-04	---	---	---	---	**2.1E+00**
Lead	4.7E-02	1.1E-04	**1.1E+00**	---	3.8E-05	---	---	---	---	**1.2E+00**
Manganese	5.4E-04	3.0E-04	1.8E-03	---	8.2E-05	---	---	---	---	2.7E-03
Molybdenum	2.6E-04	9.4E-04	1.2E-02	---	9.3E-07	---	---	---	---	1.3E-02
Nickel	1.2E-02	4.0E-04	6.4E-01	---	2.6E-05	---	---	---	---	6.5E-01
Selenium	1.0E-02	5.5E-04	4.9E-01	---	9.8E-05	---	---	---	---	5.0E-01
Thallium	4.9E-03	5.6E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.6E-02
Uranium	1.1E-04	3.3E-07	1.7E-04	---	1.2E-07	---	---	---	---	2.8E-04
Vanadium	3.4E-01	2.4E-03	7.1E-01	---	4.5E-04	---	---	---	---	**1.1E+00**
Zinc	5.2E-03	6.1E-04	**1.3E+00**	---	2.0E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	7.0E-06	9.2E-04	2.8E-04	5.4E-03	1.0E-03	7.6E-03
Barium	---	---	---	---	8.4E-06	1.7E-04	3.7E-05	3.8E-04	1.4E-03	2.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	4.9E-07	4.1E-04	4.9E-05	7.6E-03	1.6E-03	9.7E-03
Chromium (Total)	---	---	---	---	2.5E-05	1.2E-02	7.4E-04	3.5E-02	2.6E-03	5.1E-02
Cobalt	---	---	---	---	6.1E-06	3.3E-03	2.9E-04	1.3E-04	1.3E-03	5.0E-03
Copper	---	---	---	---	1.4E-05	4.5E-03	1.5E-03	1.2E-01	7.8E-02	2.0E-01
Lead	---	---	---	---	8.9E-06	1.4E-02	5.8E-04	2.0E-02	3.5E-03	3.8E-02
Manganese	---	---	---	---	1.9E-05	3.9E-04	2.2E-04	9.7E-04	8.3E-04	2.4E-03
Molybdenum	---	---	---	---	7.3E-08	2.3E-05	7.9E-05	1.9E-04	1.7E-04	4.6E-04
Nickel	---	---	---	---	6.2E-06	3.0E-03	5.7E-04	6.9E-03	1.1E-03	1.2E-02
Selenium	---	---	---	---	2.3E-05	2.4E-03	4.9E-04	2.5E-02	1.7E-01	1.9E-01
Thallium	---	---	---	---	3.2E-06	9.4E-04	1.2E-03	3.0E-03	5.3E-03	1.0E-02
Uranium	---	---	---	---	3.0E-08	2.6E-05	9.8E-06	7.0E-06	7.9E-06	5.1E-05
Vanadium	---	---	---	---	1.1E-04	8.2E-02	1.5E-02	2.4E-02	3.6E-02	1.6E-01
Zinc	---	---	---	---	4.7E-06	1.7E-03	5.8E-04	4.2E-02	1.3E-01	1.7E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	9.0E-06	1.2E-03	2.0E-03	8.5E-02	---	8.8E-02
Barium	---	---	---	---	1.1E-05	2.3E-04	2.6E-04	6.1E-03	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	6.3E-07	5.3E-04	3.4E-04	1.2E-01	---	1.2E-01
Chromium (Total)	---	---	---	---	3.2E-05	1.6E-02	5.2E-03	5.6E-01	---	5.8E-01
Cobalt	---	---	---	---	7.8E-06	4.3E-03	2.0E-03	2.0E-03	---	8.4E-03
Copper	---	---	---	---	1.8E-05	5.8E-03	1.0E-02	**1.8E+00**	---	**1.8E+00**
Lead	---	---	---	---	1.1E-05	1.8E-02	4.0E-03	3.2E-01	---	3.4E-01
Manganese	---	---	---	---	2.5E-05	5.1E-04	1.6E-03	1.5E-02	---	1.7E-02
Molybdenum	---	---	---	---	9.4E-08	2.9E-05	5.5E-04	3.0E-03	---	3.6E-03
Nickel	---	---	---	---	7.9E-06	3.9E-03	4.0E-03	1.1E-01	---	1.2E-01
Selenium	---	---	---	---	3.0E-05	3.2E-03	3.5E-03	3.9E-01	---	4.0E-01
Thallium	---	---	---	---	3.4E-06	1.0E-03	7.2E-03	3.9E-02	---	4.8E-02
Uranium	---	---	---	---	3.7E-08	3.2E-05	6.6E-05	1.1E-04	---	2.0E-04
Vanadium	---	---	---	---	1.3E-04	1.1E-01	1.0E-01	3.8E-01	---	5.9E-01
Zinc	---	---	---	---	6.0E-06	2.2E-03	4.1E-03	6.5E-01	---	6.6E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-05	3.0E-05	2.7E-04	---	7.6E-06	1.5E-03	1.1E-02	4.1E-02	---	5.3E-02
Barium	7.7E-06	6.6E-05	1.1E-05	---	9.0E-06	2.8E-04	1.4E-03	2.9E-03	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	5.3E-07	6.6E-04	1.8E-03	5.8E-02	---	6.6E-02
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.4E-03	1.1E-02	9.7E-04	---	1.9E-02
Copper	7.7E-04	3.8E-03	6.6E-03	---	1.5E-05	7.3E-03	5.5E-02	8.8E-01	---	9.5E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	9.5E-06	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	2.6E-06	3.0E-04	3.9E-05	---	7.9E-08	3.7E-05	3.0E-03	1.4E-03	---	4.8E-03
Nickel	3.8E-04	3.8E-04	6.2E-03	---	6.6E-06	4.9E-03	2.2E-02	5.2E-02	---	8.6E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.5E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	1.0E-04	3.6E-05	7.5E-05	---	3.3E-06	1.4E-03	4.5E-02	2.2E-02	---	6.8E-02
Uranium	3.3E-06	3.2E-07	1.7E-06	---	3.1E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.1E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.0E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.9E-04	9.1E-05	8.2E-04	---	2.3E-05	4.5E-03	3.2E-02	1.2E-01	---	1.6E-01
Barium	2.3E-05	2.0E-04	3.3E-05	---	2.7E-05	8.5E-04	4.2E-03	8.7E-03	---	1.4E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	1.6E-06	2.0E-03	5.5E-03	1.7E-01	---	2.0E-01
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.4E-03	1.1E-02	9.7E-04	---	1.9E-02
Copper	2.3E-03	1.1E-02	2.0E-02	---	4.4E-05	2.2E-02	1.6E-01	**2.6E+00**	---	**2.9E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	9.5E-06	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	7.9E-06	9.1E-04	1.2E-04	---	2.4E-07	1.1E-04	8.9E-03	4.3E-03	---	1.4E-02
Nickel	3.8E-04	3.8E-04	6.2E-03	---	6.6E-06	4.9E-03	2.2E-02	5.2E-02	---	8.6E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.5E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	4.3E-03	1.3E-01	6.5E-02	---	2.0E-01
Uranium	3.3E-06	3.2E-07	1.7E-06	---	3.1E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.1E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.0E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.9E-04	---	---	1.3E-04	7.8E-06	---	---	---	---	5.3E-04
Barium	3.1E-05	---	---	2.2E-04	9.3E-06	---	---	---	---	2.6E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	5.4E-07	---	---	---	---	7.4E-03
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	3.1E-03	---	---	8.6E-02	1.5E-05	---	---	---	---	8.9E-02
Lead	5.9E-03	---	---	7.0E-02	9.8E-06	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.3E-04
Molybdenum	1.1E-05	---	---	1.2E-04	8.1E-08	---	---	---	---	1.3E-04
Nickel	1.5E-03	---	---	1.4E-02	6.8E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.6E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	3.2E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.2E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	5.2E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	3.9E-04	2.3E-05	---	---	---	---	1.6E-03
Barium	9.4E-05	---	---	6.5E-04	2.8E-05	---	---	---	---	7.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	1.6E-06	---	---	---	---	2.2E-02
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	9.4E-03	---	---	2.6E-01	4.6E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	9.8E-06	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.3E-04
Molybdenum	3.2E-05	---	---	3.5E-04	2.4E-07	---	---	---	---	3.9E-04
Nickel	1.5E-03	---	---	1.4E-02	6.8E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.6E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.8E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	3.2E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.2E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	5.2E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.9E-03	---	6.8E-04	9.4E-04	3.5E-05	---	---	---	---	3.6E-03
Barium	1.5E-04	---	2.7E-05	1.6E-03	4.2E-05	---	---	---	---	1.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.4E-02	5.3E-02	2.4E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.0E-02	---	6.2E-03	7.5E-02	4.2E-05	---	---	---	---	9.1E-02
Cobalt	2.5E-03	---	5.9E-04	4.1E-03	1.0E-05	---	---	---	---	7.1E-03
Copper	1.5E-02	---	1.7E-02	6.3E-01	6.9E-05	---	---	---	---	6.6E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	1.5E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.4E-04	3.2E-05	---	---	---	---	5.0E-04
Molybdenum	5.2E-05	---	9.8E-05	8.6E-04	3.6E-07	---	---	---	---	1.0E-03
Nickel	2.5E-03	---	5.2E-03	3.3E-02	1.0E-05	---	---	---	---	4.1E-02
Selenium	2.0E-03	---	4.0E-03	1.4E-01	3.8E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.1E-05	---	1.4E-06	3.7E-06	4.8E-08	---	---	---	---	2.7E-05
Vanadium	6.9E-02	---	5.8E-03	6.4E-02	1.7E-04	---	---	---	---	1.4E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	7.8E-06	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.0E-02	---	2.4E-05	1.6E-03	3.3E-03	9.7E-02	2.7E-04	1.1E-01
Barium	9.2E-05	---	4.2E-04	---	2.8E-05	3.1E-04	4.5E-04	6.9E-03	3.6E-04	8.5E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	1.7E-06	7.2E-04	5.8E-04	1.4E-01	4.2E-04	3.6E-01
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	5.8E-03	3.5E-03	2.3E-03	3.5E-04	4.4E-02
Copper	9.2E-03	---	2.5E-01	---	4.6E-05	7.9E-03	1.7E-02	**2.1E+00**	2.1E-02	**2.4E+00**
Lead	1.7E-02	---	4.1E-01	---	3.0E-05	2.4E-02	6.9E-03	3.6E-01	9.3E-04	8.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	3.1E-05	---	1.5E-03	---	2.5E-07	4.0E-05	9.4E-04	3.4E-03	4.6E-05	6.0E-03
Nickel	4.5E-03	---	2.4E-01	---	2.1E-05	5.3E-03	6.8E-03	1.2E-01	2.9E-04	3.8E-01
Selenium	3.7E-03	---	1.8E-01	---	7.8E-05	4.3E-03	5.9E-03	4.4E-01	4.4E-02	6.8E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	7.7E-04	6.9E-03	2.5E-02	6.5E-04	3.6E-02
Uranium	3.9E-05	---	6.4E-05	---	9.8E-08	4.3E-05	1.1E-04	1.2E-04	2.0E-06	3.8E-04
Vanadium	1.3E-01	---	2.6E-01	---	3.5E-04	1.4E-01	1.8E-01	4.3E-01	9.5E-03	**1.2E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.6E-05	3.0E-03	7.0E-03	7.4E-01	3.5E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.5E-03	---	3.1E-02	---	7.1E-05	4.9E-03	1.0E-02	2.9E-01	8.0E-04	3.4E-01
Barium	2.7E-04	---	1.2E-03	---	8.5E-05	9.2E-04	1.3E-03	2.1E-02	1.1E-03	2.6E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	5.0E-06	2.2E-03	1.7E-03	4.1E-01	1.3E-03	**1.1E+00**
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	5.8E-03	3.5E-03	2.3E-03	3.5E-04	4.4E-02
Copper	2.8E-02	---	7.6E-01	---	1.4E-04	2.4E-02	5.2E-02	**6.2E+00**	6.2E-02	**7.2E+00**
Lead	1.7E-02	---	4.1E-01	---	3.0E-05	2.4E-02	6.9E-03	3.6E-01	9.3E-04	8.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	9.4E-05	---	4.5E-03	---	7.4E-07	1.2E-04	2.8E-03	1.0E-02	1.4E-04	1.8E-02
Nickel	4.5E-03	---	2.4E-01	---	2.1E-05	5.3E-03	6.8E-03	1.2E-01	2.9E-04	3.8E-01
Selenium	3.7E-03	---	1.8E-01	---	7.8E-05	4.3E-03	5.9E-03	4.4E-01	4.4E-02	6.8E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.3E-03	2.1E-02	7.6E-02	2.0E-03	1.1E-01
Uranium	3.9E-05	---	6.4E-05	---	9.8E-08	4.3E-05	1.1E-04	1.2E-04	2.0E-06	3.8E-04
Vanadium	1.3E-01	---	2.6E-01	---	3.5E-04	1.4E-01	1.8E-01	4.3E-01	9.5E-03	**1.2E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.6E-05	3.0E-03	7.0E-03	7.4E-01	3.5E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.5E-04	2.2E-03	4.1E-04	---	9.5E-06	---	---	---	---	3.5E-03
Barium	6.8E-05	6.0E-03	1.6E-05	---	1.1E-05	---	---	---	---	6.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.4E-04	7.6E-03	8.7E-03	---	6.7E-07	---	---	---	---	1.7E-02
Chromium (Total)	1.4E-02	3.2E-02	1.1E-02	---	3.4E-05	---	---	---	---	5.7E-02
Cobalt	3.3E-03	1.0E-02	1.1E-03	---	8.3E-06	---	---	---	---	1.5E-02
Copper	6.8E-03	1.5E-01	9.9E-03	---	1.9E-05	---	---	---	---	1.6E-01
Lead	1.3E-02	2.1E-02	1.6E-02	---	1.2E-05	---	---	---	---	5.0E-02
Manganese	1.5E-04	9.1E-03	2.6E-05	---	2.6E-05	---	---	---	---	9.3E-03
Molybdenum	2.3E-05	8.3E-03	5.9E-05	---	9.9E-08	---	---	---	---	8.4E-03
Nickel	3.3E-03	1.4E-02	9.3E-03	---	8.3E-06	---	---	---	---	2.7E-02
Selenium	2.7E-03	3.3E-02	7.2E-03	---	3.1E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.8E-03	9.4E-05	---	3.5E-06	---	---	---	---	4.7E-03
Uranium	2.9E-05	3.3E-05	2.5E-06	---	3.9E-08	---	---	---	---	6.4E-05
Vanadium	9.3E-02	2.4E-01	1.0E-02	---	1.4E-04	---	---	---	---	3.4E-01
Zinc	1.4E-03	5.0E-02	1.9E-02	---	6.3E-06	---	---	---	---	7.0E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	9.0E-04	2.3E-03	2.2E-03	1.8E-05	1.4E-04	1.3E-04	---	---	4.1E-04	6.2E-03
Arsenic	1.6E-03	2.6E-03	7.2E-04	1.1E-04	2.8E-04	3.4E-04	---	---	1.6E-03	7.3E-03
Barium	3.1E-05	1.5E-03	7.0E-06	4.3E-05	1.7E-05	8.4E-06	---	---	1.1E-04	1.7E-03
Beryllium	1.5E-03	8.6E-03	1.7E-04	5.8E-04	1.1E-04	3.1E-04	---	---	1.6E-03	1.3E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	1.8E-06	5.2E-05	---	---	2.3E-04	2.0E-02
Chromium (Total)	1.1E-02	3.1E-02	8.5E-03	9.4E-03	1.5E-04	6.9E-04	---	---	6.4E-04	6.2E-02
Cobalt	6.3E-04	1.6E-03	1.9E-04	1.4E-04	7.0E-06	8.4E-05	---	---	6.1E-05	2.7E-03
Copper	2.5E-03	3.8E-02	3.3E-03	1.3E-02	4.1E-05	2.3E-04	---	---	9.4E-03	6.7E-02
Lead	1.9E-03	1.6E-03	2.3E-03	4.6E-03	6.5E-06	2.3E-04	---	---	1.0E-04	1.1E-02
Manganese	2.3E-04	1.1E-02	3.8E-05	9.4E-05	8.4E-05	6.4E-05	---	---	1.5E-04	1.1E-02
Molybdenum	9.6E-04	2.8E-01	2.3E-03	2.1E-03	5.7E-04	2.6E-04	---	---	5.5E-02	3.4E-01
Nickel	1.6E-02	8.4E-02	4.2E-02	1.6E-02	3.8E-04	2.7E-03	---	---	2.8E-03	1.6E-01
Selenium	2.4E-03	1.7E-02	5.9E-03	2.3E-02	3.4E-04	2.3E-04	---	---	9.9E-02	1.5E-01
Thallium	1.7E-02	4.4E-02	2.0E-03	1.9E-02	1.6E-04	1.8E-03	---	---	1.1E-02	9.4E-02
Uranium	7.5E-04	4.7E-04	6.2E-05	1.7E-05	2.8E-04	6.9E-04	---	---	3.0E-03	5.3E-03
Vanadium	3.6E-03	5.7E-03	3.7E-04	4.4E-04	9.2E-05	5.2E-04	---	---	1.3E-03	1.2E-02
Zinc	5.4E-04	1.1E-02	6.8E-03	9.5E-03	1.2E-05	6.9E-05	---	---	1.4E-02	4.1E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	2.2E-05	4.9E-04	---	9.5E-05	1.3E-03	2.1E-03
Arsenic	6.0E-04	---	---	2.0E-04	1.3E-04	3.8E-03	---	3.1E-02	1.6E-02	5.2E-02
Barium	1.1E-05	---	---	8.0E-05	7.7E-06	9.4E-05	---	3.4E-04	1.1E-03	1.6E-03
Beryllium	1.9E-04	---	---	3.6E-04	1.7E-05	1.2E-03	---	4.1E-03	5.1E-03	1.1E-02
Cadmium	1.5E-04	---	---	6.9E-03	8.3E-07	5.8E-04	---	1.8E-02	2.3E-03	2.8E-02
Chromium (Total)	4.1E-03	---	---	1.8E-02	7.0E-05	7.6E-03	---	3.5E-02	6.2E-03	7.0E-02
Cobalt	2.3E-04	---	---	2.6E-04	3.2E-06	9.3E-04	---	6.0E-05	5.9E-04	2.1E-03
Copper	9.4E-04	---	---	2.4E-02	1.9E-05	2.6E-03	---	9.0E-02	9.1E-02	2.1E-01
Lead	7.2E-04	---	---	8.5E-03	3.0E-06	2.6E-03	---	6.2E-03	1.0E-03	1.9E-02
Manganese	8.6E-05	---	---	1.8E-04	3.9E-05	7.1E-04	---	2.9E-03	1.4E-03	5.3E-03
Molybdenum	1.2E-04	---	---	1.3E-03	8.7E-05	9.5E-04	---	1.3E-02	1.8E-01	1.9E-01
Nickel	5.8E-03	---	---	3.0E-02	1.8E-04	3.0E-02	---	7.2E-02	2.7E-02	1.7E-01
Selenium	9.0E-04	---	---	4.2E-02	1.6E-04	2.6E-03	---	4.4E-02	9.6E-01	1.0E+00
Thallium	2.1E-03	---	---	1.2E-02	2.5E-05	6.5E-03	---	3.4E-02	3.5E-02	8.9E-02
Uranium	9.2E-05	---	---	1.1E-05	4.3E-05	2.6E-03	---	1.2E-03	9.7E-03	1.4E-02
Vanadium	1.3E-03	---	---	8.1E-04	4.2E-05	5.8E-03	---	2.8E-03	1.2E-02	2.3E-02
Zinc	2.0E-04	---	---	1.8E-02	5.6E-06	7.7E-04	---	3.1E-02	1.3E-01	1.8E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.8E-04	---	---	1.2E-04	5.6E-04	7.0E-04	---	---	1.7E-03
Arsenic	4.3E-04	3.7E-04	---	---	3.1E-04	1.9E-03	5.4E-03	---	---	8.3E-03
Barium	8.2E-06	2.3E-04	---	---	1.8E-05	4.6E-05	9.5E-05	---	---	4.0E-04
Beryllium	3.1E-04	1.2E-03	---	---	9.5E-05	1.3E-03	2.0E-03	---	---	4.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	2.0E-06	2.8E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	3.0E-03	4.4E-03	---	---	1.7E-04	3.7E-03	2.2E-03	---	---	1.3E-02
Cobalt	1.7E-04	2.3E-04	---	---	7.8E-06	4.6E-04	3.8E-04	---	---	1.2E-03
Copper	6.7E-04	4.0E-03	---	---	4.6E-05	1.3E-03	3.9E-03	---	---	9.9E-03
Lead	5.1E-04	2.9E-04	---	---	7.2E-06	1.3E-03	5.1E-04	---	---	2.6E-03
Manganese	6.2E-05	9.6E-04	---	---	9.3E-05	3.5E-04	1.9E-03	---	---	3.3E-03
Molybdenum	2.0E-04	1.7E-02	---	---	4.9E-04	1.1E-03	3.6E-02	---	---	5.4E-02
Nickel	4.2E-03	9.4E-03	---	---	4.2E-04	1.5E-02	2.6E-02	---	---	5.5E-02
Selenium	6.5E-04	2.3E-03	---	---	3.8E-04	1.3E-03	2.5E-03	---	---	7.1E-03
Thallium	3.4E-03	5.7E-03	---	---	1.4E-04	7.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.8E-05	---	---	2.4E-04	2.9E-03	1.1E-02	---	---	1.4E-02
Vanadium	9.5E-04	8.8E-04	---	---	1.0E-04	2.9E-03	5.0E-03	---	---	9.7E-03
Zinc	1.5E-04	1.6E-03	---	---	1.3E-05	3.8E-04	1.2E-03	---	---	3.4E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.4E-04	---	---	7.9E-05	1.0E-04	---	---	---	---	6.2E-04
Arsenic	1.4E-03	---	---	8.2E-04	3.5E-04	---	---	---	---	2.5E-03
Barium	2.6E-05	---	---	3.3E-04	2.1E-05	---	---	---	---	3.8E-04
Beryllium	7.4E-04	---	---	2.6E-03	8.0E-05	---	---	---	---	3.4E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.2E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	1.9E-04	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	8.7E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	5.1E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.0E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	4.7E-04	---	---	9.5E-03	4.1E-04	---	---	---	---	1.0E-02
Nickel	1.3E-02	---	---	1.3E-01	4.8E-04	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	4.3E-04	---	---	---	---	1.8E-01
Thallium	8.1E-03	---	---	8.4E-02	1.2E-04	---	---	---	---	9.2E-02
Uranium	3.6E-04	---	---	7.7E-05	2.0E-04	---	---	---	---	6.5E-04
Vanadium	3.0E-03	---	---	3.4E-03	1.1E-04	---	---	---	---	6.5E-03
Zinc	4.6E-04	---	---	7.4E-02	1.5E-05	---	---	---	---	7.5E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.4E-04	3.1E-04	---	---	---	---	1.9E-03
Arsenic	1.4E-03	---	---	8.2E-04	3.5E-04	---	---	---	---	2.5E-03
Barium	2.6E-05	---	---	3.3E-04	2.1E-05	---	---	---	---	3.8E-04
Beryllium	7.4E-04	---	---	2.6E-03	8.0E-05	---	---	---	---	3.4E-03
Cadmium	3.4E-04	---	---	2.9E-02	2.2E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	1.9E-04	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	8.7E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	5.1E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.0E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.0E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.2E-03	---	---	---	---	3.1E-02
Nickel	1.3E-02	---	---	1.3E-01	4.8E-04	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	4.3E-04	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.8E-01
Uranium	1.1E-03	---	---	2.3E-04	6.1E-04	---	---	---	---	1.9E-03
Vanadium	3.0E-03	---	---	3.4E-03	1.1E-04	---	---	---	---	6.5E-03
Zinc	4.6E-04	---	---	7.4E-02	1.5E-05	---	---	---	---	7.5E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.9E-03	3.6E-03	---	---	4.8E-04	---	---	---	---	1.0E-02
Arsenic	2.9E-03	1.6E-03	---	---	2.5E-04	---	---	---	---	4.7E-03
Barium	5.5E-05	9.8E-04	---	---	1.5E-05	---	---	---	---	1.1E-03
Beryllium	3.3E-03	8.1E-03	---	---	1.2E-04	---	---	---	---	1.2E-02
Cadmium	7.2E-04	2.9E-03	---	---	1.6E-06	---	---	---	---	3.6E-03
Chromium (Total)	2.0E-02	1.9E-02	---	---	1.4E-04	---	---	---	---	3.9E-02
Cobalt	1.1E-03	9.7E-04	---	---	6.3E-06	---	---	---	---	2.1E-03
Copper	4.5E-03	1.7E-02	---	---	3.7E-05	---	---	---	---	2.1E-02
Lead	3.4E-03	1.2E-03	---	---	5.8E-06	---	---	---	---	4.6E-03
Manganese	4.1E-04	4.1E-03	---	---	7.6E-05	---	---	---	---	4.5E-03
Molybdenum	6.4E-03	3.4E-01	---	---	1.9E-03	---	---	---	---	3.5E-01
Nickel	2.8E-02	4.0E-02	---	---	3.5E-04	---	---	---	---	6.8E-02
Selenium	4.3E-03	9.8E-03	---	---	3.1E-04	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.2E-01	---	---	5.4E-04	---	---	---	---	2.3E-01
Uranium	4.9E-03	1.2E-03	---	---	9.5E-04	---	---	---	---	7.1E-03
Vanadium	6.3E-03	3.7E-03	---	---	8.3E-05	---	---	---	---	1.0E-02
Zinc	9.6E-04	6.8E-03	---	---	1.1E-05	---	---	---	---	7.8E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.7E-03	5.4E-04	1.3E-01	---	1.0E-04	---	---	---	---	1.3E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	7.4E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	4.4E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	7.8E-05	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	4.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	4.0E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	1.9E-05	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	1.1E-04	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	1.6E-03	2.7E-02	7.1E-02	---	2.2E-04	---	---	---	---	1.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.0E-03	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	9.0E-04	---	---	---	---	**1.3E+00**
Thallium	5.0E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.5E-05	1.9E-03	---	1.1E-04	---	---	---	---	3.3E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	2.4E-04	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	3.2E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-03	1.6E-03	3.8E-01	---	3.0E-04	---	---	---	---	3.9E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	7.4E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	4.4E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	7.8E-05	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	4.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	4.0E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	1.9E-05	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	1.1E-04	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.2E-04	---	---	---	---	1.9E-02
Molybdenum	4.7E-03	8.2E-02	2.1E-01	---	6.6E-04	---	---	---	---	3.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.0E-03	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	9.0E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.9E-04	5.7E-03	---	3.3E-04	---	---	---	---	1.0E-02
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	2.4E-04	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	3.2E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.7E-04	1.4E-03	---	---	1.2E-04	---	---	---	---	1.9E-03
Arsenic	3.1E-03	5.8E-03	---	---	9.1E-04	---	---	---	---	9.8E-03
Barium	6.0E-05	3.4E-03	---	---	5.4E-05	---	---	---	---	3.5E-03
Beryllium	7.9E-04	5.2E-03	---	---	9.6E-05	---	---	---	---	6.1E-03
Cadmium	7.9E-04	1.3E-02	---	---	5.8E-06	---	---	---	---	1.4E-02
Chromium (Total)	2.2E-02	7.0E-02	---	---	4.9E-04	---	---	---	---	9.2E-02
Cobalt	1.2E-03	3.5E-03	---	---	2.3E-05	---	---	---	---	4.8E-03
Copper	4.9E-03	8.4E-02	---	---	1.3E-04	---	---	---	---	8.9E-02
Lead	3.7E-03	3.6E-03	---	---	2.1E-05	---	---	---	---	7.3E-03
Manganese	4.5E-04	2.3E-02	---	---	2.7E-04	---	---	---	---	2.4E-02
Molybdenum	2.8E-04	9.0E-02	---	---	2.8E-04	---	---	---	---	9.0E-02
Nickel	3.0E-02	1.8E-01	---	---	1.2E-03	---	---	---	---	2.2E-01
Selenium	4.7E-03	3.9E-02	---	---	1.1E-03	---	---	---	---	4.4E-02
Thallium	8.7E-03	2.7E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.4E-04	---	---	---	---	5.2E-04
Vanadium	6.9E-03	1.3E-02	---	---	3.0E-04	---	---	---	---	2.0E-02
Zinc	1.1E-03	2.4E-02	---	---	3.9E-05	---	---	---	---	2.5E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.1E-04	3.0E-03	---	---	1.9E-04	2.9E-04	3.6E-03	---	---	7.8E-03
Arsenic	8.2E-04	3.1E-03	---	---	2.4E-04	4.8E-04	1.4E-02	---	---	1.8E-02
Barium	1.6E-05	2.0E-03	---	---	1.4E-05	1.2E-05	2.4E-04	---	---	2.2E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.4E-04	6.9E-04	1.0E-02	---	---	3.2E-02
Cadmium	2.1E-04	5.7E-03	---	---	1.5E-06	7.3E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	5.6E-03	3.7E-02	---	---	1.3E-04	9.6E-04	5.6E-03	---	---	4.9E-02
Cobalt	3.2E-04	1.9E-03	---	---	5.9E-06	1.2E-04	9.8E-04	---	---	3.4E-03
Copper	1.3E-03	3.4E-02	---	---	3.4E-05	3.3E-04	1.0E-02	---	---	4.5E-02
Lead	9.8E-04	2.4E-03	---	---	5.4E-06	3.3E-04	1.3E-03	---	---	5.0E-03
Manganese	1.2E-04	8.1E-03	---	---	7.0E-05	9.0E-05	4.8E-03	---	---	1.3E-02
Molybdenum	7.6E-04	2.8E-01	---	---	7.5E-04	5.6E-04	1.9E-01	---	---	4.7E-01
Nickel	8.0E-03	7.9E-02	---	---	3.2E-04	3.8E-03	6.8E-02	---	---	1.6E-01
Selenium	1.2E-03	1.9E-02	---	---	2.9E-04	3.3E-04	6.3E-03	---	---	2.8E-02
Thallium	1.3E-02	9.6E-02	---	---	2.1E-04	3.8E-03	4.8E-01	---	---	6.0E-01
Uranium	5.9E-04	9.9E-04	---	---	3.7E-04	1.5E-03	5.5E-02	---	---	5.8E-02
Vanadium	1.8E-03	7.4E-03	---	---	7.7E-05	7.4E-04	1.3E-02	---	---	2.3E-02
Zinc	2.8E-04	1.3E-02	---	---	1.0E-05	9.8E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.3E-05	---	---	3.2E-06	1.0E-04	9.2E-04	---	2.1E-04	2.4E-03	3.7E-03
Arsenic	1.0E-04	---	---	3.3E-05	3.5E-04	4.1E-03	---	4.0E-02	1.7E-02	6.1E-02
Barium	2.0E-06	---	---	1.4E-05	2.1E-05	1.0E-04	---	4.4E-04	1.1E-03	1.7E-03
Beryllium	5.5E-05	---	---	1.1E-04	8.0E-05	2.2E-03	---	9.1E-03	9.4E-03	2.1E-02
Cadmium	2.6E-05	---	---	1.2E-03	2.2E-06	6.2E-04	---	2.3E-02	2.4E-03	2.7E-02
Chromium (Total)	7.1E-04	---	---	3.0E-03	1.9E-04	8.2E-03	---	4.4E-02	6.5E-03	6.3E-02
Cobalt	4.0E-05	---	---	4.4E-05	8.7E-06	1.0E-03	---	7.6E-05	6.2E-04	1.8E-03
Copper	1.6E-04	---	---	4.1E-03	5.1E-05	2.8E-03	---	1.1E-01	9.5E-02	2.2E-01
Lead	1.2E-04	---	---	1.5E-03	8.0E-06	2.8E-03	---	7.9E-03	1.0E-03	1.3E-02
Manganese	1.5E-05	---	---	3.0E-05	1.0E-04	7.6E-04	---	3.7E-03	1.5E-03	6.1E-03
Molybdenum	3.5E-05	---	---	3.9E-04	4.1E-04	1.8E-03	---	2.9E-02	3.2E-01	3.5E-01
Nickel	9.9E-04	---	---	5.1E-03	4.8E-04	3.2E-02	---	9.2E-02	2.8E-02	1.6E-01
Selenium	1.5E-04	---	---	7.1E-03	4.3E-04	2.8E-03	---	5.6E-02	1.0E+00	**1.1E+00**
Thallium	6.1E-04	---	---	3.4E-03	1.2E-04	1.2E-02	---	7.6E-02	6.3E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	2.0E-04	4.8E-03	---	2.6E-03	1.8E-02	2.5E-02
Vanadium	2.3E-04	---	---	1.4E-04	1.1E-04	6.3E-03	---	3.6E-03	1.3E-02	2.3E-02
Zinc	3.4E-05	---	---	3.0E-03	1.5E-05	8.3E-04	---	4.0E-02	1.4E-01	1.8E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.6E-04	8.7E-05	2.6E-03	2.5E-05	9.2E-05	---	---	---	---	3.3E-03
Arsenic	1.7E-03	1.3E-04	1.7E-03	3.0E-04	3.8E-04	---	---	---	---	4.2E-03
Barium	3.3E-05	6.2E-05	1.7E-05	1.2E-04	2.2E-05	---	---	---	---	2.6E-04
Beryllium	7.8E-04	9.8E-05	2.0E-04	8.1E-04	7.2E-05	---	---	---	---	2.0E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	2.4E-06	---	---	---	---	3.5E-02
Chromium (Total)	1.2E-02	1.6E-03	2.0E-02	2.7E-02	2.0E-04	---	---	---	---	6.1E-02
Cobalt	6.7E-04	7.2E-05	4.6E-04	4.0E-04	9.4E-06	---	---	---	---	1.6E-03
Copper	2.7E-03	2.9E-03	7.9E-03	3.7E-02	5.5E-05	---	---	---	---	5.1E-02
Lead	2.1E-03	3.4E-05	5.5E-03	1.3E-02	8.6E-06	---	---	---	---	2.1E-02
Manganese	2.5E-04	9.0E-04	9.2E-05	2.7E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	5.0E-04	1.2E-02	2.7E-03	3.0E-03	3.7E-04	---	---	---	---	1.9E-02
Nickel	1.7E-02	5.8E-03	9.9E-02	4.6E-02	5.1E-04	---	---	---	---	1.7E-01
Selenium	2.6E-03	9.5E-04	1.4E-02	6.5E-02	4.6E-04	---	---	---	---	8.3E-02
Thallium	8.6E-03	6.8E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.8E-02
Uranium	3.9E-04	8.5E-06	7.2E-05	2.4E-05	1.8E-04	---	---	---	---	6.8E-04
Vanadium	3.8E-03	2.3E-04	8.9E-04	1.3E-03	1.2E-04	---	---	---	---	6.3E-03
Zinc	5.8E-04	4.6E-04	1.6E-02	2.7E-02	1.6E-05	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.1E-03	2.7E-03	---	---	7.8E-05	---	---	---	---	4.9E-03
Arsenic	1.0E-02	1.1E-02	---	---	4.2E-04	---	---	---	---	2.2E-02
Barium	1.9E-04	7.1E-03	---	---	2.5E-05	---	---	---	---	7.3E-03
Beryllium	3.5E-03	1.7E-02	---	---	6.1E-05	---	---	---	---	2.1E-02
Cadmium	2.6E-03	2.1E-02	---	---	2.7E-06	---	---	---	---	2.4E-02
Chromium (Total)	7.0E-02	1.4E-01	---	---	2.2E-04	---	---	---	---	2.1E-01
Cobalt	3.9E-03	7.1E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Copper	1.6E-02	1.3E-01	---	---	6.1E-05	---	---	---	---	1.4E-01
Lead	1.2E-02	8.6E-03	---	---	9.6E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.1E-02	---	---	1.2E-04	---	---	---	---	3.3E-02
Molybdenum	2.2E-03	2.7E-01	---	---	3.2E-04	---	---	---	---	2.7E-01
Nickel	9.9E-02	3.0E-01	---	---	5.7E-04	---	---	---	---	4.0E-01
Selenium	1.5E-02	7.2E-02	---	---	5.1E-04	---	---	---	---	8.7E-02
Thallium	3.9E-02	8.3E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.6E-04	---	---	1.6E-04	---	---	---	---	2.8E-03
Vanadium	2.2E-02	2.7E-02	---	---	1.4E-04	---	---	---	---	4.9E-02
Zinc	3.4E-03	4.9E-02	---	---	1.8E-05	---	---	---	---	5.2E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.2E-04	3.4E-03	---	---	1.4E-04	---	---	---	---	4.4E-03
Arsenic	1.4E-03	5.1E-03	---	---	2.8E-04	---	---	---	---	6.8E-03
Barium	2.8E-05	3.2E-03	---	---	1.6E-05	---	---	---	---	3.2E-03
Beryllium	1.4E-03	2.1E-02	---	---	1.1E-04	---	---	---	---	2.3E-02
Cadmium	3.6E-04	9.6E-03	---	---	1.8E-06	---	---	---	---	1.0E-02
Chromium (Total)	1.0E-02	6.1E-02	---	---	1.5E-04	---	---	---	---	7.1E-02
Cobalt	5.6E-04	3.2E-03	---	---	6.9E-06	---	---	---	---	3.7E-03
Copper	2.3E-03	5.7E-02	---	---	4.1E-05	---	---	---	---	5.9E-02
Lead	1.7E-03	3.9E-03	---	---	6.4E-06	---	---	---	---	5.6E-03
Manganese	2.1E-04	1.4E-02	---	---	8.3E-05	---	---	---	---	1.4E-02
Molybdenum	8.8E-04	3.3E-01	---	---	5.8E-04	---	---	---	---	3.3E-01
Nickel	1.4E-02	1.3E-01	---	---	3.8E-04	---	---	---	---	1.5E-01
Selenium	2.2E-03	3.2E-02	---	---	3.4E-04	---	---	---	---	3.5E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.9E-04	1.1E-03	---	---	2.9E-04	---	---	---	---	2.0E-03
Vanadium	3.2E-03	1.2E-02	---	---	9.1E-05	---	---	---	---	1.5E-02
Zinc	4.9E-04	2.2E-02	---	---	1.2E-05	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.7E-03	1.6E-03	8.8E-03	---	1.4E-04	---	---	---	---	1.5E-02
Barium	3.9E-04	3.3E-03	3.6E-04	---	3.5E-05	---	---	---	---	4.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.9E-03	7.8E-03	1.8E-01	---	1.4E-06	---	---	---	---	1.9E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	2.9E-04	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	4.3E-05	---	---	---	---	6.2E-02
Copper	3.9E-02	1.9E-01	2.1E-01	---	1.1E-04	---	---	---	---	4.4E-01
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	1.3E-04	1.4E-02	1.3E-03	---	1.3E-05	---	---	---	---	1.6E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.0E-04	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	3.5E-04	---	---	---	---	1.9E-01
Thallium	2.5E-03	8.9E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.6E-03
Uranium	1.5E-04	1.6E-05	5.3E-05	---	9.9E-06	---	---	---	---	2.3E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	2.3E-03	---	---	---	---	9.2E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	2.9E-05	---	---	---	---	4.4E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.8E-03	2.6E-02	---	4.2E-04	---	---	---	---	4.6E-02
Barium	1.2E-03	1.0E-02	1.1E-03	---	1.1E-04	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.6E-03	2.4E-02	5.5E-01	---	4.1E-06	---	---	---	---	5.8E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	2.9E-04	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	4.3E-05	---	---	---	---	6.2E-02
Copper	1.2E-01	5.7E-01	6.3E-01	---	3.2E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.1E-05	---	---	---	---	1.5E-02
Molybdenum	3.8E-04	4.3E-02	3.8E-03	---	3.8E-05	---	---	---	---	4.8E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.0E-04	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	3.5E-04	---	---	---	---	1.9E-01
Thallium	7.4E-03	2.7E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.6E-05	5.3E-05	---	9.9E-06	---	---	---	---	2.3E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	2.3E-03	---	---	---	---	9.2E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	2.9E-05	---	---	---	---	4.4E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.7E-04	---	---	5.5E-05	3.6E-05	6.7E-04	---	---	3.2E-03	4.1E-03
Barium	1.8E-05	---	---	1.3E-04	1.2E-05	9.2E-05	---	---	1.2E-03	1.5E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	3.6E-07	1.6E-04	---	---	7.1E-04	4.0E-03
Chromium (Total)	4.5E-03	---	---	1.9E-02	7.4E-05	5.1E-03	---	---	4.8E-03	3.3E-02
Cobalt	8.1E-04	---	---	8.9E-04	1.1E-05	2.0E-03	---	---	1.5E-03	5.2E-03
Copper	1.8E-03	---	---	4.8E-02	3.6E-05	3.2E-03	---	---	1.3E-01	1.8E-01
Lead	2.5E-03	---	---	3.0E-02	1.0E-05	5.6E-03	---	---	2.5E-03	4.0E-02
Manganese	3.0E-05	---	---	6.1E-05	1.3E-05	1.5E-04	---	---	3.5E-04	6.1E-04
Molybdenum	6.1E-06	---	---	6.7E-05	4.4E-06	3.0E-05	---	---	6.4E-03	6.5E-03
Nickel	1.8E-03	---	---	9.2E-03	5.3E-05	5.6E-03	---	---	5.8E-03	2.2E-02
Selenium	5.3E-04	---	---	2.5E-02	9.2E-05	9.6E-04	---	---	4.1E-01	4.3E-01
Thallium	2.5E-04	---	---	1.4E-03	2.9E-06	4.8E-04	---	---	3.0E-03	5.1E-03
Uranium	7.8E-06	---	---	8.9E-07	3.6E-06	1.3E-04	---	---	5.8E-04	7.3E-04
Vanadium	1.9E-02	---	---	1.2E-02	6.1E-04	5.2E-02	---	---	1.3E-01	2.1E-01
Zinc	2.8E-04	---	---	2.4E-02	7.5E-06	6.6E-04	---	---	1.3E-01	1.5E-01

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-03	1.1E-04	8.6E-02	---	6.7E-04	---	---	---	---	9.7E-02
Barium	8.0E-04	2.2E-04	3.6E-03	---	1.7E-04	---	---	---	---	4.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	6.6E-06	---	---	---	---	**1.8E+00**
Chromium (Total)	8.6E-02	1.7E-03	**1.3E+00**	---	4.6E-04	---	---	---	---	**1.4E+00**
Cobalt	1.5E-02	2.5E-04	9.4E-02	---	6.8E-05	---	---	---	---	1.1E-01
Copper	8.0E-02	1.3E-02	**2.1E+00**	---	5.2E-04	---	---	---	---	**2.2E+00**
Lead	4.7E-02	1.2E-04	**1.1E+00**	---	6.3E-05	---	---	---	---	**1.2E+00**
Manganese	5.7E-04	3.1E-04	1.9E-03	---	8.2E-05	---	---	---	---	2.8E-03
Molybdenum	2.6E-04	9.6E-04	1.2E-02	---	6.2E-05	---	---	---	---	1.4E-02
Nickel	3.4E-02	1.7E-03	**1.8E+00**	---	3.3E-04	---	---	---	---	**1.8E+00**
Selenium	1.0E-02	5.6E-04	5.0E-01	---	5.7E-04	---	---	---	---	5.1E-01
Thallium	4.9E-03	5.8E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.7E-02
Uranium	1.1E-04	3.5E-07	1.7E-04	---	1.6E-05	---	---	---	---	3.0E-04
Vanadium	3.7E-01	3.3E-03	7.6E-01	---	3.8E-03	---	---	---	---	**1.1E+00**
Zinc	5.3E-03	6.2E-04	**1.3E+00**	---	4.6E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	5.3E-05	1.7E-03	5.2E-04	8.7E-03	7.5E-03	1.9E-02
Barium	---	---	---	---	1.3E-05	1.8E-04	4.0E-05	4.1E-04	2.2E-03	2.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	5.2E-07	4.1E-04	4.9E-05	7.6E-03	1.7E-03	9.8E-03
Chromium (Total)	---	---	---	---	1.1E-04	1.3E-02	8.1E-04	3.6E-02	1.1E-02	6.2E-02
Cobalt	---	---	---	---	1.6E-05	5.2E-03	4.6E-04	2.0E-04	3.4E-03	9.3E-03
Copper	---	---	---	---	4.1E-05	6.2E-03	2.0E-03	1.3E-01	2.3E-01	3.7E-01
Lead	---	---	---	---	1.5E-05	1.4E-02	6.1E-04	2.1E-02	5.8E-03	4.2E-02
Manganese	---	---	---	---	1.9E-05	3.9E-04	2.2E-04	9.7E-04	8.3E-04	2.4E-03
Molybdenum	---	---	---	---	4.8E-06	5.9E-05	2.1E-04	5.0E-04	1.1E-02	1.2E-02
Nickel	---	---	---	---	7.7E-05	1.5E-02	2.8E-03	2.1E-02	1.4E-02	5.3E-02
Selenium	---	---	---	---	1.3E-04	2.5E-03	5.0E-04	2.5E-02	9.6E-01	9.8E-01
Thallium	---	---	---	---	3.2E-06	9.4E-04	1.2E-03	3.0E-03	5.3E-03	1.0E-02
Uranium	---	---	---	---	3.9E-06	2.6E-04	9.9E-05	7.1E-05	1.0E-03	1.5E-03
Vanadium	---	---	---	---	8.8E-04	1.4E-01	2.5E-02	4.0E-02	3.0E-01	5.0E-01
Zinc	---	---	---	---	1.1E-05	1.7E-03	5.9E-04	4.2E-02	3.1E-01	3.5E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	6.8E-05	2.2E-03	3.7E-03	1.4E-01	---	1.4E-01
Barium	---	---	---	---	1.7E-05	2.4E-04	2.8E-04	6.4E-03	---	6.9E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	6.7E-07	5.3E-04	3.4E-04	1.2E-01	---	1.2E-01
Chromium (Total)	---	---	---	---	1.4E-04	1.7E-02	5.7E-03	5.7E-01	---	6.0E-01
Cobalt	---	---	---	---	2.1E-05	6.7E-03	3.2E-03	3.2E-03	---	1.3E-02
Copper	---	---	---	---	5.2E-05	8.1E-03	1.4E-02	**2.1E+00**	---	**2.1E+00**
Lead	---	---	---	---	1.9E-05	1.9E-02	4.3E-03	3.3E-01	---	3.5E-01
Manganese	---	---	---	---	2.5E-05	5.1E-04	1.6E-03	1.5E-02	---	1.7E-02
Molybdenum	---	---	---	---	6.2E-06	7.7E-05	1.4E-03	7.9E-03	---	9.4E-03
Nickel	---	---	---	---	9.9E-05	1.9E-02	1.9E-02	3.4E-01	---	3.8E-01
Selenium	---	---	---	---	1.7E-04	3.2E-03	3.5E-03	4.0E-01	---	4.0E-01
Thallium	---	---	---	---	3.4E-06	1.0E-03	7.2E-03	3.9E-02	---	4.8E-02
Uranium	---	---	---	---	4.8E-06	3.2E-04	6.6E-04	1.1E-03	---	2.1E-03
Vanadium	---	---	---	---	1.1E-03	1.8E-01	1.7E-01	6.3E-01	---	9.8E-01
Zinc	---	---	---	---	1.4E-05	2.2E-03	4.1E-03	6.6E-01	---	6.6E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.0E-04	3.4E-05	2.8E-04	---	5.7E-05	2.8E-03	2.0E-02	6.6E-02	---	8.9E-02
Barium	8.2E-06	7.1E-05	1.2E-05	---	1.4E-05	3.0E-04	1.5E-03	3.1E-03	---	5.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	5.6E-07	6.7E-04	1.8E-03	5.8E-02	---	6.6E-02
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	1.2E-04	2.2E-02	3.1E-02	2.8E-01	---	3.4E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	1.7E-05	8.4E-03	1.7E-02	1.5E-03	---	2.9E-02
Copper	8.2E-04	4.1E-03	6.7E-03	---	4.4E-05	1.0E-02	7.6E-02	9.9E-01	---	**1.1E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	2.3E-02	2.3E-02	1.6E-01	---	2.2E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	2.7E-06	3.1E-04	4.0E-05	---	5.2E-06	9.6E-05	7.8E-03	3.8E-03	---	1.2E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	8.3E-05	2.4E-02	1.0E-01	1.6E-01	---	3.1E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	1.4E-04	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	1.0E-04	3.8E-05	7.6E-05	---	3.3E-06	1.4E-03	4.5E-02	2.2E-02	---	6.8E-02
Uranium	3.3E-06	3.4E-07	1.7E-06	---	4.0E-06	4.0E-04	3.6E-03	5.1E-04	---	4.5E-03
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	9.5E-04	2.2E-01	9.4E-01	3.0E-01	---	**1.5E+00**
Zinc	1.6E-04	6.0E-04	1.3E-02	---	1.2E-05	2.8E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.0E-04	1.0E-04	8.4E-04	---	1.7E-04	8.4E-03	5.9E-02	2.0E-01	---	2.7E-01
Barium	2.5E-05	2.1E-04	3.5E-05	---	4.3E-05	8.9E-04	4.5E-03	9.2E-03	---	1.5E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	1.7E-06	2.0E-03	5.5E-03	1.7E-01	---	2.0E-01
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	1.2E-04	2.2E-02	3.1E-02	2.8E-01	---	3.4E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	1.7E-05	8.4E-03	1.7E-02	1.5E-03	---	2.9E-02
Copper	2.5E-03	1.2E-02	2.0E-02	---	1.3E-04	3.0E-02	2.3E-01	**3.0E+00**	---	**3.3E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	2.3E-02	2.3E-02	1.6E-01	---	2.2E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	8.1E-06	9.3E-04	1.2E-04	---	1.6E-05	2.9E-04	2.3E-02	1.1E-02	---	3.6E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	8.3E-05	2.4E-02	1.0E-01	1.6E-01	---	3.1E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	1.4E-04	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	4.3E-03	1.3E-01	6.5E-02	---	2.0E-01
Uranium	3.3E-06	3.4E-07	1.7E-06	---	4.0E-06	4.0E-04	3.6E-03	5.1E-04	---	4.5E-03
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	9.5E-04	2.2E-01	9.4E-01	3.0E-01	---	**1.5E+00**
Zinc	1.6E-04	6.0E-04	1.3E-02	---	1.2E-05	2.8E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.0E-04	---	---	1.3E-04	5.9E-05	---	---	---	---	6.0E-04
Barium	3.3E-05	---	---	2.3E-04	1.5E-05	---	---	---	---	2.8E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	5.8E-07	---	---	---	---	7.4E-03
Chromium (Total)	1.1E-02	---	---	4.5E-02	1.2E-04	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	1.8E-05	---	---	---	---	4.1E-03
Copper	3.3E-03	---	---	8.6E-02	4.5E-05	---	---	---	---	9.0E-02
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.4E-04
Molybdenum	1.1E-05	---	---	1.2E-04	5.4E-06	---	---	---	---	1.4E-04
Nickel	4.2E-03	---	---	2.2E-02	8.5E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	1.5E-04	---	---	---	---	6.1E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	4.2E-06	---	---	---	---	1.9E-05
Vanadium	4.6E-02	---	---	2.8E-02	9.8E-04	---	---	---	---	7.5E-02
Zinc	6.6E-04	---	---	5.8E-02	1.2E-05	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	4.0E-04	1.8E-04	---	---	---	---	1.8E-03
Barium	9.9E-05	---	---	6.9E-04	4.4E-05	---	---	---	---	8.4E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	1.7E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.1E-02	---	---	4.5E-02	1.2E-04	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	1.8E-05	---	---	---	---	4.1E-03
Copper	1.0E-02	---	---	2.6E-01	1.3E-04	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.1E-05	---	---	---	---	2.4E-04
Molybdenum	3.3E-05	---	---	3.6E-04	1.6E-05	---	---	---	---	4.1E-04
Nickel	4.2E-03	---	---	2.2E-02	8.5E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	1.5E-04	---	---	---	---	6.1E-02
Thallium	1.2E-03	---	---	6.9E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	4.2E-06	---	---	---	---	1.9E-05
Vanadium	4.6E-02	---	---	2.8E-02	9.8E-04	---	---	---	---	7.5E-02
Zinc	6.6E-04	---	---	5.8E-02	1.2E-05	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.0E-03	---	7.0E-04	9.7E-04	2.6E-04	---	---	---	---	3.9E-03
Barium	1.6E-04	---	2.9E-05	1.7E-03	6.6E-05	---	---	---	---	1.9E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.5E-02	5.3E-02	2.6E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.7E-02	---	1.1E-02	1.1E-01	1.8E-04	---	---	---	---	1.4E-01
Cobalt	3.1E-03	---	7.6E-04	5.2E-03	2.7E-05	---	---	---	---	9.1E-03
Copper	1.6E-02	---	1.7E-02	6.3E-01	2.0E-04	---	---	---	---	6.7E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.5E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.5E-04	3.2E-05	---	---	---	---	5.1E-04
Molybdenum	5.3E-05	---	1.0E-04	8.8E-04	2.4E-05	---	---	---	---	1.1E-03
Nickel	6.9E-03	---	1.4E-02	5.3E-02	1.3E-04	---	---	---	---	7.5E-02
Selenium	2.1E-03	---	4.0E-03	1.4E-01	2.2E-04	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.2E-05	---	1.4E-06	3.7E-06	6.2E-06	---	---	---	---	3.3E-05
Vanadium	7.4E-02	---	6.2E-03	6.9E-02	1.5E-03	---	---	---	---	1.5E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	1.8E-05	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.1E-02	---	1.8E-04	3.0E-03	6.3E-03	1.6E-01	2.0E-03	1.8E-01
Barium	9.7E-05	---	4.4E-04	---	4.5E-05	3.2E-04	4.7E-04	7.3E-03	5.8E-04	9.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	1.8E-06	7.2E-04	5.8E-04	1.4E-01	4.4E-04	3.6E-01
Chromium (Total)	3.1E-02	---	4.8E-01	---	3.7E-04	2.3E-02	9.7E-03	6.5E-01	3.0E-03	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	5.4E-05	9.1E-03	5.4E-03	3.6E-03	9.2E-04	5.9E-02
Copper	9.8E-03	---	2.6E-01	---	1.4E-04	1.1E-02	2.4E-02	**2.3E+00**	6.1E-02	**2.7E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	2.5E-02	7.3E-03	3.8E-01	1.6E-03	8.4E-01
Manganese	2.1E-04	---	6.9E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	3.2E-05	---	1.5E-03	---	1.6E-05	1.0E-04	2.5E-03	9.0E-03	3.0E-03	1.6E-02
Nickel	1.2E-02	---	6.6E-01	---	2.6E-04	2.6E-02	3.3E-02	3.8E-01	3.6E-03	**1.1E+00**
Selenium	3.7E-03	---	1.8E-01	---	4.5E-04	4.4E-03	6.0E-03	4.5E-01	2.5E-01	9.0E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	7.7E-04	6.9E-03	2.5E-02	6.5E-04	3.6E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-05	4.4E-04	1.1E-03	1.2E-03	2.6E-04	3.2E-03
Vanadium	1.3E-01	---	2.8E-01	---	3.0E-03	2.4E-01	3.0E-01	7.1E-01	8.0E-02	**1.7E+00**
Zinc	1.9E-03	---	4.9E-01	---	3.7E-05	3.0E-03	7.0E-03	7.5E-01	8.1E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.6E-03	---	3.2E-02	---	5.4E-04	9.1E-03	1.9E-02	4.7E-01	6.0E-03	5.4E-01
Barium	2.9E-04	---	1.3E-03	---	1.4E-04	9.7E-04	1.4E-03	2.2E-02	1.7E-03	2.8E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	5.3E-06	2.2E-03	1.7E-03	4.1E-01	1.3E-03	**1.1E+00**
Chromium (Total)	3.1E-02	---	4.8E-01	---	3.7E-04	2.3E-02	9.7E-03	6.5E-01	3.0E-03	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	5.4E-05	9.1E-03	5.4E-03	3.6E-03	9.2E-04	5.9E-02
Copper	2.9E-02	---	7.7E-01	---	4.1E-04	3.3E-02	7.2E-02	**7.0E+00**	1.8E-01	**8.1E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	2.5E-02	7.3E-03	3.8E-01	1.6E-03	8.4E-01
Manganese	2.1E-04	---	6.9E-04	---	6.5E-05	7.0E-04	2.7E-03	1.7E-02	2.2E-04	2.2E-02
Molybdenum	9.6E-05	---	4.6E-03	---	4.9E-05	3.1E-04	7.4E-03	2.7E-02	9.1E-03	4.8E-02
Nickel	1.2E-02	---	6.6E-01	---	2.6E-04	2.6E-02	3.3E-02	3.8E-01	3.6E-03	**1.1E+00**
Selenium	3.7E-03	---	1.8E-01	---	4.5E-04	4.4E-03	6.0E-03	4.5E-01	2.5E-01	9.0E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.3E-03	2.1E-02	7.6E-02	2.0E-03	1.1E-01
Uranium	3.9E-05	---	6.4E-05	---	1.3E-05	4.4E-04	1.1E-03	1.2E-03	2.6E-04	3.2E-03
Vanadium	1.3E-01	---	2.8E-01	---	3.0E-03	2.4E-01	3.0E-01	7.1E-01	8.0E-02	**1.7E+00**
Zinc	1.9E-03	---	4.9E-01	---	3.7E-05	3.0E-03	7.0E-03	7.5E-01	8.1E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.8E-04	2.5E-03	4.2E-04	---	7.2E-05	---	---	---	---	3.8E-03
Barium	7.2E-05	6.5E-03	1.7E-05	---	1.8E-05	---	---	---	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.5E-04	7.7E-03	8.7E-03	---	7.0E-07	---	---	---	---	1.7E-02
Chromium (Total)	2.3E-02	1.1E-01	1.9E-02	---	1.5E-04	---	---	---	---	1.5E-01
Cobalt	4.2E-03	1.9E-02	1.4E-03	---	2.2E-05	---	---	---	---	2.4E-02
Copper	7.2E-03	1.6E-01	1.0E-02	---	5.5E-05	---	---	---	---	1.8E-01
Lead	1.3E-02	2.2E-02	1.6E-02	---	2.0E-05	---	---	---	---	5.1E-02
Manganese	1.5E-04	9.5E-03	2.7E-05	---	2.6E-05	---	---	---	---	9.7E-03
Molybdenum	2.4E-05	8.5E-03	6.0E-05	---	6.6E-06	---	---	---	---	8.6E-03
Nickel	9.2E-03	7.4E-02	2.6E-02	---	1.0E-04	---	---	---	---	1.1E-01
Selenium	2.8E-03	3.3E-02	7.2E-03	---	1.8E-04	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.9E-03	9.5E-05	---	3.5E-06	---	---	---	---	4.8E-03
Uranium	2.9E-05	3.4E-05	2.5E-06	---	5.1E-06	---	---	---	---	7.1E-05
Vanadium	9.9E-02	2.9E-01	1.1E-02	---	1.2E-03	---	---	---	---	4.1E-01
Zinc	1.4E-03	5.1E-02	1.9E-02	---	1.5E-05	---	---	---	---	7.1E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.7E-04	2.2E-03	2.2E-03	1.7E-05	4.1E-05	3.6E-05	---	---	1.6E-04	5.5E-03
Arsenic	1.6E-03	2.3E-03	7.0E-04	1.0E-04	5.6E-05	1.3E-04	---	---	3.4E-04	5.2E-03
Barium	2.9E-05	1.4E-03	6.6E-06	4.0E-05	9.4E-06	6.4E-06	---	---	8.9E-05	1.6E-03
Beryllium	1.5E-03	8.3E-03	1.7E-04	5.7E-04	9.1E-06	1.3E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	3.3E-06	4.6E-05	---	---	2.1E-04	2.0E-02
Chromium (Total)	6.5E-03	8.5E-03	5.0E-03	6.4E-03	3.5E-05	6.1E-04	---	---	1.5E-04	2.7E-02
Cobalt	4.9E-04	8.5E-04	1.5E-04	1.1E-04	2.7E-06	5.6E-05	---	---	3.7E-05	1.7E-03
Copper	2.4E-03	3.6E-02	3.2E-03	1.3E-02	2.0E-05	1.0E-04	---	---	1.8E-03	5.6E-02
Lead	1.9E-03	1.5E-03	2.3E-03	4.6E-03	6.5E-06	1.5E-04	---	---	1.4E-04	1.1E-02
Manganese	2.2E-04	1.0E-02	3.7E-05	9.1E-05	8.6E-05	8.4E-05	---	---	3.1E-04	1.1E-02
Molybdenum	9.4E-04	2.7E-01	2.2E-03	2.1E-03	8.6E-06	6.2E-05	---	---	1.0E-03	2.8E-01
Nickel	5.7E-03	1.7E-02	1.5E-02	1.0E-02	3.8E-05	4.7E-04	---	---	4.1E-04	4.9E-02
Selenium	2.4E-03	1.7E-02	5.9E-03	2.2E-02	5.4E-05	2.6E-04	---	---	1.2E-02	6.0E-02
Thallium	1.6E-02	4.3E-02	1.9E-03	1.9E-02	1.6E-04	1.5E-03	---	---	1.3E-02	9.5E-02
Uranium	7.4E-04	4.6E-04	6.1E-05	1.7E-05	2.9E-06	5.8E-05	---	---	2.4E-05	1.4E-03
Vanadium	3.3E-03	4.6E-03	3.5E-04	4.1E-04	1.7E-05	3.1E-04	---	---	1.8E-04	9.1E-03
Zinc	5.3E-04	1.0E-02	6.8E-03	9.5E-03	6.0E-06	5.0E-05	---	---	6.5E-03	3.4E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	6.3E-06	1.3E-04	---	2.5E-05	5.1E-04	7.9E-04
Arsenic	5.8E-04	---	---	1.9E-04	2.6E-05	1.5E-03	---	1.5E-02	3.3E-03	2.1E-02
Barium	1.1E-05	---	---	7.5E-05	4.3E-06	7.1E-05	---	2.6E-04	8.6E-04	1.3E-03
Beryllium	1.8E-04	---	---	3.5E-04	1.4E-06	4.9E-04	---	1.7E-03	4.2E-04	3.2E-03
Cadmium	1.5E-04	---	---	6.9E-03	1.5E-06	5.2E-04	---	1.6E-02	2.0E-03	2.6E-02
Chromium (Total)	2.4E-03	---	---	1.2E-02	1.6E-05	6.7E-03	---	3.3E-02	1.4E-03	5.6E-02
Cobalt	1.8E-04	---	---	2.0E-04	1.2E-06	6.3E-04	---	4.0E-05	3.6E-04	1.4E-03
Copper	8.8E-04	---	---	2.4E-02	9.1E-06	1.1E-03	---	6.6E-02	1.8E-02	1.1E-01
Lead	7.1E-04	---	---	8.5E-03	3.0E-06	1.7E-03	---	4.4E-03	1.3E-03	1.7E-02
Manganese	8.3E-05	---	---	1.7E-04	4.0E-05	9.3E-04	---	3.8E-03	3.0E-03	8.0E-03
Molybdenum	1.2E-04	---	---	1.3E-03	1.3E-06	2.3E-04	---	3.2E-03	3.3E-03	8.1E-03
Nickel	2.1E-03	---	---	1.9E-02	1.8E-05	5.2E-03	---	2.0E-02	4.0E-03	5.0E-02
Selenium	8.9E-04	---	---	4.2E-02	2.5E-05	2.8E-03	---	4.8E-02	1.1E-01	2.1E-01
Thallium	2.0E-03	---	---	1.1E-02	2.5E-05	5.6E-03	---	3.0E-02	4.2E-02	9.1E-02
Uranium	9.2E-05	---	---	1.1E-05	4.5E-07	2.1E-04	---	9.7E-05	7.7E-05	4.9E-04
Vanadium	1.2E-03	---	---	7.6E-04	7.9E-06	3.4E-03	---	1.6E-03	1.7E-03	8.7E-03
Zinc	2.0E-04	---	---	1.8E-02	2.8E-06	5.5E-04	---	2.9E-02	6.3E-02	1.1E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.6E-04	---	---	3.5E-05	1.5E-04	3.1E-04	---	---	8.4E-04
Arsenic	4.2E-04	3.4E-04	---	---	6.2E-05	7.1E-04	2.9E-03	---	---	4.4E-03
Barium	7.8E-06	2.2E-04	---	---	1.0E-05	3.5E-05	9.0E-05	---	---	3.6E-04
Beryllium	3.0E-04	1.2E-03	---	---	7.8E-06	5.5E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	3.6E-06	2.5E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	1.7E-03	1.3E-03	---	---	3.9E-05	3.3E-03	2.0E-03	---	---	8.4E-03
Cobalt	1.3E-04	1.3E-04	---	---	2.9E-06	3.1E-04	2.4E-04	---	---	8.2E-04
Copper	6.3E-04	3.7E-03	---	---	2.2E-05	5.5E-04	2.8E-03	---	---	7.7E-03
Lead	5.1E-04	2.8E-04	---	---	7.2E-06	8.2E-04	4.8E-04	---	---	2.1E-03
Manganese	5.9E-05	9.2E-04	---	---	9.5E-05	4.6E-04	1.9E-03	---	---	3.4E-03
Molybdenum	1.9E-04	1.6E-02	---	---	7.4E-06	2.6E-04	1.4E-02	---	---	3.1E-02
Nickel	1.5E-03	1.7E-03	---	---	4.2E-05	2.6E-03	5.5E-03	---	---	1.1E-02
Selenium	6.4E-04	2.3E-03	---	---	6.0E-05	1.4E-03	2.4E-03	---	---	6.8E-03
Thallium	3.4E-03	5.6E-03	---	---	1.4E-04	6.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.7E-05	---	---	2.5E-06	2.4E-04	1.0E-03	---	---	1.5E-03
Vanadium	8.9E-04	7.3E-04	---	---	1.9E-05	1.7E-03	3.0E-03	---	---	6.3E-03
Zinc	1.4E-04	1.6E-03	---	---	6.7E-06	2.7E-04	1.2E-03	---	---	3.2E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.2E-04	---	---	7.7E-05	2.9E-05	---	---	---	---	5.3E-04
Arsenic	1.3E-03	---	---	8.0E-04	7.0E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.2E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	2.5E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	4.6E-04	---	---	9.3E-03	6.2E-06	---	---	---	---	9.8E-03
Nickel	4.8E-03	---	---	7.8E-02	4.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	6.8E-05	---	---	---	---	1.8E-01
Thallium	8.0E-03	---	---	8.3E-02	1.2E-04	---	---	---	---	9.1E-02
Uranium	3.6E-04	---	---	7.7E-05	2.1E-06	---	---	---	---	4.4E-04
Vanadium	2.8E-03	---	---	3.2E-03	2.1E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	7.5E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.3E-04	8.8E-05	---	---	---	---	1.6E-03
Arsenic	1.3E-03	---	---	8.0E-04	7.0E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.2E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	2.5E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.9E-05	---	---	---	---	2.9E-02
Nickel	4.8E-03	---	---	7.8E-02	4.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	6.8E-05	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.7E-01
Uranium	1.1E-03	---	---	2.3E-04	6.3E-06	---	---	---	---	1.3E-03
Vanadium	2.8E-03	---	---	3.2E-03	2.1E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	7.5E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.8E-03	3.4E-03	---	---	1.4E-04	---	---	---	---	9.3E-03
Arsenic	2.8E-03	1.4E-03	---	---	5.1E-05	---	---	---	---	4.3E-03
Barium	5.2E-05	9.2E-04	---	---	8.5E-06	---	---	---	---	9.8E-04
Beryllium	3.3E-03	7.8E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	3.0E-06	---	---	---	---	3.6E-03
Chromium (Total)	1.2E-02	5.6E-03	---	---	3.2E-05	---	---	---	---	1.7E-02
Cobalt	8.8E-04	5.5E-04	---	---	2.4E-06	---	---	---	---	1.4E-03
Copper	4.2E-03	1.6E-02	---	---	1.8E-05	---	---	---	---	2.0E-02
Lead	3.4E-03	1.2E-03	---	---	5.9E-06	---	---	---	---	4.6E-03
Manganese	3.9E-04	3.9E-03	---	---	7.8E-05	---	---	---	---	4.4E-03
Molybdenum	6.2E-03	3.3E-01	---	---	2.9E-05	---	---	---	---	3.4E-01
Nickel	1.0E-02	7.2E-03	---	---	3.5E-05	---	---	---	---	1.7E-02
Selenium	4.3E-03	9.7E-03	---	---	4.9E-05	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.1E-01	---	---	5.4E-04	---	---	---	---	2.2E-01
Uranium	4.9E-03	1.2E-03	---	---	9.8E-06	---	---	---	---	6.1E-03
Vanadium	5.9E-03	3.1E-03	---	---	1.5E-05	---	---	---	---	9.0E-03
Zinc	9.5E-04	6.7E-03	---	---	5.5E-06	---	---	---	---	7.6E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.6E-03	5.0E-04	1.2E-01	---	2.9E-05	---	---	---	---	1.3E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	1.5E-04	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.5E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	5.2E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	1.5E-03	2.7E-02	6.9E-02	---	3.3E-06	---	---	---	---	9.7E-02
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	1.0E-04	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.4E-04	---	---	---	---	**1.3E+00**
Thallium	4.9E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.3E-05	1.9E-03	---	1.1E-06	---	---	---	---	3.2E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	4.5E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.6E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.8E-03	1.5E-03	3.7E-01	---	8.7E-05	---	---	---	---	3.8E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	1.5E-04	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.5E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	5.2E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	4.6E-03	8.0E-02	2.1E-01	---	9.9E-06	---	---	---	---	2.9E-01
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	1.0E-04	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.4E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.8E-04	5.7E-03	---	3.4E-06	---	---	---	---	9.6E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	4.5E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.6E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	1.3E-03	---	---	3.5E-05	---	---	---	---	1.8E-03
Arsenic	3.0E-03	5.2E-03	---	---	1.8E-04	---	---	---	---	8.5E-03
Barium	5.6E-05	3.2E-03	---	---	3.0E-05	---	---	---	---	3.2E-03
Beryllium	7.7E-04	5.0E-03	---	---	7.9E-06	---	---	---	---	5.8E-03
Cadmium	7.9E-04	1.3E-02	---	---	1.1E-05	---	---	---	---	1.4E-02
Chromium (Total)	1.3E-02	1.9E-02	---	---	1.1E-04	---	---	---	---	3.2E-02
Cobalt	9.6E-04	1.9E-03	---	---	8.6E-06	---	---	---	---	2.9E-03
Copper	4.6E-03	7.8E-02	---	---	6.4E-05	---	---	---	---	8.2E-02
Lead	3.7E-03	3.5E-03	---	---	2.1E-05	---	---	---	---	7.3E-03
Manganese	4.3E-04	2.2E-02	---	---	2.8E-04	---	---	---	---	2.3E-02
Molybdenum	2.8E-04	8.8E-02	---	---	4.2E-06	---	---	---	---	8.8E-02
Nickel	1.1E-02	3.8E-02	---	---	1.2E-04	---	---	---	---	4.9E-02
Selenium	4.7E-03	3.8E-02	---	---	1.8E-04	---	---	---	---	4.3E-02
Thallium	8.6E-03	2.6E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.4E-06	---	---	---	---	3.7E-04
Vanadium	6.5E-03	1.0E-02	---	---	5.5E-05	---	---	---	---	1.7E-02
Zinc	1.0E-03	2.3E-02	---	---	1.9E-05	---	---	---	---	2.4E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	6.9E-04	2.8E-03	---	---	5.3E-05	7.8E-05	1.6E-03	---	---	5.2E-03
Arsenic	7.9E-04	2.8E-03	---	---	4.7E-05	1.8E-04	7.3E-03	---	---	1.1E-02
Barium	1.5E-05	1.8E-03	---	---	7.9E-06	8.9E-06	2.3E-04	---	---	2.1E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	2.9E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	2.8E-06	6.5E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	3.3E-03	1.1E-02	---	---	2.9E-05	8.5E-04	5.1E-03	---	---	2.0E-02
Cobalt	2.5E-04	1.1E-03	---	---	2.2E-06	7.9E-05	6.2E-04	---	---	2.1E-03
Copper	1.2E-03	3.1E-02	---	---	1.7E-05	1.4E-04	7.3E-03	---	---	3.9E-02
Lead	9.7E-04	2.4E-03	---	---	5.4E-06	2.1E-04	1.2E-03	---	---	4.8E-03
Manganese	1.1E-04	7.7E-03	---	---	7.2E-05	1.2E-04	4.8E-03	---	---	1.3E-02
Molybdenum	7.4E-04	2.8E-01	---	---	1.1E-05	1.4E-04	7.1E-02	---	---	3.5E-01
Nickel	2.9E-03	1.4E-02	---	---	3.2E-05	6.6E-04	1.4E-02	---	---	3.2E-02
Selenium	1.2E-03	1.9E-02	---	---	4.6E-05	3.6E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.5E-02	---	---	2.1E-04	3.3E-03	4.8E-01	---	---	5.9E-01
Uranium	5.9E-04	9.6E-04	---	---	3.8E-06	1.3E-04	5.4E-03	---	---	7.1E-03
Vanadium	1.7E-03	6.1E-03	---	---	1.4E-05	4.3E-04	7.7E-03	---	---	1.6E-02
Zinc	2.7E-04	1.3E-02	---	---	5.0E-06	7.0E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.2E-05	---	---	3.1E-06	2.9E-05	2.5E-04	---	5.6E-05	9.3E-04	1.3E-03
Arsenic	9.9E-05	---	---	3.2E-05	7.0E-05	1.6E-03	---	2.0E-02	3.5E-03	2.5E-02
Barium	1.8E-06	---	---	1.3E-05	1.2E-05	7.6E-05	---	3.3E-04	9.0E-04	1.3E-03
Beryllium	5.4E-05	---	---	1.0E-04	6.5E-06	9.1E-04	---	3.8E-03	7.7E-04	5.7E-03
Cadmium	2.6E-05	---	---	1.2E-03	4.1E-06	5.5E-04	---	2.1E-02	2.1E-03	2.5E-02
Chromium (Total)	4.1E-04	---	---	2.0E-03	4.4E-05	7.3E-03	---	4.2E-02	1.5E-03	5.3E-02
Cobalt	3.1E-05	---	---	3.4E-05	3.3E-06	6.7E-04	---	5.1E-05	3.8E-04	1.2E-03
Copper	1.5E-04	---	---	4.1E-03	2.5E-05	1.2E-03	---	8.5E-02	1.9E-02	1.1E-01
Lead	1.2E-04	---	---	1.4E-03	8.1E-06	1.8E-03	---	5.6E-03	1.4E-03	1.0E-02
Manganese	1.4E-05	---	---	2.9E-05	1.1E-04	1.0E-03	---	4.8E-03	3.1E-03	9.1E-03
Molybdenum	3.4E-05	---	---	3.8E-04	6.2E-06	4.3E-04	---	7.1E-03	6.0E-03	1.4E-02
Nickel	3.6E-04	---	---	3.2E-03	4.8E-05	5.6E-03	---	2.5E-02	4.2E-03	3.9E-02
Selenium	1.5E-04	---	---	7.1E-03	6.8E-05	3.1E-03	---	6.1E-02	1.2E-01	1.9E-01
Thallium	6.0E-04	---	---	3.4E-03	1.2E-04	1.0E-02	---	6.6E-02	7.6E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	2.1E-06	4.0E-04	---	2.1E-04	1.4E-04	7.9E-04
Vanadium	2.1E-04	---	---	1.3E-04	2.1E-05	3.6E-03	---	2.1E-03	1.8E-03	7.9E-03
Zinc	3.4E-05	---	---	3.0E-03	7.5E-06	6.0E-04	---	3.7E-02	6.6E-02	1.1E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	8.3E-05	2.5E-03	2.4E-05	2.7E-05	---	---	---	---	3.1E-03
Arsenic	1.7E-03	1.1E-04	1.7E-03	2.9E-04	7.5E-05	---	---	---	---	3.8E-03
Barium	3.1E-05	5.7E-05	1.6E-05	1.2E-04	1.3E-05	---	---	---	---	2.3E-04
Beryllium	7.7E-04	9.2E-05	1.9E-04	8.0E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	4.4E-06	---	---	---	---	3.4E-02
Chromium (Total)	6.9E-03	3.4E-04	1.2E-02	1.8E-02	4.7E-05	---	---	---	---	3.8E-02
Cobalt	5.2E-04	3.4E-05	3.6E-04	3.1E-04	3.5E-06	---	---	---	---	1.2E-03
Copper	2.5E-03	2.7E-03	7.8E-03	3.7E-02	2.6E-05	---	---	---	---	5.0E-02
Lead	2.0E-03	3.2E-05	5.5E-03	1.3E-02	8.7E-06	---	---	---	---	2.1E-02
Manganese	2.4E-04	8.7E-04	8.9E-05	2.6E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	4.9E-04	1.2E-02	2.6E-03	2.9E-03	5.6E-06	---	---	---	---	1.8E-02
Nickel	6.0E-03	1.3E-03	3.6E-02	2.9E-02	5.1E-05	---	---	---	---	7.2E-02
Selenium	2.6E-03	9.4E-04	1.4E-02	6.5E-02	7.3E-05	---	---	---	---	8.2E-02
Thallium	8.5E-03	6.5E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.7E-02
Uranium	3.9E-04	8.1E-06	7.2E-05	2.4E-05	1.9E-06	---	---	---	---	4.9E-04
Vanadium	3.5E-03	1.7E-04	8.4E-04	1.2E-03	2.3E-05	---	---	---	---	5.7E-03
Zinc	5.7E-04	4.5E-04	1.6E-02	2.7E-02	8.0E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.0E-03	2.6E-03	---	---	2.3E-05	---	---	---	---	4.6E-03
Arsenic	9.8E-03	1.0E-02	---	---	8.3E-05	---	---	---	---	2.0E-02
Barium	1.8E-04	6.6E-03	---	---	1.4E-05	---	---	---	---	6.8E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.0E-02
Cadmium	2.6E-03	2.1E-02	---	---	4.9E-06	---	---	---	---	2.4E-02
Chromium (Total)	4.1E-02	4.0E-02	---	---	5.2E-05	---	---	---	---	8.1E-02
Cobalt	3.1E-03	4.0E-03	---	---	3.9E-06	---	---	---	---	7.1E-03
Copper	1.5E-02	1.2E-01	---	---	2.9E-05	---	---	---	---	1.3E-01
Lead	1.2E-02	8.5E-03	---	---	9.6E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.0E-02	---	---	1.3E-04	---	---	---	---	3.1E-02
Molybdenum	2.2E-03	2.6E-01	---	---	4.8E-06	---	---	---	---	2.6E-01
Nickel	3.6E-02	5.5E-02	---	---	5.7E-05	---	---	---	---	9.0E-02
Selenium	1.5E-02	7.1E-02	---	---	8.1E-05	---	---	---	---	8.6E-02
Thallium	3.8E-02	8.1E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.3E-04	---	---	1.6E-06	---	---	---	---	2.6E-03
Vanadium	2.1E-02	2.2E-02	---	---	2.5E-05	---	---	---	---	4.3E-02
Zinc	3.4E-03	4.8E-02	---	---	9.0E-06	---	---	---	---	5.1E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-04	3.2E-03	---	---	4.2E-05	---	---	---	---	4.0E-03
Arsenic	1.4E-03	4.7E-03	---	---	5.6E-05	---	---	---	---	6.1E-03
Barium	2.6E-05	3.0E-03	---	---	9.3E-06	---	---	---	---	3.0E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.2E-02
Cadmium	3.6E-04	9.6E-03	---	---	3.3E-06	---	---	---	---	9.9E-03
Chromium (Total)	5.8E-03	1.8E-02	---	---	3.5E-05	---	---	---	---	2.4E-02
Cobalt	4.4E-04	1.8E-03	---	---	2.6E-06	---	---	---	---	2.2E-03
Copper	2.1E-03	5.3E-02	---	---	2.0E-05	---	---	---	---	5.5E-02
Lead	1.7E-03	3.8E-03	---	---	6.4E-06	---	---	---	---	5.6E-03
Manganese	2.0E-04	1.3E-02	---	---	8.5E-05	---	---	---	---	1.4E-02
Molybdenum	8.6E-04	3.2E-01	---	---	8.7E-06	---	---	---	---	3.2E-01
Nickel	5.1E-03	2.5E-02	---	---	3.8E-05	---	---	---	---	3.0E-02
Selenium	2.1E-03	3.2E-02	---	---	5.4E-05	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.8E-04	1.0E-03	---	---	3.0E-06	---	---	---	---	1.7E-03
Vanadium	3.0E-03	9.9E-03	---	---	1.7E-05	---	---	---	---	1.3E-02
Zinc	4.8E-04	2.2E-02	---	---	6.0E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	**Surface Soil Ingestion HQ**	**Terrestrial Plant Ingestion HQ**	**Terrestrial Invertebrate Ingestion HQ**	**Terrestrial Mammal Ingestion HQ**	**Surface Water Ingestion HQ**	**Freshwater Sediment Ingestion HQ**	**Freshwater Aquatic Plant Ingestion HQ**	**Freshwater Benthic Invertebrate Ingestion HQ**	**Freshwater Fish Ingestion HQ**	**Total Hazard Quotient**
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.6E-03	1.4E-03	8.6E-03	---	2.8E-05	---	---	---	---	1.5E-02
Barium	3.6E-04	3.1E-03	3.4E-04	---	2.0E-05	---	---	---	---	3.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.8E-03	7.8E-03	1.8E-01	---	2.5E-06	---	---	---	---	1.9E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	3.6E-02	1.8E-01	2.1E-01	---	5.2E-05	---	---	---	---	4.2E-01
Lead	6.9E-02	5.0E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	1.2E-04	1.4E-02	1.2E-03	---	1.9E-07	---	---	---	---	1.6E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	2.0E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	5.6E-05	---	---	---	---	1.9E-01
Thallium	2.4E-03	8.7E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.5E-03
Uranium	1.5E-04	1.5E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	4.3E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.4E-05	---	---	---	---	4.3E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.3E-03	2.6E-02	---	8.4E-05	---	---	---	---	4.4E-02
Barium	1.1E-03	9.3E-03	1.0E-03	---	6.0E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.5E-03	2.3E-02	5.4E-01	---	7.6E-06	---	---	---	---	5.7E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	1.1E-01	5.3E-01	6.2E-01	---	1.5E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.0E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	3.7E-04	4.3E-02	3.7E-03	---	5.8E-07	---	---	---	---	4.7E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	2.0E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	5.6E-05	---	---	---	---	1.9E-01
Thallium	7.3E-03	2.6E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.5E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	4.3E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.4E-05	---	---	---	---	4.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.6E-04	---	---	5.4E-05	7.2E-06	2.6E-04	---	---	6.7E-04	1.2E-03
Barium	1.7E-05	---	---	1.2E-04	6.8E-06	7.0E-05	---	---	9.8E-04	1.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	6.6E-07	1.4E-04	---	---	6.3E-04	3.9E-03
Chromium (Total)	2.6E-03	---	---	1.3E-02	1.7E-05	4.5E-03	---	---	1.1E-03	2.1E-02
Cobalt	6.4E-04	---	---	7.0E-04	4.2E-06	1.4E-03	---	---	8.9E-04	3.6E-03
Copper	1.7E-03	---	---	4.7E-02	1.8E-05	1.4E-03	---	---	2.5E-02	7.5E-02
Lead	2.5E-03	---	---	2.9E-02	1.0E-05	3.6E-03	---	---	3.3E-03	3.9E-02
Manganese	2.9E-05	---	---	5.8E-05	1.3E-05	2.0E-04	---	---	7.4E-04	1.0E-03
Molybdenum	6.0E-06	---	---	6.6E-05	6.7E-08	7.3E-06	---	---	1.2E-04	2.0E-04
Nickel	6.4E-04	---	---	5.7E-03	5.3E-06	9.9E-04	---	---	8.7E-04	8.2E-03
Selenium	5.3E-04	---	---	2.5E-02	1.5E-05	1.0E-03	---	---	4.8E-02	7.5E-02
Thallium	2.4E-04	---	---	1.4E-03	2.9E-06	4.2E-04	---	---	3.6E-03	5.7E-03
Uranium	7.7E-06	---	---	8.9E-07	3.7E-08	1.1E-05	---	---	4.6E-06	2.4E-05
Vanadium	1.8E-02	---	---	1.1E-02	1.1E-04	3.1E-02	---	---	1.8E-02	7.7E-02
Zinc	2.7E-04	---	---	2.4E-02	3.7E-06	4.7E-04	---	---	6.1E-02	8.6E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.4E-03	9.4E-05	8.4E-02	---	1.3E-04	---	---	---	---	9.4E-02
Barium	7.5E-04	2.1E-04	3.4E-03	---	9.6E-05	---	---	---	---	4.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	1.2E-05	---	---	---	---	**1.8E+00**
Chromium (Total)	5.0E-02	3.6E-04	7.6E-01	---	1.1E-04	---	---	---	---	8.1E-01
Cobalt	1.2E-02	1.2E-04	7.3E-02	---	2.6E-05	---	---	---	---	8.6E-02
Copper	7.5E-02	1.2E-02	**2.0E+00**	---	2.5E-04	---	---	---	---	**2.1E+00**
Lead	4.7E-02	1.1E-04	**1.1E+00**	---	6.3E-05	---	---	---	---	**1.2E+00**
Manganese	5.4E-04	3.0E-04	1.8E-03	---	8.4E-05	---	---	---	---	2.7E-03
Molybdenum	2.6E-04	9.4E-04	1.2E-02	---	9.3E-07	---	---	---	---	1.3E-02
Nickel	1.2E-02	4.0E-04	6.4E-01	---	3.3E-05	---	---	---	---	6.5E-01
Selenium	1.0E-02	5.5E-04	4.9E-01	---	9.1E-05	---	---	---	---	5.0E-01
Thallium	4.9E-03	5.6E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.6E-02
Uranium	1.1E-04	3.3E-07	1.7E-04	---	1.6E-07	---	---	---	---	2.8E-04
Vanadium	3.4E-01	2.4E-03	7.1E-01	---	7.0E-04	---	---	---	---	**1.1E+00**
Zinc	5.2E-03	6.1E-04	**1.3E+00**	---	2.3E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.1E-05	6.7E-04	2.8E-04	4.2E-03	1.6E-03	6.8E-03
Barium	---	---	---	---	7.5E-06	1.4E-04	3.7E-05	3.1E-04	1.8E-03	2.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	9.6E-07	3.7E-04	4.9E-05	7.1E-03	1.5E-03	9.0E-03
Chromium (Total)	---	---	---	---	2.5E-05	1.2E-02	7.4E-04	3.5E-02	2.6E-03	5.0E-02
Cobalt	---	---	---	---	6.1E-06	3.5E-03	2.9E-04	1.4E-04	2.1E-03	6.0E-03
Copper	---	---	---	---	1.9E-05	2.7E-03	1.5E-03	9.7E-02	4.5E-02	1.5E-01
Lead	---	---	---	---	1.5E-05	9.3E-03	5.8E-04	1.5E-02	7.7E-03	3.2E-02
Manganese	---	---	---	---	2.0E-05	5.2E-04	2.2E-04	1.3E-03	1.7E-03	3.8E-03
Molybdenum	---	---	---	---	7.3E-08	1.4E-05	7.9E-05	1.2E-04	2.1E-04	4.3E-04
Nickel	---	---	---	---	7.7E-06	2.6E-03	5.7E-04	5.9E-03	2.1E-03	1.1E-02
Selenium	---	---	---	---	2.1E-05	2.7E-03	4.9E-04	2.8E-02	1.1E-01	1.5E-01
Thallium	---	---	---	---	3.2E-06	8.2E-04	1.2E-03	2.6E-03	6.4E-03	1.1E-02
Uranium	---	---	---	---	4.1E-08	2.2E-05	9.8E-06	5.9E-06	8.2E-06	4.6E-05
Vanadium	---	---	---	---	1.6E-04	7.9E-02	1.5E-02	2.3E-02	4.2E-02	1.6E-01
Zinc	---	---	---	---	5.5E-06	1.2E-03	5.8E-04	3.9E-02	1.4E-01	1.9E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.4E-05	8.7E-04	2.0E-03	6.7E-02	---	7.0E-02
Barium	---	---	---	---	9.7E-06	1.8E-04	2.6E-04	4.8E-03	---	5.3E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.2E-06	4.8E-04	3.4E-04	1.1E-01	---	1.1E-01
Chromium (Total)	---	---	---	---	3.2E-05	1.5E-02	5.2E-03	5.5E-01	---	5.7E-01
Cobalt	---	---	---	---	7.8E-06	4.6E-03	2.0E-03	2.1E-03	---	8.7E-03
Copper	---	---	---	---	2.5E-05	3.5E-03	1.0E-02	**1.5E+00**	---	**1.5E+00**
Lead	---	---	---	---	1.9E-05	1.2E-02	4.0E-03	2.3E-01	---	2.5E-01
Manganese	---	---	---	---	2.5E-05	6.7E-04	1.6E-03	2.0E-02	---	2.2E-02
Molybdenum	---	---	---	---	9.4E-08	1.9E-05	5.5E-04	1.9E-03	---	2.5E-03
Nickel	---	---	---	---	9.9E-06	3.3E-03	4.0E-03	9.3E-02	---	1.0E-01
Selenium	---	---	---	---	2.7E-05	3.5E-03	3.5E-03	4.3E-01	---	4.4E-01
Thallium	---	---	---	---	3.4E-06	8.8E-04	7.2E-03	3.4E-02	---	4.2E-02
Uranium	---	---	---	---	5.0E-08	2.7E-05	6.6E-05	8.9E-05	---	1.8E-04
Vanadium	---	---	---	---	2.1E-04	1.0E-01	1.0E-01	3.7E-01	---	5.7E-01
Zinc	---	---	---	---	7.0E-06	1.6E-03	4.1E-03	6.1E-01	---	6.2E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-05	3.0E-05	2.7E-04	---	1.1E-05	1.1E-03	1.1E-02	3.2E-02	---	4.4E-02
Barium	7.7E-06	6.6E-05	1.1E-05	---	8.1E-06	2.2E-04	1.4E-03	2.3E-03	---	4.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	1.0E-06	5.9E-04	1.8E-03	5.3E-02	---	6.2E-02
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	1.9E-02	2.8E-02	2.6E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.7E-03	1.1E-02	1.0E-03	---	1.9E-02
Copper	7.7E-04	3.8E-03	6.6E-03	---	2.1E-05	4.4E-03	5.5E-02	7.3E-01	---	8.0E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	2.6E-06	3.0E-04	3.9E-05	---	7.9E-08	2.3E-05	3.0E-03	9.1E-04	---	4.3E-03
Nickel	3.8E-04	3.8E-04	6.2E-03	---	8.3E-06	4.2E-03	2.2E-02	4.4E-02	---	7.7E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.3E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	1.0E-04	3.6E-05	7.5E-05	---	3.3E-06	1.3E-03	4.5E-02	1.9E-02	---	6.5E-02
Uranium	3.3E-06	3.2E-07	1.7E-06	---	4.2E-08	3.4E-05	3.5E-04	4.3E-05	---	4.4E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.8E-04	1.3E-01	5.7E-01	1.8E-01	---	8.9E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.9E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.9E-04	9.1E-05	8.2E-04	---	3.4E-05	3.2E-03	3.2E-02	9.6E-02	---	1.3E-01
Barium	2.3E-05	2.0E-04	3.3E-05	---	2.4E-05	6.7E-04	4.2E-03	6.9E-03	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	3.1E-06	1.8E-03	5.5E-03	1.6E-01	---	1.9E-01
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	1.9E-02	2.8E-02	2.6E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.7E-03	1.1E-02	1.0E-03	---	1.9E-02
Copper	2.3E-03	1.1E-02	2.0E-02	---	6.3E-05	1.3E-02	1.6E-01	**2.2E+00**	---	**2.4E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	7.9E-06	9.1E-04	1.2E-04	---	2.4E-07	7.0E-05	8.9E-03	2.7E-03	---	1.3E-02
Nickel	3.8E-04	3.8E-04	6.2E-03	---	8.3E-06	4.2E-03	2.2E-02	4.4E-02	---	7.7E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.3E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	3.8E-03	1.3E-01	5.6E-02	---	1.9E-01
Uranium	3.3E-06	3.2E-07	1.7E-06	---	4.2E-08	3.4E-05	3.5E-04	4.3E-05	---	4.4E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.8E-04	1.3E-01	5.7E-01	1.8E-01	---	8.9E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.9E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.9E-04	---	---	1.3E-04	1.2E-05	---	---	---	---	5.3E-04
Barium	3.1E-05	---	---	2.2E-04	8.4E-06	---	---	---	---	2.6E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	1.1E-06	---	---	---	---	7.4E-03
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	3.1E-03	---	---	8.6E-02	2.2E-05	---	---	---	---	8.9E-02
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.3E-04
Molybdenum	1.1E-05	---	---	1.2E-04	8.1E-08	---	---	---	---	1.3E-04
Nickel	1.5E-03	---	---	1.4E-02	8.5E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.4E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.8E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	6.1E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	3.9E-04	3.5E-05	---	---	---	---	1.6E-03
Barium	9.4E-05	---	---	6.5E-04	2.5E-05	---	---	---	---	7.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	9.4E-03	---	---	2.6E-01	6.5E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.3E-04
Molybdenum	3.2E-05	---	---	3.5E-04	2.4E-07	---	---	---	---	3.9E-04
Nickel	1.5E-03	---	---	1.4E-02	8.5E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.4E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.8E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.8E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	6.1E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.9E-03	---	6.8E-04	9.4E-04	5.3E-05	---	---	---	---	3.6E-03
Barium	1.5E-04	---	2.7E-05	1.6E-03	3.8E-05	---	---	---	---	1.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.4E-02	5.3E-02	4.8E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.0E-02	---	6.2E-03	7.5E-02	4.2E-05	---	---	---	---	9.1E-02
Cobalt	2.5E-03	---	5.9E-04	4.1E-03	1.0E-05	---	---	---	---	7.1E-03
Copper	1.5E-02	---	1.7E-02	6.3E-01	9.7E-05	---	---	---	---	6.6E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.5E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.4E-04	3.3E-05	---	---	---	---	5.0E-04
Molybdenum	5.2E-05	---	9.8E-05	8.6E-04	3.6E-07	---	---	---	---	1.0E-03
Nickel	2.5E-03	---	5.2E-03	3.3E-02	1.3E-05	---	---	---	---	4.1E-02
Selenium	2.0E-03	---	4.0E-03	1.4E-01	3.5E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.1E-05	---	1.4E-06	3.7E-06	6.4E-08	---	---	---	---	2.7E-05
Vanadium	6.9E-02	---	5.8E-03	6.4E-02	2.7E-04	---	---	---	---	1.4E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	9.1E-06	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.0E-02	---	3.6E-05	1.2E-03	3.3E-03	7.6E-02	4.2E-04	9.2E-02
Barium	9.2E-05	---	4.2E-04	---	2.5E-05	2.4E-04	4.5E-04	5.5E-03	4.7E-04	7.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	3.2E-06	6.4E-04	5.8E-04	1.3E-01	4.0E-04	3.5E-01
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	6.2E-03	3.5E-03	2.4E-03	5.6E-04	4.4E-02
Copper	9.2E-03	---	2.5E-01	---	6.6E-05	4.7E-03	1.7E-02	**1.7E+00**	1.2E-02	**2.0E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	1.6E-02	6.9E-03	2.6E-01	2.0E-03	7.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	3.1E-05	---	1.5E-03	---	2.5E-07	2.5E-05	9.4E-04	2.2E-03	5.7E-05	4.7E-03
Nickel	4.5E-03	---	2.4E-01	---	2.6E-05	4.5E-03	6.8E-03	1.1E-01	5.5E-04	3.6E-01
Selenium	3.7E-03	---	1.8E-01	---	7.2E-05	4.8E-03	5.9E-03	4.9E-01	3.0E-02	7.2E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	6.7E-04	6.9E-03	2.2E-02	7.9E-04	3.2E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	3.7E-05	1.1E-04	1.0E-04	2.1E-06	3.6E-04
Vanadium	1.3E-01	---	2.6E-01	---	5.5E-04	1.4E-01	1.8E-01	4.2E-01	1.1E-02	**1.1E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.8E-05	2.2E-03	7.0E-03	7.0E-01	3.8E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.5E-03	---	3.1E-02	---	1.1E-04	3.5E-03	1.0E-02	2.3E-01	1.3E-03	2.8E-01
Barium	2.7E-04	---	1.2E-03	---	7.6E-05	7.3E-04	1.3E-03	1.6E-02	1.4E-03	2.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	9.7E-06	1.9E-03	1.7E-03	3.8E-01	1.2E-03	1.0E+00
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	6.2E-03	3.5E-03	2.4E-03	5.6E-04	4.4E-02
Copper	2.8E-02	---	7.6E-01	---	2.0E-04	1.4E-02	5.2E-02	**5.2E+00**	3.6E-02	**6.1E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	1.6E-02	6.9E-03	2.6E-01	2.0E-03	7.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	9.4E-05	---	4.5E-03	---	7.4E-07	7.6E-05	2.8E-03	6.5E-03	1.7E-04	1.4E-02
Nickel	4.5E-03	---	2.4E-01	---	2.6E-05	4.5E-03	6.8E-03	1.1E-01	5.5E-04	3.6E-01
Selenium	3.7E-03	---	1.8E-01	---	7.2E-05	4.8E-03	5.9E-03	4.9E-01	3.0E-02	7.2E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.0E-03	2.1E-02	6.5E-02	2.4E-03	9.7E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	3.7E-05	1.1E-04	1.0E-04	2.1E-06	3.6E-04
Vanadium	1.3E-01	---	2.6E-01	---	5.5E-04	1.4E-01	1.8E-01	4.2E-01	1.1E-02	**1.1E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.8E-05	2.2E-03	7.0E-03	7.0E-01	3.8E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.5E-04	2.2E-03	4.1E-04	---	1.4E-05	---	---	---	---	3.5E-03
Barium	6.8E-05	6.0E-03	1.6E-05	---	1.0E-05	---	---	---	---	6.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.4E-04	7.6E-03	8.7E-03	---	1.3E-06	---	---	---	---	1.7E-02
Chromium (Total)	1.4E-02	3.2E-02	1.1E-02	---	3.4E-05	---	---	---	---	5.7E-02
Cobalt	3.3E-03	1.0E-02	1.1E-03	---	8.3E-06	---	---	---	---	1.5E-02
Copper	6.8E-03	1.5E-01	9.9E-03	---	2.6E-05	---	---	---	---	1.6E-01
Lead	1.3E-02	2.1E-02	1.6E-02	---	2.0E-05	---	---	---	---	5.0E-02
Manganese	1.5E-04	9.1E-03	2.6E-05	---	2.7E-05	---	---	---	---	9.3E-03
Molybdenum	2.3E-05	8.3E-03	5.9E-05	---	9.9E-08	---	---	---	---	8.4E-03
Nickel	3.3E-03	1.4E-02	9.3E-03	---	1.0E-05	---	---	---	---	2.7E-02
Selenium	2.7E-03	3.3E-02	7.2E-03	---	2.9E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.8E-03	9.4E-05	---	3.5E-06	---	---	---	---	4.7E-03
Uranium	2.9E-05	3.3E-05	2.5E-06	---	5.2E-08	---	---	---	---	6.4E-05
Vanadium	9.3E-02	2.4E-01	1.0E-02	---	2.2E-04	---	---	---	---	3.4E-01
Zinc	1.4E-03	5.0E-02	1.9E-02	---	7.4E-06	---	---	---	---	7.0E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	9.0E-04	2.3E-03	2.2E-03	1.8E-05	5.3E-05	4.3E-05	---	---	2.1E-04	5.8E-03
Arsenic	1.6E-03	2.6E-03	7.2E-04	1.1E-04	6.4E-05	1.3E-04	---	---	3.9E-04	5.6E-03
Barium	3.1E-05	1.5E-03	7.0E-06	4.3E-05	1.0E-05	6.4E-06	---	---	9.5E-05	1.7E-03
Beryllium	1.5E-03	8.6E-03	1.7E-04	5.8E-04	9.1E-06	1.3E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	3.3E-06	4.6E-05	---	---	2.1E-04	2.0E-02
Chromium (Total)	1.1E-02	3.1E-02	8.5E-03	9.4E-03	3.9E-05	6.1E-04	---	---	1.6E-04	6.1E-02
Cobalt	6.3E-04	1.6E-03	1.9E-04	1.4E-04	2.8E-06	5.7E-05	---	---	4.0E-05	2.6E-03
Copper	2.5E-03	3.8E-02	3.3E-03	1.3E-02	2.0E-05	1.0E-04	---	---	1.9E-03	5.9E-02
Lead	1.9E-03	1.6E-03	2.3E-03	4.6E-03	6.5E-06	1.5E-04	---	---	1.4E-04	1.1E-02
Manganese	2.3E-04	1.1E-02	3.8E-05	9.4E-05	8.6E-05	8.4E-05	---	---	3.1E-04	1.2E-02
Molybdenum	9.6E-04	2.8E-01	2.3E-03	2.1E-03	5.0E-05	7.2E-05	---	---	5.9E-03	2.9E-01
Nickel	1.6E-02	8.4E-02	4.2E-02	1.6E-02	5.3E-05	5.4E-04	---	---	5.8E-04	1.6E-01
Selenium	2.4E-03	1.7E-02	5.9E-03	2.3E-02	7.1E-05	2.6E-04	---	---	1.5E-02	6.4E-02
Thallium	1.7E-02	4.4E-02	2.0E-03	1.9E-02	1.6E-04	1.5E-03	---	---	1.3E-02	9.6E-02
Uranium	7.5E-04	4.7E-04	6.2E-05	1.7E-05	1.2E-05	7.3E-05	---	---	9.5E-05	1.5E-03
Vanadium	3.6E-03	5.7E-03	3.7E-04	4.4E-04	1.9E-05	3.1E-04	---	---	2.0E-04	1.1E-02
Zinc	5.4E-04	1.1E-02	6.8E-03	9.5E-03	6.2E-06	5.0E-05	---	---	6.7E-03	3.4E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	8.2E-06	1.6E-04	---	3.0E-05	6.7E-04	9.9E-04
Arsenic	6.0E-04	---	---	2.0E-04	2.9E-05	1.5E-03	---	1.6E-02	3.8E-03	2.2E-02
Barium	1.1E-05	---	---	8.0E-05	4.6E-06	7.1E-05	---	2.6E-04	9.2E-04	1.3E-03
Beryllium	1.9E-04	---	---	3.6E-04	1.4E-06	4.9E-04	---	1.7E-03	4.2E-04	3.2E-03
Cadmium	1.5E-04	---	---	6.9E-03	1.5E-06	5.2E-04	---	1.6E-02	2.0E-03	2.6E-02
Chromium (Total)	4.1E-03	---	---	1.8E-02	1.8E-05	6.8E-03	---	3.3E-02	1.6E-03	6.3E-02
Cobalt	2.3E-04	---	---	2.6E-04	1.3E-06	6.4E-04	---	4.1E-05	3.8E-04	1.6E-03
Copper	9.4E-04	---	---	2.4E-02	9.4E-06	1.1E-03	---	6.7E-02	1.9E-02	1.1E-01
Lead	7.2E-04	---	---	8.5E-03	3.0E-06	1.7E-03	---	4.4E-03	1.3E-03	1.7E-02
Manganese	8.6E-05	---	---	1.8E-04	4.0E-05	9.3E-04	---	3.8E-03	3.0E-03	8.0E-03
Molybdenum	1.2E-04	---	---	1.3E-03	7.7E-06	2.6E-04	---	3.7E-03	1.9E-02	2.4E-02
Nickel	5.8E-03	---	---	3.0E-02	2.5E-05	6.0E-03	---	2.3E-02	5.6E-03	7.0E-02
Selenium	9.0E-04	---	---	4.2E-02	3.3E-05	2.9E-03	---	4.8E-02	1.5E-01	2.4E-01
Thallium	2.1E-03	---	---	1.2E-02	2.5E-05	5.6E-03	---	3.0E-02	4.3E-02	9.2E-02
Uranium	9.2E-05	---	---	1.1E-05	1.8E-06	2.7E-04	---	1.2E-04	3.1E-04	8.0E-04
Vanadium	1.3E-03	---	---	8.1E-04	8.9E-06	3.4E-03	---	1.7E-03	1.9E-03	9.2E-03
Zinc	2.0E-04	---	---	1.8E-02	2.9E-06	5.5E-04	---	2.9E-02	6.5E-02	1.1E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.8E-04	---	---	4.6E-05	1.8E-04	3.7E-04	---	---	9.6E-04
Arsenic	4.3E-04	3.7E-04	---	---	7.1E-05	7.4E-04	2.9E-03	---	---	4.5E-03
Barium	8.2E-06	2.3E-04	---	---	1.1E-05	3.5E-05	9.1E-05	---	---	3.8E-04
Beryllium	3.1E-04	1.2E-03	---	---	7.8E-06	5.5E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	3.6E-06	2.5E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	3.0E-03	4.4E-03	---	---	4.3E-05	3.3E-03	2.0E-03	---	---	1.3E-02
Cobalt	1.7E-04	2.3E-04	---	---	3.1E-06	3.1E-04	2.5E-04	---	---	9.6E-04
Copper	6.7E-04	4.0E-03	---	---	2.3E-05	5.6E-04	2.9E-03	---	---	8.1E-03
Lead	5.1E-04	2.9E-04	---	---	7.2E-06	8.2E-04	4.8E-04	---	---	2.1E-03
Manganese	6.2E-05	9.6E-04	---	---	9.5E-05	4.6E-04	1.9E-03	---	---	3.5E-03
Molybdenum	2.0E-04	1.7E-02	---	---	4.3E-05	3.0E-04	1.6E-02	---	---	3.3E-02
Nickel	4.2E-03	9.4E-03	---	---	5.9E-05	3.0E-03	6.3E-03	---	---	2.3E-02
Selenium	6.5E-04	2.3E-03	---	---	7.9E-05	1.4E-03	2.4E-03	---	---	6.9E-03
Thallium	3.4E-03	5.7E-03	---	---	1.4E-04	6.4E-03	9.4E-02	---	---	1.1E-01
Uranium	1.5E-04	5.8E-05	---	---	9.9E-06	3.1E-04	1.3E-03	---	---	1.9E-03
Vanadium	9.5E-04	8.8E-04	---	---	2.1E-05	1.7E-03	3.0E-03	---	---	6.6E-03
Zinc	1.5E-04	1.6E-03	---	---	6.9E-06	2.7E-04	1.2E-03	---	---	3.3E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.4E-04	---	---	7.9E-05	3.8E-05	---	---	---	---	5.5E-04
Arsenic	1.4E-03	---	---	8.2E-04	7.9E-05	---	---	---	---	2.3E-03
Barium	2.6E-05	---	---	3.3E-04	1.3E-05	---	---	---	---	3.7E-04
Beryllium	7.4E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	4.8E-05	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	3.5E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	2.5E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	4.7E-04	---	---	9.5E-03	3.6E-05	---	---	---	---	1.0E-02
Nickel	1.3E-02	---	---	1.3E-01	6.7E-05	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	8.9E-05	---	---	---	---	1.8E-01
Thallium	8.1E-03	---	---	8.4E-02	1.2E-04	---	---	---	---	9.2E-02
Uranium	3.6E-04	---	---	7.7E-05	8.3E-06	---	---	---	---	4.5E-04
Vanadium	3.0E-03	---	---	3.4E-03	2.4E-05	---	---	---	---	6.4E-03
Zinc	4.6E-04	---	---	7.4E-02	7.7E-06	---	---	---	---	7.5E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.4E-04	1.1E-04	---	---	---	---	1.7E-03
Arsenic	1.4E-03	---	---	8.2E-04	7.9E-05	---	---	---	---	2.3E-03
Barium	2.6E-05	---	---	3.3E-04	1.3E-05	---	---	---	---	3.7E-04
Beryllium	7.4E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	4.8E-05	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	3.5E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	2.5E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.1E-04	---	---	---	---	3.0E-02
Nickel	1.3E-02	---	---	1.3E-01	6.7E-05	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	8.9E-05	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.8E-01
Uranium	1.1E-03	---	---	2.3E-04	2.5E-05	---	---	---	---	1.4E-03
Vanadium	3.0E-03	---	---	3.4E-03	2.4E-05	---	---	---	---	6.4E-03
Zinc	4.6E-04	---	---	7.4E-02	7.7E-06	---	---	---	---	7.5E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.9E-03	3.6E-03	---	---	1.8E-04	---	---	---	---	9.7E-03
Arsenic	2.9E-03	1.6E-03	---	---	5.8E-05	---	---	---	---	4.5E-03
Barium	5.5E-05	9.8E-04	---	---	9.1E-06	---	---	---	---	1.0E-03
Beryllium	3.3E-03	8.1E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	3.0E-06	---	---	---	---	3.6E-03
Chromium (Total)	2.0E-02	1.9E-02	---	---	3.5E-05	---	---	---	---	3.8E-02
Cobalt	1.1E-03	9.7E-04	---	---	2.6E-06	---	---	---	---	2.1E-03
Copper	4.5E-03	1.7E-02	---	---	1.8E-05	---	---	---	---	2.1E-02
Lead	3.4E-03	1.2E-03	---	---	5.9E-06	---	---	---	---	4.6E-03
Manganese	4.1E-04	4.1E-03	---	---	7.8E-05	---	---	---	---	4.5E-03
Molybdenum	6.4E-03	3.4E-01	---	---	1.7E-04	---	---	---	---	3.5E-01
Nickel	2.8E-02	4.0E-02	---	---	4.8E-05	---	---	---	---	6.8E-02
Selenium	4.3E-03	9.8E-03	---	---	6.5E-05	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.2E-01	---	---	5.5E-04	---	---	---	---	2.3E-01
Uranium	4.9E-03	1.2E-03	---	---	3.9E-05	---	---	---	---	6.2E-03
Vanadium	6.3E-03	3.7E-03	---	---	1.8E-05	---	---	---	---	1.0E-02
Zinc	9.6E-04	6.8E-03	---	---	5.6E-06	---	---	---	---	7.7E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.7E-03	5.4E-04	1.3E-01	---	3.8E-05	---	---	---	---	1.3E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	1.7E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	2.7E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	6.4E-06	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	1.0E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	7.5E-06	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	5.4E-05	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	1.6E-03	2.7E-02	7.1E-02	---	1.9E-05	---	---	---	---	1.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.4E-04	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.9E-04	---	---	---	---	**1.3E+00**
Thallium	5.0E-02	1.7E-02	1.1E-01	---	1.2E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.5E-05	1.9E-03	---	4.4E-06	---	---	---	---	3.2E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	5.1E-05	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	1.6E-05	---	---	---	---	**1.5E+00**

Notes:

Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-03	1.6E-03	3.8E-01	---	1.1E-04	---	---	---	---	3.9E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	1.7E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	2.7E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	6.4E-06	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	1.0E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	7.5E-06	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	5.4E-05	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	4.7E-03	8.2E-02	2.1E-01	---	5.8E-05	---	---	---	---	3.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.4E-04	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.9E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.5E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.9E-04	5.7E-03	---	1.3E-05	---	---	---	---	9.6E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	5.1E-05	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	1.6E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.7E-04	1.4E-03	---	---	4.6E-05	---	---	---	---	1.9E-03
Arsenic	3.1E-03	5.8E-03	---	---	2.1E-04	---	---	---	---	9.1E-03
Barium	6.0E-05	3.4E-03	---	---	3.3E-05	---	---	---	---	3.5E-03
Beryllium	7.9E-04	5.2E-03	---	---	7.9E-06	---	---	---	---	6.0E-03
Cadmium	7.9E-04	1.3E-02	---	---	1.1E-05	---	---	---	---	1.4E-02
Chromium (Total)	2.2E-02	7.0E-02	---	---	1.3E-04	---	---	---	---	9.1E-02
Cobalt	1.2E-03	3.5E-03	---	---	9.1E-06	---	---	---	---	4.7E-03
Copper	4.9E-03	8.4E-02	---	---	6.6E-05	---	---	---	---	8.9E-02
Lead	3.7E-03	3.6E-03	---	---	2.1E-05	---	---	---	---	7.3E-03
Manganese	4.5E-04	2.3E-02	---	---	2.8E-04	---	---	---	---	2.4E-02
Molybdenum	2.8E-04	9.0E-02	---	---	2.4E-05	---	---	---	---	9.0E-02
Nickel	3.0E-02	1.8E-01	---	---	1.7E-04	---	---	---	---	2.1E-01
Selenium	4.7E-03	3.9E-02	---	---	2.3E-04	---	---	---	---	4.4E-02
Thallium	8.7E-03	2.7E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	5.7E-06	---	---	---	---	3.9E-04
Vanadium	6.9E-03	1.3E-02	---	---	6.3E-05	---	---	---	---	2.0E-02
Zinc	1.1E-03	2.4E-02	---	---	2.0E-05	---	---	---	---	2.5E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.1E-04	3.0E-03	---	---	7.0E-05	9.4E-05	1.9E-03	---	---	5.8E-03
Arsenic	8.2E-04	3.1E-03	---	---	5.3E-05	1.9E-04	7.5E-03	---	---	1.2E-02
Barium	1.6E-05	2.0E-03	---	---	8.4E-06	9.0E-06	2.3E-04	---	---	2.2E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	2.9E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	2.8E-06	6.5E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	5.6E-03	3.7E-02	---	---	3.2E-05	8.6E-04	5.1E-03	---	---	4.9E-02
Cobalt	3.2E-04	1.9E-03	---	---	2.4E-06	8.1E-05	6.3E-04	---	---	3.0E-03
Copper	1.3E-03	3.4E-02	---	---	1.7E-05	1.4E-04	7.4E-03	---	---	4.2E-02
Lead	9.8E-04	2.4E-03	---	---	5.4E-06	2.1E-04	1.2E-03	---	---	4.8E-03
Manganese	1.2E-04	8.1E-03	---	---	7.2E-05	1.2E-04	4.8E-03	---	---	1.3E-02
Molybdenum	7.6E-04	2.8E-01	---	---	6.5E-05	1.6E-04	8.2E-02	---	---	3.7E-01
Nickel	8.0E-03	7.9E-02	---	---	4.5E-05	7.6E-04	1.6E-02	---	---	1.0E-01
Selenium	1.2E-03	1.9E-02	---	---	6.0E-05	3.6E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.6E-02	---	---	2.1E-04	3.4E-03	4.9E-01	---	---	6.0E-01
Uranium	5.9E-04	9.9E-04	---	---	1.5E-05	1.6E-04	6.8E-03	---	---	8.6E-03
Vanadium	1.8E-03	7.4E-03	---	---	1.6E-05	4.4E-04	7.8E-03	---	---	1.8E-02
Zinc	2.8E-04	1.3E-02	---	---	5.2E-06	7.0E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.3E-05	---	---	3.2E-06	3.8E-05	2.9E-04	---	6.7E-05	1.2E-03	1.7E-03
Arsenic	1.0E-04	---	---	3.3E-05	7.9E-05	1.6E-03	---	2.0E-02	3.9E-03	2.6E-02
Barium	2.0E-06	---	---	1.4E-05	1.3E-05	7.6E-05	---	3.3E-04	9.6E-04	1.4E-03
Beryllium	5.5E-05	---	---	1.1E-04	6.5E-06	9.1E-04	---	3.8E-03	7.7E-04	5.7E-03
Cadmium	2.6E-05	---	---	1.2E-03	4.1E-06	5.5E-04	---	2.1E-02	2.1E-03	2.5E-02
Chromium (Total)	7.1E-04	---	---	3.0E-03	4.8E-05	7.3E-03	---	4.2E-02	1.7E-03	5.5E-02
Cobalt	4.0E-05	---	---	4.4E-05	3.5E-06	6.9E-04	---	5.2E-05	4.0E-04	1.2E-03
Copper	1.6E-04	---	---	4.1E-03	2.5E-05	1.2E-03	---	8.5E-02	1.9E-02	1.1E-01
Lead	1.2E-04	---	---	1.5E-03	8.1E-06	1.8E-03	---	5.6E-03	1.4E-03	1.0E-02
Manganese	1.5E-05	---	---	3.0E-05	1.1E-04	1.0E-03	---	4.8E-03	3.1E-03	9.1E-03
Molybdenum	3.5E-05	---	---	3.9E-04	3.6E-05	4.9E-04	---	8.2E-03	3.5E-02	4.4E-02
Nickel	9.9E-04	---	---	5.1E-03	6.7E-05	6.5E-03	---	2.9E-02	5.9E-03	4.8E-02
Selenium	1.5E-04	---	---	7.1E-03	8.9E-05	3.1E-03	---	6.1E-02	1.6E-01	2.3E-01
Thallium	6.1E-04	---	---	3.4E-03	1.2E-04	1.1E-02	---	6.6E-02	7.8E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	8.3E-06	5.0E-04	---	2.7E-04	5.6E-04	1.4E-03
Vanadium	2.3E-04	---	---	1.4E-04	2.4E-05	3.7E-03	---	2.1E-03	2.0E-03	8.2E-03
Zinc	3.4E-05	---	---	3.0E-03	7.7E-06	6.0E-04	---	3.7E-02	6.8E-02	1.1E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.6E-04	8.7E-05	2.6E-03	2.5E-05	3.5E-05	---	---	---	---	3.2E-03
Arsenic	1.7E-03	1.3E-04	1.7E-03	3.0E-04	8.5E-05	---	---	---	---	4.0E-03
Barium	3.3E-05	6.2E-05	1.7E-05	1.2E-04	1.3E-05	---	---	---	---	2.5E-04
Beryllium	7.8E-04	9.8E-05	2.0E-04	8.1E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	4.4E-06	---	---	---	---	3.5E-02
Chromium (Total)	1.2E-02	1.6E-03	2.0E-02	2.7E-02	5.2E-05	---	---	---	---	6.1E-02
Cobalt	6.7E-04	7.2E-05	4.6E-04	4.0E-04	3.8E-06	---	---	---	---	1.6E-03
Copper	2.7E-03	2.9E-03	7.9E-03	3.7E-02	2.7E-05	---	---	---	---	5.1E-02
Lead	2.1E-03	3.4E-05	5.5E-03	1.3E-02	8.7E-06	---	---	---	---	2.1E-02
Manganese	2.5E-04	9.0E-04	9.2E-05	2.7E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	5.0E-04	1.2E-02	2.7E-03	3.0E-03	3.3E-05	---	---	---	---	1.8E-02
Nickel	1.7E-02	5.8E-03	9.9E-02	4.6E-02	7.1E-05	---	---	---	---	1.7E-01
Selenium	2.6E-03	9.5E-04	1.4E-02	6.5E-02	9.5E-05	---	---	---	---	8.3E-02
Thallium	8.6E-03	6.8E-04	2.3E-03	2.6E-02	1.1E-04	---	---	---	---	3.8E-02
Uranium	3.9E-04	8.5E-06	7.2E-05	2.4E-05	7.5E-06	---	---	---	---	5.0E-04
Vanadium	3.8E-03	2.3E-04	8.9E-04	1.3E-03	2.6E-05	---	---	---	---	6.2E-03
Zinc	5.8E-04	4.6E-04	1.6E-02	2.7E-02	8.3E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.1E-03	2.7E-03	---	---	2.9E-05	---	---	---	---	4.9E-03
Arsenic	1.0E-02	1.1E-02	---	---	9.5E-05	---	---	---	---	2.2E-02
Barium	1.9E-04	7.1E-03	---	---	1.5E-05	---	---	---	---	7.3E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.1E-02
Cadmium	2.6E-03	2.1E-02	---	---	4.9E-06	---	---	---	---	2.4E-02
Chromium (Total)	7.0E-02	1.4E-01	---	---	5.7E-05	---	---	---	---	2.1E-01
Cobalt	3.9E-03	7.1E-03	---	---	4.2E-06	---	---	---	---	1.1E-02
Copper	1.6E-02	1.3E-01	---	---	3.0E-05	---	---	---	---	1.4E-01
Lead	1.2E-02	8.6E-03	---	---	9.6E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.1E-02	---	---	1.3E-04	---	---	---	---	3.3E-02
Molybdenum	2.2E-03	2.7E-01	---	---	2.8E-05	---	---	---	---	2.7E-01
Nickel	9.9E-02	3.0E-01	---	---	7.9E-05	---	---	---	---	3.9E-01
Selenium	1.5E-02	7.2E-02	---	---	1.1E-04	---	---	---	---	8.7E-02
Thallium	3.9E-02	8.3E-02	---	---	9.1E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.6E-04	---	---	6.4E-06	---	---	---	---	2.6E-03
Vanadium	2.2E-02	2.7E-02	---	---	2.9E-05	---	---	---	---	4.9E-02
Zinc	3.4E-03	4.9E-02	---	---	9.2E-06	---	---	---	---	5.2E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.2E-04	3.4E-03	---	---	5.4E-05	---	---	---	---	4.3E-03
Arsenic	1.4E-03	5.1E-03	---	---	6.3E-05	---	---	---	---	6.6E-03
Barium	2.8E-05	3.2E-03	---	---	1.0E-05	---	---	---	---	3.2E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.3E-02
Cadmium	3.6E-04	9.6E-03	---	---	3.3E-06	---	---	---	---	1.0E-02
Chromium (Total)	1.0E-02	6.1E-02	---	---	3.8E-05	---	---	---	---	7.1E-02
Cobalt	5.6E-04	3.2E-03	---	---	2.8E-06	---	---	---	---	3.7E-03
Copper	2.3E-03	5.7E-02	---	---	2.0E-05	---	---	---	---	5.9E-02
Lead	1.7E-03	3.9E-03	---	---	6.4E-06	---	---	---	---	5.6E-03
Manganese	2.1E-04	1.4E-02	---	---	8.5E-05	---	---	---	---	1.4E-02
Molybdenum	8.8E-04	3.3E-01	---	---	5.1E-05	---	---	---	---	3.3E-01
Nickel	1.4E-02	1.3E-01	---	---	5.3E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	3.2E-02	---	---	7.1E-05	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.7E-04	---	---	---	---	1.2E-01
Uranium	6.9E-04	1.1E-03	---	---	1.2E-05	---	---	---	---	1.8E-03
Vanadium	3.2E-03	1.2E-02	---	---	1.9E-05	---	---	---	---	1.5E-02
Zinc	4.9E-04	2.2E-02	---	---	6.1E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.7E-03	1.6E-03	8.8E-03	---	3.2E-05	---	---	---	---	1.5E-02
Barium	3.9E-04	3.3E-03	3.6E-04	---	2.1E-05	---	---	---	---	4.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.9E-03	7.8E-03	1.8E-01	---	2.5E-06	---	---	---	---	1.9E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	7.3E-05	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	1.7E-05	---	---	---	---	6.2E-02
Copper	3.9E-02	1.9E-01	2.1E-01	---	5.3E-05	---	---	---	---	4.4E-01
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	1.3E-04	1.4E-02	1.3E-03	---	1.1E-06	---	---	---	---	1.6E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.8E-05	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	7.4E-05	---	---	---	---	1.9E-01
Thallium	2.5E-03	8.9E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.6E-03
Uranium	1.5E-04	1.6E-05	5.3E-05	---	4.1E-07	---	---	---	---	2.2E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	4.9E-04	---	---	---	---	9.1E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	1.5E-05	---	---	---	---	4.4E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.8E-03	2.6E-02	---	9.5E-05	---	---	---	---	4.5E-02
Barium	1.2E-03	1.0E-02	1.1E-03	---	6.4E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.6E-03	2.4E-02	5.5E-01	---	7.6E-06	---	---	---	---	5.8E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	7.3E-05	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	1.7E-05	---	---	---	---	6.2E-02
Copper	1.2E-01	5.7E-01	6.3E-01	---	1.6E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	3.8E-04	4.3E-02	3.8E-03	---	3.4E-06	---	---	---	---	4.8E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.8E-05	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	7.4E-05	---	---	---	---	1.9E-01
Thallium	7.4E-03	2.7E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.6E-05	5.3E-05	---	4.1E-07	---	---	---	---	2.2E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	4.9E-04	---	---	---	---	9.1E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	1.5E-05	---	---	---	---	4.4E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.7E-04	---	---	5.5E-05	8.2E-06	2.6E-04	---	---	7.6E-04	1.3E-03
Barium	1.8E-05	---	---	1.3E-04	7.2E-06	7.0E-05	---	---	1.0E-03	1.3E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	6.6E-07	1.4E-04	---	---	6.3E-04	3.9E-03
Chromium (Total)	4.5E-03	---	---	1.9E-02	1.9E-05	4.6E-03	---	---	1.2E-03	2.9E-02
Cobalt	8.1E-04	---	---	8.9E-04	4.5E-06	1.4E-03	---	---	9.5E-04	4.0E-03
Copper	1.8E-03	---	---	4.8E-02	1.8E-05	1.4E-03	---	---	2.6E-02	7.7E-02
Lead	2.5E-03	---	---	3.0E-02	1.0E-05	3.6E-03	---	---	3.3E-03	3.9E-02
Manganese	3.0E-05	---	---	6.1E-05	1.3E-05	2.0E-04	---	---	7.4E-04	1.0E-03
Molybdenum	6.1E-06	---	---	6.7E-05	3.9E-07	8.4E-06	---	---	7.0E-04	7.8E-04
Nickel	1.8E-03	---	---	9.2E-03	7.4E-06	1.1E-03	---	---	1.2E-03	1.3E-02
Selenium	5.3E-04	---	---	2.5E-02	1.9E-05	1.0E-03	---	---	6.3E-02	9.0E-02
Thallium	2.5E-04	---	---	1.4E-03	3.0E-06	4.2E-04	---	---	3.7E-03	5.7E-03
Uranium	7.8E-06	---	---	8.9E-07	1.5E-07	1.4E-05	---	---	1.8E-05	4.1E-05
Vanadium	1.9E-02	---	---	1.2E-02	1.3E-04	3.1E-02	---	---	2.0E-02	8.2E-02
Zinc	2.8E-04	---	---	2.4E-02	3.9E-06	4.7E-04	---	---	6.3E-02	8.8E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-03	1.1E-04	8.6E-02	---	1.5E-04	---	---	---	---	9.6E-02
Barium	8.0E-04	2.2E-04	3.6E-03	---	1.0E-04	---	---	---	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	1.2E-05	---	---	---	---	**1.8E+00**
Chromium (Total)	8.6E-02	1.7E-03	**1.3E+00**	---	1.2E-04	---	---	---	---	**1.4E+00**
Cobalt	1.5E-02	2.5E-04	9.4E-02	---	2.8E-05	---	---	---	---	1.1E-01
Copper	8.0E-02	1.3E-02	**2.1E+00**	---	2.6E-04	---	---	---	---	**2.2E+00**
Lead	4.7E-02	1.2E-04	**1.1E+00**	---	6.3E-05	---	---	---	---	**1.2E+00**
Manganese	5.7E-04	3.1E-04	1.9E-03	---	8.4E-05	---	---	---	---	2.8E-03
Molybdenum	2.6E-04	9.6E-04	1.2E-02	---	5.4E-06	---	---	---	---	1.4E-02
Nickel	3.4E-02	1.7E-03	**1.8E+00**	---	4.6E-05	---	---	---	---	**1.8E+00**
Selenium	1.0E-02	5.6E-04	5.0E-01	---	1.2E-04	---	---	---	---	5.1E-01
Thallium	4.9E-03	5.8E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.7E-02
Uranium	1.1E-04	3.5E-07	1.7E-04	---	6.5E-07	---	---	---	---	2.8E-04
Vanadium	3.7E-01	3.3E-03	7.6E-01	---	7.9E-04	---	---	---	---	**1.1E+00**
Zinc	5.3E-03	6.2E-04	**1.3E+00**	---	2.4E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.2E-05	6.8E-04	2.9E-04	4.3E-03	1.8E-03	7.1E-03
Barium	---	---	---	---	8.1E-06	1.4E-04	3.8E-05	3.1E-04	1.9E-03	2.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	9.6E-07	3.7E-04	4.9E-05	7.1E-03	1.5E-03	9.0E-03
Chromium (Total)	---	---	---	---	2.8E-05	1.2E-02	7.4E-04	3.5E-02	2.9E-03	5.0E-02
Cobalt	---	---	---	---	6.5E-06	3.6E-03	2.9E-04	1.4E-04	2.2E-03	6.2E-03
Copper	---	---	---	---	2.0E-05	2.7E-03	1.5E-03	9.7E-02	4.7E-02	1.5E-01
Lead	---	---	---	---	1.5E-05	9.3E-03	5.8E-04	1.5E-02	7.7E-03	3.2E-02
Manganese	---	---	---	---	2.0E-05	5.2E-04	2.2E-04	1.3E-03	1.7E-03	3.8E-03
Molybdenum	---	---	---	---	4.3E-07	1.6E-05	9.0E-05	1.4E-04	1.2E-03	1.5E-03
Nickel	---	---	---	---	1.1E-05	2.9E-03	6.6E-04	6.8E-03	2.9E-03	1.3E-02
Selenium	---	---	---	---	2.8E-05	2.7E-03	4.9E-04	2.8E-02	1.5E-01	1.8E-01
Thallium	---	---	---	---	3.3E-06	8.2E-04	1.3E-03	2.6E-03	6.5E-03	1.1E-02
Uranium	---	---	---	---	1.6E-07	2.7E-05	1.2E-05	7.5E-06	3.3E-05	8.0E-05
Vanadium	---	---	---	---	1.9E-04	8.0E-02	1.5E-02	2.4E-02	4.7E-02	1.7E-01
Zinc	---	---	---	---	5.6E-06	1.2E-03	5.8E-04	3.9E-02	1.5E-01	1.9E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.5E-05	8.9E-04	2.0E-03	6.8E-02	---	7.1E-02
Barium	---	---	---	---	1.0E-05	1.8E-04	2.6E-04	4.9E-03	---	5.3E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.2E-06	4.8E-04	3.4E-04	1.1E-01	---	1.1E-01
Chromium (Total)	---	---	---	---	3.6E-05	1.5E-02	5.2E-03	5.5E-01	---	5.7E-01
Cobalt	---	---	---	---	8.3E-06	4.6E-03	2.1E-03	2.2E-03	---	8.9E-03
Copper	---	---	---	---	2.6E-05	3.5E-03	1.0E-02	**1.5E+00**	---	**1.5E+00**
Lead	---	---	---	---	1.9E-05	1.2E-02	4.0E-03	2.3E-01	---	2.5E-01
Manganese	---	---	---	---	2.5E-05	6.7E-04	1.6E-03	2.0E-02	---	2.2E-02
Molybdenum	---	---	---	---	5.5E-07	2.1E-05	6.3E-04	2.2E-03	---	2.8E-03
Nickel	---	---	---	---	1.4E-05	3.8E-03	4.6E-03	1.1E-01	---	1.2E-01
Selenium	---	---	---	---	3.6E-05	3.5E-03	3.5E-03	4.3E-01	---	4.4E-01
Thallium	---	---	---	---	3.5E-06	8.9E-04	7.3E-03	3.4E-02	---	4.3E-02
Uranium	---	---	---	---	2.0E-07	3.4E-05	8.3E-05	1.1E-04	---	2.3E-04
Vanadium	---	---	---	---	2.4E-04	1.0E-01	1.1E-01	3.7E-01	---	5.8E-01
Zinc	---	---	---	---	7.2E-06	1.6E-03	4.1E-03	6.1E-01	---	6.2E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.0E-04	3.4E-05	2.8E-04	---	1.3E-05	1.1E-03	1.1E-02	3.3E-02	---	4.5E-02
Barium	8.2E-06	7.1E-05	1.2E-05	---	8.7E-06	2.3E-04	1.4E-03	2.3E-03	---	4.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	1.0E-06	5.9E-04	1.8E-03	5.3E-02	---	6.2E-02
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	3.0E-05	1.9E-02	2.8E-02	2.6E-01	---	3.3E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	7.0E-06	5.8E-03	1.1E-02	1.0E-03	---	2.0E-02
Copper	8.2E-04	4.1E-03	6.7E-03	---	2.2E-05	4.4E-03	5.6E-02	7.3E-01	---	8.1E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	2.7E-06	3.1E-04	4.0E-05	---	4.6E-07	2.7E-05	3.4E-03	1.0E-03	---	4.8E-03
Nickel	1.0E-03	1.7E-03	1.7E-02	---	1.2E-05	4.8E-03	2.5E-02	5.1E-02	---	1.0E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	3.0E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	1.0E-04	3.8E-05	7.6E-05	---	3.3E-06	1.3E-03	4.5E-02	1.9E-02	---	6.5E-02
Uranium	3.3E-06	3.4E-07	1.7E-06	---	1.7E-07	4.3E-05	4.5E-04	5.4E-05	---	5.5E-04
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	2.0E-04	1.3E-01	5.7E-01	1.8E-01	---	9.1E-01
Zinc	1.6E-04	6.0E-04	1.3E-02	---	6.1E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.0E-04	1.0E-04	8.4E-04	---	3.9E-05	3.3E-03	3.3E-02	9.8E-02	---	1.4E-01
Barium	2.5E-05	2.1E-04	3.5E-05	---	2.6E-05	6.8E-04	4.3E-03	7.0E-03	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	3.1E-06	1.8E-03	5.5E-03	1.6E-01	---	1.9E-01
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	3.0E-05	1.9E-02	2.8E-02	2.6E-01	---	3.3E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	7.0E-06	5.8E-03	1.1E-02	1.0E-03	---	2.0E-02
Copper	2.5E-03	1.2E-02	2.0E-02	---	6.5E-05	1.3E-02	1.7E-01	**2.2E+00**	---	**2.4E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	8.1E-06	9.3E-04	1.2E-04	---	1.4E-06	8.0E-05	1.0E-02	3.1E-03	---	1.5E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	1.2E-05	4.8E-03	2.5E-02	5.1E-02	---	1.0E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	3.0E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	1.0E-05	3.8E-03	1.3E-01	5.7E-02	---	2.0E-01
Uranium	3.3E-06	3.4E-07	1.7E-06	---	1.7E-07	4.3E-05	4.5E-04	5.4E-05	---	5.5E-04
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	2.0E-04	1.3E-01	5.7E-01	1.8E-01	---	9.1E-01
Zinc	1.6E-04	6.0E-04	1.3E-02	---	6.1E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.0E-04	---	---	1.3E-04	1.3E-05	---	---	---	---	5.5E-04
Barium	3.3E-05	---	---	2.3E-04	8.9E-06	---	---	---	---	2.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	1.1E-06	---	---	---	---	7.4E-03
Chromium (Total)	1.1E-02	---	---	4.5E-02	3.1E-05	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	7.2E-06	---	---	---	---	4.1E-03
Copper	3.3E-03	---	---	8.6E-02	2.2E-05	---	---	---	---	9.0E-02
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.4E-04
Molybdenum	1.1E-05	---	---	1.2E-04	4.7E-07	---	---	---	---	1.3E-04
Nickel	4.2E-03	---	---	2.2E-02	1.2E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	3.1E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.4E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	1.7E-07	---	---	---	---	1.5E-05
Vanadium	4.6E-02	---	---	2.8E-02	2.1E-04	---	---	---	---	7.4E-02
Zinc	6.6E-04	---	---	5.8E-02	6.2E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	4.0E-04	4.0E-05	---	---	---	---	1.7E-03
Barium	9.9E-05	---	---	6.9E-04	2.7E-05	---	---	---	---	8.2E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.1E-02	---	---	4.5E-02	3.1E-05	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	7.2E-06	---	---	---	---	4.1E-03
Copper	1.0E-02	---	---	2.6E-01	6.7E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.4E-04
Molybdenum	3.3E-05	---	---	3.6E-04	1.4E-06	---	---	---	---	3.9E-04
Nickel	4.2E-03	---	---	2.2E-02	1.2E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	3.1E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.9E-03	1.0E-05	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	1.7E-07	---	---	---	---	1.5E-05
Vanadium	4.6E-02	---	---	2.8E-02	2.1E-04	---	---	---	---	7.4E-02
Zinc	6.6E-04	---	---	5.8E-02	6.2E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.0E-03	---	7.0E-04	9.7E-04	6.0E-05	---	---	---	---	3.7E-03
Barium	1.6E-04	---	2.9E-05	1.7E-03	4.0E-05	---	---	---	---	1.9E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.5E-02	5.3E-02	4.8E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.7E-02	---	1.1E-02	1.1E-01	4.6E-05	---	---	---	---	1.4E-01
Cobalt	3.1E-03	---	7.6E-04	5.2E-03	1.1E-05	---	---	---	---	9.1E-03
Copper	1.6E-02	---	1.7E-02	6.3E-01	1.0E-04	---	---	---	---	6.7E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.5E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.5E-04	3.3E-05	---	---	---	---	5.2E-04
Molybdenum	5.3E-05	---	1.0E-04	8.8E-04	2.1E-06	---	---	---	---	1.0E-03
Nickel	6.9E-03	---	1.4E-02	5.3E-02	1.8E-05	---	---	---	---	7.5E-02
Selenium	2.1E-03	---	4.0E-03	1.4E-01	4.6E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.2E-05	---	1.4E-06	3.7E-06	2.6E-07	---	---	---	---	2.7E-05
Vanadium	7.4E-02	---	6.2E-03	6.9E-02	3.1E-04	---	---	---	---	1.5E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	9.3E-06	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.1E-02	---	4.0E-05	1.2E-03	3.4E-03	7.8E-02	4.8E-04	9.5E-02
Barium	9.7E-05	---	4.4E-04	---	2.7E-05	2.4E-04	4.5E-04	5.5E-03	5.0E-04	7.3E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	3.2E-06	6.4E-04	5.8E-04	1.3E-01	4.0E-04	3.5E-01
Chromium (Total)	3.1E-02	---	4.8E-01	---	9.4E-05	2.1E-02	8.8E-03	6.3E-01	7.7E-04	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	2.2E-05	6.3E-03	3.5E-03	2.5E-03	5.9E-04	5.3E-02
Copper	9.8E-03	---	2.6E-01	---	6.8E-05	4.8E-03	1.8E-02	**1.7E+00**	1.2E-02	**2.0E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	1.6E-02	6.9E-03	2.6E-01	2.0E-03	7.2E-01
Manganese	2.1E-04	---	6.9E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	3.2E-05	---	1.5E-03	---	1.4E-06	2.9E-05	1.1E-03	2.5E-03	3.3E-04	5.5E-03
Nickel	1.2E-02	---	6.6E-01	---	3.6E-05	5.2E-03	7.9E-03	1.2E-01	7.7E-04	8.0E-01
Selenium	3.7E-03	---	1.8E-01	---	9.4E-05	4.8E-03	5.9E-03	4.9E-01	4.0E-02	7.3E-01
Thallium	6.0E-04	---	1.4E-03	---	5.1E-06	6.7E-04	7.0E-03	2.2E-02	8.1E-04	3.2E-02
Uranium	3.9E-05	---	6.4E-05	---	5.2E-07	4.6E-05	1.4E-04	1.3E-04	8.3E-06	4.3E-04
Vanadium	1.3E-01	---	2.8E-01	---	6.3E-04	1.4E-01	1.8E-01	4.2E-01	1.3E-02	**1.2E+00**
Zinc	1.9E-03	---	4.9E-01	---	1.9E-05	2.2E-03	7.0E-03	7.0E-01	4.0E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.6E-03	---	3.2E-02	---	1.2E-04	3.6E-03	1.0E-02	2.3E-01	1.4E-03	2.8E-01
Barium	2.9E-04	---	1.3E-03	---	8.2E-05	7.3E-04	1.4E-03	1.7E-02	1.5E-03	2.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	9.7E-06	1.9E-03	1.7E-03	3.8E-01	1.2E-03	1.0E+00
Chromium (Total)	3.1E-02	---	4.8E-01	---	9.4E-05	2.1E-02	8.8E-03	6.3E-01	7.7E-04	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	2.2E-05	6.3E-03	3.5E-03	2.5E-03	5.9E-04	5.3E-02
Copper	2.9E-02	---	7.7E-01	---	2.0E-04	1.4E-02	5.3E-02	**5.2E+00**	3.7E-02	**6.1E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	1.6E-02	6.9E-03	2.6E-01	2.0E-03	7.2E-01
Manganese	2.1E-04	---	6.9E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	9.6E-05	---	4.6E-03	---	4.3E-06	8.7E-05	3.2E-03	7.5E-03	9.9E-04	1.6E-02
Nickel	1.2E-02	---	6.6E-01	---	3.6E-05	5.2E-03	7.9E-03	1.2E-01	7.7E-04	8.0E-01
Selenium	3.7E-03	---	1.8E-01	---	9.4E-05	4.8E-03	5.9E-03	4.9E-01	4.0E-02	7.3E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.0E-03	2.1E-02	6.6E-02	2.4E-03	9.7E-02
Uranium	3.9E-05	---	6.4E-05	---	5.2E-07	4.6E-05	1.4E-04	1.3E-04	8.3E-06	4.3E-04
Vanadium	1.3E-01	---	2.8E-01	---	6.3E-04	1.4E-01	1.8E-01	4.2E-01	1.3E-02	**1.2E+00**
Zinc	1.9E-03	---	4.9E-01	---	1.9E-05	2.2E-03	7.0E-03	7.0E-01	4.0E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.8E-04	2.5E-03	4.2E-04	---	1.6E-05	---	---	---	---	3.8E-03
Barium	7.2E-05	6.5E-03	1.7E-05	---	1.1E-05	---	---	---	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.5E-04	7.7E-03	8.7E-03	---	1.3E-06	---	---	---	---	1.7E-02
Chromium (Total)	2.3E-02	1.1E-01	1.9E-02	---	3.8E-05	---	---	---	---	1.5E-01
Cobalt	4.2E-03	1.9E-02	1.4E-03	---	8.8E-06	---	---	---	---	2.4E-02
Copper	7.2E-03	1.6E-01	1.0E-02	---	2.7E-05	---	---	---	---	1.8E-01
Lead	1.3E-02	2.2E-02	1.6E-02	---	2.0E-05	---	---	---	---	5.1E-02
Manganese	1.5E-04	9.5E-03	2.7E-05	---	2.7E-05	---	---	---	---	9.7E-03
Molybdenum	2.4E-05	8.5E-03	6.0E-05	---	5.8E-07	---	---	---	---	8.6E-03
Nickel	9.2E-03	7.4E-02	2.6E-02	---	1.5E-05	---	---	---	---	1.1E-01
Selenium	2.8E-03	3.3E-02	7.2E-03	---	3.8E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.9E-03	9.5E-05	---	3.5E-06	---	---	---	---	4.8E-03
Uranium	2.9E-05	3.4E-05	2.5E-06	---	2.1E-07	---	---	---	---	6.6E-05
Vanadium	9.9E-02	2.9E-01	1.1E-02	---	2.5E-04	---	---	---	---	4.0E-01
Zinc	1.4E-03	5.1E-02	1.9E-02	---	7.6E-06	---	---	---	---	7.1E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.7E-04	2.2E-03	2.2E-03	1.7E-05	4.1E-05	3.6E-05	---	---	1.6E-04	5.5E-03
Arsenic	1.6E-03	2.3E-03	7.0E-04	1.0E-04	5.6E-05	1.3E-04	---	---	3.4E-04	5.2E-03
Barium	2.9E-05	1.4E-03	6.6E-06	4.0E-05	9.4E-06	6.4E-06	---	---	8.9E-05	1.6E-03
Beryllium	1.5E-03	8.3E-03	1.7E-04	5.7E-04	9.1E-06	1.3E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	3.3E-06	4.6E-05	---	---	2.1E-04	2.0E-02
Chromium (Total)	6.5E-03	8.5E-03	5.0E-03	6.4E-03	3.5E-05	6.1E-04	---	---	1.5E-04	2.7E-02
Cobalt	4.9E-04	8.5E-04	1.5E-04	1.1E-04	2.7E-06	5.6E-05	---	---	3.7E-05	1.7E-03
Copper	2.4E-03	3.6E-02	3.2E-03	1.3E-02	2.0E-05	1.0E-04	---	---	1.8E-03	5.6E-02
Lead	1.9E-03	1.5E-03	2.3E-03	4.6E-03	6.5E-06	1.5E-04	---	---	1.4E-04	1.1E-02
Manganese	2.2E-04	1.0E-02	3.7E-05	9.1E-05	8.6E-05	8.4E-05	---	---	3.1E-04	1.1E-02
Molybdenum	9.4E-04	2.7E-01	2.2E-03	2.1E-03	8.6E-06	6.2E-05	---	---	1.0E-03	2.8E-01
Nickel	5.7E-03	1.7E-02	1.5E-02	1.0E-02	3.8E-05	4.7E-04	---	---	4.1E-04	4.9E-02
Selenium	2.4E-03	1.7E-02	5.9E-03	2.2E-02	5.4E-05	2.6E-04	---	---	1.2E-02	6.0E-02
Thallium	1.6E-02	4.3E-02	1.9E-03	1.9E-02	1.6E-04	1.5E-03	---	---	1.3E-02	9.5E-02
Uranium	7.4E-04	4.6E-04	6.1E-05	1.7E-05	2.9E-06	5.8E-05	---	---	2.4E-05	1.4E-03
Vanadium	3.3E-03	4.6E-03	3.5E-04	4.1E-04	1.7E-05	3.1E-04	---	---	1.8E-04	9.1E-03
Zinc	5.3E-04	1.0E-02	6.8E-03	9.5E-03	6.0E-06	5.0E-05	---	---	6.5E-03	3.4E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	6.3E-06	1.3E-04	---	2.5E-05	5.1E-04	7.9E-04
Arsenic	5.8E-04	---	---	1.9E-04	2.6E-05	1.5E-03	---	1.5E-02	3.3E-03	2.1E-02
Barium	1.1E-05	---	---	7.5E-05	4.3E-06	7.1E-05	---	2.6E-04	8.6E-04	1.3E-03
Beryllium	1.8E-04	---	---	3.5E-04	1.4E-06	4.9E-04	---	1.7E-03	4.2E-04	3.2E-03
Cadmium	1.5E-04	---	---	6.9E-03	1.5E-06	5.2E-04	---	1.6E-02	2.0E-03	2.6E-02
Chromium (Total)	2.4E-03	---	---	1.2E-02	1.6E-05	6.7E-03	---	3.3E-02	1.4E-03	5.6E-02
Cobalt	1.8E-04	---	---	2.0E-04	1.2E-06	6.3E-04	---	4.0E-05	3.6E-04	1.4E-03
Copper	8.8E-04	---	---	2.4E-02	9.1E-06	1.1E-03	---	6.6E-02	1.8E-02	1.1E-01
Lead	7.1E-04	---	---	8.5E-03	3.0E-06	1.7E-03	---	4.4E-03	1.3E-03	1.7E-02
Manganese	8.3E-05	---	---	1.7E-04	4.0E-05	9.3E-04	---	3.8E-03	3.0E-03	8.0E-03
Molybdenum	1.2E-04	---	---	1.3E-03	1.3E-06	2.3E-04	---	3.2E-03	3.3E-03	8.1E-03
Nickel	2.1E-03	---	---	1.9E-02	1.8E-05	5.2E-03	---	2.0E-02	4.0E-03	5.0E-02
Selenium	8.9E-04	---	---	4.2E-02	2.5E-05	2.8E-03	---	4.8E-02	1.1E-01	2.1E-01
Thallium	2.0E-03	---	---	1.1E-02	2.5E-05	5.6E-03	---	3.0E-02	4.2E-02	9.1E-02
Uranium	9.2E-05	---	---	1.1E-05	4.5E-07	2.1E-04	---	9.7E-05	7.7E-05	4.9E-04
Vanadium	1.2E-03	---	---	7.6E-04	7.9E-06	3.4E-03	---	1.6E-03	1.7E-03	8.7E-03
Zinc	2.0E-04	---	---	1.8E-02	2.8E-06	5.5E-04	---	2.9E-02	6.3E-02	1.1E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.6E-04	---	---	3.5E-05	1.5E-04	3.1E-04	---	---	8.4E-04
Arsenic	4.2E-04	3.4E-04	---	---	6.2E-05	7.1E-04	2.9E-03	---	---	4.4E-03
Barium	7.8E-06	2.2E-04	---	---	1.0E-05	3.5E-05	9.0E-05	---	---	3.6E-04
Beryllium	3.0E-04	1.2E-03	---	---	7.8E-06	5.5E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	3.6E-06	2.5E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	1.7E-03	1.3E-03	---	---	3.9E-05	3.3E-03	2.0E-03	---	---	8.4E-03
Cobalt	1.3E-04	1.3E-04	---	---	2.9E-06	3.1E-04	2.4E-04	---	---	8.2E-04
Copper	6.3E-04	3.7E-03	---	---	2.2E-05	5.5E-04	2.8E-03	---	---	7.7E-03
Lead	5.1E-04	2.8E-04	---	---	7.2E-06	8.2E-04	4.8E-04	---	---	2.1E-03
Manganese	5.9E-05	9.2E-04	---	---	9.5E-05	4.6E-04	1.9E-03	---	---	3.4E-03
Molybdenum	1.9E-04	1.6E-02	---	---	7.4E-06	2.6E-04	1.4E-02	---	---	3.1E-02
Nickel	1.5E-03	1.7E-03	---	---	4.2E-05	2.6E-03	5.5E-03	---	---	1.1E-02
Selenium	6.4E-04	2.3E-03	---	---	6.0E-05	1.4E-03	2.4E-03	---	---	6.8E-03
Thallium	3.4E-03	5.6E-03	---	---	1.4E-04	6.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.7E-05	---	---	2.5E-06	2.4E-04	1.0E-03	---	---	1.5E-03
Vanadium	8.9E-04	7.3E-04	---	---	1.9E-05	1.7E-03	3.0E-03	---	---	6.3E-03
Zinc	1.4E-04	1.6E-03	---	---	6.7E-06	2.7E-04	1.2E-03	---	---	3.2E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.2E-04	---	---	7.7E-05	2.9E-05	---	---	---	---	5.3E-04
Arsenic	1.3E-03	---	---	8.0E-04	7.0E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.2E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	2.5E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	4.6E-04	---	---	9.3E-03	6.2E-06	---	---	---	---	9.8E-03
Nickel	4.8E-03	---	---	7.8E-02	4.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	6.8E-05	---	---	---	---	1.8E-01
Thallium	8.0E-03	---	---	8.3E-02	1.2E-04	---	---	---	---	9.1E-02
Uranium	3.6E-04	---	---	7.7E-05	2.1E-06	---	---	---	---	4.4E-04
Vanadium	2.8E-03	---	---	3.2E-03	2.1E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	7.5E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.3E-04	8.8E-05	---	---	---	---	1.6E-03
Arsenic	1.3E-03	---	---	8.0E-04	7.0E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.2E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	3.3E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	2.5E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	8.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	1.9E-05	---	---	---	---	2.9E-02
Nickel	4.8E-03	---	---	7.8E-02	4.8E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	6.8E-05	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.7E-01
Uranium	1.1E-03	---	---	2.3E-04	6.3E-06	---	---	---	---	1.3E-03
Vanadium	2.8E-03	---	---	3.2E-03	2.1E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	7.5E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.8E-03	3.4E-03	---	---	1.4E-04	---	---	---	---	9.3E-03
Arsenic	2.8E-03	1.4E-03	---	---	5.1E-05	---	---	---	---	4.3E-03
Barium	5.2E-05	9.2E-04	---	---	8.5E-06	---	---	---	---	9.8E-04
Beryllium	3.3E-03	7.8E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	3.0E-06	---	---	---	---	3.6E-03
Chromium (Total)	1.2E-02	5.6E-03	---	---	3.2E-05	---	---	---	---	1.7E-02
Cobalt	8.8E-04	5.5E-04	---	---	2.4E-06	---	---	---	---	1.4E-03
Copper	4.2E-03	1.6E-02	---	---	1.8E-05	---	---	---	---	2.0E-02
Lead	3.4E-03	1.2E-03	---	---	5.9E-06	---	---	---	---	4.6E-03
Manganese	3.9E-04	3.9E-03	---	---	7.8E-05	---	---	---	---	4.4E-03
Molybdenum	6.2E-03	3.3E-01	---	---	2.9E-05	---	---	---	---	3.4E-01
Nickel	1.0E-02	7.2E-03	---	---	3.5E-05	---	---	---	---	1.7E-02
Selenium	4.3E-03	9.7E-03	---	---	4.9E-05	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.1E-01	---	---	5.4E-04	---	---	---	---	2.2E-01
Uranium	4.9E-03	1.2E-03	---	---	9.8E-06	---	---	---	---	6.1E-03
Vanadium	5.9E-03	3.1E-03	---	---	1.5E-05	---	---	---	---	9.0E-03
Zinc	9.5E-04	6.7E-03	---	---	5.5E-06	---	---	---	---	7.6E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.6E-03	5.0E-04	1.2E-01	---	2.9E-05	---	---	---	---	1.3E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	1.5E-04	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.5E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	5.2E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	1.5E-03	2.7E-02	6.9E-02	---	3.3E-06	---	---	---	---	9.7E-02
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	1.0E-04	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.4E-04	---	---	---	---	**1.3E+00**
Thallium	4.9E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.3E-05	1.9E-03	---	1.1E-06	---	---	---	---	3.2E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	4.5E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.6E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.8E-03	1.5E-03	3.7E-01	---	8.7E-05	---	---	---	---	3.8E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	1.5E-04	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.5E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	7.0E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	5.2E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.7E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	4.6E-03	8.0E-02	2.1E-01	---	9.9E-06	---	---	---	---	2.9E-01
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	1.0E-04	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	1.4E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.8E-04	5.7E-03	---	3.4E-06	---	---	---	---	9.6E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	4.5E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.6E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	1.3E-03	---	---	3.5E-05	---	---	---	---	1.8E-03
Arsenic	3.0E-03	5.2E-03	---	---	1.8E-04	---	---	---	---	8.5E-03
Barium	5.6E-05	3.2E-03	---	---	3.0E-05	---	---	---	---	3.2E-03
Beryllium	7.7E-04	5.0E-03	---	---	7.9E-06	---	---	---	---	5.8E-03
Cadmium	7.9E-04	1.3E-02	---	---	1.1E-05	---	---	---	---	1.4E-02
Chromium (Total)	1.3E-02	1.9E-02	---	---	1.1E-04	---	---	---	---	3.2E-02
Cobalt	9.6E-04	1.9E-03	---	---	8.6E-06	---	---	---	---	2.9E-03
Copper	4.6E-03	7.8E-02	---	---	6.4E-05	---	---	---	---	8.2E-02
Lead	3.7E-03	3.5E-03	---	---	2.1E-05	---	---	---	---	7.3E-03
Manganese	4.3E-04	2.2E-02	---	---	2.8E-04	---	---	---	---	2.3E-02
Molybdenum	2.8E-04	8.8E-02	---	---	4.2E-06	---	---	---	---	8.8E-02
Nickel	1.1E-02	3.8E-02	---	---	1.2E-04	---	---	---	---	4.9E-02
Selenium	4.7E-03	3.8E-02	---	---	1.8E-04	---	---	---	---	4.3E-02
Thallium	8.6E-03	2.6E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.4E-06	---	---	---	---	3.7E-04
Vanadium	6.5E-03	1.0E-02	---	---	5.5E-05	---	---	---	---	1.7E-02
Zinc	1.0E-03	2.3E-02	---	---	1.9E-05	---	---	---	---	2.4E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	6.9E-04	2.8E-03	---	---	5.3E-05	7.8E-05	1.6E-03	---	---	5.2E-03
Arsenic	7.9E-04	2.8E-03	---	---	4.7E-05	1.8E-04	7.3E-03	---	---	1.1E-02
Barium	1.5E-05	1.8E-03	---	---	7.9E-06	8.9E-06	2.3E-04	---	---	2.1E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	2.9E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	2.8E-06	6.5E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	3.3E-03	1.1E-02	---	---	2.9E-05	8.5E-04	5.1E-03	---	---	2.0E-02
Cobalt	2.5E-04	1.1E-03	---	---	2.2E-06	7.9E-05	6.2E-04	---	---	2.1E-03
Copper	1.2E-03	3.1E-02	---	---	1.7E-05	1.4E-04	7.3E-03	---	---	3.9E-02
Lead	9.7E-04	2.4E-03	---	---	5.4E-06	2.1E-04	1.2E-03	---	---	4.8E-03
Manganese	1.1E-04	7.7E-03	---	---	7.2E-05	1.2E-04	4.8E-03	---	---	1.3E-02
Molybdenum	7.4E-04	2.8E-01	---	---	1.1E-05	1.4E-04	7.1E-02	---	---	3.5E-01
Nickel	2.9E-03	1.4E-02	---	---	3.2E-05	6.6E-04	1.4E-02	---	---	3.2E-02
Selenium	1.2E-03	1.9E-02	---	---	4.6E-05	3.6E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.5E-02	---	---	2.1E-04	3.3E-03	4.8E-01	---	---	5.9E-01
Uranium	5.9E-04	9.6E-04	---	---	3.8E-06	1.3E-04	5.4E-03	---	---	7.1E-03
Vanadium	1.7E-03	6.1E-03	---	---	1.4E-05	4.3E-04	7.7E-03	---	---	1.6E-02
Zinc	2.7E-04	1.3E-02	---	---	5.0E-06	7.0E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.2E-05	---	---	3.1E-06	2.9E-05	2.5E-04	---	5.6E-05	9.3E-04	1.3E-03
Arsenic	9.9E-05	---	---	3.2E-05	7.0E-05	1.6E-03	---	2.0E-02	3.5E-03	2.5E-02
Barium	1.8E-06	---	---	1.3E-05	1.2E-05	7.6E-05	---	3.3E-04	9.0E-04	1.3E-03
Beryllium	5.4E-05	---	---	1.0E-04	6.5E-06	9.1E-04	---	3.8E-03	7.7E-04	5.7E-03
Cadmium	2.6E-05	---	---	1.2E-03	4.1E-06	5.5E-04	---	2.1E-02	2.1E-03	2.5E-02
Chromium (Total)	4.1E-04	---	---	2.0E-03	4.4E-05	7.3E-03	---	4.2E-02	1.5E-03	5.3E-02
Cobalt	3.1E-05	---	---	3.4E-05	3.3E-06	6.7E-04	---	5.1E-05	3.8E-04	1.2E-03
Copper	1.5E-04	---	---	4.1E-03	2.5E-05	1.2E-03	---	8.5E-02	1.9E-02	1.1E-01
Lead	1.2E-04	---	---	1.4E-03	8.1E-06	1.8E-03	---	5.6E-03	1.4E-03	1.0E-02
Manganese	1.4E-05	---	---	2.9E-05	1.1E-04	1.0E-03	---	4.8E-03	3.1E-03	9.1E-03
Molybdenum	3.4E-05	---	---	3.8E-04	6.2E-06	4.3E-04	---	7.1E-03	6.0E-03	1.4E-02
Nickel	3.6E-04	---	---	3.2E-03	4.8E-05	5.6E-03	---	2.5E-02	4.2E-03	3.9E-02
Selenium	1.5E-04	---	---	7.1E-03	6.8E-05	3.1E-03	---	6.1E-02	1.2E-01	1.9E-01
Thallium	6.0E-04	---	---	3.4E-03	1.2E-04	1.0E-02	---	6.6E-02	7.6E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	2.1E-06	4.0E-04	---	2.1E-04	1.4E-04	7.9E-04
Vanadium	2.1E-04	---	---	1.3E-04	2.1E-05	3.6E-03	---	2.1E-03	1.8E-03	7.9E-03
Zinc	3.4E-05	---	---	3.0E-03	7.5E-06	6.0E-04	---	3.7E-02	6.6E-02	1.1E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	8.3E-05	2.5E-03	2.4E-05	2.7E-05	---	---	---	---	3.1E-03
Arsenic	1.7E-03	1.1E-04	1.7E-03	2.9E-04	7.5E-05	---	---	---	---	3.8E-03
Barium	3.1E-05	5.7E-05	1.6E-05	1.2E-04	1.3E-05	---	---	---	---	2.3E-04
Beryllium	7.7E-04	9.2E-05	1.9E-04	8.0E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	4.4E-06	---	---	---	---	3.4E-02
Chromium (Total)	6.9E-03	3.4E-04	1.2E-02	1.8E-02	4.7E-05	---	---	---	---	3.8E-02
Cobalt	5.2E-04	3.4E-05	3.6E-04	3.1E-04	3.5E-06	---	---	---	---	1.2E-03
Copper	2.5E-03	2.7E-03	7.8E-03	3.7E-02	2.6E-05	---	---	---	---	5.0E-02
Lead	2.0E-03	3.2E-05	5.5E-03	1.3E-02	8.7E-06	---	---	---	---	2.1E-02
Manganese	2.4E-04	8.7E-04	8.9E-05	2.6E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	4.9E-04	1.2E-02	2.6E-03	2.9E-03	5.6E-06	---	---	---	---	1.8E-02
Nickel	6.0E-03	1.3E-03	3.6E-02	2.9E-02	5.1E-05	---	---	---	---	7.2E-02
Selenium	2.6E-03	9.4E-04	1.4E-02	6.5E-02	7.3E-05	---	---	---	---	8.2E-02
Thallium	8.5E-03	6.5E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.7E-02
Uranium	3.9E-04	8.1E-06	7.2E-05	2.4E-05	1.9E-06	---	---	---	---	4.9E-04
Vanadium	3.5E-03	1.7E-04	8.4E-04	1.2E-03	2.3E-05	---	---	---	---	5.7E-03
Zinc	5.7E-04	4.5E-04	1.6E-02	2.7E-02	8.0E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.0E-03	2.6E-03	---	---	2.3E-05	---	---	---	---	4.6E-03
Arsenic	9.8E-03	1.0E-02	---	---	8.3E-05	---	---	---	---	2.0E-02
Barium	1.8E-04	6.6E-03	---	---	1.4E-05	---	---	---	---	6.8E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.0E-02
Cadmium	2.6E-03	2.1E-02	---	---	4.9E-06	---	---	---	---	2.4E-02
Chromium (Total)	4.1E-02	4.0E-02	---	---	5.2E-05	---	---	---	---	8.1E-02
Cobalt	3.1E-03	4.0E-03	---	---	3.9E-06	---	---	---	---	7.1E-03
Copper	1.5E-02	1.2E-01	---	---	2.9E-05	---	---	---	---	1.3E-01
Lead	1.2E-02	8.5E-03	---	---	9.6E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.0E-02	---	---	1.3E-04	---	---	---	---	3.1E-02
Molybdenum	2.2E-03	2.6E-01	---	---	4.8E-06	---	---	---	---	2.6E-01
Nickel	3.6E-02	5.5E-02	---	---	5.7E-05	---	---	---	---	9.0E-02
Selenium	1.5E-02	7.1E-02	---	---	8.1E-05	---	---	---	---	8.6E-02
Thallium	3.8E-02	8.1E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.3E-04	---	---	1.6E-06	---	---	---	---	2.6E-03
Vanadium	2.1E-02	2.2E-02	---	---	2.5E-05	---	---	---	---	4.3E-02
Zinc	3.4E-03	4.8E-02	---	---	9.0E-06	---	---	---	---	5.1E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-04	3.2E-03	---	---	4.2E-05	---	---	---	---	4.0E-03
Arsenic	1.4E-03	4.7E-03	---	---	5.6E-05	---	---	---	---	6.1E-03
Barium	2.6E-05	3.0E-03	---	---	9.3E-06	---	---	---	---	3.0E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.2E-02
Cadmium	3.6E-04	9.6E-03	---	---	3.3E-06	---	---	---	---	9.9E-03
Chromium (Total)	5.8E-03	1.8E-02	---	---	3.5E-05	---	---	---	---	2.4E-02
Cobalt	4.4E-04	1.8E-03	---	---	2.6E-06	---	---	---	---	2.2E-03
Copper	2.1E-03	5.3E-02	---	---	2.0E-05	---	---	---	---	5.5E-02
Lead	1.7E-03	3.8E-03	---	---	6.4E-06	---	---	---	---	5.6E-03
Manganese	2.0E-04	1.3E-02	---	---	8.5E-05	---	---	---	---	1.4E-02
Molybdenum	8.6E-04	3.2E-01	---	---	8.7E-06	---	---	---	---	3.2E-01
Nickel	5.1E-03	2.5E-02	---	---	3.8E-05	---	---	---	---	3.0E-02
Selenium	2.1E-03	3.2E-02	---	---	5.4E-05	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.8E-04	1.0E-03	---	---	3.0E-06	---	---	---	---	1.7E-03
Vanadium	3.0E-03	9.9E-03	---	---	1.7E-05	---	---	---	---	1.3E-02
Zinc	4.8E-04	2.2E-02	---	---	6.0E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.6E-03	1.4E-03	8.6E-03	---	2.8E-05	---	---	---	---	1.5E-02
Barium	3.6E-04	3.1E-03	3.4E-04	---	2.0E-05	---	---	---	---	3.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.8E-03	7.8E-03	1.8E-01	---	2.5E-06	---	---	---	---	1.9E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	3.6E-02	1.8E-01	2.1E-01	---	5.2E-05	---	---	---	---	4.2E-01
Lead	6.9E-02	5.0E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	1.2E-04	1.4E-02	1.2E-03	---	1.9E-07	---	---	---	---	1.6E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	2.0E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	5.6E-05	---	---	---	---	1.9E-01
Thallium	2.4E-03	8.7E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.5E-03
Uranium	1.5E-04	1.5E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	4.3E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.4E-05	---	---	---	---	4.3E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.3E-03	2.6E-02	---	8.4E-05	---	---	---	---	4.4E-02
Barium	1.1E-03	9.3E-03	1.0E-03	---	6.0E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.5E-03	2.3E-02	5.4E-01	---	7.6E-06	---	---	---	---	5.7E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.6E-05	---	---	---	---	4.5E-02
Copper	1.1E-01	5.3E-01	6.2E-01	---	1.5E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.0E-03	3.4E-01	---	3.9E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	3.7E-04	4.3E-02	3.7E-03	---	5.8E-07	---	---	---	---	4.7E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	2.0E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	5.6E-05	---	---	---	---	1.9E-01
Thallium	7.3E-03	2.6E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.5E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	4.3E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.4E-05	---	---	---	---	4.3E-01

Notes:

Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.6E-04	---	---	5.4E-05	7.2E-06	2.6E-04	---	---	6.7E-04	1.2E-03
Barium	1.7E-05	---	---	1.2E-04	6.8E-06	7.0E-05	---	---	9.8E-04	1.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	6.6E-07	1.4E-04	---	---	6.3E-04	3.9E-03
Chromium (Total)	2.6E-03	---	---	1.3E-02	1.7E-05	4.5E-03	---	---	1.1E-03	2.1E-02
Cobalt	6.4E-04	---	---	7.0E-04	4.2E-06	1.4E-03	---	---	8.9E-04	3.6E-03
Copper	1.7E-03	---	---	4.7E-02	1.8E-05	1.4E-03	---	---	2.5E-02	7.5E-02
Lead	2.5E-03	---	---	2.9E-02	1.0E-05	3.6E-03	---	---	3.3E-03	3.9E-02
Manganese	2.9E-05	---	---	5.8E-05	1.3E-05	2.0E-04	---	---	7.4E-04	1.0E-03
Molybdenum	6.0E-06	---	---	6.6E-05	6.7E-08	7.3E-06	---	---	1.2E-04	2.0E-04
Nickel	6.4E-04	---	---	5.7E-03	5.3E-06	9.9E-04	---	---	8.7E-04	8.2E-03
Selenium	5.3E-04	---	---	2.5E-02	1.5E-05	1.0E-03	---	---	4.8E-02	7.5E-02
Thallium	2.4E-04	---	---	1.4E-03	2.9E-06	4.2E-04	---	---	3.6E-03	5.7E-03
Uranium	7.7E-06	---	---	8.9E-07	3.7E-08	1.1E-05	---	---	4.6E-06	2.4E-05
Vanadium	1.8E-02	---	---	1.1E-02	1.1E-04	3.1E-02	---	---	1.8E-02	7.7E-02
Zinc	2.7E-04	---	---	2.4E-02	3.7E-06	4.7E-04	---	---	6.1E-02	8.6E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.4E-03	9.4E-05	8.4E-02	---	1.3E-04	---	---	---	---	9.4E-02
Barium	7.5E-04	2.1E-04	3.4E-03	---	9.6E-05	---	---	---	---	4.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	1.2E-05	---	---	---	---	**1.8E+00**
Chromium (Total)	5.0E-02	3.6E-04	7.6E-01	---	1.1E-04	---	---	---	---	8.1E-01
Cobalt	1.2E-02	1.2E-04	7.3E-02	---	2.6E-05	---	---	---	---	8.6E-02
Copper	7.5E-02	1.2E-02	**2.0E+00**	---	2.5E-04	---	---	---	---	**2.1E+00**
Lead	4.7E-02	1.1E-04	**1.1E+00**	---	6.3E-05	---	---	---	---	**1.2E+00**
Manganese	5.4E-04	3.0E-04	1.8E-03	---	8.4E-05	---	---	---	---	2.7E-03
Molybdenum	2.6E-04	9.4E-04	1.2E-02	---	9.3E-07	---	---	---	---	1.3E-02
Nickel	1.2E-02	4.0E-04	6.4E-01	---	3.3E-05	---	---	---	---	6.5E-01
Selenium	1.0E-02	5.5E-04	4.9E-01	---	9.1E-05	---	---	---	---	5.0E-01
Thallium	4.9E-03	5.6E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.6E-02
Uranium	1.1E-04	3.3E-07	1.7E-04	---	1.6E-07	---	---	---	---	2.8E-04
Vanadium	3.4E-01	2.4E-03	7.1E-01	---	7.0E-04	---	---	---	---	**1.1E+00**
Zinc	5.2E-03	6.1E-04	**1.3E+00**	---	2.3E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.1E-05	6.7E-04	2.8E-04	4.2E-03	1.6E-03	6.8E-03
Barium	---	---	---	---	7.5E-06	1.4E-04	3.7E-05	3.1E-04	1.8E-03	2.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	9.6E-07	3.7E-04	4.9E-05	7.1E-03	1.5E-03	9.0E-03
Chromium (Total)	---	---	---	---	2.5E-05	1.2E-02	7.4E-04	3.5E-02	2.6E-03	5.0E-02
Cobalt	---	---	---	---	6.1E-06	3.5E-03	2.9E-04	1.4E-04	2.1E-03	6.0E-03
Copper	---	---	---	---	1.9E-05	2.7E-03	1.5E-03	9.7E-02	4.5E-02	1.5E-01
Lead	---	---	---	---	1.5E-05	9.3E-03	5.8E-04	1.5E-02	7.7E-03	3.2E-02
Manganese	---	---	---	---	2.0E-05	5.2E-04	2.2E-04	1.3E-03	1.7E-03	3.8E-03
Molybdenum	---	---	---	---	7.3E-08	1.4E-05	7.9E-05	1.2E-04	2.1E-04	4.3E-04
Nickel	---	---	---	---	7.7E-06	2.6E-03	5.7E-04	5.9E-03	2.1E-03	1.1E-02
Selenium	---	---	---	---	2.1E-05	2.7E-03	4.9E-04	2.8E-02	1.1E-01	1.5E-01
Thallium	---	---	---	---	3.2E-06	8.2E-04	1.2E-03	2.6E-03	6.4E-03	1.1E-02
Uranium	---	---	---	---	4.1E-08	2.2E-05	9.8E-06	5.9E-06	8.2E-06	4.6E-05
Vanadium	---	---	---	---	1.6E-04	7.9E-02	1.5E-02	2.3E-02	4.2E-02	1.6E-01
Zinc	---	---	---	---	5.5E-06	1.2E-03	5.8E-04	3.9E-02	1.4E-01	1.9E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.4E-05	8.7E-04	2.0E-03	6.7E-02	---	7.0E-02
Barium	---	---	---	---	9.7E-06	1.8E-04	2.6E-04	4.8E-03	---	5.3E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.2E-06	4.8E-04	3.4E-04	1.1E-01	---	1.1E-01
Chromium (Total)	---	---	---	---	3.2E-05	1.5E-02	5.2E-03	5.5E-01	---	5.7E-01
Cobalt	---	---	---	---	7.8E-06	4.6E-03	2.0E-03	2.1E-03	---	8.7E-03
Copper	---	---	---	---	2.5E-05	3.5E-03	1.0E-02	**1.5E+00**	---	**1.5E+00**
Lead	---	---	---	---	1.9E-05	1.2E-02	4.0E-03	2.3E-01	---	2.5E-01
Manganese	---	---	---	---	2.5E-05	6.7E-04	1.6E-03	2.0E-02	---	2.2E-02
Molybdenum	---	---	---	---	9.4E-08	1.9E-05	5.5E-04	1.9E-03	---	2.5E-03
Nickel	---	---	---	---	9.9E-06	3.3E-03	4.0E-03	9.3E-02	---	1.0E-01
Selenium	---	---	---	---	2.7E-05	3.5E-03	3.5E-03	4.3E-01	---	4.4E-01
Thallium	---	---	---	---	3.4E-06	8.8E-04	7.2E-03	3.4E-02	---	4.2E-02
Uranium	---	---	---	---	5.0E-08	2.7E-05	6.6E-05	8.9E-05	---	1.8E-04
Vanadium	---	---	---	---	2.1E-04	1.0E-01	1.0E-01	3.7E-01	---	5.7E-01
Zinc	---	---	---	---	7.0E-06	1.6E-03	4.1E-03	6.1E-01	---	6.2E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-05	3.0E-05	2.7E-04	---	1.1E-05	1.1E-03	1.1E-02	3.2E-02	---	4.4E-02
Barium	7.7E-06	6.6E-05	1.1E-05	---	8.1E-06	2.2E-04	1.4E-03	2.3E-03	---	4.0E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	1.0E-06	5.9E-04	1.8E-03	5.3E-02	---	6.2E-02
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	1.9E-02	2.8E-02	2.6E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.7E-03	1.1E-02	1.0E-03	---	1.9E-02
Copper	7.7E-04	3.8E-03	6.6E-03	---	2.1E-05	4.4E-03	5.5E-02	7.3E-01	---	8.0E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	2.6E-06	3.0E-04	3.9E-05	---	7.9E-08	2.3E-05	3.0E-03	9.1E-04	---	4.3E-03
Nickel	3.8E-04	3.8E-04	6.2E-03	---	8.3E-06	4.2E-03	2.2E-02	4.4E-02	---	7.7E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.3E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	1.0E-04	3.6E-05	7.5E-05	---	3.3E-06	1.3E-03	4.5E-02	1.9E-02	---	6.5E-02
Uranium	3.3E-06	3.2E-07	1.7E-06	---	4.2E-08	3.4E-05	3.5E-04	4.3E-05	---	4.4E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.8E-04	1.3E-01	5.7E-01	1.8E-01	---	8.9E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.9E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.9E-04	9.1E-05	8.2E-04	---	3.4E-05	3.2E-03	3.2E-02	9.6E-02	---	1.3E-01
Barium	2.3E-05	2.0E-04	3.3E-05	---	2.4E-05	6.7E-04	4.2E-03	6.9E-03	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	3.1E-06	1.8E-03	5.5E-03	1.6E-01	---	1.9E-01
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	1.9E-02	2.8E-02	2.6E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	6.6E-06	5.7E-03	1.1E-02	1.0E-03	---	1.9E-02
Copper	2.3E-03	1.1E-02	2.0E-02	---	6.3E-05	1.3E-02	1.6E-01	**2.2E+00**	---	**2.4E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.6E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	7.9E-06	9.1E-04	1.2E-04	---	2.4E-07	7.0E-05	8.9E-03	2.7E-03	---	1.3E-02
Nickel	3.8E-04	3.8E-04	6.2E-03	---	8.3E-06	4.2E-03	2.2E-02	4.4E-02	---	7.7E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	2.3E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	3.8E-03	1.3E-01	5.6E-02	---	1.9E-01
Uranium	3.3E-06	3.2E-07	1.7E-06	---	4.2E-08	3.4E-05	3.5E-04	4.3E-05	---	4.4E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.8E-04	1.3E-01	5.7E-01	1.8E-01	---	8.9E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	5.9E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.9E-04	---	---	1.3E-04	1.2E-05	---	---	---	---	5.3E-04
Barium	3.1E-05	---	---	2.2E-04	8.4E-06	---	---	---	---	2.6E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	1.1E-06	---	---	---	---	7.4E-03
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	3.1E-03	---	---	8.6E-02	2.2E-05	---	---	---	---	8.9E-02
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.3E-04
Molybdenum	1.1E-05	---	---	1.2E-04	8.1E-08	---	---	---	---	1.3E-04
Nickel	1.5E-03	---	---	1.4E-02	8.5E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.4E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.8E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	6.1E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	3.9E-04	3.5E-05	---	---	---	---	1.6E-03
Barium	9.4E-05	---	---	6.5E-04	2.5E-05	---	---	---	---	7.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	6.8E-06	---	---	---	---	3.2E-03
Copper	9.4E-03	---	---	2.6E-01	6.5E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.6E-05	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.3E-04
Molybdenum	3.2E-05	---	---	3.5E-04	2.4E-07	---	---	---	---	3.9E-04
Nickel	1.5E-03	---	---	1.4E-02	8.5E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	2.4E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.8E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.8E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	6.1E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.9E-03	---	6.8E-04	9.4E-04	5.3E-05	---	---	---	---	3.6E-03
Barium	1.5E-04	---	2.7E-05	1.6E-03	3.8E-05	---	---	---	---	1.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.4E-02	5.3E-02	4.8E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.0E-02	---	6.2E-03	7.5E-02	4.2E-05	---	---	---	---	9.1E-02
Cobalt	2.5E-03	---	5.9E-04	4.1E-03	1.0E-05	---	---	---	---	7.1E-03
Copper	1.5E-02	---	1.7E-02	6.3E-01	9.7E-05	---	---	---	---	6.6E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.5E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.4E-04	3.3E-05	---	---	---	---	5.0E-04
Molybdenum	5.2E-05	---	9.8E-05	8.6E-04	3.6E-07	---	---	---	---	1.0E-03
Nickel	2.5E-03	---	5.2E-03	3.3E-02	1.3E-05	---	---	---	---	4.1E-02
Selenium	2.0E-03	---	4.0E-03	1.4E-01	3.5E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.1E-05	---	1.4E-06	3.7E-06	6.4E-08	---	---	---	---	2.7E-05
Vanadium	6.9E-02	---	5.8E-03	6.4E-02	2.7E-04	---	---	---	---	1.4E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	9.1E-06	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.0E-02	---	3.6E-05	1.2E-03	3.3E-03	7.6E-02	4.2E-04	9.2E-02
Barium	9.2E-05	---	4.2E-04	---	2.5E-05	2.4E-04	4.5E-04	5.5E-03	4.7E-04	7.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	3.2E-06	6.4E-04	5.8E-04	1.3E-01	4.0E-04	3.5E-01
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	6.2E-03	3.5E-03	2.4E-03	5.6E-04	4.4E-02
Copper	9.2E-03	---	2.5E-01	---	6.6E-05	4.7E-03	1.7E-02	**1.7E+00**	1.2E-02	**2.0E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	1.6E-02	6.9E-03	2.6E-01	2.0E-03	7.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	3.1E-05	---	1.5E-03	---	2.5E-07	2.5E-05	9.4E-04	2.2E-03	5.7E-05	4.7E-03
Nickel	4.5E-03	---	2.4E-01	---	2.6E-05	4.5E-03	6.8E-03	1.1E-01	5.5E-04	3.6E-01
Selenium	3.7E-03	---	1.8E-01	---	7.2E-05	4.8E-03	5.9E-03	4.9E-01	3.0E-02	7.2E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	6.7E-04	6.9E-03	2.2E-02	7.9E-04	3.2E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	3.7E-05	1.1E-04	1.0E-04	2.1E-06	3.6E-04
Vanadium	1.3E-01	---	2.6E-01	---	5.5E-04	1.4E-01	1.8E-01	4.2E-01	1.1E-02	**1.1E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.8E-05	2.2E-03	7.0E-03	7.0E-01	3.8E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.5E-03	---	3.1E-02	---	1.1E-04	3.5E-03	1.0E-02	2.3E-01	1.3E-03	2.8E-01
Barium	2.7E-04	---	1.2E-03	---	7.6E-05	7.3E-04	1.3E-03	1.6E-02	1.4E-03	2.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	9.7E-06	1.9E-03	1.7E-03	3.8E-01	1.2E-03	1.0E+00
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	7.0E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	2.1E-05	6.2E-03	3.5E-03	2.4E-03	5.6E-04	4.4E-02
Copper	2.8E-02	---	7.6E-01	---	2.0E-04	1.4E-02	5.2E-02	**5.2E+00**	3.6E-02	**6.1E+00**
Lead	1.7E-02	---	4.1E-01	---	5.0E-05	1.6E-02	6.9E-03	2.6E-01	2.0E-03	7.2E-01
Manganese	2.0E-04	---	6.7E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	9.4E-05	---	4.5E-03	---	7.4E-07	7.6E-05	2.8E-03	6.5E-03	1.7E-04	1.4E-02
Nickel	4.5E-03	---	2.4E-01	---	2.6E-05	4.5E-03	6.8E-03	1.1E-01	5.5E-04	3.6E-01
Selenium	3.7E-03	---	1.8E-01	---	7.2E-05	4.8E-03	5.9E-03	4.9E-01	3.0E-02	7.2E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.0E-03	2.1E-02	6.5E-02	2.4E-03	9.7E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	3.7E-05	1.1E-04	1.0E-04	2.1E-06	3.6E-04
Vanadium	1.3E-01	---	2.6E-01	---	5.5E-04	1.4E-01	1.8E-01	4.2E-01	1.1E-02	**1.1E+00**
Zinc	1.9E-03	---	4.8E-01	---	1.8E-05	2.2E-03	7.0E-03	7.0E-01	3.8E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.5E-04	2.2E-03	4.1E-04	---	1.4E-05	---	---	---	---	3.5E-03
Barium	6.8E-05	6.0E-03	1.6E-05	---	1.0E-05	---	---	---	---	6.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.4E-04	7.6E-03	8.7E-03	---	1.3E-06	---	---	---	---	1.7E-02
Chromium (Total)	1.4E-02	3.2E-02	1.1E-02	---	3.4E-05	---	---	---	---	5.7E-02
Cobalt	3.3E-03	1.0E-02	1.1E-03	---	8.3E-06	---	---	---	---	1.5E-02
Copper	6.8E-03	1.5E-01	9.9E-03	---	2.6E-05	---	---	---	---	1.6E-01
Lead	1.3E-02	2.1E-02	1.6E-02	---	2.0E-05	---	---	---	---	5.0E-02
Manganese	1.5E-04	9.1E-03	2.6E-05	---	2.7E-05	---	---	---	---	9.3E-03
Molybdenum	2.3E-05	8.3E-03	5.9E-05	---	9.9E-08	---	---	---	---	8.4E-03
Nickel	3.3E-03	1.4E-02	9.3E-03	---	1.0E-05	---	---	---	---	2.7E-02
Selenium	2.7E-03	3.3E-02	7.2E-03	---	2.9E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.8E-03	9.4E-05	---	3.5E-06	---	---	---	---	4.7E-03
Uranium	2.9E-05	3.3E-05	2.5E-06	---	5.2E-08	---	---	---	---	6.4E-05
Vanadium	9.3E-02	2.4E-01	1.0E-02	---	2.2E-04	---	---	---	---	3.4E-01
Zinc	1.4E-03	5.0E-02	1.9E-02	---	7.4E-06	---	---	---	---	7.0E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	9.0E-04	2.3E-03	2.2E-03	1.8E-05	6.7E-05	5.1E-05	---	---	2.6E-04	5.9E-03
Arsenic	1.6E-03	2.6E-03	7.2E-04	1.1E-04	1.1E-04	1.6E-04	---	---	7.0E-04	6.0E-03
Barium	3.1E-05	1.5E-03	7.0E-06	4.3E-05	1.4E-05	6.7E-06	---	---	1.4E-04	1.7E-03
Beryllium	1.5E-03	8.6E-03	1.7E-04	5.8E-04	9.1E-06	1.3E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	3.3E-06	4.6E-05	---	---	2.1E-04	2.0E-02
Chromium (Total)	1.1E-02	3.1E-02	8.5E-03	9.4E-03	6.4E-05	6.2E-04	---	---	2.7E-04	6.1E-02
Cobalt	6.3E-04	1.6E-03	1.9E-04	1.4E-04	3.8E-06	6.2E-05	---	---	5.3E-05	2.7E-03
Copper	2.5E-03	3.8E-02	3.3E-03	1.3E-02	2.6E-05	1.1E-04	---	---	2.4E-03	6.0E-02
Lead	1.9E-03	1.6E-03	2.3E-03	4.6E-03	7.2E-06	1.5E-04	---	---	1.5E-04	1.1E-02
Manganese	2.3E-04	1.1E-02	3.8E-05	9.4E-05	8.6E-05	8.4E-05	---	---	3.1E-04	1.2E-02
Molybdenum	9.6E-04	2.8E-01	2.3E-03	2.1E-03	1.9E-04	1.0E-04	---	---	2.3E-02	3.1E-01
Nickel	1.6E-02	8.4E-02	4.2E-02	1.6E-02	1.3E-04	9.0E-04	---	---	1.4E-03	1.6E-01
Selenium	2.4E-03	1.7E-02	5.9E-03	2.3E-02	1.3E-04	2.6E-04	---	---	2.8E-02	7.6E-02
Thallium	1.7E-02	4.4E-02	2.0E-03	1.9E-02	1.6E-04	1.5E-03	---	---	1.3E-02	9.6E-02
Uranium	7.5E-04	4.7E-04	6.2E-05	1.7E-05	7.3E-05	1.8E-04	---	---	6.0E-04	2.2E-03
Vanadium	3.6E-03	5.7E-03	3.7E-04	4.4E-04	3.6E-05	3.4E-04	---	---	3.8E-04	1.1E-02
Zinc	5.4E-04	1.1E-02	6.8E-03	9.5E-03	7.6E-06	5.0E-05	---	---	8.1E-03	3.6E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	1.0E-05	1.9E-04	---	3.6E-05	8.4E-04	1.2E-03
Arsenic	6.0E-04	---	---	2.0E-04	5.3E-05	1.8E-03	---	1.8E-02	6.8E-03	2.7E-02
Barium	1.1E-05	---	---	8.0E-05	6.6E-06	7.5E-05	---	2.7E-04	1.3E-03	1.8E-03
Beryllium	1.9E-04	---	---	3.6E-04	1.4E-06	4.9E-04	---	1.7E-03	4.2E-04	3.2E-03
Cadmium	1.5E-04	---	---	6.9E-03	1.5E-06	5.2E-04	---	1.6E-02	2.0E-03	2.6E-02
Chromium (Total)	4.1E-03	---	---	1.8E-02	3.0E-05	6.9E-03	---	3.3E-02	2.6E-03	6.5E-02
Cobalt	2.3E-04	---	---	2.6E-04	1.7E-06	6.9E-04	---	4.5E-05	5.1E-04	1.7E-03
Copper	9.4E-04	---	---	2.4E-02	1.2E-05	1.2E-03	---	6.9E-02	2.3E-02	1.2E-01
Lead	7.2E-04	---	---	8.5E-03	3.3E-06	1.7E-03	---	4.4E-03	1.5E-03	1.7E-02
Manganese	8.6E-05	---	---	1.8E-04	4.0E-05	9.3E-04	---	3.8E-03	3.0E-03	8.0E-03
Molybdenum	1.2E-04	---	---	1.3E-03	2.9E-05	3.8E-04	---	5.3E-03	7.3E-02	8.0E-02
Nickel	5.8E-03	---	---	3.0E-02	6.0E-05	1.0E-02	---	3.4E-02	1.4E-02	9.3E-02
Selenium	9.0E-04	---	---	4.2E-02	5.9E-05	2.9E-03	---	4.8E-02	2.7E-01	3.6E-01
Thallium	2.1E-03	---	---	1.2E-02	2.5E-05	5.6E-03	---	3.0E-02	4.2E-02	9.1E-02
Uranium	9.2E-05	---	---	1.1E-05	1.1E-05	6.6E-04	---	3.0E-04	1.9E-03	3.0E-03
Vanadium	1.3E-03	---	---	8.1E-04	1.7E-05	3.8E-03	---	1.8E-03	3.6E-03	1.1E-02
Zinc	2.0E-04	---	---	1.8E-02	3.5E-06	5.6E-04	---	2.9E-02	7.9E-02	1.3E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.8E-04	---	---	5.8E-05	2.1E-04	4.4E-04	---	---	1.1E-03
Arsenic	4.3E-04	3.7E-04	---	---	1.3E-04	8.8E-04	3.5E-03	---	---	5.3E-03
Barium	8.2E-06	2.3E-04	---	---	1.6E-05	3.7E-05	9.5E-05	---	---	3.9E-04
Beryllium	3.1E-04	1.2E-03	---	---	7.8E-06	5.5E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	3.6E-06	2.5E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	3.0E-03	4.4E-03	---	---	7.1E-05	3.4E-03	2.0E-03	---	---	1.3E-02
Cobalt	1.7E-04	2.3E-04	---	---	4.2E-06	3.4E-04	2.7E-04	---	---	1.0E-03
Copper	6.7E-04	4.0E-03	---	---	2.8E-05	6.1E-04	3.1E-03	---	---	8.4E-03
Lead	5.1E-04	2.9E-04	---	---	8.0E-06	8.3E-04	4.9E-04	---	---	2.1E-03
Manganese	6.2E-05	9.6E-04	---	---	9.5E-05	4.6E-04	1.9E-03	---	---	3.5E-03
Molybdenum	2.0E-04	1.7E-02	---	---	1.6E-04	4.3E-04	2.3E-02	---	---	4.0E-02
Nickel	4.2E-03	9.4E-03	---	---	1.4E-04	4.9E-03	1.0E-02	---	---	2.9E-02
Selenium	6.5E-04	2.3E-03	---	---	1.4E-04	1.4E-03	2.4E-03	---	---	6.9E-03
Thallium	3.4E-03	5.7E-03	---	---	1.4E-04	6.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.8E-05	---	---	6.3E-05	7.6E-04	3.2E-03	---	---	4.3E-03
Vanadium	9.5E-04	8.8E-04	---	---	4.0E-05	1.9E-03	3.4E-03	---	---	7.1E-03
Zinc	1.5E-04	1.6E-03	---	---	8.4E-06	2.7E-04	1.2E-03	---	---	3.3E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.4E-04	---	---	7.9E-05	4.8E-05	---	---	---	---	5.6E-04
Arsenic	1.4E-03	---	---	8.2E-04	1.4E-04	---	---	---	---	2.3E-03
Barium	2.6E-05	---	---	3.3E-04	1.8E-05	---	---	---	---	3.8E-04
Beryllium	7.4E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	8.0E-05	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	4.7E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	3.2E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	9.0E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	4.7E-04	---	---	9.5E-03	1.4E-04	---	---	---	---	1.0E-02
Nickel	1.3E-02	---	---	1.3E-01	1.6E-04	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	1.6E-04	---	---	---	---	1.8E-01
Thallium	8.1E-03	---	---	8.4E-02	1.2E-04	---	---	---	---	9.2E-02
Uranium	3.6E-04	---	---	7.7E-05	5.2E-05	---	---	---	---	4.9E-04
Vanadium	3.0E-03	---	---	3.4E-03	4.5E-05	---	---	---	---	6.5E-03
Zinc	4.6E-04	---	---	7.4E-02	9.4E-06	---	---	---	---	7.5E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.4E-04	1.5E-04	---	---	---	---	1.7E-03
Arsenic	1.4E-03	---	---	8.2E-04	1.4E-04	---	---	---	---	2.3E-03
Barium	2.6E-05	---	---	3.3E-04	1.8E-05	---	---	---	---	3.8E-04
Beryllium	7.4E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.1E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	8.0E-05	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	4.7E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	3.2E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	9.0E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	1.1E-04	---	---	---	---	1.0E-03
Molybdenum	1.4E-03	---	---	2.8E-02	4.1E-04	---	---	---	---	3.0E-02
Nickel	1.3E-02	---	---	1.3E-01	1.6E-04	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	1.6E-04	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.8E-01
Uranium	1.1E-03	---	---	2.3E-04	1.6E-04	---	---	---	---	1.5E-03
Vanadium	3.0E-03	---	---	3.4E-03	4.5E-05	---	---	---	---	6.5E-03
Zinc	4.6E-04	---	---	7.4E-02	9.4E-06	---	---	---	---	7.5E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.9E-03	3.6E-03	---	---	2.3E-04	---	---	---	---	9.8E-03
Arsenic	2.9E-03	1.6E-03	---	---	1.0E-04	---	---	---	---	4.5E-03
Barium	5.5E-05	9.8E-04	---	---	1.3E-05	---	---	---	---	1.1E-03
Beryllium	3.3E-03	8.1E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	3.0E-06	---	---	---	---	3.6E-03
Chromium (Total)	2.0E-02	1.9E-02	---	---	5.8E-05	---	---	---	---	3.8E-02
Cobalt	1.1E-03	9.7E-04	---	---	3.4E-06	---	---	---	---	2.1E-03
Copper	4.5E-03	1.7E-02	---	---	2.3E-05	---	---	---	---	2.1E-02
Lead	3.4E-03	1.2E-03	---	---	6.6E-06	---	---	---	---	4.6E-03
Manganese	4.1E-04	4.1E-03	---	---	7.8E-05	---	---	---	---	4.5E-03
Molybdenum	6.4E-03	3.4E-01	---	---	6.4E-04	---	---	---	---	3.5E-01
Nickel	2.8E-02	4.0E-02	---	---	1.2E-04	---	---	---	---	6.8E-02
Selenium	4.3E-03	9.8E-03	---	---	1.2E-04	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.2E-01	---	---	5.4E-04	---	---	---	---	2.3E-01
Uranium	4.9E-03	1.2E-03	---	---	2.5E-04	---	---	---	---	6.4E-03
Vanadium	6.3E-03	3.7E-03	---	---	3.3E-05	---	---	---	---	1.0E-02
Zinc	9.6E-04	6.8E-03	---	---	6.8E-06	---	---	---	---	7.8E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.7E-03	5.4E-04	1.3E-01	---	4.8E-05	---	---	---	---	1.3E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	3.0E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	3.8E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	6.4E-06	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	1.7E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	9.9E-06	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	6.8E-05	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.9E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	1.6E-03	2.7E-02	7.1E-02	---	7.3E-05	---	---	---	---	1.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	3.4E-04	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	3.4E-04	---	---	---	---	**1.3E+00**
Thallium	5.0E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.5E-05	1.9E-03	---	2.8E-05	---	---	---	---	3.2E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	9.6E-05	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	2.0E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-03	1.6E-03	3.8E-01	---	1.4E-04	---	---	---	---	3.9E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	3.0E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	3.8E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	6.4E-06	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	8.7E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	1.7E-04	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	9.9E-06	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	6.8E-05	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.9E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	2.3E-04	---	---	---	---	1.9E-02
Molybdenum	4.7E-03	8.2E-02	2.1E-01	---	2.2E-04	---	---	---	---	3.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	3.4E-04	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	3.4E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.9E-04	5.7E-03	---	8.4E-05	---	---	---	---	9.7E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	9.6E-05	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	2.0E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.7E-04	1.4E-03	---	---	5.8E-05	---	---	---	---	1.9E-03
Arsenic	3.1E-03	5.8E-03	---	---	3.7E-04	---	---	---	---	9.3E-03
Barium	6.0E-05	3.4E-03	---	---	4.6E-05	---	---	---	---	3.5E-03
Beryllium	7.9E-04	5.2E-03	---	---	7.9E-06	---	---	---	---	6.0E-03
Cadmium	7.9E-04	1.3E-02	---	---	1.1E-05	---	---	---	---	1.4E-02
Chromium (Total)	2.2E-02	7.0E-02	---	---	2.1E-04	---	---	---	---	9.1E-02
Cobalt	1.2E-03	3.5E-03	---	---	1.2E-05	---	---	---	---	4.7E-03
Copper	4.9E-03	8.4E-02	---	---	8.3E-05	---	---	---	---	8.9E-02
Lead	3.7E-03	3.6E-03	---	---	2.3E-05	---	---	---	---	7.3E-03
Manganese	4.5E-04	2.3E-02	---	---	2.8E-04	---	---	---	---	2.4E-02
Molybdenum	2.8E-04	9.0E-02	---	---	9.3E-05	---	---	---	---	9.0E-02
Nickel	3.0E-02	1.8E-01	---	---	4.2E-04	---	---	---	---	2.2E-01
Selenium	4.7E-03	3.9E-02	---	---	4.1E-04	---	---	---	---	4.4E-02
Thallium	8.7E-03	2.7E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	3.6E-05	---	---	---	---	4.2E-04
Vanadium	6.9E-03	1.3E-02	---	---	1.2E-04	---	---	---	---	2.0E-02
Zinc	1.1E-03	2.4E-02	---	---	2.4E-05	---	---	---	---	2.5E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.1E-04	3.0E-03	---	---	8.8E-05	1.1E-04	2.3E-03	---	---	6.2E-03
Arsenic	8.2E-04	3.1E-03	---	---	9.6E-05	2.3E-04	9.0E-03	---	---	1.3E-02
Barium	1.6E-05	2.0E-03	---	---	1.2E-05	9.4E-06	2.4E-04	---	---	2.2E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	2.9E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	2.8E-06	6.5E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	5.6E-03	3.7E-02	---	---	5.4E-05	8.7E-04	5.2E-03	---	---	4.9E-02
Cobalt	3.2E-04	1.9E-03	---	---	3.1E-06	8.8E-05	6.9E-04	---	---	3.0E-03
Copper	1.3E-03	3.4E-02	---	---	2.1E-05	1.6E-04	8.1E-03	---	---	4.3E-02
Lead	9.8E-04	2.4E-03	---	---	6.1E-06	2.2E-04	1.3E-03	---	---	4.9E-03
Manganese	1.2E-04	8.1E-03	---	---	7.2E-05	1.2E-04	4.8E-03	---	---	1.3E-02
Molybdenum	7.6E-04	2.8E-01	---	---	2.5E-04	2.3E-04	1.2E-01	---	---	4.0E-01
Nickel	8.0E-03	7.9E-02	---	---	1.1E-04	1.3E-03	2.7E-02	---	---	1.2E-01
Selenium	1.2E-03	1.9E-02	---	---	1.1E-04	3.6E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.6E-02	---	---	2.1E-04	3.3E-03	4.8E-01	---	---	6.0E-01
Uranium	5.9E-04	9.9E-04	---	---	9.5E-05	3.9E-04	1.7E-02	---	---	1.9E-02
Vanadium	1.8E-03	7.4E-03	---	---	3.0E-05	4.8E-04	8.7E-03	---	---	1.8E-02
Zinc	2.8E-04	1.3E-02	---	---	6.3E-06	7.0E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.3E-05	---	---	3.2E-06	4.8E-05	3.5E-04	---	8.0E-05	1.5E-03	2.1E-03
Arsenic	1.0E-04	---	---	3.3E-05	1.4E-04	1.9E-03	---	2.3E-02	7.1E-03	3.2E-02
Barium	2.0E-06	---	---	1.4E-05	1.8E-05	8.0E-05	---	3.5E-04	1.4E-03	1.8E-03
Beryllium	5.5E-05	---	---	1.1E-04	6.5E-06	9.1E-04	---	3.8E-03	7.7E-04	5.7E-03
Cadmium	2.6E-05	---	---	1.2E-03	4.1E-06	5.5E-04	---	2.1E-02	2.1E-03	2.5E-02
Chromium (Total)	7.1E-04	---	---	3.0E-03	8.0E-05	7.4E-03	---	4.2E-02	2.7E-03	5.6E-02
Cobalt	4.0E-05	---	---	4.4E-05	4.7E-06	7.5E-04	---	5.7E-05	5.3E-04	1.4E-03
Copper	1.6E-04	---	---	4.1E-03	3.2E-05	1.3E-03	---	8.8E-02	2.4E-02	1.2E-01
Lead	1.2E-04	---	---	1.5E-03	9.0E-06	1.8E-03	---	5.7E-03	1.5E-03	1.1E-02
Manganese	1.5E-05	---	---	3.0E-05	1.1E-04	1.0E-03	---	4.8E-03	3.1E-03	9.1E-03
Molybdenum	3.5E-05	---	---	3.9E-04	1.4E-04	7.1E-04	---	1.2E-02	1.3E-01	1.5E-01
Nickel	9.9E-04	---	---	5.1E-03	1.6E-04	1.1E-02	---	4.3E-02	1.4E-02	7.4E-02
Selenium	1.5E-04	---	---	7.1E-03	1.6E-04	3.1E-03	---	6.1E-02	2.8E-01	3.5E-01
Thallium	6.1E-04	---	---	3.4E-03	1.2E-04	1.0E-02	---	6.6E-02	7.6E-02	1.6E-01
Uranium	2.7E-05	---	---	3.1E-06	5.2E-05	1.2E-03	---	6.6E-04	3.5E-03	5.5E-03
Vanadium	2.3E-04	---	---	1.4E-04	4.5E-05	4.1E-03	---	2.4E-03	3.8E-03	1.1E-02
Zinc	3.4E-05	---	---	3.0E-03	9.4E-06	6.0E-04	---	3.7E-02	8.2E-02	1.2E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.6E-04	8.7E-05	2.6E-03	2.5E-05	4.4E-05	---	---	---	---	3.2E-03
Arsenic	1.7E-03	1.3E-04	1.7E-03	3.0E-04	1.5E-04	---	---	---	---	4.0E-03
Barium	3.3E-05	6.2E-05	1.7E-05	1.2E-04	1.9E-05	---	---	---	---	2.5E-04
Beryllium	7.8E-04	9.8E-05	2.0E-04	8.1E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	4.4E-06	---	---	---	---	3.5E-02
Chromium (Total)	1.2E-02	1.6E-03	2.0E-02	2.7E-02	8.6E-05	---	---	---	---	6.1E-02
Cobalt	6.7E-04	7.2E-05	4.6E-04	4.0E-04	5.0E-06	---	---	---	---	1.6E-03
Copper	2.7E-03	2.9E-03	7.9E-03	3.7E-02	3.4E-05	---	---	---	---	5.1E-02
Lead	2.1E-03	3.4E-05	5.5E-03	1.3E-02	9.7E-06	---	---	---	---	2.1E-02
Manganese	2.5E-04	9.0E-04	9.2E-05	2.7E-04	1.1E-04	---	---	---	---	1.6E-03
Molybdenum	5.0E-04	1.2E-02	2.7E-03	3.0E-03	1.2E-04	---	---	---	---	1.9E-02
Nickel	1.7E-02	5.8E-03	9.9E-02	4.6E-02	1.7E-04	---	---	---	---	1.7E-01
Selenium	2.6E-03	9.5E-04	1.4E-02	6.5E-02	1.7E-04	---	---	---	---	8.3E-02
Thallium	8.6E-03	6.8E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.8E-02
Uranium	3.9E-04	8.5E-06	7.2E-05	2.4E-05	4.7E-05	---	---	---	---	5.4E-04
Vanadium	3.8E-03	2.3E-04	8.9E-04	1.3E-03	4.9E-05	---	---	---	---	6.2E-03
Zinc	5.8E-04	4.6E-04	1.6E-02	2.7E-02	1.0E-05	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.1E-03	2.7E-03	---	---	3.7E-05	---	---	---	---	4.9E-03
Arsenic	1.0E-02	1.1E-02	---	---	1.7E-04	---	---	---	---	2.2E-02
Barium	1.9E-04	7.1E-03	---	---	2.1E-05	---	---	---	---	7.3E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.1E-02
Cadmium	2.6E-03	2.1E-02	---	---	4.9E-06	---	---	---	---	2.4E-02
Chromium (Total)	7.0E-02	1.4E-01	---	---	9.5E-05	---	---	---	---	2.1E-01
Cobalt	3.9E-03	7.1E-03	---	---	5.6E-06	---	---	---	---	1.1E-02
Copper	1.6E-02	1.3E-01	---	---	3.8E-05	---	---	---	---	1.4E-01
Lead	1.2E-02	8.6E-03	---	---	1.1E-05	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.1E-02	---	---	1.3E-04	---	---	---	---	3.3E-02
Molybdenum	2.2E-03	2.7E-01	---	---	1.1E-04	---	---	---	---	2.7E-01
Nickel	9.9E-02	3.0E-01	---	---	1.9E-04	---	---	---	---	4.0E-01
Selenium	1.5E-02	7.2E-02	---	---	1.9E-04	---	---	---	---	8.7E-02
Thallium	3.9E-02	8.3E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.6E-04	---	---	4.0E-05	---	---	---	---	2.6E-03
Vanadium	2.2E-02	2.7E-02	---	---	5.4E-05	---	---	---	---	4.9E-02
Zinc	3.4E-03	4.9E-02	---	---	1.1E-05	---	---	---	---	5.2E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.2E-04	3.4E-03	---	---	6.8E-05	---	---	---	---	4.3E-03
Arsenic	1.4E-03	5.1E-03	---	---	1.1E-04	---	---	---	---	6.7E-03
Barium	2.8E-05	3.2E-03	---	---	1.4E-05	---	---	---	---	3.2E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.3E-02
Cadmium	3.6E-04	9.6E-03	---	---	3.3E-06	---	---	---	---	1.0E-02
Chromium (Total)	1.0E-02	6.1E-02	---	---	6.3E-05	---	---	---	---	7.1E-02
Cobalt	5.6E-04	3.2E-03	---	---	3.7E-06	---	---	---	---	3.7E-03
Copper	2.3E-03	5.7E-02	---	---	2.5E-05	---	---	---	---	5.9E-02
Lead	1.7E-03	3.9E-03	---	---	7.2E-06	---	---	---	---	5.6E-03
Manganese	2.1E-04	1.4E-02	---	---	8.5E-05	---	---	---	---	1.4E-02
Molybdenum	8.8E-04	3.3E-01	---	---	1.9E-04	---	---	---	---	3.3E-01
Nickel	1.4E-02	1.3E-01	---	---	1.3E-04	---	---	---	---	1.5E-01
Selenium	2.2E-03	3.2E-02	---	---	1.3E-04	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.9E-04	1.1E-03	---	---	7.4E-05	---	---	---	---	1.8E-03
Vanadium	3.2E-03	1.2E-02	---	---	3.6E-05	---	---	---	---	1.5E-02
Zinc	4.9E-04	2.2E-02	---	---	7.5E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.7E-03	1.6E-03	8.8E-03	---	5.7E-05	---	---	---	---	1.5E-02
Barium	3.9E-04	3.3E-03	3.6E-04	---	3.0E-05	---	---	---	---	4.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.9E-03	7.8E-03	1.8E-01	---	2.5E-06	---	---	---	---	1.9E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	1.2E-04	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	2.3E-05	---	---	---	---	6.2E-02
Copper	3.9E-02	1.9E-01	2.1E-01	---	6.7E-05	---	---	---	---	4.4E-01
Lead	6.9E-02	5.2E-03	3.4E-01	---	4.4E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	1.3E-04	1.4E-02	1.3E-03	---	4.3E-06	---	---	---	---	1.6E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	6.9E-05	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	1.3E-04	---	---	---	---	1.9E-01
Thallium	2.5E-03	8.9E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.6E-03
Uranium	1.5E-04	1.6E-05	5.3E-05	---	2.6E-06	---	---	---	---	2.3E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	9.2E-04	---	---	---	---	9.2E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	1.8E-05	---	---	---	---	4.4E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.8E-03	2.6E-02	---	1.7E-04	---	---	---	---	4.5E-02
Barium	1.2E-03	1.0E-02	1.1E-03	---	9.1E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.6E-03	2.4E-02	5.5E-01	---	7.6E-06	---	---	---	---	5.8E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	1.2E-04	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	2.3E-05	---	---	---	---	6.2E-02
Copper	1.2E-01	5.7E-01	6.3E-01	---	2.0E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.2E-03	3.4E-01	---	4.4E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	5.2E-05	---	---	---	---	1.5E-02
Molybdenum	3.8E-04	4.3E-02	3.8E-03	---	1.3E-05	---	---	---	---	4.8E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	6.9E-05	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	1.3E-04	---	---	---	---	1.9E-01
Thallium	7.4E-03	2.7E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.6E-05	5.3E-05	---	2.6E-06	---	---	---	---	2.3E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	9.2E-04	---	---	---	---	9.2E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	1.8E-05	---	---	---	---	4.4E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.7E-04	---	---	5.5E-05	1.5E-05	3.1E-04	---	---	1.4E-03	1.9E-03
Barium	1.8E-05	---	---	1.3E-04	1.0E-05	7.4E-05	---	---	1.5E-03	1.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	6.6E-07	1.4E-04	---	---	6.3E-04	3.9E-03
Chromium (Total)	4.5E-03	---	---	1.9E-02	3.2E-05	4.6E-03	---	---	2.0E-03	3.0E-02
Cobalt	8.1E-04	---	---	8.9E-04	5.9E-06	1.5E-03	---	---	1.3E-03	4.5E-03
Copper	1.8E-03	---	---	4.8E-02	2.3E-05	1.5E-03	---	---	3.2E-02	8.3E-02
Lead	2.5E-03	---	---	3.0E-02	1.1E-05	3.7E-03	---	---	3.6E-03	3.9E-02
Manganese	3.0E-05	---	---	6.1E-05	1.3E-05	2.0E-04	---	---	7.4E-04	1.0E-03
Molybdenum	6.1E-06	---	---	6.7E-05	1.5E-06	1.2E-05	---	---	2.7E-03	2.8E-03
Nickel	1.8E-03	---	---	9.2E-03	1.8E-05	1.9E-03	---	---	3.0E-03	1.6E-02
Selenium	5.3E-04	---	---	2.5E-02	3.4E-05	1.1E-03	---	---	1.1E-01	1.4E-01
Thallium	2.5E-04	---	---	1.4E-03	2.9E-06	4.2E-04	---	---	3.6E-03	5.7E-03
Uranium	7.8E-06	---	---	8.9E-07	9.2E-07	3.5E-05	---	---	1.2E-04	1.6E-04
Vanadium	1.9E-02	---	---	1.2E-02	2.4E-04	3.4E-02	---	---	3.8E-02	1.0E-01
Zinc	2.8E-04	---	---	2.4E-02	4.7E-06	4.7E-04	---	---	7.7E-02	1.0E-01

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-03	1.1E-04	8.6E-02	---	2.7E-04	---	---	---	---	9.6E-02
Barium	8.0E-04	2.2E-04	3.6E-03	---	1.5E-04	---	---	---	---	4.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	1.2E-05	---	---	---	---	**1.8E+00**
Chromium (Total)	8.6E-02	1.7E-03	**1.3E+00**	---	2.0E-04	---	---	---	---	**1.4E+00**
Cobalt	1.5E-02	2.5E-04	9.4E-02	---	3.7E-05	---	---	---	---	1.1E-01
Copper	8.0E-02	1.3E-02	**2.1E+00**	---	3.2E-04	---	---	---	---	**2.2E+00**
Lead	4.7E-02	1.2E-04	**1.1E+00**	---	7.1E-05	---	---	---	---	**1.2E+00**
Manganese	5.7E-04	3.1E-04	1.9E-03	---	8.4E-05	---	---	---	---	2.8E-03
Molybdenum	2.6E-04	9.6E-04	1.2E-02	---	2.1E-05	---	---	---	---	1.4E-02
Nickel	3.4E-02	1.7E-03	**1.8E+00**	---	1.1E-04	---	---	---	---	**1.8E+00**
Selenium	1.0E-02	5.6E-04	5.0E-01	---	2.1E-04	---	---	---	---	5.1E-01
Thallium	4.9E-03	5.8E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.7E-02
Uranium	1.1E-04	3.5E-07	1.7E-04	---	4.1E-06	---	---	---	---	2.8E-04
Vanadium	3.7E-01	3.3E-03	7.6E-01	---	1.5E-03	---	---	---	---	**1.1E+00**
Zinc	5.3E-03	6.2E-04	**1.3E+00**	---	2.9E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	2.1E-05	8.1E-04	3.4E-04	4.9E-03	3.2E-03	9.3E-03
Barium	---	---	---	---	1.2E-05	1.5E-04	4.0E-05	3.2E-04	2.7E-03	3.2E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	9.6E-07	3.7E-04	4.9E-05	7.1E-03	1.5E-03	9.0E-03
Chromium (Total)	---	---	---	---	4.6E-05	1.2E-02	7.5E-04	3.5E-02	4.8E-03	5.3E-02
Cobalt	---	---	---	---	8.6E-06	3.9E-03	3.2E-04	1.5E-04	3.0E-03	7.3E-03
Copper	---	---	---	---	2.5E-05	3.0E-03	1.6E-03	1.0E-01	5.8E-02	1.6E-01
Lead	---	---	---	---	1.7E-05	9.5E-03	5.9E-04	1.5E-02	8.6E-03	3.4E-02
Manganese	---	---	---	---	2.0E-05	5.2E-04	2.2E-04	1.3E-03	1.7E-03	3.8E-03
Molybdenum	---	---	---	---	1.6E-06	2.4E-05	1.3E-04	2.0E-04	4.8E-03	5.1E-03
Nickel	---	---	---	---	2.6E-05	4.9E-03	1.1E-03	1.0E-02	7.0E-03	2.3E-02
Selenium	---	---	---	---	5.0E-05	2.7E-03	5.0E-04	2.8E-02	2.7E-01	3.0E-01
Thallium	---	---	---	---	3.2E-06	8.2E-04	1.2E-03	2.6E-03	6.4E-03	1.1E-02
Uranium	---	---	---	---	1.0E-06	6.7E-05	3.0E-05	1.8E-05	2.1E-04	3.2E-04
Vanadium	---	---	---	---	3.5E-04	8.9E-02	1.7E-02	2.6E-02	8.9E-02	2.2E-01
Zinc	---	---	---	---	6.9E-06	1.2E-03	5.8E-04	3.9E-02	1.8E-01	2.2E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	2.8E-05	1.1E-03	2.4E-03	7.8E-02	---	8.1E-02
Barium	---	---	---	---	1.5E-05	1.9E-04	2.8E-04	5.1E-03	---	5.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.2E-06	4.8E-04	3.4E-04	1.1E-01	---	1.1E-01
Chromium (Total)	---	---	---	---	5.9E-05	1.6E-02	5.3E-03	5.5E-01	---	5.7E-01
Cobalt	---	---	---	---	1.1E-05	5.0E-03	2.2E-03	2.4E-03	---	9.7E-03
Copper	---	---	---	---	3.2E-05	3.9E-03	1.1E-02	**1.6E+00**	---	**1.6E+00**
Lead	---	---	---	---	2.1E-05	1.2E-02	4.1E-03	2.4E-01	---	2.5E-01
Manganese	---	---	---	---	2.5E-05	6.7E-04	1.6E-03	2.0E-02	---	2.2E-02
Molybdenum	---	---	---	---	2.1E-06	3.1E-05	9.1E-04	3.1E-03	---	4.1E-03
Nickel	---	---	---	---	3.4E-05	6.4E-03	7.7E-03	1.6E-01	---	1.7E-01
Selenium	---	---	---	---	6.4E-05	3.5E-03	3.5E-03	4.4E-01	---	4.4E-01
Thallium	---	---	---	---	3.4E-06	8.8E-04	7.2E-03	3.4E-02	---	4.2E-02
Uranium	---	---	---	---	1.2E-06	8.4E-05	2.0E-04	2.8E-04	---	5.6E-04
Vanadium	---	---	---	---	4.5E-04	1.2E-01	1.2E-01	4.1E-01	---	6.5E-01
Zinc	---	---	---	---	8.8E-06	1.6E-03	4.1E-03	6.1E-01	---	6.2E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.0E-04	3.4E-05	2.8E-04	---	2.3E-05	1.3E-03	1.3E-02	3.7E-02	---	5.2E-02
Barium	8.2E-06	7.1E-05	1.2E-05	---	1.2E-05	2.4E-04	1.5E-03	2.4E-03	---	4.3E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	1.0E-06	5.9E-04	1.8E-03	5.3E-02	---	6.2E-02
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	4.9E-05	2.0E-02	2.8E-02	2.7E-01	---	3.3E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	9.3E-06	6.3E-03	1.2E-02	1.1E-03	---	2.1E-02
Copper	8.2E-04	4.1E-03	6.7E-03	---	2.7E-05	4.9E-03	6.1E-02	7.6E-01	---	8.4E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.8E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	2.7E-06	3.1E-04	4.0E-05	---	1.8E-06	3.8E-05	4.9E-03	1.5E-03	---	6.8E-03
Nickel	1.0E-03	1.7E-03	1.7E-02	---	2.8E-05	8.0E-03	4.1E-02	7.5E-02	---	1.4E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	5.4E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	1.0E-04	3.8E-05	7.6E-05	---	3.3E-06	1.3E-03	4.5E-02	1.9E-02	---	6.5E-02
Uranium	3.3E-06	3.4E-07	1.7E-06	---	1.0E-06	1.0E-04	1.1E-03	1.3E-04	---	1.3E-03
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	3.8E-04	1.5E-01	6.4E-01	2.0E-01	---	1.0E+00
Zinc	1.6E-04	6.0E-04	1.3E-02	---	7.4E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.0E-04	1.0E-04	8.4E-04	---	6.9E-05	4.0E-03	3.9E-02	1.1E-01	---	1.6E-01
Barium	2.5E-05	2.1E-04	3.5E-05	---	3.7E-05	7.1E-04	4.5E-03	7.3E-03	---	1.3E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	3.1E-06	1.8E-03	5.5E-03	1.6E-01	---	1.9E-01
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	4.9E-05	2.0E-02	2.8E-02	2.7E-01	---	3.3E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	9.3E-06	6.3E-03	1.2E-02	1.1E-03	---	2.1E-02
Copper	2.5E-03	1.2E-02	2.0E-02	---	8.2E-05	1.5E-02	1.8E-01	**2.3E+00**	---	**2.5E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.8E-05	1.5E-02	2.2E-02	1.1E-01	---	1.6E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	2.1E-05	8.4E-04	8.5E-03	9.6E-03	---	1.9E-02
Molybdenum	8.1E-06	9.3E-04	1.2E-04	---	5.3E-06	1.2E-04	1.5E-02	4.5E-03	---	2.0E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	2.8E-05	8.0E-03	4.1E-02	7.5E-02	---	1.4E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	5.4E-05	4.4E-03	1.9E-02	2.1E-01	---	2.4E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	3.8E-03	1.3E-01	5.6E-02	---	1.9E-01
Uranium	3.3E-06	3.4E-07	1.7E-06	---	1.0E-06	1.0E-04	1.1E-03	1.3E-04	---	1.3E-03
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	3.8E-04	1.5E-01	6.4E-01	2.0E-01	---	1.0E+00
Zinc	1.6E-04	6.0E-04	1.3E-02	---	7.4E-06	2.0E-03	2.2E-02	2.9E-01	---	3.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.0E-04	---	---	1.3E-04	2.4E-05	---	---	---	---	5.6E-04
Barium	3.3E-05	---	---	2.3E-04	1.3E-05	---	---	---	---	2.8E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	1.1E-06	---	---	---	---	7.4E-03
Chromium (Total)	1.1E-02	---	---	4.5E-02	5.1E-05	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	9.6E-06	---	---	---	---	4.1E-03
Copper	3.3E-03	---	---	8.6E-02	2.8E-05	---	---	---	---	9.0E-02
Lead	5.9E-03	---	---	7.0E-02	1.8E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.4E-04
Molybdenum	1.1E-05	---	---	1.2E-04	1.8E-06	---	---	---	---	1.3E-04
Nickel	4.2E-03	---	---	2.2E-02	2.9E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	5.5E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	1.1E-06	---	---	---	---	1.6E-05
Vanadium	4.6E-02	---	---	2.8E-02	3.9E-04	---	---	---	---	7.4E-02
Zinc	6.6E-04	---	---	5.8E-02	7.6E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	4.0E-04	7.1E-05	---	---	---	---	1.7E-03
Barium	9.9E-05	---	---	6.9E-04	3.8E-05	---	---	---	---	8.3E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	3.2E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.1E-02	---	---	4.5E-02	5.1E-05	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	9.6E-06	---	---	---	---	4.1E-03
Copper	1.0E-02	---	---	2.6E-01	8.4E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.8E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	2.2E-05	---	---	---	---	2.4E-04
Molybdenum	3.3E-05	---	---	3.6E-04	5.4E-06	---	---	---	---	4.0E-04
Nickel	4.2E-03	---	---	2.2E-02	2.9E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	5.5E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.9E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	1.1E-06	---	---	---	---	1.6E-05
Vanadium	4.6E-02	---	---	2.8E-02	3.9E-04	---	---	---	---	7.4E-02
Zinc	6.6E-04	---	---	5.8E-02	7.6E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.0E-03	---	7.0E-04	9.7E-04	1.1E-04	---	---	---	---	3.7E-03
Barium	1.6E-04	---	2.9E-05	1.7E-03	5.7E-05	---	---	---	---	1.9E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.5E-02	5.3E-02	4.8E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.7E-02	---	1.1E-02	1.1E-01	7.6E-05	---	---	---	---	1.4E-01
Cobalt	3.1E-03	---	7.6E-04	5.2E-03	1.4E-05	---	---	---	---	9.1E-03
Copper	1.6E-02	---	1.7E-02	6.3E-01	1.3E-04	---	---	---	---	6.7E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.8E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.5E-04	3.3E-05	---	---	---	---	5.2E-04
Molybdenum	5.3E-05	---	1.0E-04	8.8E-04	8.1E-06	---	---	---	---	1.0E-03
Nickel	6.9E-03	---	1.4E-02	5.3E-02	4.3E-05	---	---	---	---	7.5E-02
Selenium	2.1E-03	---	4.0E-03	1.4E-01	8.3E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.2E-05	---	1.4E-06	3.7E-06	1.6E-06	---	---	---	---	2.8E-05
Vanadium	7.4E-02	---	6.2E-03	6.9E-02	5.8E-04	---	---	---	---	1.5E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	1.1E-05	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.1E-02	---	7.3E-05	1.4E-03	4.1E-03	8.9E-02	8.6E-04	1.1E-01
Barium	9.7E-05	---	4.4E-04	---	3.9E-05	2.6E-04	4.7E-04	5.8E-03	7.1E-04	7.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	3.2E-06	6.4E-04	5.8E-04	1.3E-01	4.0E-04	3.5E-01
Chromium (Total)	3.1E-02	---	4.8E-01	---	1.6E-04	2.1E-02	9.0E-03	6.3E-01	1.3E-03	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	2.9E-05	6.8E-03	3.8E-03	2.7E-03	7.9E-04	5.4E-02
Copper	9.8E-03	---	2.6E-01	---	8.6E-05	5.3E-03	1.9E-02	**1.8E+00**	1.6E-02	**2.1E+00**
Lead	1.7E-02	---	4.1E-01	---	5.6E-05	1.7E-02	7.0E-03	2.7E-01	2.3E-03	7.2E-01
Manganese	2.1E-04	---	6.9E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	3.2E-05	---	1.5E-03	---	5.5E-06	4.2E-05	1.6E-03	3.6E-03	1.3E-03	8.0E-03
Nickel	1.2E-02	---	6.6E-01	---	8.8E-05	8.6E-03	1.3E-02	1.8E-01	1.9E-03	8.7E-01
Selenium	3.7E-03	---	1.8E-01	---	1.7E-04	4.8E-03	5.9E-03	5.0E-01	7.1E-02	7.6E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	6.7E-04	6.9E-03	2.2E-02	7.9E-04	3.2E-02
Uranium	3.9E-05	---	6.4E-05	---	3.3E-06	1.1E-04	3.5E-04	3.1E-04	5.2E-05	9.3E-04
Vanadium	1.3E-01	---	2.8E-01	---	1.2E-03	1.6E-01	2.0E-01	4.7E-01	2.4E-02	**1.3E+00**
Zinc	1.9E-03	---	4.9E-01	---	2.3E-05	2.2E-03	7.0E-03	7.0E-01	4.8E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.6E-03	---	3.2E-02	---	2.2E-04	4.3E-03	1.2E-02	2.7E-01	2.6E-03	3.2E-01
Barium	2.9E-04	---	1.3E-03	---	1.2E-04	7.7E-04	1.4E-03	1.7E-02	2.1E-03	2.3E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	9.7E-06	1.9E-03	1.7E-03	3.8E-01	1.2E-03	1.0E+00
Chromium (Total)	3.1E-02	---	4.8E-01	---	1.6E-04	2.1E-02	9.0E-03	6.3E-01	1.3E-03	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	2.9E-05	6.8E-03	3.8E-03	2.7E-03	7.9E-04	5.4E-02
Copper	2.9E-02	---	7.7E-01	---	2.6E-04	1.6E-02	5.8E-02	**5.4E+00**	4.7E-02	**6.3E+00**
Lead	1.7E-02	---	4.1E-01	---	5.6E-05	1.7E-02	7.0E-03	2.7E-01	2.3E-03	7.2E-01
Manganese	2.1E-04	---	6.9E-04	---	6.6E-05	9.1E-04	2.7E-03	2.3E-02	4.6E-04	2.8E-02
Molybdenum	9.6E-05	---	4.6E-03	---	1.6E-05	1.2E-04	4.7E-03	1.1E-02	3.8E-03	2.4E-02
Nickel	1.2E-02	---	6.6E-01	---	8.8E-05	8.6E-03	1.3E-02	1.8E-01	1.9E-03	8.7E-01
Selenium	3.7E-03	---	1.8E-01	---	1.7E-04	4.8E-03	5.9E-03	5.0E-01	7.1E-02	7.6E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.0E-03	2.1E-02	6.5E-02	2.4E-03	9.7E-02
Uranium	3.9E-05	---	6.4E-05	---	3.3E-06	1.1E-04	3.5E-04	3.1E-04	5.2E-05	9.3E-04
Vanadium	1.3E-01	---	2.8E-01	---	1.2E-03	1.6E-01	2.0E-01	4.7E-01	2.4E-02	**1.3E+00**
Zinc	1.9E-03	---	4.9E-01	---	2.3E-05	2.2E-03	7.0E-03	7.0E-01	4.8E-02	**1.2E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.8E-04	2.5E-03	4.2E-04	---	2.9E-05	---	---	---	---	3.8E-03
Barium	7.2E-05	6.5E-03	1.7E-05	---	1.6E-05	---	---	---	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.5E-04	7.7E-03	8.7E-03	---	1.3E-06	---	---	---	---	1.7E-02
Chromium (Total)	2.3E-02	1.1E-01	1.9E-02	---	6.2E-05	---	---	---	---	1.5E-01
Cobalt	4.2E-03	1.9E-02	1.4E-03	---	1.2E-05	---	---	---	---	2.4E-02
Copper	7.2E-03	1.6E-01	1.0E-02	---	3.4E-05	---	---	---	---	1.8E-01
Lead	1.3E-02	2.2E-02	1.6E-02	---	2.2E-05	---	---	---	---	5.1E-02
Manganese	1.5E-04	9.5E-03	2.7E-05	---	2.7E-05	---	---	---	---	9.7E-03
Molybdenum	2.4E-05	8.5E-03	6.0E-05	---	2.2E-06	---	---	---	---	8.6E-03
Nickel	9.2E-03	7.4E-02	2.6E-02	---	3.5E-05	---	---	---	---	1.1E-01
Selenium	2.8E-03	3.3E-02	7.2E-03	---	6.8E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.9E-03	9.5E-05	---	3.5E-06	---	---	---	---	4.8E-03
Uranium	2.9E-05	3.4E-05	2.5E-06	---	1.3E-06	---	---	---	---	6.7E-05
Vanadium	9.9E-02	2.9E-01	1.1E-02	---	4.7E-04	---	---	---	---	4.0E-01
Zinc	1.4E-03	5.1E-02	1.9E-02	---	9.3E-06	---	---	---	---	7.1E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.7E-04	2.2E-03	2.2E-03	1.7E-05	4.1E-05	5.9E-05	---	---	1.2E-04	5.5E-03
Arsenic	1.6E-03	2.3E-03	7.0E-04	1.0E-04	4.4E-05	1.8E-04	---	---	2.0E-04	5.1E-03
Barium	2.9E-05	1.4E-03	6.6E-06	4.0E-05	9.1E-06	8.0E-06	---	---	4.0E-05	1.5E-03
Beryllium	1.5E-03	8.3E-03	1.7E-04	5.7E-04	9.1E-06	1.4E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	3.5E-06	5.2E-05	---	---	6.5E-04	2.0E-02
Chromium (Total)	6.5E-03	8.5E-03	5.0E-03	6.4E-03	3.5E-05	6.3E-04	---	---	3.9E-05	2.7E-02
Cobalt	4.9E-04	8.5E-04	1.5E-04	1.1E-04	1.8E-06	5.3E-05	---	---	1.7E-05	1.7E-03
Copper	2.4E-03	3.6E-02	3.2E-03	1.3E-02	2.7E-05	1.7E-04	---	---	2.7E-03	5.7E-02
Lead	1.9E-03	1.5E-03	2.3E-03	4.6E-03	5.7E-06	2.2E-04	---	---	3.3E-04	1.1E-02
Manganese	2.2E-04	1.0E-02	3.7E-05	9.1E-05	5.0E-05	6.4E-05	---	---	2.1E-04	1.1E-02
Molybdenum	9.4E-04	2.7E-01	2.2E-03	2.1E-03	8.6E-06	9.9E-05	---	---	6.4E-04	2.8E-01
Nickel	5.7E-03	1.7E-02	1.5E-02	1.0E-02	3.4E-05	5.5E-04	---	---	2.2E-04	4.9E-02
Selenium	2.4E-03	1.7E-02	5.9E-03	2.2E-02	8.6E-05	2.3E-04	---	---	1.7E-02	6.5E-02
Thallium	1.6E-02	4.3E-02	1.9E-03	1.9E-02	1.6E-04	1.8E-03	---	---	2.5E-02	1.1E-01
Uranium	7.4E-04	4.6E-04	6.1E-05	1.7E-05	2.9E-06	6.9E-05	---	---	7.0E-06	1.4E-03
Vanadium	3.3E-03	4.6E-03	3.5E-04	4.1E-04	1.2E-05	3.2E-04	---	---	4.5E-05	9.0E-03
Zinc	5.3E-04	1.0E-02	6.8E-03	9.5E-03	6.9E-06	6.9E-05	---	---	5.6E-03	3.3E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	6.3E-06	2.2E-04	---	4.2E-05	3.8E-04	7.7E-04
Arsenic	5.8E-04	---	---	1.9E-04	2.0E-05	2.0E-03	---	2.0E-02	1.9E-03	2.4E-02
Barium	1.1E-05	---	---	7.5E-05	4.2E-06	8.9E-05	---	3.3E-04	3.8E-04	8.9E-04
Beryllium	1.8E-04	---	---	3.5E-04	1.4E-06	5.1E-04	---	1.8E-03	4.2E-04	3.3E-03
Cadmium	1.5E-04	---	---	6.9E-03	1.6E-06	5.8E-04	---	1.8E-02	6.3E-03	3.2E-02
Chromium (Total)	2.4E-03	---	---	1.2E-02	1.6E-05	7.0E-03	---	3.3E-02	3.8E-04	5.5E-02
Cobalt	1.8E-04	---	---	2.0E-04	8.2E-07	5.9E-04	---	3.8E-05	1.7E-04	1.2E-03
Copper	8.8E-04	---	---	2.4E-02	1.2E-05	1.9E-03	---	8.0E-02	2.6E-02	1.3E-01
Lead	7.1E-04	---	---	8.5E-03	2.6E-06	2.4E-03	---	5.9E-03	3.2E-03	2.1E-02
Manganese	8.3E-05	---	---	1.7E-04	2.3E-05	7.1E-04	---	2.9E-03	2.0E-03	5.9E-03
Molybdenum	1.2E-04	---	---	1.3E-03	1.3E-06	3.6E-04	---	5.1E-03	2.1E-03	8.9E-03
Nickel	2.1E-03	---	---	1.9E-02	1.6E-05	6.1E-03	---	2.3E-02	2.1E-03	5.2E-02
Selenium	8.9E-04	---	---	4.2E-02	4.0E-05	2.6E-03	---	4.3E-02	1.6E-01	2.5E-01
Thallium	2.0E-03	---	---	1.1E-02	2.5E-05	6.5E-03	---	3.4E-02	8.0E-02	1.3E-01
Uranium	9.2E-05	---	---	1.1E-05	4.5E-07	2.5E-04	---	1.1E-04	2.2E-05	4.9E-04
Vanadium	1.2E-03	---	---	7.6E-04	5.8E-06	3.5E-03	---	1.7E-03	4.4E-04	7.7E-03
Zinc	2.0E-04	---	---	1.8E-02	3.2E-06	7.6E-04	---	3.1E-02	5.4E-02	1.0E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.6E-04	---	---	3.5E-05	2.5E-04	3.1E-04	---	---	9.4E-04
Arsenic	4.2E-04	3.4E-04	---	---	4.8E-05	9.9E-04	2.9E-03	---	---	4.6E-03
Barium	7.8E-06	2.2E-04	---	---	1.0E-05	4.4E-05	9.0E-05	---	---	3.7E-04
Beryllium	3.0E-04	1.2E-03	---	---	7.8E-06	5.8E-04	8.7E-04	---	---	2.9E-03
Cadmium	1.1E-04	6.8E-04	---	---	3.9E-06	2.8E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	1.7E-03	1.3E-03	---	---	3.9E-05	3.4E-03	2.0E-03	---	---	8.5E-03
Cobalt	1.3E-04	1.3E-04	---	---	2.0E-06	2.9E-04	2.4E-04	---	---	8.0E-04
Copper	6.3E-04	3.7E-03	---	---	3.0E-05	9.2E-04	2.8E-03	---	---	8.1E-03
Lead	5.1E-04	2.8E-04	---	---	6.3E-06	1.2E-03	4.8E-04	---	---	2.5E-03
Manganese	5.9E-05	9.2E-04	---	---	5.5E-05	3.5E-04	1.9E-03	---	---	3.3E-03
Molybdenum	1.9E-04	1.6E-02	---	---	7.4E-06	4.1E-04	1.4E-02	---	---	3.1E-02
Nickel	1.5E-03	1.7E-03	---	---	3.8E-05	3.0E-03	5.5E-03	---	---	1.2E-02
Selenium	6.4E-04	2.3E-03	---	---	9.6E-05	1.3E-03	2.4E-03	---	---	6.7E-03
Thallium	3.4E-03	5.6E-03	---	---	1.4E-04	7.4E-03	9.3E-02	---	---	1.1E-01
Uranium	1.5E-04	5.7E-05	---	---	2.5E-06	2.9E-04	1.0E-03	---	---	1.5E-03
Vanadium	8.9E-04	7.3E-04	---	---	1.4E-05	1.7E-03	3.0E-03	---	---	6.4E-03
Zinc	1.4E-04	1.6E-03	---	---	7.6E-06	3.7E-04	1.2E-03	---	---	3.3E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.2E-04	---	---	7.7E-05	2.9E-05	---	---	---	---	5.3E-04
Arsenic	1.3E-03	---	---	8.0E-04	5.4E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.1E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.4E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	2.2E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	3.3E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	7.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	6.2E-05	---	---	---	---	9.6E-04
Molybdenum	4.6E-04	---	---	9.3E-03	6.2E-06	---	---	---	---	9.8E-03
Nickel	4.8E-03	---	---	7.8E-02	4.3E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	1.1E-04	---	---	---	---	1.8E-01
Thallium	8.0E-03	---	---	8.3E-02	1.2E-04	---	---	---	---	9.1E-02
Uranium	3.6E-04	---	---	7.7E-05	2.1E-06	---	---	---	---	4.4E-04
Vanadium	2.8E-03	---	---	3.2E-03	1.6E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	8.6E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.3E-04	8.8E-05	---	---	---	---	1.6E-03
Arsenic	1.3E-03	---	---	8.0E-04	5.4E-05	---	---	---	---	2.2E-03
Barium	2.5E-05	---	---	3.1E-04	1.1E-05	---	---	---	---	3.5E-04
Beryllium	7.2E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.4E-06	---	---	---	---	2.9E-02
Chromium (Total)	5.5E-03	---	---	4.9E-02	4.4E-05	---	---	---	---	5.5E-02
Cobalt	4.2E-04	---	---	8.4E-04	2.2E-06	---	---	---	---	1.3E-03
Copper	2.0E-03	---	---	1.0E-01	3.3E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	7.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.1E-04	6.2E-05	---	---	---	---	9.6E-04
Molybdenum	1.4E-03	---	---	2.8E-02	1.9E-05	---	---	---	---	2.9E-02
Nickel	4.8E-03	---	---	7.8E-02	4.3E-05	---	---	---	---	8.3E-02
Selenium	2.0E-03	---	---	1.7E-01	1.1E-04	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.5E-04	---	---	---	---	2.7E-01
Uranium	1.1E-03	---	---	2.3E-04	6.3E-06	---	---	---	---	1.3E-03
Vanadium	2.8E-03	---	---	3.2E-03	1.6E-05	---	---	---	---	6.0E-03
Zinc	4.5E-04	---	---	7.4E-02	8.6E-06	---	---	---	---	7.4E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.8E-03	3.4E-03	---	---	1.4E-04	---	---	---	---	9.3E-03
Arsenic	2.8E-03	1.4E-03	---	---	4.0E-05	---	---	---	---	4.2E-03
Barium	5.2E-05	9.2E-04	---	---	8.3E-06	---	---	---	---	9.8E-04
Beryllium	3.3E-03	7.8E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	3.2E-06	---	---	---	---	3.6E-03
Chromium (Total)	1.2E-02	5.6E-03	---	---	3.2E-05	---	---	---	---	1.7E-02
Cobalt	8.8E-04	5.5E-04	---	---	1.6E-06	---	---	---	---	1.4E-03
Copper	4.2E-03	1.6E-02	---	---	2.4E-05	---	---	---	---	2.0E-02
Lead	3.4E-03	1.2E-03	---	---	5.1E-06	---	---	---	---	4.6E-03
Manganese	3.9E-04	3.9E-03	---	---	4.5E-05	---	---	---	---	4.3E-03
Molybdenum	6.2E-03	3.3E-01	---	---	2.9E-05	---	---	---	---	3.4E-01
Nickel	1.0E-02	7.2E-03	---	---	3.1E-05	---	---	---	---	1.7E-02
Selenium	4.3E-03	9.7E-03	---	---	7.8E-05	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.1E-01	---	---	5.4E-04	---	---	---	---	2.2E-01
Uranium	4.9E-03	1.2E-03	---	---	9.8E-06	---	---	---	---	6.1E-03
Vanadium	5.9E-03	3.1E-03	---	---	1.1E-05	---	---	---	---	9.0E-03
Zinc	9.5E-04	6.7E-03	---	---	6.2E-06	---	---	---	---	7.6E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.6E-03	5.0E-04	1.2E-01	---	2.9E-05	---	---	---	---	1.3E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	1.2E-04	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.4E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	9.4E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	4.7E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	7.0E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.5E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	1.3E-04	---	---	---	---	1.9E-02
Molybdenum	1.5E-03	2.7E-02	6.9E-02	---	3.3E-06	---	---	---	---	9.7E-02
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	9.1E-05	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	2.3E-04	---	---	---	---	**1.3E+00**
Thallium	4.9E-02	1.7E-02	1.1E-01	---	1.1E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.3E-05	1.9E-03	---	1.1E-06	---	---	---	---	3.2E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	3.3E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.8E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.8E-03	1.5E-03	3.7E-01	---	8.7E-05	---	---	---	---	3.8E-01
Arsenic	1.7E-02	2.9E-03	1.5E-01	---	1.2E-04	---	---	---	---	1.7E-01
Barium	3.2E-04	1.9E-03	1.4E-03	---	2.4E-05	---	---	---	---	3.6E-03
Beryllium	4.4E-03	3.5E-03	9.5E-03	---	6.4E-06	---	---	---	---	1.7E-02
Cadmium	4.5E-03	5.9E-03	**2.0E+00**	---	9.4E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	7.3E-02	1.1E-02	**1.1E+00**	---	9.3E-05	---	---	---	---	**1.1E+00**
Cobalt	5.5E-03	1.1E-03	3.2E-02	---	4.7E-06	---	---	---	---	3.9E-02
Copper	2.6E-02	3.2E-02	6.9E-01	---	7.0E-05	---	---	---	---	7.5E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.5E-05	---	---	---	---	5.1E-01
Manganese	2.5E-03	8.0E-03	7.9E-03	---	1.3E-04	---	---	---	---	1.9E-02
Molybdenum	4.6E-03	8.0E-02	2.1E-01	---	9.9E-06	---	---	---	---	2.9E-01
Nickel	6.3E-02	1.5E-02	**3.2E+00**	---	9.1E-05	---	---	---	---	**3.3E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	2.3E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.4E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.8E-04	5.7E-03	---	3.4E-06	---	---	---	---	9.6E-03
Vanadium	3.7E-02	6.3E-03	7.4E-02	---	3.3E-05	---	---	---	---	1.2E-01
Zinc	6.0E-03	1.4E-02	**1.4E+00**	---	1.8E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	1.3E-03	---	---	3.5E-05	---	---	---	---	1.8E-03
Arsenic	3.0E-03	5.2E-03	---	---	1.4E-04	---	---	---	---	8.4E-03
Barium	5.6E-05	3.2E-03	---	---	3.0E-05	---	---	---	---	3.2E-03
Beryllium	7.7E-04	5.0E-03	---	---	7.9E-06	---	---	---	---	5.8E-03
Cadmium	7.9E-04	1.3E-02	---	---	1.1E-05	---	---	---	---	1.4E-02
Chromium (Total)	1.3E-02	1.9E-02	---	---	1.1E-04	---	---	---	---	3.2E-02
Cobalt	9.6E-04	1.9E-03	---	---	5.7E-06	---	---	---	---	2.9E-03
Copper	4.6E-03	7.8E-02	---	---	8.6E-05	---	---	---	---	8.2E-02
Lead	3.7E-03	3.5E-03	---	---	1.8E-05	---	---	---	---	7.3E-03
Manganese	4.3E-04	2.2E-02	---	---	1.6E-04	---	---	---	---	2.3E-02
Molybdenum	2.8E-04	8.8E-02	---	---	4.2E-06	---	---	---	---	8.8E-02
Nickel	1.1E-02	3.8E-02	---	---	1.1E-04	---	---	---	---	4.9E-02
Selenium	4.7E-03	3.8E-02	---	---	2.8E-04	---	---	---	---	4.3E-02
Thallium	8.6E-03	2.6E-02	---	---	1.4E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.4E-06	---	---	---	---	3.7E-04
Vanadium	6.5E-03	1.0E-02	---	---	4.0E-05	---	---	---	---	1.7E-02
Zinc	1.0E-03	2.3E-02	---	---	2.2E-05	---	---	---	---	2.4E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	6.9E-04	2.8E-03	---	---	5.3E-05	1.3E-04	1.6E-03	---	---	5.3E-03
Arsenic	7.9E-04	2.8E-03	---	---	3.7E-05	2.5E-04	7.3E-03	---	---	1.1E-02
Barium	1.5E-05	1.8E-03	---	---	7.7E-06	1.1E-05	2.3E-04	---	---	2.1E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	3.0E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	3.0E-06	7.3E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	3.3E-03	1.1E-02	---	---	2.9E-05	8.8E-04	5.1E-03	---	---	2.0E-02
Cobalt	2.5E-04	1.1E-03	---	---	1.5E-06	7.5E-05	6.2E-04	---	---	2.0E-03
Copper	1.2E-03	3.1E-02	---	---	2.2E-05	2.4E-04	7.3E-03	---	---	4.0E-02
Lead	9.7E-04	2.4E-03	---	---	4.7E-06	3.1E-04	1.2E-03	---	---	4.9E-03
Manganese	1.1E-04	7.7E-03	---	---	4.2E-05	9.0E-05	4.8E-03	---	---	1.3E-02
Molybdenum	7.4E-04	2.8E-01	---	---	1.1E-05	2.2E-04	7.1E-02	---	---	3.5E-01
Nickel	2.9E-03	1.4E-02	---	---	2.9E-05	7.8E-04	1.4E-02	---	---	3.2E-02
Selenium	1.2E-03	1.9E-02	---	---	7.2E-05	3.2E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.5E-02	---	---	2.1E-04	3.8E-03	4.8E-01	---	---	5.9E-01
Uranium	5.9E-04	9.6E-04	---	---	3.8E-06	1.5E-04	5.4E-03	---	---	7.1E-03
Vanadium	1.7E-03	6.1E-03	---	---	1.0E-05	4.4E-04	7.7E-03	---	---	1.6E-02
Zinc	2.7E-04	1.3E-02	---	---	5.8E-06	9.6E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.2E-05	---	---	3.1E-06	2.9E-05	4.1E-04	---	9.3E-05	6.9E-04	1.3E-03
Arsenic	9.9E-05	---	---	3.2E-05	5.4E-05	2.2E-03	---	2.5E-02	2.0E-03	2.9E-02
Barium	1.8E-06	---	---	1.3E-05	1.1E-05	9.5E-05	---	4.2E-04	4.0E-04	9.4E-04
Beryllium	5.4E-05	---	---	1.0E-04	6.5E-06	9.5E-04	---	4.0E-03	7.7E-04	5.9E-03
Cadmium	2.6E-05	---	---	1.2E-03	4.4E-06	6.2E-04	---	2.3E-02	6.6E-03	3.1E-02
Chromium (Total)	4.1E-04	---	---	2.0E-03	4.4E-05	7.5E-03	---	4.3E-02	4.0E-04	5.3E-02
Cobalt	3.1E-05	---	---	3.4E-05	2.2E-06	6.4E-04	---	4.9E-05	1.8E-04	9.3E-04
Copper	1.5E-04	---	---	4.1E-03	3.3E-05	2.0E-03	---	1.0E-01	2.7E-02	1.4E-01
Lead	1.2E-04	---	---	1.4E-03	7.1E-06	2.6E-03	---	7.6E-03	3.3E-03	1.5E-02
Manganese	1.4E-05	---	---	2.9E-05	6.2E-05	7.6E-04	---	3.7E-03	2.1E-03	6.7E-03
Molybdenum	3.4E-05	---	---	3.8E-04	6.2E-06	6.8E-04	---	1.1E-02	3.8E-03	1.6E-02
Nickel	3.6E-04	---	---	3.2E-03	4.3E-05	6.6E-03	---	3.0E-02	2.2E-03	4.2E-02
Selenium	1.5E-04	---	---	7.1E-03	1.1E-04	2.8E-03	---	5.5E-02	1.7E-01	2.3E-01
Thallium	6.0E-04	---	---	3.4E-03	1.2E-04	1.2E-02	---	7.6E-02	1.4E-01	2.4E-01
Uranium	2.7E-05	---	---	3.1E-06	2.1E-06	4.7E-04	---	2.5E-04	4.1E-05	8.0E-04
Vanadium	2.1E-04	---	---	1.3E-04	1.6E-05	3.8E-03	---	2.2E-03	4.6E-04	6.8E-03
Zinc	3.4E-05	---	---	3.0E-03	8.6E-06	8.2E-04	---	4.0E-02	5.7E-02	1.0E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.5E-04	8.3E-05	2.5E-03	2.4E-05	2.7E-05	---	---	---	---	3.1E-03
Arsenic	1.7E-03	1.1E-04	1.7E-03	2.9E-04	5.8E-05	---	---	---	---	3.8E-03
Barium	3.1E-05	5.7E-05	1.6E-05	1.2E-04	1.2E-05	---	---	---	---	2.3E-04
Beryllium	7.7E-04	9.2E-05	1.9E-04	8.0E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	4.7E-06	---	---	---	---	3.4E-02
Chromium (Total)	6.9E-03	3.4E-04	1.2E-02	1.8E-02	4.7E-05	---	---	---	---	3.8E-02
Cobalt	5.2E-04	3.4E-05	3.6E-04	3.1E-04	2.4E-06	---	---	---	---	1.2E-03
Copper	2.5E-03	2.7E-03	7.8E-03	3.7E-02	3.6E-05	---	---	---	---	5.0E-02
Lead	2.0E-03	3.2E-05	5.5E-03	1.3E-02	7.6E-06	---	---	---	---	2.1E-02
Manganese	2.4E-04	8.7E-04	8.9E-05	2.6E-04	6.6E-05	---	---	---	---	1.5E-03
Molybdenum	4.9E-04	1.2E-02	2.6E-03	2.9E-03	5.6E-06	---	---	---	---	1.8E-02
Nickel	6.0E-03	1.3E-03	3.6E-02	2.9E-02	4.6E-05	---	---	---	---	7.2E-02
Selenium	2.6E-03	9.4E-04	1.4E-02	6.5E-02	1.2E-04	---	---	---	---	8.2E-02
Thallium	8.5E-03	6.5E-04	2.3E-03	2.6E-02	1.0E-04	---	---	---	---	3.7E-02
Uranium	3.9E-04	8.1E-06	7.2E-05	2.4E-05	1.9E-06	---	---	---	---	4.9E-04
Vanadium	3.5E-03	1.7E-04	8.4E-04	1.2E-03	1.7E-05	---	---	---	---	5.7E-03
Zinc	5.7E-04	4.5E-04	1.6E-02	2.7E-02	9.2E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.0E-03	2.6E-03	---	---	2.3E-05	---	---	---	---	4.6E-03
Arsenic	9.8E-03	1.0E-02	---	---	6.5E-05	---	---	---	---	2.0E-02
Barium	1.8E-04	6.6E-03	---	---	1.4E-05	---	---	---	---	6.8E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.0E-02
Cadmium	2.6E-03	2.1E-02	---	---	5.3E-06	---	---	---	---	2.4E-02
Chromium (Total)	4.1E-02	4.0E-02	---	---	5.2E-05	---	---	---	---	8.1E-02
Cobalt	3.1E-03	4.0E-03	---	---	2.6E-06	---	---	---	---	7.1E-03
Copper	1.5E-02	1.2E-01	---	---	4.0E-05	---	---	---	---	1.3E-01
Lead	1.2E-02	8.5E-03	---	---	8.4E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.0E-02	---	---	7.4E-05	---	---	---	---	3.1E-02
Molybdenum	2.2E-03	2.6E-01	---	---	4.8E-06	---	---	---	---	2.6E-01
Nickel	3.6E-02	5.5E-02	---	---	5.1E-05	---	---	---	---	9.0E-02
Selenium	1.5E-02	7.1E-02	---	---	1.3E-04	---	---	---	---	8.6E-02
Thallium	3.8E-02	8.1E-02	---	---	8.9E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.3E-04	---	---	1.6E-06	---	---	---	---	2.6E-03
Vanadium	2.1E-02	2.2E-02	---	---	1.9E-05	---	---	---	---	4.3E-02
Zinc	3.4E-03	4.8E-02	---	---	1.0E-05	---	---	---	---	5.1E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-04	3.2E-03	---	---	4.2E-05	---	---	---	---	4.0E-03
Arsenic	1.4E-03	4.7E-03	---	---	4.3E-05	---	---	---	---	6.1E-03
Barium	2.6E-05	3.0E-03	---	---	9.1E-06	---	---	---	---	3.0E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.2E-02
Cadmium	3.6E-04	9.6E-03	---	---	3.5E-06	---	---	---	---	9.9E-03
Chromium (Total)	5.8E-03	1.8E-02	---	---	3.5E-05	---	---	---	---	2.4E-02
Cobalt	4.4E-04	1.8E-03	---	---	1.8E-06	---	---	---	---	2.2E-03
Copper	2.1E-03	5.3E-02	---	---	2.6E-05	---	---	---	---	5.5E-02
Lead	1.7E-03	3.8E-03	---	---	5.6E-06	---	---	---	---	5.5E-03
Manganese	2.0E-04	1.3E-02	---	---	4.9E-05	---	---	---	---	1.4E-02
Molybdenum	8.6E-04	3.2E-01	---	---	8.7E-06	---	---	---	---	3.2E-01
Nickel	5.1E-03	2.5E-02	---	---	3.4E-05	---	---	---	---	3.0E-02
Selenium	2.1E-03	3.2E-02	---	---	8.5E-05	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.6E-04	---	---	---	---	1.2E-01
Uranium	6.8E-04	1.0E-03	---	---	3.0E-06	---	---	---	---	1.7E-03
Vanadium	3.0E-03	9.9E-03	---	---	1.2E-05	---	---	---	---	1.3E-02
Zinc	4.8E-04	2.2E-02	---	---	6.8E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.6E-03	1.4E-03	8.6E-03	---	2.2E-05	---	---	---	---	1.5E-02
Barium	3.6E-04	3.1E-03	3.4E-04	---	1.9E-05	---	---	---	---	3.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.8E-03	7.8E-03	1.8E-01	---	2.7E-06	---	---	---	---	1.9E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.1E-05	---	---	---	---	4.5E-02
Copper	3.6E-02	1.8E-01	2.1E-01	---	7.0E-05	---	---	---	---	4.2E-01
Lead	6.9E-02	5.0E-03	3.4E-01	---	3.4E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	3.0E-05	---	---	---	---	1.5E-02
Molybdenum	1.2E-04	1.4E-02	1.2E-03	---	1.9E-07	---	---	---	---	1.6E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	1.8E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	8.9E-05	---	---	---	---	1.9E-01
Thallium	2.4E-03	8.7E-04	1.2E-03	---	4.1E-06	---	---	---	---	4.5E-03
Uranium	1.5E-04	1.5E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	3.2E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.7E-05	---	---	---	---	4.3E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.3E-03	2.6E-02	---	6.5E-05	---	---	---	---	4.4E-02
Barium	1.1E-03	9.3E-03	1.0E-03	---	5.8E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.5E-03	2.3E-02	5.4E-01	---	8.2E-06	---	---	---	---	5.7E-01
Chromium (Total)	7.3E-02	1.6E-02	2.3E-01	---	6.7E-05	---	---	---	---	3.2E-01
Cobalt	1.8E-02	5.3E-03	2.2E-02	---	1.1E-05	---	---	---	---	4.5E-02
Copper	1.1E-01	5.3E-01	6.2E-01	---	2.1E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.0E-03	3.4E-01	---	3.4E-05	---	---	---	---	4.1E-01
Manganese	7.9E-04	1.3E-02	5.5E-04	---	3.0E-05	---	---	---	---	1.5E-02
Molybdenum	3.7E-04	4.3E-02	3.7E-03	---	5.8E-07	---	---	---	---	4.7E-02
Nickel	1.8E-02	1.8E-02	2.0E-01	---	1.8E-05	---	---	---	---	2.3E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	8.9E-05	---	---	---	---	1.9E-01
Thallium	7.3E-03	2.6E-03	3.6E-03	---	1.2E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.5E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.0E-01	1.1E-01	2.2E-01	---	3.2E-04	---	---	---	---	8.3E-01
Zinc	7.6E-03	2.7E-02	4.0E-01	---	1.7E-05	---	---	---	---	4.3E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.6E-04	---	---	5.4E-05	5.6E-06	3.5E-04	---	---	3.9E-04	9.7E-04
Barium	1.7E-05	---	---	1.2E-04	6.6E-06	8.8E-05	---	---	4.4E-04	6.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	7.1E-07	1.6E-04	---	---	2.0E-03	5.2E-03
Chromium (Total)	2.6E-03	---	---	1.3E-02	1.7E-05	4.7E-03	---	---	2.9E-04	2.0E-02
Cobalt	6.4E-04	---	---	7.0E-04	2.8E-06	1.3E-03	---	---	4.2E-04	3.0E-03
Copper	1.7E-03	---	---	4.7E-02	2.4E-05	2.3E-03	---	---	3.6E-02	8.7E-02
Lead	2.5E-03	---	---	2.9E-02	8.9E-06	5.3E-03	---	---	7.8E-03	4.5E-02
Manganese	2.9E-05	---	---	5.8E-05	7.8E-06	1.5E-04	---	---	5.0E-04	7.5E-04
Molybdenum	6.0E-06	---	---	6.6E-05	6.7E-08	1.2E-05	---	---	7.6E-05	1.6E-04
Nickel	6.4E-04	---	---	5.7E-03	4.7E-06	1.2E-03	---	---	4.6E-04	8.0E-03
Selenium	5.3E-04	---	---	2.5E-02	2.3E-05	9.4E-04	---	---	6.8E-02	9.4E-02
Thallium	2.4E-04	---	---	1.4E-03	2.9E-06	4.8E-04	---	---	6.8E-03	8.9E-03
Uranium	7.7E-06	---	---	8.9E-07	3.7E-08	1.3E-05	---	---	1.3E-06	2.3E-05
Vanadium	1.8E-02	---	---	1.1E-02	8.2E-05	3.2E-02	---	---	4.5E-03	6.5E-02
Zinc	2.7E-04	---	---	2.4E-02	4.3E-06	6.5E-04	---	---	5.3E-02	7.8E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.4E-03	9.4E-05	8.4E-02	---	1.0E-04	---	---	---	---	9.4E-02
Barium	7.5E-04	2.1E-04	3.4E-03	---	9.4E-05	---	---	---	---	4.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	1.3E-05	---	---	---	---	**1.8E+00**
Chromium (Total)	5.0E-02	3.6E-04	7.6E-01	---	1.1E-04	---	---	---	---	8.1E-01
Cobalt	1.2E-02	1.2E-04	7.3E-02	---	1.7E-05	---	---	---	---	8.6E-02
Copper	7.5E-02	1.2E-02	**2.0E+00**	---	3.4E-04	---	---	---	---	**2.1E+00**
Lead	4.7E-02	1.1E-04	**1.1E+00**	---	5.5E-05	---	---	---	---	**1.2E+00**
Manganese	5.4E-04	3.0E-04	1.8E-03	---	4.8E-05	---	---	---	---	2.7E-03
Molybdenum	2.6E-04	9.4E-04	1.2E-02	---	9.3E-07	---	---	---	---	1.3E-02
Nickel	1.2E-02	4.0E-04	6.4E-01	---	2.9E-05	---	---	---	---	6.5E-01
Selenium	1.0E-02	5.5E-04	4.9E-01	---	1.4E-04	---	---	---	---	5.0E-01
Thallium	4.9E-03	5.6E-05	1.1E-02	---	1.9E-05	---	---	---	---	1.6E-02
Uranium	1.1E-04	3.3E-07	1.7E-04	---	1.6E-07	---	---	---	---	2.8E-04
Vanadium	3.4E-01	2.4E-03	7.1E-01	---	5.1E-04	---	---	---	---	**1.1E+00**
Zinc	5.2E-03	6.1E-04	**1.3E+00**	---	2.7E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	8.2E-06	9.2E-04	2.8E-04	5.4E-03	9.3E-04	7.5E-03
Barium	---	---	---	---	7.3E-06	1.7E-04	3.7E-05	3.8E-04	7.9E-04	1.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.0E-06	4.1E-04	4.9E-05	7.6E-03	4.7E-03	1.3E-02
Chromium (Total)	---	---	---	---	2.5E-05	1.2E-02	7.4E-04	3.5E-02	6.9E-04	4.9E-02
Cobalt	---	---	---	---	4.1E-06	3.3E-03	2.9E-04	1.3E-04	9.8E-04	4.7E-03
Copper	---	---	---	---	2.6E-05	4.5E-03	1.5E-03	1.2E-01	6.5E-02	1.9E-01
Lead	---	---	---	---	1.3E-05	1.4E-02	5.8E-04	2.0E-02	1.8E-02	5.3E-02
Manganese	---	---	---	---	1.1E-05	3.9E-04	2.2E-04	9.7E-04	1.2E-03	2.8E-03
Molybdenum	---	---	---	---	7.3E-08	2.3E-05	7.9E-05	1.9E-04	1.3E-04	4.3E-04
Nickel	---	---	---	---	6.9E-06	3.0E-03	5.7E-04	6.9E-03	1.1E-03	1.2E-02
Selenium	---	---	---	---	3.4E-05	2.4E-03	4.9E-04	2.5E-02	1.6E-01	1.9E-01
Thallium	---	---	---	---	3.2E-06	9.4E-04	1.2E-03	3.0E-03	1.2E-02	1.7E-02
Uranium	---	---	---	---	4.1E-08	2.6E-05	9.8E-06	7.0E-06	2.4E-06	4.5E-05
Vanadium	---	---	---	---	1.2E-04	8.2E-02	1.5E-02	2.4E-02	1.1E-02	1.3E-01
Zinc	---	---	---	---	6.2E-06	1.7E-03	5.8E-04	4.2E-02	1.3E-01	1.7E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.1E-05	1.2E-03	2.0E-03	8.5E-02	---	8.8E-02
Barium	---	---	---	---	9.4E-06	2.3E-04	2.6E-04	6.1E-03	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.3E-06	5.3E-04	3.4E-04	1.2E-01	---	1.2E-01
Chromium (Total)	---	---	---	---	3.2E-05	1.6E-02	5.2E-03	5.6E-01	---	5.8E-01
Cobalt	---	---	---	---	5.2E-06	4.3E-03	2.0E-03	2.0E-03	---	8.4E-03
Copper	---	---	---	---	3.4E-05	5.8E-03	1.0E-02	**1.8E+00**	---	**1.8E+00**
Lead	---	---	---	---	1.7E-05	1.8E-02	4.0E-03	3.2E-01	---	3.4E-01
Manganese	---	---	---	---	1.5E-05	5.1E-04	1.6E-03	1.5E-02	---	1.7E-02
Molybdenum	---	---	---	---	9.4E-08	2.9E-05	5.5E-04	3.0E-03	---	3.6E-03
Nickel	---	---	---	---	8.9E-06	3.9E-03	4.0E-03	1.1E-01	---	1.2E-01
Selenium	---	---	---	---	4.3E-05	3.2E-03	3.5E-03	3.9E-01	---	4.0E-01
Thallium	---	---	---	---	3.4E-06	1.0E-03	7.2E-03	3.9E-02	---	4.8E-02
Uranium	---	---	---	---	5.0E-08	3.2E-05	6.6E-05	1.1E-04	---	2.0E-04
Vanadium	---	---	---	---	1.5E-04	1.1E-01	1.0E-01	3.8E-01	---	5.9E-01
Zinc	---	---	---	---	8.0E-06	2.2E-03	4.1E-03	6.5E-01	---	6.6E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-05	3.0E-05	2.7E-04	---	8.8E-06	1.5E-03	1.1E-02	4.1E-02	---	5.3E-02
Barium	7.7E-06	6.6E-05	1.1E-05	---	7.9E-06	2.8E-04	1.4E-03	2.9E-03	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	1.1E-06	6.6E-04	1.8E-03	5.8E-02	---	6.6E-02
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	4.4E-06	5.4E-03	1.1E-02	9.7E-04	---	1.9E-02
Copper	7.7E-04	3.8E-03	6.6E-03	---	2.8E-05	7.3E-03	5.5E-02	8.8E-01	---	9.5E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.4E-05	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	1.2E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	2.6E-06	3.0E-04	3.9E-05	---	7.9E-08	3.7E-05	3.0E-03	1.4E-03	---	4.8E-03
Nickel	3.8E-04	3.8E-04	6.2E-03	---	7.5E-06	4.9E-03	2.2E-02	5.2E-02	---	8.6E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	3.6E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	1.0E-04	3.6E-05	7.5E-05	---	3.3E-06	1.4E-03	4.5E-02	2.2E-02	---	6.8E-02
Uranium	3.3E-06	3.2E-07	1.7E-06	---	4.2E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.3E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	6.7E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.9E-04	9.1E-05	8.2E-04	---	2.7E-05	4.5E-03	3.2E-02	1.2E-01	---	1.6E-01
Barium	2.3E-05	2.0E-04	3.3E-05	---	2.4E-05	8.5E-04	4.2E-03	8.7E-03	---	1.4E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	3.3E-06	2.0E-03	5.5E-03	1.7E-01	---	2.0E-01
Chromium (Total)	1.5E-03	3.5E-04	7.4E-03	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.2E-01
Cobalt	3.7E-04	1.1E-04	7.1E-04	---	4.4E-06	5.4E-03	1.1E-02	9.7E-04	---	1.9E-02
Copper	2.3E-03	1.1E-02	2.0E-02	---	8.5E-05	2.2E-02	1.6E-01	**2.6E+00**	---	**2.9E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.4E-05	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	2.8E-04	1.8E-05	---	1.2E-05	6.4E-04	8.5E-03	7.3E-03	---	1.7E-02
Molybdenum	7.9E-06	9.1E-04	1.2E-04	---	2.4E-07	1.1E-04	8.9E-03	4.3E-03	---	1.4E-02
Nickel	3.8E-04	3.8E-04	6.2E-03	---	7.5E-06	4.9E-03	2.2E-02	5.2E-02	---	8.6E-02
Selenium	3.1E-04	5.3E-04	4.8E-03	---	3.6E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	9.8E-06	4.3E-03	1.3E-01	6.5E-02	---	2.0E-01
Uranium	3.3E-06	3.2E-07	1.7E-06	---	4.2E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	2.3E-03	6.9E-03	---	1.3E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	5.8E-04	1.3E-02	---	6.7E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.9E-04	---	---	1.3E-04	9.1E-06	---	---	---	---	5.3E-04
Barium	3.1E-05	---	---	2.2E-04	8.1E-06	---	---	---	---	2.6E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	1.1E-06	---	---	---	---	7.4E-03
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	4.5E-06	---	---	---	---	3.2E-03
Copper	3.1E-03	---	---	8.6E-02	2.9E-05	---	---	---	---	8.9E-02
Lead	5.9E-03	---	---	7.0E-02	1.4E-05	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	1.3E-05	---	---	---	---	2.2E-04
Molybdenum	1.1E-05	---	---	1.2E-04	8.1E-08	---	---	---	---	1.3E-04
Nickel	1.5E-03	---	---	1.4E-02	7.7E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	3.7E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.3E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.3E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	6.9E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	3.9E-04	2.7E-05	---	---	---	---	1.6E-03
Barium	9.4E-05	---	---	6.5E-04	2.4E-05	---	---	---	---	7.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	3.4E-06	---	---	---	---	2.2E-02
Chromium (Total)	6.3E-03	---	---	3.1E-02	2.8E-05	---	---	---	---	3.7E-02
Cobalt	1.5E-03	---	---	1.7E-03	4.5E-06	---	---	---	---	3.2E-03
Copper	9.4E-03	---	---	2.6E-01	8.8E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.4E-05	---	---	---	---	7.6E-02
Manganese	6.8E-05	---	---	1.4E-04	1.3E-05	---	---	---	---	2.2E-04
Molybdenum	3.2E-05	---	---	3.5E-04	2.4E-07	---	---	---	---	3.9E-04
Nickel	1.5E-03	---	---	1.4E-02	7.7E-06	---	---	---	---	1.5E-02
Selenium	1.3E-03	---	---	5.9E-02	3.7E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.8E-03	9.9E-06	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.3E-02	---	---	2.6E-02	1.3E-04	---	---	---	---	6.9E-02
Zinc	6.5E-04	---	---	5.8E-02	6.9E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.9E-03	---	6.8E-04	9.4E-04	4.1E-05	---	---	---	---	3.6E-03
Barium	1.5E-04	---	2.7E-05	1.6E-03	3.7E-05	---	---	---	---	1.8E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.4E-02	5.3E-02	5.1E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.0E-02	---	6.2E-03	7.5E-02	4.2E-05	---	---	---	---	9.1E-02
Cobalt	2.5E-03	---	5.9E-04	4.1E-03	6.8E-06	---	---	---	---	7.1E-03
Copper	1.5E-02	---	1.7E-02	6.3E-01	1.3E-04	---	---	---	---	6.6E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.2E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.4E-04	1.9E-05	---	---	---	---	4.8E-04
Molybdenum	5.2E-05	---	9.8E-05	8.6E-04	3.6E-07	---	---	---	---	1.0E-03
Nickel	2.5E-03	---	5.2E-03	3.3E-02	1.1E-05	---	---	---	---	4.1E-02
Selenium	2.0E-03	---	4.0E-03	1.4E-01	5.6E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.1E-05	---	---	---	---	1.4E-02
Uranium	2.1E-05	---	1.4E-06	3.7E-06	6.4E-08	---	---	---	---	2.7E-05
Vanadium	6.9E-02	---	5.8E-03	6.4E-02	2.0E-04	---	---	---	---	1.4E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	1.0E-05	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.0E-02	---	2.8E-05	1.6E-03	3.3E-03	9.7E-02	2.5E-04	1.1E-01
Barium	9.2E-05	---	4.2E-04	---	2.5E-05	3.1E-04	4.5E-04	6.9E-03	2.1E-04	8.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	3.5E-06	7.2E-04	5.8E-04	1.4E-01	1.2E-03	3.6E-01
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	1.8E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	1.4E-05	5.8E-03	3.5E-03	2.3E-03	2.6E-04	4.3E-02
Copper	9.2E-03	---	2.5E-01	---	8.9E-05	7.9E-03	1.7E-02	**2.1E+00**	1.7E-02	**2.4E+00**
Lead	1.7E-02	---	4.1E-01	---	4.4E-05	2.4E-02	6.9E-03	3.6E-01	4.9E-03	8.2E-01
Manganese	2.0E-04	---	6.7E-04	---	3.8E-05	7.0E-04	2.7E-03	1.7E-02	3.1E-04	2.2E-02
Molybdenum	3.1E-05	---	1.5E-03	---	2.5E-07	4.0E-05	9.4E-04	3.4E-03	3.6E-05	6.0E-03
Nickel	4.5E-03	---	2.4E-01	---	2.3E-05	5.3E-03	6.8E-03	1.2E-01	2.9E-04	3.8E-01
Selenium	3.7E-03	---	1.8E-01	---	1.1E-04	4.3E-03	5.9E-03	4.4E-01	4.3E-02	6.8E-01
Thallium	6.0E-04	---	1.4E-03	---	5.0E-06	7.7E-04	6.9E-03	2.5E-02	1.5E-03	3.6E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	4.3E-05	1.1E-04	1.2E-04	6.1E-07	3.8E-04
Vanadium	1.3E-01	---	2.6E-01	---	4.1E-04	1.4E-01	1.8E-01	4.3E-01	2.8E-03	**1.1E+00**
Zinc	1.9E-03	---	4.8E-01	---	2.1E-05	3.0E-03	7.0E-03	7.4E-01	3.3E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.5E-03	---	3.1E-02	---	8.3E-05	4.9E-03	1.0E-02	2.9E-01	7.4E-04	3.4E-01
Barium	2.7E-04	---	1.2E-03	---	7.4E-05	9.2E-04	1.3E-03	2.1E-02	6.3E-04	2.5E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	1.0E-05	2.2E-03	1.7E-03	4.1E-01	3.7E-03	**1.1E+00**
Chromium (Total)	1.8E-02	---	2.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	1.8E-04	9.6E-01
Cobalt	4.4E-03	---	2.7E-02	---	1.4E-05	5.8E-03	3.5E-03	2.3E-03	2.6E-04	4.3E-02
Copper	2.8E-02	---	7.6E-01	---	2.7E-04	2.4E-02	5.2E-02	**6.2E+00**	5.2E-02	**7.2E+00**
Lead	1.7E-02	---	4.1E-01	---	4.4E-05	2.4E-02	6.9E-03	3.6E-01	4.9E-03	8.2E-01
Manganese	2.0E-04	---	6.7E-04	---	3.8E-05	7.0E-04	2.7E-03	1.7E-02	3.1E-04	2.2E-02
Molybdenum	9.4E-05	---	4.5E-03	---	7.4E-07	1.2E-04	2.8E-03	1.0E-02	1.1E-04	1.8E-02
Nickel	4.5E-03	---	2.4E-01	---	2.3E-05	5.3E-03	6.8E-03	1.2E-01	2.9E-04	3.8E-01
Selenium	3.7E-03	---	1.8E-01	---	1.1E-04	4.3E-03	5.9E-03	4.4E-01	4.3E-02	6.8E-01
Thallium	1.8E-03	---	4.2E-03	---	1.5E-05	2.3E-03	2.1E-02	7.6E-02	4.5E-03	1.1E-01
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	4.3E-05	1.1E-04	1.2E-04	6.1E-07	3.8E-04
Vanadium	1.3E-01	---	2.6E-01	---	4.1E-04	1.4E-01	1.8E-01	4.3E-01	2.8E-03	**1.1E+00**
Zinc	1.9E-03	---	4.8E-01	---	2.1E-05	3.0E-03	7.0E-03	7.4E-01	3.3E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the Jocko Creek - Baseline Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.5E-04	2.2E-03	4.1E-04	---	1.1E-05	---	---	---	---	3.5E-03
Barium	6.8E-05	6.0E-03	1.6E-05	---	9.9E-06	---	---	---	---	6.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.4E-04	7.6E-03	8.7E-03	---	1.4E-06	---	---	---	---	1.7E-02
Chromium (Total)	1.4E-02	3.2E-02	1.1E-02	---	3.4E-05	---	---	---	---	5.7E-02
Cobalt	3.3E-03	1.0E-02	1.1E-03	---	5.5E-06	---	---	---	---	1.5E-02
Copper	6.8E-03	1.5E-01	9.9E-03	---	3.6E-05	---	---	---	---	1.6E-01
Lead	1.3E-02	2.1E-02	1.6E-02	---	1.8E-05	---	---	---	---	5.0E-02
Manganese	1.5E-04	9.1E-03	2.6E-05	---	1.5E-05	---	---	---	---	9.3E-03
Molybdenum	2.3E-05	8.3E-03	5.9E-05	---	9.9E-08	---	---	---	---	8.4E-03
Nickel	3.3E-03	1.4E-02	9.3E-03	---	9.4E-06	---	---	---	---	2.7E-02
Selenium	2.7E-03	3.3E-02	7.2E-03	---	4.6E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.8E-03	9.4E-05	---	3.5E-06	---	---	---	---	4.7E-03
Uranium	2.9E-05	3.3E-05	2.5E-06	---	5.2E-08	---	---	---	---	6.4E-05
Vanadium	9.3E-02	2.4E-01	1.0E-02	---	1.6E-04	---	---	---	---	3.4E-01
Zinc	1.4E-03	5.0E-02	1.9E-02	---	8.5E-06	---	---	---	---	7.0E-02

Hazard Quotients for the American Black Bear Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	9.0E-04	2.3E-03	2.2E-03	1.8E-05	7.3E-05	8.3E-05	---	---	2.1E-04	5.8E-03
Arsenic	1.6E-03	2.6E-03	7.2E-04	1.1E-04	4.4E-05	1.8E-04	---	---	2.0E-04	5.5E-03
Barium	3.1E-05	1.5E-03	7.0E-06	4.3E-05	9.2E-06	8.0E-06	---	---	4.0E-05	1.7E-03
Beryllium	1.5E-03	8.6E-03	1.7E-04	5.8E-04	9.1E-06	1.4E-04	---	---	1.3E-04	1.1E-02
Cadmium	4.1E-04	5.9E-03	9.6E-03	3.7E-03	3.5E-06	5.2E-05	---	---	6.5E-04	2.0E-02
Chromium (Total)	1.1E-02	3.1E-02	8.5E-03	9.4E-03	3.5E-05	6.3E-04	---	---	3.9E-05	6.1E-02
Cobalt	6.3E-04	1.6E-03	1.9E-04	1.4E-04	1.9E-06	5.4E-05	---	---	1.9E-05	2.6E-03
Copper	2.5E-03	3.8E-02	3.3E-03	1.3E-02	2.7E-05	1.7E-04	---	---	2.7E-03	6.0E-02
Lead	1.9E-03	1.6E-03	2.3E-03	4.6E-03	5.7E-06	2.2E-04	---	---	3.3E-04	1.1E-02
Manganese	2.3E-04	1.1E-02	3.8E-05	9.4E-05	5.1E-05	6.4E-05	---	---	2.1E-04	1.1E-02
Molybdenum	9.6E-04	2.8E-01	2.3E-03	2.1E-03	1.1E-04	1.3E-04	---	---	8.2E-03	2.9E-01
Nickel	1.6E-02	8.4E-02	4.2E-02	1.6E-02	4.7E-05	6.3E-04	---	---	3.0E-04	1.6E-01
Selenium	2.4E-03	1.7E-02	5.9E-03	2.3E-02	1.1E-04	2.3E-04	---	---	2.2E-02	7.0E-02
Thallium	1.7E-02	4.4E-02	2.0E-03	1.9E-02	1.8E-04	1.8E-03	---	---	2.7E-02	1.1E-01
Uranium	7.5E-04	4.7E-04	6.2E-05	1.7E-05	2.9E-06	6.9E-05	---	---	7.0E-06	1.4E-03
Vanadium	3.6E-03	5.7E-03	3.7E-04	4.4E-04	1.2E-05	3.2E-04	---	---	4.5E-05	1.0E-02
Zinc	5.4E-04	1.1E-02	6.8E-03	9.5E-03	6.9E-06	6.9E-05	---	---	5.6E-03	3.3E-02

Hazard Quotients for the American Mink Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.1E-04	---	---	1.1E-05	1.1E-05	3.1E-04	---	5.9E-05	6.8E-04	1.2E-03
Arsenic	6.0E-04	---	---	2.0E-04	2.0E-05	2.0E-03	---	2.0E-02	2.0E-03	2.4E-02
Barium	1.1E-05	---	---	8.0E-05	4.2E-06	8.9E-05	---	3.3E-04	3.9E-04	9.0E-04
Beryllium	1.9E-04	---	---	3.6E-04	1.4E-06	5.1E-04	---	1.8E-03	4.2E-04	3.3E-03
Cadmium	1.5E-04	---	---	6.9E-03	1.6E-06	5.8E-04	---	1.8E-02	6.3E-03	3.2E-02
Chromium (Total)	4.1E-03	---	---	1.8E-02	1.6E-05	7.0E-03	---	3.3E-02	3.8E-04	6.3E-02
Cobalt	2.3E-04	---	---	2.6E-04	8.8E-07	6.0E-04	---	3.9E-05	1.8E-04	1.3E-03
Copper	9.4E-04	---	---	2.4E-02	1.2E-05	1.9E-03	---	8.0E-02	2.6E-02	1.3E-01
Lead	7.2E-04	---	---	8.5E-03	2.6E-06	2.4E-03	---	5.9E-03	3.2E-03	2.1E-02
Manganese	8.6E-05	---	---	1.8E-04	2.3E-05	7.1E-04	---	2.9E-03	2.1E-03	6.0E-03
Molybdenum	1.2E-04	---	---	1.3E-03	1.7E-05	4.7E-04	---	6.5E-03	2.6E-02	3.5E-02
Nickel	5.8E-03	---	---	3.0E-02	2.2E-05	7.0E-03	---	2.6E-02	2.9E-03	7.2E-02
Selenium	9.0E-04	---	---	4.2E-02	5.2E-05	2.6E-03	---	4.3E-02	2.1E-01	3.0E-01
Thallium	2.1E-03	---	---	1.2E-02	2.7E-05	6.7E-03	---	3.6E-02	8.7E-02	1.4E-01
Uranium	9.2E-05	---	---	1.1E-05	4.5E-07	2.5E-04	---	1.1E-04	2.2E-05	4.9E-04
Vanadium	1.3E-03	---	---	8.1E-04	5.8E-06	3.5E-03	---	1.7E-03	4.4E-04	7.8E-03
Zinc	2.0E-04	---	---	1.8E-02	3.2E-06	7.6E-04	---	3.1E-02	5.4E-02	1.0E-01

Hazard Quotients for the Beaver Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.8E-04	1.8E-04	---	---	6.3E-05	3.5E-04	4.3E-04	---	---	1.2E-03
Arsenic	4.3E-04	3.7E-04	---	---	4.9E-05	9.9E-04	2.9E-03	---	---	4.7E-03
Barium	8.2E-06	2.3E-04	---	---	1.0E-05	4.4E-05	9.0E-05	---	---	3.8E-04
Beryllium	3.1E-04	1.2E-03	---	---	7.8E-06	5.8E-04	8.7E-04	---	---	3.0E-03
Cadmium	1.1E-04	6.8E-04	---	---	3.9E-06	2.8E-04	3.2E-04	---	---	1.4E-03
Chromium (Total)	3.0E-03	4.4E-03	---	---	3.9E-05	3.4E-03	2.0E-03	---	---	1.3E-02
Cobalt	1.7E-04	2.3E-04	---	---	2.1E-06	3.0E-04	2.5E-04	---	---	9.4E-04
Copper	6.7E-04	4.0E-03	---	---	3.0E-05	9.2E-04	2.8E-03	---	---	8.4E-03
Lead	5.1E-04	2.9E-04	---	---	6.3E-06	1.2E-03	4.8E-04	---	---	2.5E-03
Manganese	6.2E-05	9.6E-04	---	---	5.6E-05	3.5E-04	1.9E-03	---	---	3.3E-03
Molybdenum	2.0E-04	1.7E-02	---	---	9.4E-05	5.3E-04	1.8E-02	---	---	3.5E-02
Nickel	4.2E-03	9.4E-03	---	---	5.2E-05	3.4E-03	6.2E-03	---	---	2.3E-02
Selenium	6.5E-04	2.3E-03	---	---	1.2E-04	1.3E-03	2.4E-03	---	---	6.8E-03
Thallium	3.4E-03	5.7E-03	---	---	1.5E-04	7.7E-03	9.7E-02	---	---	1.1E-01
Uranium	1.5E-04	5.8E-05	---	---	2.5E-06	2.9E-04	1.0E-03	---	---	1.6E-03
Vanadium	9.5E-04	8.8E-04	---	---	1.4E-05	1.7E-03	3.0E-03	---	---	6.6E-03
Zinc	1.5E-04	1.6E-03	---	---	7.6E-06	3.7E-04	1.2E-03	---	---	3.4E-03

Hazard Quotients for the Bobcat Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.4E-04	---	---	7.9E-05	5.3E-05	---	---	---	---	5.7E-04
Arsenic	1.4E-03	---	---	8.2E-04	5.5E-05	---	---	---	---	2.2E-03
Barium	2.6E-05	---	---	3.3E-04	1.1E-05	---	---	---	---	3.7E-04
Beryllium	7.4E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.4E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	4.4E-05	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	2.4E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	3.3E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	7.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	6.3E-05	---	---	---	---	9.9E-04
Molybdenum	4.7E-04	---	---	9.5E-03	7.9E-05	---	---	---	---	1.0E-02
Nickel	1.3E-02	---	---	1.3E-01	5.9E-05	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	1.4E-04	---	---	---	---	1.8E-01
Thallium	8.1E-03	---	---	8.4E-02	1.3E-04	---	---	---	---	9.2E-02
Uranium	3.6E-04	---	---	7.7E-05	2.1E-06	---	---	---	---	4.4E-04
Vanadium	3.0E-03	---	---	3.4E-03	1.6E-05	---	---	---	---	6.4E-03
Zinc	4.6E-04	---	---	7.4E-02	8.6E-06	---	---	---	---	7.5E-02

Hazard Quotients for the Bobcat (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	1.3E-03	---	---	2.4E-04	1.6E-04	---	---	---	---	1.7E-03
Arsenic	1.4E-03	---	---	8.2E-04	5.5E-05	---	---	---	---	2.2E-03
Barium	2.6E-05	---	---	3.3E-04	1.1E-05	---	---	---	---	3.7E-04
Beryllium	7.4E-04	---	---	2.6E-03	6.5E-06	---	---	---	---	3.3E-03
Cadmium	3.4E-04	---	---	2.9E-02	4.4E-06	---	---	---	---	2.9E-02
Chromium (Total)	9.4E-03	---	---	7.3E-02	4.4E-05	---	---	---	---	8.3E-02
Cobalt	5.3E-04	---	---	1.1E-03	2.4E-06	---	---	---	---	1.6E-03
Copper	2.1E-03	---	---	1.0E-01	3.3E-05	---	---	---	---	1.0E-01
Lead	1.6E-03	---	---	3.6E-02	7.1E-06	---	---	---	---	3.7E-02
Manganese	1.9E-04	---	---	7.3E-04	6.3E-05	---	---	---	---	9.9E-04
Molybdenum	1.4E-03	---	---	2.8E-02	2.4E-04	---	---	---	---	3.0E-02
Nickel	1.3E-02	---	---	1.3E-01	5.9E-05	---	---	---	---	1.4E-01
Selenium	2.0E-03	---	---	1.8E-01	1.4E-04	---	---	---	---	1.8E-01
Thallium	2.4E-02	---	---	2.5E-01	3.8E-04	---	---	---	---	2.8E-01
Uranium	1.1E-03	---	---	2.3E-04	6.3E-06	---	---	---	---	1.3E-03
Vanadium	3.0E-03	---	---	3.4E-03	1.6E-05	---	---	---	---	6.4E-03
Zinc	4.6E-04	---	---	7.4E-02	8.6E-06	---	---	---	---	7.5E-02

Hazard Quotients for the Boreal Caribou Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	5.9E-03	3.6E-03	---	---	2.5E-04	---	---	---	---	9.8E-03
Arsenic	2.9E-03	1.6E-03	---	---	4.0E-05	---	---	---	---	4.5E-03
Barium	5.5E-05	9.8E-04	---	---	8.3E-06	---	---	---	---	1.0E-03
Beryllium	3.3E-03	8.1E-03	---	---	1.0E-05	---	---	---	---	1.1E-02
Cadmium	7.2E-04	2.9E-03	---	---	3.2E-06	---	---	---	---	3.6E-03
Chromium (Total)	2.0E-02	1.9E-02	---	---	3.2E-05	---	---	---	---	3.8E-02
Cobalt	1.1E-03	9.7E-04	---	---	1.7E-06	---	---	---	---	2.1E-03
Copper	4.5E-03	1.7E-02	---	---	2.4E-05	---	---	---	---	2.1E-02
Lead	3.4E-03	1.2E-03	---	---	5.1E-06	---	---	---	---	4.6E-03
Manganese	4.1E-04	4.1E-03	---	---	4.6E-05	---	---	---	---	4.5E-03
Molybdenum	6.4E-03	3.4E-01	---	---	3.7E-04	---	---	---	---	3.5E-01
Nickel	2.8E-02	4.0E-02	---	---	4.3E-05	---	---	---	---	6.8E-02
Selenium	4.3E-03	9.8E-03	---	---	1.0E-04	---	---	---	---	1.4E-02
Thallium	1.1E-01	1.2E-01	---	---	6.0E-04	---	---	---	---	2.3E-01
Uranium	4.9E-03	1.2E-03	---	---	9.8E-06	---	---	---	---	6.1E-03
Vanadium	6.3E-03	3.7E-03	---	---	1.1E-05	---	---	---	---	1.0E-02
Zinc	9.6E-04	6.8E-03	---	---	6.2E-06	---	---	---	---	7.7E-03

Hazard Quotients for the Common (Masked) Shrew Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.7E-03	5.4E-04	1.3E-01	---	5.2E-05	---	---	---	---	1.3E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	1.2E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	2.4E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	6.4E-06	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	9.4E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	9.3E-05	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	5.0E-06	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	7.0E-05	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.5E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	1.3E-04	---	---	---	---	1.9E-02
Molybdenum	1.6E-03	2.7E-02	7.1E-02	---	4.2E-05	---	---	---	---	1.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.2E-04	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	3.0E-04	---	---	---	---	**1.3E+00**
Thallium	5.0E-02	1.7E-02	1.1E-01	---	1.3E-04	---	---	---	---	1.8E-01
Uranium	1.2E-03	9.5E-05	1.9E-03	---	1.1E-06	---	---	---	---	3.2E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	3.3E-05	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	1.8E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common (Masked) Shrew (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.0E-03	1.6E-03	3.8E-01	---	1.6E-04	---	---	---	---	3.9E-01
Arsenic	1.8E-02	3.2E-03	1.5E-01	---	1.2E-04	---	---	---	---	1.7E-01
Barium	3.4E-04	2.0E-03	1.5E-03	---	2.4E-05	---	---	---	---	3.9E-03
Beryllium	4.5E-03	3.6E-03	9.7E-03	---	6.4E-06	---	---	---	---	1.8E-02
Cadmium	4.5E-03	5.9E-03	**2.1E+00**	---	9.4E-06	---	---	---	---	**2.1E+00**
Chromium (Total)	1.2E-01	3.8E-02	**1.8E+00**	---	9.3E-05	---	---	---	---	**2.0E+00**
Cobalt	7.0E-03	2.0E-03	4.1E-02	---	5.0E-06	---	---	---	---	5.0E-02
Copper	2.8E-02	3.5E-02	7.0E-01	---	7.0E-05	---	---	---	---	7.6E-01
Lead	2.1E-02	2.5E-03	4.9E-01	---	1.5E-05	---	---	---	---	5.1E-01
Manganese	2.6E-03	8.3E-03	8.2E-03	---	1.3E-04	---	---	---	---	1.9E-02
Molybdenum	4.7E-03	8.2E-02	2.1E-01	---	1.3E-04	---	---	---	---	3.0E-01
Nickel	1.7E-01	8.2E-02	**8.8E+00**	---	1.2E-04	---	---	---	---	**9.1E+00**
Selenium	2.7E-02	2.0E-02	**1.3E+00**	---	3.0E-04	---	---	---	---	**1.3E+00**
Thallium	1.5E-01	5.1E-02	3.3E-01	---	3.8E-04	---	---	---	---	5.3E-01
Uranium	3.6E-03	2.9E-04	5.7E-03	---	3.4E-06	---	---	---	---	9.6E-03
Vanadium	4.0E-02	7.7E-03	7.9E-02	---	3.3E-05	---	---	---	---	1.3E-01
Zinc	6.1E-03	1.4E-02	**1.4E+00**	---	1.8E-05	---	---	---	---	**1.5E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Meadow Vole Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.7E-04	1.4E-03	---	---	6.4E-05	---	---	---	---	1.9E-03
Arsenic	3.1E-03	5.8E-03	---	---	1.4E-04	---	---	---	---	9.1E-03
Barium	6.0E-05	3.4E-03	---	---	3.0E-05	---	---	---	---	3.5E-03
Beryllium	7.9E-04	5.2E-03	---	---	7.9E-06	---	---	---	---	6.0E-03
Cadmium	7.9E-04	1.3E-02	---	---	1.1E-05	---	---	---	---	1.4E-02
Chromium (Total)	2.2E-02	7.0E-02	---	---	1.1E-04	---	---	---	---	9.1E-02
Cobalt	1.2E-03	3.5E-03	---	---	6.2E-06	---	---	---	---	4.7E-03
Copper	4.9E-03	8.4E-02	---	---	8.6E-05	---	---	---	---	8.9E-02
Lead	3.7E-03	3.6E-03	---	---	1.8E-05	---	---	---	---	7.3E-03
Manganese	4.5E-04	2.3E-02	---	---	1.6E-04	---	---	---	---	2.4E-02
Molybdenum	2.8E-04	9.0E-02	---	---	5.4E-05	---	---	---	---	9.0E-02
Nickel	3.0E-02	1.8E-01	---	---	1.5E-04	---	---	---	---	2.1E-01
Selenium	4.7E-03	3.9E-02	---	---	3.6E-04	---	---	---	---	4.4E-02
Thallium	8.7E-03	2.7E-02	---	---	1.5E-04	---	---	---	---	3.5E-02
Uranium	2.2E-04	1.6E-04	---	---	1.4E-06	---	---	---	---	3.8E-04
Vanadium	6.9E-03	1.3E-02	---	---	4.0E-05	---	---	---	---	2.0E-02
Zinc	1.1E-03	2.4E-02	---	---	2.2E-05	---	---	---	---	2.5E-02

Hazard Quotients for the Moose Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	7.1E-04	3.0E-03	---	---	9.6E-05	1.8E-04	2.2E-03	---	---	6.2E-03
Arsenic	8.2E-04	3.1E-03	---	---	3.7E-05	2.5E-04	7.3E-03	---	---	1.2E-02
Barium	1.6E-05	2.0E-03	---	---	7.7E-06	1.1E-05	2.3E-04	---	---	2.2E-03
Beryllium	1.2E-03	2.0E-02	---	---	1.2E-05	3.0E-04	4.5E-03	---	---	2.6E-02
Cadmium	2.1E-04	5.7E-03	---	---	3.0E-06	7.3E-05	8.3E-04	---	---	6.8E-03
Chromium (Total)	5.6E-03	3.7E-02	---	---	2.9E-05	8.8E-04	5.1E-03	---	---	4.9E-02
Cobalt	3.2E-04	1.9E-03	---	---	1.6E-06	7.6E-05	6.4E-04	---	---	3.0E-03
Copper	1.3E-03	3.4E-02	---	---	2.2E-05	2.4E-04	7.3E-03	---	---	4.2E-02
Lead	9.8E-04	2.4E-03	---	---	4.7E-06	3.1E-04	1.2E-03	---	---	4.9E-03
Manganese	1.2E-04	8.1E-03	---	---	4.2E-05	9.0E-05	4.9E-03	---	---	1.3E-02
Molybdenum	7.6E-04	2.8E-01	---	---	1.4E-04	2.8E-04	9.2E-02	---	---	3.8E-01
Nickel	8.0E-03	7.9E-02	---	---	4.0E-05	8.9E-04	1.6E-02	---	---	1.0E-01
Selenium	1.2E-03	1.9E-02	---	---	9.4E-05	3.2E-04	6.2E-03	---	---	2.7E-02
Thallium	1.3E-02	9.6E-02	---	---	2.3E-04	4.0E-03	5.0E-01	---	---	6.2E-01
Uranium	5.9E-04	9.9E-04	---	---	3.8E-06	1.5E-04	5.4E-03	---	---	7.2E-03
Vanadium	1.8E-03	7.4E-03	---	---	1.0E-05	4.4E-04	7.7E-03	---	---	1.7E-02
Zinc	2.8E-04	1.3E-02	---	---	5.8E-06	9.6E-05	3.2E-03	---	---	1.7E-02

Hazard Quotients for the Northern River Otter Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	3.3E-05	---	---	3.2E-06	5.3E-05	5.7E-04	---	1.3E-04	1.2E-03	2.0E-03
Arsenic	1.0E-04	---	---	3.3E-05	5.5E-05	2.2E-03	---	2.5E-02	2.1E-03	2.9E-02
Barium	2.0E-06	---	---	1.4E-05	1.1E-05	9.5E-05	---	4.2E-04	4.0E-04	9.4E-04
Beryllium	5.5E-05	---	---	1.1E-04	6.5E-06	9.5E-04	---	4.0E-03	7.7E-04	5.9E-03
Cadmium	2.6E-05	---	---	1.2E-03	4.4E-06	6.2E-04	---	2.3E-02	6.6E-03	3.1E-02
Chromium (Total)	7.1E-04	---	---	3.0E-03	4.4E-05	7.5E-03	---	4.3E-02	4.0E-04	5.4E-02
Cobalt	4.0E-05	---	---	4.4E-05	2.4E-06	6.5E-04	---	4.9E-05	1.9E-04	9.7E-04
Copper	1.6E-04	---	---	4.1E-03	3.3E-05	2.0E-03	---	1.0E-01	2.7E-02	1.4E-01
Lead	1.2E-04	---	---	1.5E-03	7.1E-06	2.6E-03	---	7.6E-03	3.3E-03	1.5E-02
Manganese	1.5E-05	---	---	3.0E-05	6.3E-05	7.7E-04	---	3.7E-03	2.2E-03	6.7E-03
Molybdenum	3.5E-05	---	---	3.9E-04	7.9E-05	8.8E-04	---	1.5E-02	4.8E-02	6.4E-02
Nickel	9.9E-04	---	---	5.1E-03	5.9E-05	7.5E-03	---	3.4E-02	3.1E-03	5.0E-02
Selenium	1.5E-04	---	---	7.1E-03	1.4E-04	2.8E-03	---	5.5E-02	2.2E-01	2.8E-01
Thallium	6.1E-04	---	---	3.4E-03	1.3E-04	1.3E-02	---	7.9E-02	1.6E-01	2.6E-01
Uranium	2.7E-05	---	---	3.1E-06	2.1E-06	4.7E-04	---	2.5E-04	4.1E-05	8.0E-04
Vanadium	2.3E-04	---	---	1.4E-04	1.6E-05	3.8E-03	---	2.2E-03	4.6E-04	6.8E-03
Zinc	3.4E-05	---	---	3.0E-03	8.6E-06	8.2E-04	---	4.0E-02	5.7E-02	1.0E-01

Hazard Quotients for the Red Fox Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	4.6E-04	8.7E-05	2.6E-03	2.5E-05	4.8E-05	---	---	---	---	3.2E-03
Arsenic	1.7E-03	1.3E-04	1.7E-03	3.0E-04	5.9E-05	---	---	---	---	3.9E-03
Barium	3.3E-05	6.2E-05	1.7E-05	1.2E-04	1.2E-05	---	---	---	---	2.5E-04
Beryllium	7.8E-04	9.8E-05	2.0E-04	8.1E-04	5.9E-06	---	---	---	---	1.9E-03
Cadmium	4.3E-04	4.0E-04	2.3E-02	1.1E-02	4.7E-06	---	---	---	---	3.5E-02
Chromium (Total)	1.2E-02	1.6E-03	2.0E-02	2.7E-02	4.7E-05	---	---	---	---	6.1E-02
Cobalt	6.7E-04	7.2E-05	4.6E-04	4.0E-04	2.5E-06	---	---	---	---	1.6E-03
Copper	2.7E-03	2.9E-03	7.9E-03	3.7E-02	3.6E-05	---	---	---	---	5.1E-02
Lead	2.1E-03	3.4E-05	5.5E-03	1.3E-02	7.6E-06	---	---	---	---	2.1E-02
Manganese	2.5E-04	9.0E-04	9.2E-05	2.7E-04	6.7E-05	---	---	---	---	1.6E-03
Molybdenum	5.0E-04	1.2E-02	2.7E-03	3.0E-03	7.1E-05	---	---	---	---	1.8E-02
Nickel	1.7E-02	5.8E-03	9.9E-02	4.6E-02	6.3E-05	---	---	---	---	1.7E-01
Selenium	2.6E-03	9.5E-04	1.4E-02	6.5E-02	1.5E-04	---	---	---	---	8.3E-02
Thallium	8.6E-03	6.8E-04	2.3E-03	2.6E-02	1.2E-04	---	---	---	---	3.8E-02
Uranium	3.9E-04	8.5E-06	7.2E-05	2.4E-05	1.9E-06	---	---	---	---	4.9E-04
Vanadium	3.8E-03	2.3E-04	8.9E-04	1.3E-03	1.7E-05	---	---	---	---	6.2E-03
Zinc	5.8E-04	4.6E-04	1.6E-02	2.7E-02	9.2E-06	---	---	---	---	4.5E-02

Hazard Quotients for the Snowshoe Hare Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	2.1E-03	2.7E-03	---	---	4.1E-05	---	---	---	---	4.9E-03
Arsenic	1.0E-02	1.1E-02	---	---	6.6E-05	---	---	---	---	2.2E-02
Barium	1.9E-04	7.1E-03	---	---	1.4E-05	---	---	---	---	7.3E-03
Beryllium	3.5E-03	1.7E-02	---	---	5.0E-06	---	---	---	---	2.1E-02
Cadmium	2.6E-03	2.1E-02	---	---	5.3E-06	---	---	---	---	2.4E-02
Chromium (Total)	7.0E-02	1.4E-01	---	---	5.2E-05	---	---	---	---	2.1E-01
Cobalt	3.9E-03	7.1E-03	---	---	2.8E-06	---	---	---	---	1.1E-02
Copper	1.6E-02	1.3E-01	---	---	4.0E-05	---	---	---	---	1.4E-01
Lead	1.2E-02	8.6E-03	---	---	8.4E-06	---	---	---	---	2.1E-02
Manganese	1.4E-03	3.1E-02	---	---	7.5E-05	---	---	---	---	3.3E-02
Molybdenum	2.2E-03	2.7E-01	---	---	6.1E-05	---	---	---	---	2.7E-01
Nickel	9.9E-02	3.0E-01	---	---	7.0E-05	---	---	---	---	3.9E-01
Selenium	1.5E-02	7.2E-02	---	---	1.7E-04	---	---	---	---	8.7E-02
Thallium	3.9E-02	8.3E-02	---	---	9.8E-05	---	---	---	---	1.2E-01
Uranium	1.7E-03	8.6E-04	---	---	1.6E-06	---	---	---	---	2.6E-03
Vanadium	2.2E-02	2.7E-02	---	---	1.9E-05	---	---	---	---	4.9E-02
Zinc	3.4E-03	4.9E-02	---	---	1.0E-05	---	---	---	---	5.2E-02

Hazard Quotients for the White-tailed Deer Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	8.2E-04	3.4E-03	---	---	7.4E-05	---	---	---	---	4.3E-03
Arsenic	1.4E-03	5.1E-03	---	---	4.4E-05	---	---	---	---	6.6E-03
Barium	2.8E-05	3.2E-03	---	---	9.1E-06	---	---	---	---	3.2E-03
Beryllium	1.4E-03	2.1E-02	---	---	9.2E-06	---	---	---	---	2.3E-02
Cadmium	3.6E-04	9.6E-03	---	---	3.5E-06	---	---	---	---	1.0E-02
Chromium (Total)	1.0E-02	6.1E-02	---	---	3.5E-05	---	---	---	---	7.1E-02
Cobalt	5.6E-04	3.2E-03	---	---	1.9E-06	---	---	---	---	3.7E-03
Copper	2.3E-03	5.7E-02	---	---	2.6E-05	---	---	---	---	5.9E-02
Lead	1.7E-03	3.9E-03	---	---	5.6E-06	---	---	---	---	5.6E-03
Manganese	2.1E-04	1.4E-02	---	---	5.0E-05	---	---	---	---	1.4E-02
Molybdenum	8.8E-04	3.3E-01	---	---	1.1E-04	---	---	---	---	3.3E-01
Nickel	1.4E-02	1.3E-01	---	---	4.7E-05	---	---	---	---	1.5E-01
Selenium	2.2E-03	3.2E-02	---	---	1.1E-04	---	---	---	---	3.4E-02
Thallium	1.5E-02	1.0E-01	---	---	1.8E-04	---	---	---	---	1.2E-01
Uranium	6.9E-04	1.1E-03	---	---	3.0E-06	---	---	---	---	1.7E-03
Vanadium	3.2E-03	1.2E-02	---	---	1.2E-05	---	---	---	---	1.5E-02
Zinc	4.9E-04	2.2E-02	---	---	6.8E-06	---	---	---	---	2.2E-02

Hazard Quotients for the American Robin Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.7E-03	1.6E-03	8.8E-03	---	2.2E-05	---	---	---	---	1.5E-02
Barium	3.9E-04	3.3E-03	3.6E-04	---	1.9E-05	---	---	---	---	4.1E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.9E-03	7.8E-03	1.8E-01	---	2.7E-06	---	---	---	---	1.9E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	6.7E-05	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	1.2E-05	---	---	---	---	6.2E-02
Copper	3.9E-02	1.9E-01	2.1E-01	---	7.0E-05	---	---	---	---	4.4E-01
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.4E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	3.1E-05	---	---	---	---	1.5E-02
Molybdenum	1.3E-04	1.4E-02	1.3E-03	---	2.5E-06	---	---	---	---	1.6E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.5E-05	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	1.2E-04	---	---	---	---	1.9E-01
Thallium	2.5E-03	8.9E-04	1.2E-03	---	4.5E-06	---	---	---	---	4.6E-03
Uranium	1.5E-04	1.6E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	3.2E-04	---	---	---	---	9.1E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	1.7E-05	---	---	---	---	4.4E-01

Hazard Quotients for the American Robin (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.4E-02	4.8E-03	2.6E-02	---	6.6E-05	---	---	---	---	4.5E-02
Barium	1.2E-03	1.0E-02	1.1E-03	---	5.8E-05	---	---	---	---	1.2E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	5.6E-03	2.4E-02	5.5E-01	---	8.2E-06	---	---	---	---	5.8E-01
Chromium (Total)	1.2E-01	7.5E-02	4.0E-01	---	6.7E-05	---	---	---	---	6.0E-01
Cobalt	2.3E-02	1.1E-02	2.9E-02	---	1.2E-05	---	---	---	---	6.2E-02
Copper	1.2E-01	5.7E-01	6.3E-01	---	2.1E-04	---	---	---	---	**1.3E+00**
Lead	6.9E-02	5.2E-03	3.4E-01	---	3.4E-05	---	---	---	---	4.1E-01
Manganese	8.2E-04	1.4E-02	5.7E-04	---	3.1E-05	---	---	---	---	1.5E-02
Molybdenum	3.8E-04	4.3E-02	3.8E-03	---	7.4E-06	---	---	---	---	4.8E-02
Nickel	4.9E-02	7.9E-02	5.4E-01	---	2.5E-05	---	---	---	---	6.7E-01
Selenium	1.5E-02	2.5E-02	1.5E-01	---	1.2E-04	---	---	---	---	1.9E-01
Thallium	7.4E-03	2.7E-03	3.6E-03	---	1.3E-05	---	---	---	---	1.4E-02
Uranium	1.5E-04	1.6E-05	5.3E-05	---	1.0E-07	---	---	---	---	2.2E-04
Vanadium	5.3E-01	1.5E-01	2.3E-01	---	3.2E-04	---	---	---	---	9.1E-01
Zinc	7.7E-03	2.8E-02	4.0E-01	---	1.7E-05	---	---	---	---	4.4E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Bald Eagle Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.7E-04	---	---	5.5E-05	5.7E-06	3.6E-04	---	---	4.0E-04	9.8E-04
Barium	1.8E-05	---	---	1.3E-04	6.6E-06	8.8E-05	---	---	4.4E-04	6.8E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	6.7E-05	---	---	3.0E-03	7.1E-07	1.6E-04	---	---	2.0E-03	5.2E-03
Chromium (Total)	4.5E-03	---	---	1.9E-02	1.7E-05	4.7E-03	---	---	2.9E-04	2.8E-02
Cobalt	8.1E-04	---	---	8.9E-04	3.0E-06	1.3E-03	---	---	4.5E-04	3.5E-03
Copper	1.8E-03	---	---	4.8E-02	2.4E-05	2.3E-03	---	---	3.6E-02	8.8E-02
Lead	2.5E-03	---	---	3.0E-02	8.9E-06	5.3E-03	---	---	7.8E-03	4.5E-02
Manganese	3.0E-05	---	---	6.1E-05	7.9E-06	1.5E-04	---	---	5.1E-04	7.6E-04
Molybdenum	6.1E-06	---	---	6.7E-05	8.5E-07	1.5E-05	---	---	9.7E-04	1.1E-03
Nickel	1.8E-03	---	---	9.2E-03	6.5E-06	1.3E-03	---	---	6.4E-04	1.3E-02
Selenium	5.3E-04	---	---	2.5E-02	3.0E-05	9.4E-04	---	---	8.8E-02	1.1E-01
Thallium	2.5E-04	---	---	1.4E-03	3.2E-06	5.0E-04	---	---	7.5E-03	9.7E-03
Uranium	7.8E-06	---	---	8.9E-07	3.7E-08	1.3E-05	---	---	1.3E-06	2.3E-05
Vanadium	1.9E-02	---	---	1.2E-02	8.2E-05	3.2E-02	---	---	4.5E-03	6.7E-02
Zinc	2.8E-04	---	---	2.4E-02	4.3E-06	6.5E-04	---	---	5.3E-02	7.8E-02

Hazard Quotients for the Barn Swallow Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	9.7E-03	1.1E-04	8.6E-02	---	1.1E-04	---	---	---	---	9.6E-02
Barium	8.0E-04	2.2E-04	3.6E-03	---	9.4E-05	---	---	---	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.8E-03	5.2E-04	**1.8E+00**	---	1.3E-05	---	---	---	---	**1.8E+00**
Chromium (Total)	8.6E-02	1.7E-03	**1.3E+00**	---	1.1E-04	---	---	---	---	**1.4E+00**
Cobalt	1.5E-02	2.5E-04	9.4E-02	---	1.9E-05	---	---	---	---	1.1E-01
Copper	8.0E-02	1.3E-02	**2.1E+00**	---	3.4E-04	---	---	---	---	**2.2E+00**
Lead	4.7E-02	1.2E-04	**1.1E+00**	---	5.5E-05	---	---	---	---	**1.2E+00**
Manganese	5.7E-04	3.1E-04	1.9E-03	---	4.9E-05	---	---	---	---	2.8E-03
Molybdenum	2.6E-04	9.6E-04	1.2E-02	---	1.2E-05	---	---	---	---	1.4E-02
Nickel	3.4E-02	1.7E-03	**1.8E+00**	---	4.0E-05	---	---	---	---	**1.8E+00**
Selenium	1.0E-02	5.6E-04	5.0E-01	---	1.9E-04	---	---	---	---	5.1E-01
Thallium	4.9E-03	5.8E-05	1.1E-02	---	2.1E-05	---	---	---	---	1.7E-02
Uranium	1.1E-04	3.5E-07	1.7E-04	---	1.6E-07	---	---	---	---	2.8E-04
Vanadium	3.7E-01	3.3E-03	7.6E-01	---	5.1E-04	---	---	---	---	**1.1E+00**
Zinc	5.3E-03	6.2E-04	**1.3E+00**	---	2.7E-05	---	---	---	---	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Common Merganser Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	8.3E-06	9.2E-04	2.8E-04	5.4E-03	9.4E-04	7.6E-03
Barium	---	---	---	---	7.4E-06	1.7E-04	3.7E-05	3.8E-04	7.9E-04	1.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.0E-06	4.1E-04	4.9E-05	7.6E-03	4.7E-03	1.3E-02
Chromium (Total)	---	---	---	---	2.5E-05	1.2E-02	7.4E-04	3.5E-02	6.9E-04	4.9E-02
Cobalt	---	---	---	---	4.4E-06	3.4E-03	3.0E-04	1.3E-04	1.1E-03	4.8E-03
Copper	---	---	---	---	2.6E-05	4.5E-03	1.5E-03	1.2E-01	6.5E-02	1.9E-01
Lead	---	---	---	---	1.3E-05	1.4E-02	5.8E-04	2.0E-02	1.8E-02	5.3E-02
Manganese	---	---	---	---	1.2E-05	4.0E-04	2.2E-04	9.7E-04	1.2E-03	2.8E-03
Molybdenum	---	---	---	---	9.3E-07	2.9E-05	1.0E-04	2.5E-04	1.7E-03	2.1E-03
Nickel	---	---	---	---	9.5E-06	3.4E-03	6.5E-04	7.8E-03	1.5E-03	1.3E-02
Selenium	---	---	---	---	4.4E-05	2.4E-03	4.9E-04	2.5E-02	2.1E-01	2.4E-01
Thallium	---	---	---	---	3.5E-06	9.8E-04	1.3E-03	3.1E-03	1.3E-02	1.9E-02
Uranium	---	---	---	---	4.1E-08	2.6E-05	9.8E-06	7.0E-06	2.4E-06	4.5E-05
Vanadium	---	---	---	---	1.2E-04	8.2E-02	1.5E-02	2.4E-02	1.1E-02	1.3E-01
Zinc	---	---	---	---	6.2E-06	1.7E-03	5.8E-04	4.2E-02	1.3E-01	1.7E-01

Hazard Quotients for the Lesser Scaup Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	---	---	---	---	1.1E-05	1.2E-03	2.0E-03	8.5E-02	---	8.8E-02
Barium	---	---	---	---	9.5E-06	2.3E-04	2.6E-04	6.1E-03	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	---	---	---	---	1.3E-06	5.3E-04	3.4E-04	1.2E-01	---	1.2E-01
Chromium (Total)	---	---	---	---	3.2E-05	1.6E-02	5.2E-03	5.6E-01	---	5.8E-01
Cobalt	---	---	---	---	5.6E-06	4.4E-03	2.1E-03	2.1E-03	---	8.5E-03
Copper	---	---	---	---	3.4E-05	5.8E-03	1.0E-02	**1.8E+00**	---	**1.8E+00**
Lead	---	---	---	---	1.7E-05	1.8E-02	4.0E-03	3.2E-01	---	3.4E-01
Manganese	---	---	---	---	1.5E-05	5.1E-04	1.6E-03	1.5E-02	---	1.7E-02
Molybdenum	---	---	---	---	1.2E-06	3.8E-05	7.1E-04	3.9E-03	---	4.6E-03
Nickel	---	---	---	---	1.2E-05	4.5E-03	4.6E-03	1.2E-01	---	1.3E-01
Selenium	---	---	---	---	5.6E-05	3.2E-03	3.5E-03	3.9E-01	---	4.0E-01
Thallium	---	---	---	---	3.7E-06	1.1E-03	7.5E-03	4.1E-02	---	5.0E-02
Uranium	---	---	---	---	5.0E-08	3.2E-05	6.6E-05	1.1E-04	---	2.0E-04
Vanadium	---	---	---	---	1.5E-04	1.1E-01	1.0E-01	3.8E-01	---	5.9E-01
Zinc	---	---	---	---	8.0E-06	2.2E-03	4.1E-03	6.5E-01	---	6.6E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Mallard Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.0E-04	3.4E-05	2.8E-04	---	8.9E-06	1.5E-03	1.1E-02	4.1E-02	---	5.3E-02
Barium	8.2E-06	7.1E-05	1.2E-05	---	7.9E-06	2.8E-04	1.4E-03	2.9E-03	---	4.7E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.9E-05	1.7E-04	5.8E-03	---	1.1E-06	6.6E-04	1.8E-03	5.8E-02	---	6.6E-02
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.3E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	4.7E-06	5.5E-03	1.1E-02	9.9E-04	---	1.9E-02
Copper	8.2E-04	4.1E-03	6.7E-03	---	2.8E-05	7.3E-03	5.5E-02	8.8E-01	---	9.5E-01
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.4E-05	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	1.2E-05	6.4E-04	8.5E-03	7.4E-03	---	1.7E-02
Molybdenum	2.7E-06	3.1E-04	4.0E-05	---	1.0E-06	4.7E-05	3.8E-03	1.9E-03	---	6.1E-03
Nickel	1.0E-03	1.7E-03	1.7E-02	---	1.0E-05	5.6E-03	2.5E-02	5.9E-02	---	1.1E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	4.7E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	1.0E-04	3.8E-05	7.6E-05	---	3.6E-06	1.5E-03	4.6E-02	2.3E-02	---	7.1E-02
Uranium	3.3E-06	3.4E-07	1.7E-06	---	4.2E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	1.3E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	6.0E-04	1.3E-02	---	6.7E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Hazard Quotients for the Mallard (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.0E-04	1.0E-04	8.4E-04	---	2.7E-05	4.5E-03	3.2E-02	1.2E-01	---	1.6E-01
Barium	2.5E-05	2.1E-04	3.5E-05	---	2.4E-05	8.5E-04	4.3E-03	8.7E-03	---	1.4E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.2E-04	5.0E-04	1.7E-02	---	3.3E-06	2.0E-03	5.5E-03	1.7E-01	---	2.0E-01
Chromium (Total)	2.6E-03	1.6E-03	1.3E-02	---	2.7E-05	2.0E-02	2.8E-02	2.7E-01	---	3.3E-01
Cobalt	4.8E-04	2.4E-04	9.1E-04	---	4.7E-06	5.5E-03	1.1E-02	9.9E-04	---	1.9E-02
Copper	2.5E-03	1.2E-02	2.0E-02	---	8.5E-05	2.2E-02	1.6E-01	**2.6E+00**	---	**2.9E+00**
Lead	1.5E-03	1.1E-04	1.1E-02	---	1.4E-05	2.2E-02	2.2E-02	1.5E-01	---	2.1E-01
Manganese	1.7E-05	3.0E-04	1.8E-05	---	1.2E-05	6.4E-04	8.5E-03	7.4E-03	---	1.7E-02
Molybdenum	8.1E-06	9.3E-04	1.2E-04	---	3.0E-06	1.4E-04	1.2E-02	5.6E-03	---	1.8E-02
Nickel	1.0E-03	1.7E-03	1.7E-02	---	1.0E-05	5.6E-03	2.5E-02	5.9E-02	---	1.1E-01
Selenium	3.1E-04	5.4E-04	4.8E-03	---	4.7E-05	4.0E-03	1.9E-02	1.9E-01	---	2.2E-01
Thallium	3.1E-04	1.1E-04	2.3E-04	---	1.1E-05	4.5E-03	1.4E-01	6.8E-02	---	2.1E-01
Uranium	3.3E-06	3.4E-07	1.7E-06	---	4.2E-08	4.0E-05	3.5E-04	5.1E-05	---	4.5E-04
Vanadium	1.1E-02	3.2E-03	7.4E-03	---	1.3E-04	1.3E-01	5.7E-01	1.8E-01	---	9.0E-01
Zinc	1.6E-04	6.0E-04	1.3E-02	---	6.7E-06	2.7E-03	2.2E-02	3.1E-01	---	3.5E-01

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Red-tailed Hawk Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	4.0E-04	---	---	1.3E-04	9.2E-06	---	---	---	---	5.5E-04
Barium	3.3E-05	---	---	2.3E-04	8.2E-06	---	---	---	---	2.7E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.6E-04	---	---	7.2E-03	1.1E-06	---	---	---	---	7.4E-03
Chromium (Total)	1.1E-02	---	---	4.5E-02	2.8E-05	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	4.8E-06	---	---	---	---	4.1E-03
Copper	3.3E-03	---	---	8.6E-02	2.9E-05	---	---	---	---	9.0E-02
Lead	5.9E-03	---	---	7.0E-02	1.4E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	1.3E-05	---	---	---	---	2.3E-04
Molybdenum	1.1E-05	---	---	1.2E-04	1.0E-06	---	---	---	---	1.3E-04
Nickel	4.2E-03	---	---	2.2E-02	1.1E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	4.9E-05	---	---	---	---	6.0E-02
Thallium	4.1E-04	---	---	2.3E-03	3.6E-06	---	---	---	---	2.7E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.6E-02	---	---	2.8E-02	1.3E-04	---	---	---	---	7.4E-02
Zinc	6.6E-04	---	---	5.8E-02	6.9E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Red-tailed Hawk (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	---	4.0E-04	2.8E-05	---	---	---	---	1.6E-03
Barium	9.9E-05	---	---	6.9E-04	2.5E-05	---	---	---	---	8.2E-04
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.8E-04	---	---	2.2E-02	3.4E-06	---	---	---	---	2.2E-02
Chromium (Total)	1.1E-02	---	---	4.5E-02	2.8E-05	---	---	---	---	5.6E-02
Cobalt	1.9E-03	---	---	2.1E-03	4.8E-06	---	---	---	---	4.1E-03
Copper	1.0E-02	---	---	2.6E-01	8.8E-05	---	---	---	---	2.7E-01
Lead	5.9E-03	---	---	7.0E-02	1.4E-05	---	---	---	---	7.6E-02
Manganese	7.0E-05	---	---	1.4E-04	1.3E-05	---	---	---	---	2.3E-04
Molybdenum	3.3E-05	---	---	3.6E-04	3.1E-06	---	---	---	---	4.0E-04
Nickel	4.2E-03	---	---	2.2E-02	1.1E-05	---	---	---	---	2.6E-02
Selenium	1.3E-03	---	---	5.9E-02	4.9E-05	---	---	---	---	6.0E-02
Thallium	1.2E-03	---	---	6.9E-03	1.1E-05	---	---	---	---	8.1E-03
Uranium	1.3E-05	---	---	1.5E-06	4.3E-08	---	---	---	---	1.5E-05
Vanadium	4.6E-02	---	---	2.8E-02	1.3E-04	---	---	---	---	7.4E-02
Zinc	6.6E-04	---	---	5.8E-02	6.9E-06	---	---	---	---	5.8E-02

Hazard Quotients for the Short-eared Owl Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	2.0E-03	---	7.0E-04	9.7E-04	4.1E-05	---	---	---	---	3.7E-03
Barium	1.6E-04	---	2.9E-05	1.7E-03	3.7E-05	---	---	---	---	1.9E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	7.7E-04	---	1.5E-02	5.3E-02	5.1E-06	---	---	---	---	6.8E-02
Chromium (Total)	1.7E-02	---	1.1E-02	1.1E-01	4.2E-05	---	---	---	---	1.4E-01
Cobalt	3.1E-03	---	7.6E-04	5.2E-03	7.3E-06	---	---	---	---	9.1E-03
Copper	1.6E-02	---	1.7E-02	6.3E-01	1.3E-04	---	---	---	---	6.7E-01
Lead	9.6E-03	---	9.0E-03	1.7E-01	2.2E-05	---	---	---	---	1.9E-01
Manganese	1.1E-04	---	1.5E-05	3.5E-04	1.9E-05	---	---	---	---	5.0E-04
Molybdenum	5.3E-05	---	1.0E-04	8.8E-04	4.6E-06	---	---	---	---	1.0E-03
Nickel	6.9E-03	---	1.4E-02	5.3E-02	1.6E-05	---	---	---	---	7.4E-02
Selenium	2.1E-03	---	4.0E-03	1.4E-01	7.3E-05	---	---	---	---	1.5E-01
Thallium	1.5E-03	---	1.4E-04	1.3E-02	1.2E-05	---	---	---	---	1.4E-02
Uranium	2.2E-05	---	1.4E-06	3.7E-06	6.4E-08	---	---	---	---	2.7E-05
Vanadium	7.4E-02	---	6.2E-03	6.9E-02	2.0E-04	---	---	---	---	1.5E-01
Zinc	1.1E-03	---	1.1E-02	1.4E-01	1.0E-05	---	---	---	---	1.5E-01

Hazard Quotients for the Spotted Sandpiper Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	1.2E-03	---	1.1E-02	---	2.8E-05	1.6E-03	3.3E-03	9.7E-02	2.5E-04	1.1E-01
Barium	9.7E-05	---	4.4E-04	---	2.5E-05	3.1E-04	4.5E-04	6.9E-03	2.1E-04	8.4E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	4.7E-04	---	2.2E-01	---	3.5E-06	7.2E-04	5.8E-04	1.4E-01	1.2E-03	3.6E-01
Chromium (Total)	3.1E-02	---	4.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	1.8E-04	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	1.5E-05	5.9E-03	3.5E-03	2.3E-03	2.8E-04	5.2E-02
Copper	9.8E-03	---	2.6E-01	---	8.9E-05	7.9E-03	1.7E-02	**2.1E+00**	1.7E-02	**2.4E+00**
Lead	1.7E-02	---	4.1E-01	---	4.4E-05	2.4E-02	6.9E-03	3.6E-01	4.9E-03	8.2E-01
Manganese	2.1E-04	---	6.9E-04	---	3.9E-05	7.0E-04	2.7E-03	1.7E-02	3.2E-04	2.2E-02
Molybdenum	3.2E-05	---	1.5E-03	---	3.2E-06	5.1E-05	1.2E-03	4.4E-03	4.6E-04	7.7E-03
Nickel	1.2E-02	---	6.6E-01	---	3.2E-05	6.1E-03	7.8E-03	1.4E-01	4.0E-04	8.2E-01
Selenium	3.7E-03	---	1.8E-01	---	1.5E-04	4.3E-03	5.9E-03	4.4E-01	5.5E-02	7.0E-01
Thallium	6.0E-04	---	1.4E-03	---	5.5E-06	8.0E-04	7.2E-03	2.6E-02	1.6E-03	3.8E-02
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	4.3E-05	1.1E-04	1.2E-04	6.1E-07	3.8E-04
Vanadium	1.3E-01	---	2.8E-01	---	4.1E-04	1.4E-01	1.8E-01	4.3E-01	2.8E-03	**1.2E+00**
Zinc	1.9E-03	---	4.9E-01	---	2.1E-05	3.0E-03	7.0E-03	7.4E-01	3.3E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spotted Sandpiper (SaR) Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	3.6E-03	---	3.2E-02	---	8.4E-05	4.9E-03	1.0E-02	2.9E-01	7.5E-04	3.4E-01
Barium	2.9E-04	---	1.3E-03	---	7.5E-05	9.2E-04	1.3E-03	2.1E-02	6.3E-04	2.5E-02
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	1.4E-03	---	6.6E-01	---	1.0E-05	2.2E-03	1.7E-03	4.1E-01	3.7E-03	**1.1E+00**
Chromium (Total)	3.1E-02	---	4.8E-01	---	8.5E-05	2.1E-02	8.8E-03	6.3E-01	1.8E-04	**1.2E+00**
Cobalt	5.7E-03	---	3.5E-02	---	1.5E-05	5.9E-03	3.5E-03	2.3E-03	2.8E-04	5.2E-02
Copper	2.9E-02	---	7.7E-01	---	2.7E-04	2.4E-02	5.2E-02	**6.2E+00**	5.2E-02	**7.2E+00**
Lead	1.7E-02	---	4.1E-01	---	4.4E-05	2.4E-02	6.9E-03	3.6E-01	4.9E-03	8.2E-01
Manganese	2.1E-04	---	6.9E-04	---	3.9E-05	7.0E-04	2.7E-03	1.7E-02	3.2E-04	2.2E-02
Molybdenum	9.6E-05	---	4.6E-03	---	9.5E-06	1.5E-04	3.6E-03	1.3E-02	1.4E-03	2.3E-02
Nickel	1.2E-02	---	6.6E-01	---	3.2E-05	6.1E-03	7.8E-03	1.4E-01	4.0E-04	8.2E-01
Selenium	3.7E-03	---	1.8E-01	---	1.5E-04	4.3E-03	5.9E-03	4.4E-01	5.5E-02	7.0E-01
Thallium	1.8E-03	---	4.2E-03	---	1.7E-05	2.4E-03	2.2E-02	7.9E-02	4.9E-03	1.1E-01
Uranium	3.9E-05	---	6.4E-05	---	1.3E-07	4.3E-05	1.1E-04	1.2E-04	6.1E-07	3.8E-04
Vanadium	1.3E-01	---	2.8E-01	---	4.1E-04	1.4E-01	1.8E-01	4.3E-01	2.8E-03	**1.2E+00**
Zinc	1.9E-03	---	4.9E-01	---	2.1E-05	3.0E-03	7.0E-03	7.4E-01	3.3E-02	**1.3E+00**

Notes:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Spruce Grouse Exposed to Constituents of Concern at the Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Soil Ingestion HQ	Terrestrial Plant Ingestion HQ	Terrestrial Invertebrate Ingestion HQ	Terrestrial Mammal Ingestion HQ	Surface Water Ingestion HQ	Freshwater Sediment Ingestion HQ	Freshwater Aquatic Plant Ingestion HQ	Freshwater Benthic Invertebrate Ingestion HQ	Freshwater Fish Ingestion HQ	Total Hazard Quotient
Inorganics										
Antimony	---	---	---	---	---	---	---	---	---	---
Arsenic	8.8E-04	2.5E-03	4.2E-04	---	1.1E-05	---	---	---	---	3.8E-03
Barium	7.2E-05	6.5E-03	1.7E-05	---	1.0E-05	---	---	---	---	6.6E-03
Beryllium	---	---	---	---	---	---	---	---	---	---
Cadmium	3.5E-04	7.7E-03	8.7E-03	---	1.4E-06	---	---	---	---	1.7E-02
Chromium (Total)	2.3E-02	1.1E-01	1.9E-02	---	3.4E-05	---	---	---	---	1.5E-01
Cobalt	4.2E-03	1.9E-02	1.4E-03	---	5.9E-06	---	---	---	---	2.4E-02
Copper	7.2E-03	1.6E-01	1.0E-02	---	3.6E-05	---	---	---	---	1.8E-01
Lead	1.3E-02	2.2E-02	1.6E-02	---	1.8E-05	---	---	---	---	5.1E-02
Manganese	1.5E-04	9.5E-03	2.7E-05	---	1.6E-05	---	---	---	---	9.7E-03
Molybdenum	2.4E-05	8.5E-03	6.0E-05	---	1.3E-06	---	---	---	---	8.6E-03
Nickel	9.2E-03	7.4E-02	2.6E-02	---	1.3E-05	---	---	---	---	1.1E-01
Selenium	2.8E-03	3.3E-02	7.2E-03	---	5.9E-05	---	---	---	---	4.3E-02
Thallium	7.6E-04	3.9E-03	9.5E-05	---	3.8E-06	---	---	---	---	4.8E-03
Uranium	2.9E-05	3.4E-05	2.5E-06	---	5.2E-08	---	---	---	---	6.6E-05
Vanadium	9.9E-02	2.9E-01	1.1E-02	---	1.6E-04	---	---	---	---	4.0E-01
Zinc	1.4E-03	5.1E-02	1.9E-02	---	8.5E-06	---	---	---	---	7.1E-02

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.0E-04	2.0E-02	Interim PWQO	5.0E-03	2.0E-01	4.3E+03	vanVlaardingen et al. 2005	4.6E-05
Arsenic	6.0E-04	5.0E-03	CCME. 1999b.	1.2E-01	4.0E+00	1.7E+01	CCME. 1999c.	2.4E-01
Barium	8.3E-03	2.2E-01	Crommentuijn et al. 1997	3.8E-02	8.8E+01	2.5E+03	vanVlaardingen et al. 2005	3.6E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.2E-01	5.4E+00	vanVlaardingen et al. 2005	7.8E-02
Cadmium	2.0E-05	4.0E-05	CCME. 1999b.	5.0E-01	8.5E-01	3.5E+00	CCME. 1999c.	2.4E-01
Chromium (Total)	1.3E-03	8.9E-03	CCME. 1999b.	1.5E-01	3.2E+01	4.3E+03	Verbuggen et al. 2001	7.4E-03
Cobalt	3.0E-04	8.4E-04	ECCC 2017	3.6E-01	8.3E+00	4.6E+02	vanVlaardingen et al. 2005	1.8E-02
Copper	1.2E-03	2.0E-03	CCME. 1999b.	6.0E-01	2.0E+01	2.0E+02	CCME. 1999c.	1.0E-01
Lead	2.8E-04	1.0E-03	CCME. 1999b.	2.8E-01	2.2E+01	9.1E+01	CCME. 1999c.	2.4E-01
Manganese	6.7E-02	9.0E+01	CCME. 1999b.	7.4E-04	7.0E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	5.0E-05	7.3E-02	CCME. 1999b.	6.8E-04	7.9E-01	7.0E+03	vanVlaardingen et al. 2005	1.1E-04
Nickel	8.0E-04	2.5E-02	CCME. 1999b.	3.2E-02	2.0E+01	3.0E+02	Verbuggen et al. 2001	6.8E-02
Selenium	1.3E-04	1.0E-03	CCME. 1999b.	1.3E-01	7.0E-01	1.5E+01	vanVlaardingen et al. 2005	4.8E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.5E-01	No suitable screening benchmark identified.	---	NA
Uranium	3.0E-05	1.5E-02	CCME. 1999b.	2.0E-03	1.3E+00	No suitable screening benchmark identified.	---	NA
Vanadium	7.0E-04	1.2E-01	ECCC 2016.	5.8E-03	2.8E+01	1.0E+02	vanVlaardingen et al. 2005	2.7E-01
Zinc	6.0E-03	2.0E-02	Interim PWQO	3.0E-01	1.1E+02	3.2E+02	CCME. 1999c.	3.5E-01

Note:
NA - Not Available

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	3.9E-04	2.0E-02	Interim PWQO	1.9E-02	4.9E-01	4.3E+03	vanVlaardingen et al. 2005	1.1E-04
Arsenic	4.6E-03	5.0E-03	CCME. 1999b.	9.2E-01	7.6E+00	1.7E+01	CCME. 1999c.	4.5E-01
Barium	8.6E-03	2.2E-01	Crommentuijn et al. 1997	3.9E-02	8.8E+01	2.5E+03	vanVlaardingen et al. 2005	3.6E-02
Beryllium	3.5E-04	1.1E-02	PWQO	3.2E-02	1.2E+00	5.4E+00	vanVlaardingen et al. 2005	2.3E-01
Cadmium	2.0E-05	4.0E-05	CCME. 1999b.	5.1E-01	8.5E-01	3.5E+00	CCME. 1999c.	2.4E-01
Chromium (Total)	5.7E-03	8.9E-03	CCME. 1999b.	6.4E-01	3.5E+01	4.3E+03	Verbuggen et al. 2001	8.2E-03
Cobalt	8.1E-04	8.4E-04	ECCC 2017	9.6E-01	1.3E+01	4.6E+02	vanVlaardingen et al. 2005	2.9E-02
Copper	3.6E-03	2.0E-03	CCME. 1999b.	**1.8E+00**	2.8E+01	2.0E+02	CCME. 1999c.	1.4E-01
Lead	4.4E-04	1.0E-03	CCME. 1999b.	4.4E-01	2.3E+01	9.1E+01	CCME. 1999c.	2.5E-01
Manganese	6.7E-02	9.0E+01	CCME. 1999b.	7.4E-04	7.0E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	3.7E-03	7.3E-02	CCME. 1999b.	5.1E-02	2.2E+00	7.0E+03	vanVlaardingen et al. 2005	3.2E-04
Nickel	1.1E-02	2.5E-02	CCME. 1999b.	4.4E-01	1.0E+02	3.0E+02	Verbuggen et al. 2001	3.6E-01
Selenium	7.9E-04	1.0E-03	CCME. 1999b.	7.9E-01	7.1E-01	1.5E+01	vanVlaardingen et al. 2005	4.8E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.5E-01	No suitable screening benchmark identified.	---	NA
Uranium	4.0E-03	1.5E-02	CCME. 1999b.	2.6E-01	1.3E+01	No suitable screening benchmark identified.	---	NA
Vanadium	6.0E-03	1.2E-01	ECCC 2016.	5.0E-02	4.7E+01	1.0E+02	vanVlaardingen et al. 2005	4.5E-01
Zinc	1.4E-02	2.0E-02	Interim PWQO	7.0E-01	1.1E+02	3.2E+02	CCME. 1999c.	3.5E-01

Notes:
NA - Not Available
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.0E-04	2.0E-02	Interim PWQO	5.0E-03	2.0E-01	4.3E+03	vanVlaardingen et al. 2005	4.6E-05
Arsenic	6.0E-04	5.0E-03	CCME. 1999b.	1.2E-01	4.0E+00	1.7E+01	CCME. 1999c.	2.4E-01
Barium	8.3E-03	2.2E-01	Crommentuijn et al. 1997	3.8E-02	8.8E+01	2.5E+03	vanVlaardingen et al. 2005	3.6E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.2E-01	5.4E+00	vanVlaardingen et al. 2005	7.8E-02
Cadmium	2.0E-05	4.0E-05	CCME. 1999b.	5.0E-01	8.5E-01	3.5E+00	CCME. 1999c.	2.4E-01
Chromium (Total)	1.3E-03	8.9E-03	CCME. 1999b.	1.5E-01	3.2E+01	4.3E+03	Verbuggen et al. 2001	7.4E-03
Cobalt	3.0E-04	8.4E-04	ECCC 2017	3.6E-01	8.3E+00	4.6E+02	vanVlaardingen et al. 2005	1.8E-02
Copper	1.2E-03	2.0E-03	CCME. 1999b.	6.0E-01	2.0E+01	2.0E+02	CCME. 1999c.	1.0E-01
Lead	2.8E-04	1.0E-03	CCME. 1999b.	2.8E-01	2.2E+01	9.1E+01	CCME. 1999c.	2.4E-01
Manganese	6.7E-02	9.0E+01	CCME. 1999b.	7.4E-04	7.0E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	5.0E-05	7.3E-02	CCME. 1999b.	6.8E-04	7.9E-01	7.0E+03	vanVlaardingen et al. 2005	1.1E-04
Nickel	8.0E-04	2.5E-02	CCME. 1999b.	3.2E-02	2.0E+01	3.0E+02	Verbuggen et al. 2001	6.8E-02
Selenium	1.3E-04	1.0E-03	CCME. 1999b.	1.3E-01	7.0E-01	1.5E+01	vanVlaardingen et al. 2005	4.8E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.5E-01	No suitable screening benchmark identified.	---	NA
Uranium	3.0E-05	1.5E-02	CCME. 1999b.	2.0E-03	1.3E+00	No suitable screening benchmark identified.	---	NA
Vanadium	7.0E-04	1.2E-01	ECCC 2016.	5.8E-03	2.8E+01	1.0E+02	vanVlaardingen et al. 2005	2.7E-01
Zinc	6.0E-03	2.0E-02	Interim PWQO	3.0E-01	1.1E+02	3.2E+02	CCME. 1999c.	3.5E-01

Note:
NA - Not Available

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	3.5E-04	2.0E-02	Interim PWQO	1.7E-02	4.5E-01	4.3E+03	vanVlaardingen et al. 2005	1.1E-04
Arsenic	4.5E-03	5.0E-03	CCME. 1999b.	9.0E-01	7.5E+00	1.7E+01	CCME. 1999c.	4.4E-01
Barium	1.3E-02	2.2E-01	Crommentuijn et al. 1997	6.0E-02	9.3E+01	2.5E+03	vanVlaardingen et al. 2005	3.8E-02
Beryllium	2.4E-04	1.1E-02	PWQO	2.2E-02	9.6E-01	5.4E+00	vanVlaardingen et al. 2005	1.8E-01
Cadmium	2.1E-05	4.0E-05	CCME. 1999b.	5.3E-01	8.5E-01	3.5E+00	CCME. 1999c.	2.4E-01
Chromium (Total)	5.6E-03	8.9E-03	CCME. 1999b.	6.3E-01	3.5E+01	4.3E+03	Verbuggen et al. 2001	8.1E-03
Cobalt	7.9E-04	8.4E-04	ECCC 2017	9.4E-01	1.3E+01	4.6E+02	vanVlaardingen et al. 2005	2.8E-02
Copper	3.5E-03	2.0E-03	CCME. 1999b.	**1.8E+00**	2.8E+01	2.0E+02	CCME. 1999c.	1.4E-01
Lead	4.7E-04	1.0E-03	CCME. 1999b.	4.7E-01	2.3E+01	9.1E+01	CCME. 1999c.	2.6E-01
Manganese	6.7E-02	9.0E+01	CCME. 1999b.	7.4E-04	7.0E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	3.3E-03	7.3E-02	CCME. 1999b.	4.5E-02	2.1E+00	7.0E+03	vanVlaardingen et al. 2005	3.0E-04
Nickel	1.0E-02	2.5E-02	CCME. 1999b.	4.0E-01	9.7E+01	3.0E+02	Verbuggen et al. 2001	3.3E-01
Selenium	7.5E-04	1.0E-03	CCME. 1999b.	7.5E-01	7.1E-01	1.5E+01	vanVlaardingen et al. 2005	4.8E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.5E-01	No suitable screening benchmark identified.	---	NA
Uranium	3.9E-03	1.5E-02	CCME. 1999b.	2.6E-01	1.3E+01	No suitable screening benchmark identified.	---	NA
Vanadium	5.9E-03	1.2E-01	ECCC 2016.	4.9E-02	4.6E+01	1.0E+02	vanVlaardingen et al. 2005	4.5E-01
Zinc	1.4E-02	2.0E-02	Interim PWQO	7.0E-01	1.1E+02	3.2E+02	CCME. 1999c.	3.5E-01

Notes:
NA - Not Available
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.0E-04	2.0E-02	Interim PWQO	5.0E-03	1.2E-01	4.3E+03	vanVlaardingen et al. 2005	2.8E-05
Arsenic	9.0E-04	5.0E-03	CCME. 1999b.	1.8E-01	2.9E+00	1.7E+01	CCME. 1999c.	1.7E-01
Barium	7.5E-03	2.2E-01	Crommentuijn et al. 1997	3.4E-02	7.0E+01	2.5E+03	vanVlaardingen et al. 2005	2.9E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.0E-01	5.4E+00	vanVlaardingen et al. 2005	7.4E-02
Cadmium	3.9E-05	4.0E-05	CCME. 1999b.	9.8E-01	7.6E-01	3.5E+00	CCME. 1999c.	2.2E-01
Chromium (Total)	1.3E-03	8.9E-03	CCME. 1999b.	1.5E-01	3.1E+01	4.3E+03	Verbuggen et al. 2001	7.2E-03
Cobalt	3.0E-04	6.7E-04	ECCC 2017	4.5E-01	8.8E+00	4.6E+02	vanVlaardingen et al. 2005	1.9E-02
Copper	1.7E-03	2.0E-03	CCME. 1999b.	8.5E-01	1.2E+01	2.0E+02	CCME. 1999c.	6.1E-02
Lead	4.7E-04	1.0E-03	CCME. 1999b.	4.7E-01	1.5E+01	9.1E+01	CCME. 1999c.	1.6E-01
Manganese	6.8E-02	9.0E+01	CCME. 1999b.	7.6E-04	9.2E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	5.0E-05	7.3E-02	CCME. 1999b.	6.8E-04	5.0E-01	7.0E+03	vanVlaardingen et al. 2005	7.1E-05
Nickel	1.0E-03	2.5E-02	CCME. 1999b.	4.0E-02	1.7E+01	3.0E+02	Verbuggen et al. 2001	5.8E-02
Selenium	1.2E-04	1.0E-03	CCME. 1999b.	1.2E-01	7.8E-01	1.5E+01	vanVlaardingen et al. 2005	5.3E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.3E-01	No suitable screening benchmark identified.	---	NA
Uranium	4.0E-05	1.5E-02	CCME. 1999b.	2.7E-03	1.1E+00	No suitable screening benchmark identified.	---	NA
Vanadium	1.1E-03	1.2E-01	ECCC 2016.	9.1E-03	2.7E+01	1.0E+02	vanVlaardingen et al. 2005	2.6E-01
Zinc	7.0E-03	2.0E-02	Interim PWQO	3.5E-01	8.0E+01	3.2E+02	CCME. 1999c.	2.5E-01

Note:
NA - Not Available

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.3E-04	2.0E-02	Interim PWQO	6.5E-03	1.4E-01	4.3E+03	vanVlaardingen et al. 2005	3.3E-05
Arsenic	1.0E-03	5.0E-03	CCME. 1999b.	2.0E-01	3.0E+00	1.7E+01	CCME. 1999c.	1.8E-01
Barium	8.0E-03	2.2E-01	Crommentuijn et al. 1997	3.6E-02	7.1E+01	2.5E+03	vanVlaardingen et al. 2005	2.9E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.0E-01	5.4E+00	vanVlaardingen et al. 2005	7.4E-02
Cadmium	3.9E-05	4.0E-05	CCME. 1999b.	9.8E-01	7.6E-01	3.5E+00	CCME. 1999c.	2.2E-01
Chromium (Total)	1.4E-03	8.9E-03	CCME. 1999b.	1.6E-01	3.1E+01	4.3E+03	Verbuggen et al. 2001	7.2E-03
Cobalt	3.2E-04	6.7E-04	ECCC 2017	4.8E-01	8.9E+00	4.6E+02	vanVlaardingen et al. 2005	1.9E-02
Copper	1.8E-03	2.0E-03	CCME. 1999b.	8.8E-01	1.2E+01	2.0E+02	CCME. 1999c.	6.2E-02
Lead	4.7E-04	1.0E-03	CCME. 1999b.	4.7E-01	1.5E+01	9.1E+01	CCME. 1999c.	1.6E-01
Manganese	6.8E-02	9.0E+01	CCME. 1999b.	7.6E-04	9.2E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	2.9E-04	7.3E-02	CCME. 1999b.	4.0E-03	5.7E-01	7.0E+03	vanVlaardingen et al. 2005	8.2E-05
Nickel	1.4E-03	2.5E-02	CCME. 1999b.	5.6E-02	2.0E+01	3.0E+02	Verbuggen et al. 2001	6.6E-02
Selenium	1.6E-04	1.0E-03	CCME. 1999b.	1.6E-01	7.8E-01	1.5E+01	vanVlaardingen et al. 2005	5.3E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.3E-01	No suitable screening benchmark identified.	---	NA
Uranium	1.6E-04	1.5E-02	CCME. 1999b.	1.1E-02	1.4E+00	No suitable screening benchmark identified.	---	NA
Vanadium	1.2E-03	1.2E-01	ECCC 2016.	1.0E-02	2.7E+01	1.0E+02	vanVlaardingen et al. 2005	2.7E-01
Zinc	7.2E-03	2.0E-02	Interim PWQO	3.6E-01	8.0E+01	3.2E+02	CCME. 1999c.	2.5E-01

Note:
NA - Not Available

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.0E-04	2.0E-02	Interim PWQO	5.0E-03	1.2E-01	4.3E+03	vanVlaardingen et al. 2005	2.8E-05
Arsenic	9.0E-04	5.0E-03	CCME. 1999b.	1.8E-01	2.9E+00	1.7E+01	CCME. 1999c.	1.7E-01
Barium	7.5E-03	2.2E-01	Crommentuijn et al. 1997	3.4E-02	7.0E+01	2.5E+03	vanVlaardingen et al. 2005	2.9E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.0E-01	5.4E+00	vanVlaardingen et al. 2005	7.4E-02
Cadmium	3.9E-05	4.0E-05	CCME. 1999b.	9.8E-01	7.6E-01	3.5E+00	CCME. 1999c.	2.2E-01
Chromium (Total)	1.3E-03	8.9E-03	CCME. 1999b.	1.5E-01	3.1E+01	4.3E+03	Verbuggen et al. 2001	7.2E-03
Cobalt	3.0E-04	6.7E-04	ECCC 2017	4.5E-01	8.8E+00	4.6E+02	vanVlaardingen et al. 2005	1.9E-02
Copper	1.7E-03	2.0E-03	CCME. 1999b.	8.5E-01	1.2E+01	2.0E+02	CCME. 1999c.	6.1E-02
Lead	4.7E-04	1.0E-03	CCME. 1999b.	4.7E-01	1.5E+01	9.1E+01	CCME. 1999c.	1.6E-01
Manganese	6.8E-02	9.0E+01	CCME. 1999b.	7.6E-04	9.2E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	5.0E-05	7.3E-02	CCME. 1999b.	6.8E-04	5.0E-01	7.0E+03	vanVlaardingen et al. 2005	7.1E-05
Nickel	1.0E-03	2.5E-02	CCME. 1999b.	4.0E-02	1.7E+01	3.0E+02	Verbuggen et al. 2001	5.8E-02
Selenium	1.2E-04	1.0E-03	CCME. 1999b.	1.2E-01	7.8E-01	1.5E+01	vanVlaardingen et al. 2005	5.3E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.3E-01	No suitable screening benchmark identified.	---	NA
Uranium	4.0E-05	1.5E-02	CCME. 1999b.	2.7E-03	1.1E+00	No suitable screening benchmark identified.	---	NA
Vanadium	1.1E-03	1.2E-01	ECCC 2016.	9.1E-03	2.7E+01	1.0E+02	vanVlaardingen et al. 2005	2.6E-01
Zinc	7.0E-03	2.0E-02	Interim PWQO	3.5E-01	8.0E+01	3.2E+02	CCME. 1999c.	2.5E-01

Note:
NA - Not Available

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.6E-04	2.0E-02	Interim PWQO	8.2E-03	1.7E-01	4.3E+03	vanVlaardingen et al. 2005	4.0E-05
Arsenic	1.8E-03	5.0E-03	CCME. 1999b.	3.7E-01	3.6E+00	1.7E+01	CCME. 1999c.	2.1E-01
Barium	1.1E-02	2.2E-01	Crommentuijn et al. 1997	5.2E-02	7.4E+01	2.5E+03	vanVlaardingen et al. 2005	3.0E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.0E-01	5.4E+00	vanVlaardingen et al. 2005	7.4E-02
Cadmium	3.9E-05	4.0E-05	CCME. 1999b.	9.8E-01	7.6E-01	3.5E+00	CCME. 1999c.	2.2E-01
Chromium (Total)	2.4E-03	8.9E-03	CCME. 1999b.	2.7E-01	3.2E+01	4.3E+03	Verbuggen et al. 2001	7.3E-03
Cobalt	4.2E-04	6.7E-04	ECCC 2017	6.3E-01	9.7E+00	4.6E+02	vanVlaardingen et al. 2005	2.1E-02
Copper	2.2E-03	2.0E-03	CCME. 1999b.	**1.1E+00**	1.3E+01	2.0E+02	CCME. 1999c.	6.8E-02
Lead	5.2E-04	1.0E-03	CCME. 1999b.	5.2E-01	1.5E+01	9.1E+01	CCME. 1999c.	1.7E-01
Manganese	6.8E-02	9.0E+01	CCME. 1999b.	7.6E-04	9.2E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	1.1E-03	7.3E-02	CCME. 1999b.	1.5E-02	8.2E-01	7.0E+03	vanVlaardingen et al. 2005	1.2E-04
Nickel	3.4E-03	2.5E-02	CCME. 1999b.	1.4E-01	3.3E+01	3.0E+02	Verbuggen et al. 2001	1.1E-01
Selenium	2.8E-04	1.0E-03	CCME. 1999b.	2.8E-01	7.8E-01	1.5E+01	vanVlaardingen et al. 2005	5.3E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.3E-01	No suitable screening benchmark identified.	---	NA
Uranium	1.0E-03	1.5E-02	CCME. 1999b.	6.7E-02	3.4E+00	No suitable screening benchmark identified.	---	NA
Vanadium	2.3E-03	1.2E-01	ECCC 2016.	1.9E-02	3.0E+01	1.0E+02	vanVlaardingen et al. 2005	3.0E-01
Zinc	8.8E-03	2.0E-02	Interim PWQO	4.4E-01	8.0E+01	3.2E+02	CCME. 1999c.	2.5E-01

Notes:
NA - Not Available
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in Jocko Creek - Baseline Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.0E-04	2.0E-02	Interim PWQO	5.0E-03	2.0E-01	4.3E+03	vanVlaardingen et al. 2005	4.6E-05
Arsenic	7.0E-04	5.0E-03	CCME. 1999b.	1.4E-01	4.0E+00	1.7E+01	CCME. 1999c.	2.4E-01
Barium	7.3E-03	2.2E-01	Crommentuijn et al. 1997	3.3E-02	8.8E+01	2.5E+03	vanVlaardingen et al. 2005	3.6E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.2E-01	5.4E+00	vanVlaardingen et al. 2005	7.8E-02
Cadmium	4.2E-05	4.0E-05	CCME. 1999b.	**1.1E+00**	8.5E-01	3.5E+00	CCME. 1999c.	2.4E-01
Chromium (Total)	1.3E-03	8.9E-03	CCME. 1999b.	1.5E-01	3.2E+01	4.3E+03	Verbuggen et al. 2001	7.4E-03
Cobalt	2.0E-04	6.7E-04	ECCC 2017	3.0E-01	8.3E+00	4.6E+02	vanVlaardingen et al. 2005	1.8E-02
Copper	2.3E-03	2.0E-03	CCME. 1999b.	**1.2E+00**	2.0E+01	2.0E+02	CCME. 1999c.	1.0E-01
Lead	4.1E-04	1.0E-03	CCME. 1999b.	4.1E-01	2.2E+01	9.1E+01	CCME. 1999c.	2.4E-01
Manganese	4.0E-02	9.0E+01	CCME. 1999b.	4.4E-04	7.0E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	5.0E-05	7.3E-02	CCME. 1999b.	6.8E-04	7.9E-01	7.0E+03	vanVlaardingen et al. 2005	1.1E-04
Nickel	9.0E-04	2.5E-02	CCME. 1999b.	3.6E-02	2.0E+01	3.0E+02	Verbuggen et al. 2001	6.8E-02
Selenium	1.9E-04	1.0E-03	CCME. 1999b.	1.9E-01	7.0E-01	1.5E+01	vanVlaardingen et al. 2005	4.8E-02
Thallium	1.0E-05	8.0E-04	CCME. 1999b.	1.3E-02	1.5E-01	No suitable screening benchmark identified.	---	NA
Uranium	4.0E-05	1.5E-02	CCME. 1999b.	2.7E-03	1.3E+00	No suitable screening benchmark identified.	---	NA
Vanadium	8.0E-04	1.2E-01	ECCC 2016.	6.7E-03	2.8E+01	1.0E+02	vanVlaardingen et al. 2005	2.7E-01
Zinc	8.0E-03	2.0E-02	Interim PWQO	4.0E-01	1.1E+02	3.2E+02	CCME. 1999c.	3.5E-01

Notes:
NA - Not Available
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for the Freshwater Community Receptors Exposed to Constituents of Interest in Jocko Creek - Baseline plus Project Scenario

Constituent	Surface Water Conc. (mg/L)	Freshwater Chronic Screening Benchmark (mg/L)	Reference for Benchmark	Chronic HQ for Freshwater Receptors	Freshwater Sediment Conc. (mg/kg dw)	Benthic Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Benthic Receptors
Inorganics								
Antimony	1.8E-04	2.0E-02	Interim PWQO	9.0E-03	2.8E-01	4.3E+03	vanVlaardingen et al. 2005	6.5E-05
Arsenic	7.1E-04	5.0E-03	CCME. 1999b.	1.4E-01	4.0E+00	1.7E+01	CCME. 1999c.	2.4E-01
Barium	7.3E-03	2.2E-01	Crommentuijn et al. 1997	3.3E-02	8.8E+01	2.5E+03	vanVlaardingen et al. 2005	3.6E-02
Beryllium	2.0E-05	1.1E-02	PWQO	1.8E-03	4.2E-01	5.4E+00	vanVlaardingen et al. 2005	7.8E-02
Cadmium	4.2E-05	4.0E-05	CCME. 1999b.	**1.1E+00**	8.5E-01	3.5E+00	CCME. 1999c.	2.4E-01
Chromium (Total)	1.3E-03	8.9E-03	CCME. 1999b.	1.5E-01	3.2E+01	4.3E+03	Verbuggen et al. 2001	7.4E-03
Cobalt	2.1E-04	6.7E-04	ECCC 2017	3.2E-01	8.4E+00	4.6E+02	vanVlaardingen et al. 2005	1.8E-02
Copper	2.3E-03	2.0E-03	CCME. 1999b.	**1.2E+00**	2.0E+01	2.0E+02	CCME. 1999c.	1.0E-01
Lead	4.1E-04	1.0E-03	CCME. 1999b.	4.1E-01	2.2E+01	9.1E+01	CCME. 1999c.	2.4E-01
Manganese	4.0E-02	9.0E+01	CCME. 1999b.	4.5E-04	7.0E+02	No suitable screening benchmark identified.	---	NA
Molybdenum	6.4E-04	7.3E-02	CCME. 1999b.	8.7E-03	1.0E+00	7.0E+03	vanVlaardingen et al. 2005	1.5E-04
Nickel	1.2E-03	2.5E-02	CCME. 1999b.	5.0E-02	2.3E+01	3.0E+02	Verbuggen et al. 2001	7.7E-02
Selenium	2.5E-04	1.0E-03	CCME. 1999b.	2.5E-01	7.0E-01	1.5E+01	vanVlaardingen et al. 2005	4.8E-02
Thallium	1.1E-05	8.0E-04	CCME. 1999b.	1.4E-02	1.6E-01	No suitable screening benchmark identified.	---	NA
Uranium	4.0E-05	1.5E-02	CCME. 1999b.	2.7E-03	1.3E+00	No suitable screening benchmark identified.	---	NA
Vanadium	8.0E-04	1.2E-01	ECCC 2016.	6.7E-03	2.8E+01	1.0E+02	vanVlaardingen et al. 2005	2.7E-01
Zinc	8.0E-03	2.0E-02	Interim PWQO	4.0E-01	1.1E+02	3.2E+02	CCME. 1999c.	3.5E-01

Notes:
NA - Not Available
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in North Driftwood River (TMF Ponds) - Baseline Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.0E+01	5.0E+02	CCME. 1999a.	1.0E-01	5.0E+01	7.5E+02	CCME. 1999a.	6.7E-02
Beryllium	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01
Cobalt	6.0E+00	5.0E+01	CCME. 1999a.	1.2E-01	6.0E+00	4.0E+01	CCME. 1999a.	1.5E-01
Copper	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.8E+02	4.5E+02	USEPA. 2007.	8.4E-01	3.8E+02	2.2E+02	USEPA. 2007.	**1.7E+00**
Molybdenum	5.9E-01	1.0E+01	CCME. 1999a.	5.9E-02	5.9E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01
Zinc	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in North Driftwood River (TMF Ponds) - Baseline plus Project Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.3E+01	5.0E+02	CCME. 1999a.	1.1E-01	5.3E+01	7.5E+02	CCME. 1999a.	7.1E-02
Beryllium	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01
Cobalt	7.7E+00	5.0E+01	CCME. 1999a.	1.5E-01	7.7E+00	4.0E+01	CCME. 1999a.	1.9E-01
Copper	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.9E+02	4.5E+02	USEPA. 2007.	8.8E-01	3.9E+02	2.2E+02	USEPA. 2007.	**1.8E+00**
Molybdenum	6.0E-01	1.0E+01	CCME. 1999a.	6.0E-02	6.0E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01
Zinc	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in North Driftwood River (Pond 2) - Baseline Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.0E+01	5.0E+02	CCME. 1999a.	1.0E-01	5.0E+01	7.5E+02	CCME. 1999a.	6.7E-02
Beryllium	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01
Cobalt	6.0E+00	5.0E+01	CCME. 1999a.	1.2E-01	6.0E+00	4.0E+01	CCME. 1999a.	1.5E-01
Copper	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.8E+02	4.5E+02	USEPA. 2007.	8.4E-01	3.8E+02	2.2E+02	USEPA. 2007.	**1.7E+00**
Molybdenum	5.9E-01	1.0E+01	CCME. 1999a.	5.9E-02	5.9E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01
Zinc	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in North Driftwood River (Pond 2) - Baseline plus Project Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.3E+01	5.0E+02	CCME. 1999a.	1.1E-01	5.3E+01	7.5E+02	CCME. 1999a.	7.1E-02
Beryllium	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01
Cobalt	7.7E+00	5.0E+01	CCME. 1999a.	1.5E-01	7.7E+00	4.0E+01	CCME. 1999a.	1.9E-01
Copper	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.9E+02	4.5E+02	USEPA. 2007.	8.8E-01	3.9E+02	2.2E+02	USEPA. 2007.	**1.8E+00**
Molybdenum	6.0E-01	1.0E+01	CCME. 1999a.	6.0E-02	6.0E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01
Zinc	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 3) - Baseline Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.0E+01	5.0E+02	CCME. 1999a.	1.0E-01	5.0E+01	7.5E+02	CCME. 1999a.	6.7E-02
Beryllium	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01
Cobalt	6.0E+00	5.0E+01	CCME. 1999a.	1.2E-01	6.0E+00	4.0E+01	CCME. 1999a.	1.5E-01
Copper	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.8E+02	4.5E+02	USEPA. 2007.	8.4E-01	3.8E+02	2.2E+02	USEPA. 2007.	**1.7E+00**
Molybdenum	5.9E-01	1.0E+01	CCME. 1999a.	5.9E-02	5.9E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01
Zinc	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 3) - Baseline plus Project Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.3E+01	5.0E+02	CCME. 1999a.	1.1E-01	5.3E+01	7.5E+02	CCME. 1999a.	7.1E-02
Beryllium	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01
Cobalt	7.7E+00	5.0E+01	CCME. 1999a.	1.5E-01	7.7E+00	4.0E+01	CCME. 1999a.	1.9E-01
Copper	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.9E+02	4.5E+02	USEPA. 2007.	8.8E-01	3.9E+02	2.2E+02	USEPA. 2007.	**1.8E+00**
Molybdenum	6.0E-01	1.0E+01	CCME. 1999a.	6.0E-02	6.0E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01
Zinc	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 1) - Baseline Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.0E+01	5.0E+02	CCME. 1999a.	1.0E-01	5.0E+01	7.5E+02	CCME. 1999a.	6.7E-02
Beryllium	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01
Cobalt	6.0E+00	5.0E+01	CCME. 1999a.	1.2E-01	6.0E+00	4.0E+01	CCME. 1999a.	1.5E-01
Copper	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.8E+02	4.5E+02	USEPA. 2007.	8.4E-01	3.8E+02	2.2E+02	USEPA. 2007.	**1.7E+00**
Molybdenum	5.9E-01	1.0E+01	CCME. 1999a.	5.9E-02	5.9E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01
Zinc	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in West Buskegau River (Pond 1) - Baseline plus Project Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.4E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.8E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.3E+01	5.0E+02	CCME. 1999a.	1.1E-01	5.3E+01	7.5E+02	CCME. 1999a.	7.1E-02
Beryllium	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02	3.6E-01	4.0E+00	CCME. 1999a.	8.9E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01	4.4E+01	6.4E+01	CCME. 1999a.	6.9E-01
Cobalt	7.7E+00	5.0E+01	CCME. 1999a.	1.5E-01	7.7E+00	4.0E+01	CCME. 1999a.	1.9E-01
Copper	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01	2.3E+01	6.3E+01	CCME. 1999a.	3.7E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.9E+02	4.5E+02	USEPA. 2007.	8.8E-01	3.9E+02	2.2E+02	USEPA. 2007.	**1.8E+00**
Molybdenum	6.0E-01	1.0E+01	CCME. 1999a.	6.0E-02	6.0E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01	4.4E+01	4.5E+01	CCME. 1999a.	9.8E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01	2.5E+01	1.3E+02	CCME. 1999a.	1.9E-01
Zinc	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.8E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0

Hazard Quotients for theTerrestrial Community Receptors Exposed to Constituents of Interest in Jocko Creek - Baseline Scenario

Constituent	Soil Conc. (mg/kg dw)	Terrestrial Invertebrate Screening Benchmark (mg/kg)	Reference for Benchmark	Chronic HQ for Terrestrial Invertebrates	Soil Conc. (mg/kg dw)	Terrestrial Plant Screening Benchmark (mg/kg)	Reference for Benchmark	HQ for Terrestrial Plants
Inorganics								
Antimony	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02	2.3E-01	2.0E+01	CCME. 1999a.	1.2E-02
Arsenic	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01	2.7E+00	1.7E+01	CCME. 1999a.	1.6E-01
Barium	5.0E+01	5.0E+02	CCME. 1999a.	1.0E-01	5.0E+01	7.5E+02	CCME. 1999a.	6.7E-02
Beryllium	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02	3.5E-01	4.0E+00	CCME. 1999a.	8.8E-02
Cadmium	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02	5.2E-01	1.0E+01	CCME. 1999a.	5.2E-02
Chromium (Total)	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01	2.6E+01	6.4E+01	CCME. 1999a.	4.1E-01
Cobalt	6.0E+00	5.0E+01	CCME. 1999a.	1.2E-01	6.0E+00	4.0E+01	CCME. 1999a.	1.5E-01
Copper	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01	2.2E+01	6.3E+01	CCME. 1999a.	3.5E-01
Lead	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02	1.5E+01	3.0E+02	CCME. 1999a.	5.0E-02
Manganese	3.8E+02	4.5E+02	USEPA. 2007.	8.4E-01	3.8E+02	2.2E+02	USEPA. 2007.	**1.7E+00**
Molybdenum	5.9E-01	1.0E+01	CCME. 1999a.	5.9E-02	5.9E-01	5.0E+00	CCME. 1999a.	1.2E-01
Nickel	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01	1.6E+01	4.5E+01	CCME. 1999a.	3.6E-01
Selenium	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01	5.7E-01	1.0E+00	CCME. 1999a.	5.7E-01
Thallium	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02	1.1E-01	1.4E+00	CCME. 1999a.	7.9E-02
Uranium	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03	1.1E+00	5.0E+02	CCME. 1999a.	2.2E-03
Vanadium	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01	2.3E+01	1.3E+02	CCME. 1999a.	1.8E-01
Zinc	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01	6.7E+01	2.5E+02	CCME. 1999a.	2.7E-01

Note:
Red highlight with white text indicates that the HQ is greater than 1.0