FINAL REPORT

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT OF THE HIGH LAKE MINE

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EXECUTIVE SUMMARY

Introduction

The objective of the environmental risk assessment is to provide scientific information related to potential human health and ecological risks associated with the proposed High Lake Mine development ("Project").

The risk assessment consists of a human health risk assessment (HHRA) component, and a terrestrial ecological risk assessment (TERA) component. The focus of the TERA will be on terrestrial mammalian and avian wildlife species.

The geographic focus of the HHRA and the TERA will be the High Lake mine site, the Grays Bay Dock Site and regional traditional use areas close to project activities, where human and terrestrial wildlife receptors are most likely to come into contact with chemicals of potential concern (COPCs).

The prediction of COPC exposure to humans and wildlife and the potential risks resulting from exposure was determined through the completion of a quantitative site specific HHRA and TERA. Standard environmental risk assessments follow a stepwise approach consisting of the following stages:

1. Problem Formulation, which involves the characterization of the site, and identification of chemicals, potential receptors and exposure pathways, routes, and scenarios that are of concern;
2. Exposure Assessment, which involves the estimation of exposure of hypothetical human and wildlife receptors to each of the chemicals of potential concern;
3. Toxicity Assessment, which involves the determination of an exposure limit (*i.e.,* concentration of a chemical not expected to be associated with adverse health effects) for each of the chemicals of potential concern; and
4. Risk Characterization, which involves the calculation of risks associated with the estimated exposures and toxicity

Human Health Risk Assessment (HHRA)

The primary purpose of the HHRA was to determine whether people spending time at or near the mine site, dock site or traditional use areas might be exposed to concentrations of chemicals that have the potential to cause adverse health effects on an acute and chronic basis. The assessment focused on those chemicals discharged into surface water or emitted into ambient air as a result of the Mine's normal operating conditions.

The groups of compounds that were selected for consideration in the HHRA include the following:

- Criteria Air Contaminants (CACs) including - particulate matter, sulphur dioxide, nitrogen dioxide, and carbon monoxide);
- Metals (comprehensive list of heavy metals);
- Volatile Organic Compounds (VOCs), and;
- Polycyclic Aromatic Hydrocarbons (PAHs).

The air quality group identified the COPCs emitted based on project design information. Reasonable maximum measured baseline media concentrations (*i.e.*, 95th percentile) were used in the HHRA to characterize exposures from the ambient or baseline environment (*i.e.*, soil, Labrador tea, crowberry, surface water and fish).

Two receptor groups were evaluated in the HHRA, including:

- Traditional Land Use group, which includes representative receptors from nearby Inuit communities engaged in traditional land use activities at, and surrounding, the High Lake Mine site and Grays Bay Dock site;
- Worker Camp group, which includes individuals who are employed at the High Lake Mine site and reside at the Mine camp.

When characterizing the potentially exposed individuals for the Traditional Land Use group, it is important to consider sensitive age and gender class. The five age classes or life-stages, as defined by Health Canada (2004a) include:

- Infant (0 to 6 months)
- Toddler (7 months to 4 years)
- Child (5 to 11 years)
- Adolescent (12 to 19 years)
- Adult (20 years and over)

According to the project proposal (Wolfden Resources Inc. 2006), the remote High Lake Mine location is not a well-used area for traditional activities. Non-worker human exposure to COPCs associated with the Project would generally be of a transient and intermittent nature, perhaps occurring two months out of the year on worst case basis. However, with the proposed all-season road linking Grays Bay to the High Lake Mine site, the possibility exists that the Inuit population could begin making more use of the area for the harvesting of game, fish and plant country foods. Thus, human exposure may occur to COPCs present in terrestrial plants, avian and mammalian game species, fish, surface water, air and soil.

When characterizing potential exposure to the Worker Camp group, general health based guidelines were applied. Although occupational health criteria is generally applied to assess worker health on industrial sites, this more conservative approach was used to address potential health concerns associated with workers living in the on-site camp during their work shift rotations.

The potential human exposure pathways identified for the HHRA are identified in Table E1.

Table E1 Human Exposure Pathways Identified for the Two Receptor Groups

Exposure Pathway	Receptor Group	
	Traditional Land Use	Worker Camp
Inhalation of air	✓	✓
Inhalation of dust	✓	✓
Inadvertent ingestion of soil/dust	✓	✓
Ingestion of country foods (*i.e.*, plants, game and fish)	✓	
Dermal contact with soil	✓	✓
Ingestion of water	✓	

The two exposure limit durations used in this assessment included:

- Acute exposures: the amount or dose of a chemical that can be tolerated without evidence of adverse health effects on a short-term basis.
- Chronic exposures: the amount of a chemical that is expected to be without effect when exposure occurs continuously or regularly over periods of at least a year and possibly extending over a lifetime.

Health agencies used to identify exposure limits for use in the HHRA included:

- Canadian regulatory agencies (*e.g.*, Health Canada, CCME, Environment Canada);
- Other recognized regulatory authorities or expert organizations (*e.g.* WHO, US EPA or RIVM).

Overall, exposure limits were based on conservative methods from regulatory agencies and are designed to be protective of public health.

Occupational health and safety protocols will be developed and employed at the site to minimize worker exposure while on the job. No exceedance of occupational health criteria were predicted on the Mine site for individual COPCs. However, since workers will also be living at the site, more conservative health criteria designed to protect the general population were applied.

Predicted short-term air concentrations for individual COPCs were less than the health-based guidelines for most of the COPCs, with exception for carbon monoxide, lead, nitrogen dioxide and $PM_{2.5}$. Mixtures that exceeded health based criteria included respiratory irritants, reproductive and CNS depressant mixtures. Most exceedances of health guidelines were predicted to occur within the facility footprint and would not impact traditional use areas. Due to the harsh environment and dedicated shift rotations, no significant effects on workers are anticipated. Workers will occupy indoor areas during time off with artificially engineered air quality, thus reducing their exposure to outside airborne contaminants.

The predicted peak fine particulate concentrations on the mine site and loading dock are elevated (*i.e.*, ranging from 54 to 380 µg/m^3) and could be associated with adverse health effects to workers unless dust management and/or respiratory protection is provided. Potential adverse health effects could be influenced by peak elevated NO_2 concentrations. Appropriate protection or mitigation measures should again be considered.

The predicted long-term air concentrations met the health-based guidelines for most COPCs. Exceedances within the actual mine site *per se* were predicted for chromium (hexavalent), manganese, NO_2 and $PM_{2.5}$. Mixtures that exceeded chronic health-based criteria within the mine site included CNS depressant and carcinogen groups.

It is important to note that worker exposure to the outside air will be limited, considering 12-hour operational shifts and 2-week rotation cycles off site. Therefore risk estimates presented herein are conservative.

Chronic country food consumption related risks predicted through the multi pathway exposure assessment indicated that the majority of predicted exposures are associated with “baseline” conditions and that project-related contributions are minimal compared to the baseline. ILCR for the Inuit and worker receptor were within acceptable thresholds. Unacceptable cancer risks were not predicted for the project. The chronic multi pathway assessment conservatively assumed Inuit were exposed continuously and obtained their entire life-time diet of traditional foods from the area. A less conservative, but more realistic scenario assuming periodic (up to 2 months/year) exposure was also assessed.

Potential health risks to Inuit receptors were predicted for the Baseline + Project case for methyl mercury only (with baseline contributing the majority of predicted exposure).

For other COPCs including antimony, barium, chromium and manganese, predicted risks were judged to be overly conservative due to the assumption that Inuit are continuously harvesting all of their traditional foods from the study area as well as other highly conservative assumptions. In addition, predicted risks for these COPCs were primarily due to baseline exposures and not the project. Adverse effects from consumption of traditional foods from the study area surrounding the mine site and traditional use areas on an occasional basis (up to a few months per year) are not expected. This conclusion is further strengthened by the fact that predicted baseline condition exposures are significantly higher than incremental exposures associated with project emissions. This indicates that the project is expected to have a very small contribution to predicted overall chronic exposures and risks to Inuit in the study area.

Terrestrial Ecological Risk Assessment (TERA)

Based on the studies, surveys and consultations conducted to date in relation to the Project, indigenous wildlife receptor groups were identified for assessment in the TERA that represent valued ecosystem components (VECs). Based on the receptor screening procedure, the following ecological receptor groups were selected for assessment:

- terrestrial vegetation
- terrestrial invertebrates and soil micro-organisms
- terrestrial upland breeding birds
- small mammals (herbivores, insectivores)
- small mammals (carnivores, omnivores, piscivores)
- large mammals (herbivores-ungulates)

Terrestrial vegetation, and soil invertebrates and soil micro-organisms were evaluated in the TERA as broad receptor groups. For the terrestrial wildlife component of the TERA, surrogate (or representative) species were selected from the receptor groups noted above to allow for a more detailed evaluation of exposure. Surrogate selection was based on available study area data, consultations held with the local Inuit, and professional judgment and considered the following:

- prevalence (number of individuals) observed on or near the site;
- home range and seasonal migratory behaviour of species and how much time the species would be expected to spend in the immediate area;
- proportion of their diet the species would be expected to obtain from on-site sources;
- importance of species to local community (food source, cultural significance, *etc.*);
- availability of exposure and toxicological information;
- results from previous surveys and studies of the study area.

Individual species that were selected as surrogates for their wildlife receptor groups in the TERA are identified in Table E2

Table E2 Species that will be Selected as Surrogates for the Wildlife Receptor Groups in the TERA

Receptor Group	Surrogate Species
Small mammals (herbivores, insectivores)	Masked shrew
	Northern red-backed vole
	Arctic hare
Upland birds	Ptarmigan
Raptor	Peregrine Falcon
Small mammals (carnivores, omnivores, piscivores)	Wolverine and Arctic Fox
Large mammals (herbivores-ungulates)	Caribou

Potential exposure pathways for wildlife include;

- ingestion of food;
- inadvertent soil ingestion while foraging; and
- ingestion of surface water.

It was assumed that oral exposure is the prominent potential exposure pathway for most wildlife receptors (*i.e.*, food, water, incidental soil). Following deposition of chemicals onto soils, chemicals become incorporated into plants and, depending on the chemicals' environmental fate characteristics and physico-chemical properties, may be taken up by animals. Uptake of chemicals from dermal and inhalation pathways was not assessed as recommended by Suter (Suter *et al.* 2000) and CCME (2006).

Baseline concentrations of metals and PAHs were measured in soil and biota for use in the TERA. Samples were taken from 5 main locations, including mine, reference, traditional, dock and road sites. Concentrations of metals and PAHs were available from the following media:

- Soil
- Voles
- Sedge
- Lichen
- Surface water and
- Fish

Measured baseline concentrations in soil, water and biota were used to develop site-specific bio-concentration factors (BCFs) to predict concentrations in dietary components from the project. BCFs were developed for the following media:

- Soil to sedge
- Soil to lichen
- Water to fish
- Soil to vole or prey

Literature-derived terrestrial invertebrate models were required to estimate insect concentrations based on soil.

A wildlife toxicity assessment was conducted to determine exposure limits for the COPCs. Where available, TRVs from the U.S. EPA Ecological Soil Screening Levels (Eco-SSLs) for this TERA were selected for plant, invertebrate, avian and mammal species. The Eco-SSL methodology provides a comprehensive evaluation of ecological toxicity and prescribes TRVs based on conservative assumptions. The Eco-SSLs derived by the U.S. EPA are designed to be protective of ecological receptors, including plants, soil invertebrates, birds and mammals (U.S. EPA 2005). Where Eco-SSLs were not available, toxicity limits from other sources were used to characterize contaminants in this TERA (*e.g.*, U.S. EPA 1999).

A multi pathway exposure model was developed for the High lake Mine Project based on a large degree of site-specific data. Reasonable worst case concentrations (*i.e.*, 95th percentile) were selected as exposure point concentrations and used to develop site-specific bio-transfer models (*i.e.*, BCFs). TRVs were also selected that were considered conservative because they are typically based on a NOAEL, LOAEL or incorporate uncertainty factors, and were conservatively adopted for the protection of individual organisms as opposed to wildlife populations.

Predicted risks to VECs were below threshold levels for all COPCs, with the exception of cadmium, chromium and PAHs. Potential risks associated with cadmium, chromium and PAHs were considered to be highly conservative thus no adverse ecological risks are expected. Again, predicted exposures were primarily derived from Baseline conditions, not the Project. Overall, adverse effects to wildlife are not expected due to the project.

Overall Conclusions

Quantitative human health risk assessment (HHRA) and terrestrial ecological risk assessment (TERA) were completed for the proposed High Lake Mine Project. The risk assessments were largely based on site-specific information acquired from field surveys and interviews with communities that use the study area for harvesting traditional foods (*e.g.*, measured data from foods consumed by Inuit and wildlife).

Risks to humans were quantified for on-site workers and off-site Inuit on an acute and chronic basis. Certain potential acute health risks were identified within the facility "footprint" and are not expected to pose any health risk to Inuit traditional use areas. Exceptions include $PM_{2.5}$ in locations outside of the mine, but in close proximity to the facility footprint, where low health risks are predicted, based on the infrequent nature of the peak air quality events (probability of 1.8 to 2.2%) in combination with the lack of people present under most circumstances. This not only includes the Inuit which traditionally spend little time at a given location near the project site but it includes the on-site shift workers as well, who are expected to stay in camps with buildings that will reduce their potential exposure to outside airborne contaminants.

Similarly, potential chronic health risks were predicted for on-site workers. However, it is important to note that worker exposure will be limited, incorporating 12-hour operational shifts and 2-week rotation cycles off site that will limit the amount of time each worker will be on site and potentially exposed to localized outdoor air episodes. The duration of exposures would not exceed 14 years or the lifetime of the project. In addition, due to the harsh climate, workers will remain indoors for much of the time spent on site.

Potential chronic health risks to Inuit based on traditional country food consumption are low, and were related primarily to Baseline conditions. Predicted project exposures are much lower than Baseline exposures and contributed very little to potential health risks associated with traditional food consumption. In addition, incremental lifetime cancer risk (ILCR) estimates for both the Inuit and worker receptor were within acceptable risk assumptions.

Potential risks to wildlife from cadmium, chromium and PAHs were predicted based on a site-specific ecological exposure model. Once again these predicted risks to wildlife were demonstrated to be largely driven by baseline conditions and are also a function of the highly conservative nature of the risk assessment.

Adverse effects to humans and wildlife populations surrounding the project site are not expected. Adverse effects to on-site workers are not expected since the risk assessment incorporated several highly conservative assumptions including peak predicted air concentrations. However, consideration should be given to limiting the frequency and duration of exposures of workers to airborne dust and particulate matter while working on the Project site.

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HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT OF THE HIGH LAKE MINE

1.0 INTRODUCTION AND PROJECT DESCRIPTION

The objective of the environmental risk assessment is to provide scientific information related to potential human health and ecological risks associated with the proposed High Lake Mine development ("Project"), which, if required, will be used to identify appropriate mitigative or management actions.

The risk assessment consists of a human health risk assessment (HHRA) component, and a terrestrial ecological risk assessment (TERA) component. The focus of the TERA will be on terrestrial mammalian and avian wildlife species.

The geographic focus of the HHRA and the TERA will be the High Lake mine site, the Grays Bay Dock Site and regional traditional use area, where human and terrestrial wildlife receptors are most likely to come into contact with chemicals of potential concern (COPCs) (*Refer to Volume 1 EIS, Figure 2-1*)

The prediction of COPC exposure to humans and wildlife and the potential risks resulting from exposure was determined through the completion of a quantitative site specific HHRA and TERA. Standard environmental risk assessments followed a stepwise approach consisting of the following stages, as outlined below and in Figure 1-1:

1. Problem Formulation, which involves the characterization of the site, and identification of chemicals, potential receptors and exposure pathways, routes, and scenarios that are of concern;
2. Exposure Assessment, which involves the estimation of exposure of hypothetical human and wildlife receptors to each of the chemicals of potential concern;
3. Toxicity Assessment, which involves the determination of an exposure limit (*i.e.,* concentration of a chemical not expected to be associated with adverse health effects) for each of the chemicals of potential concern; and
4. Risk Characterization, which involves the calculation of risks associated with the estimated exposures and toxicity.

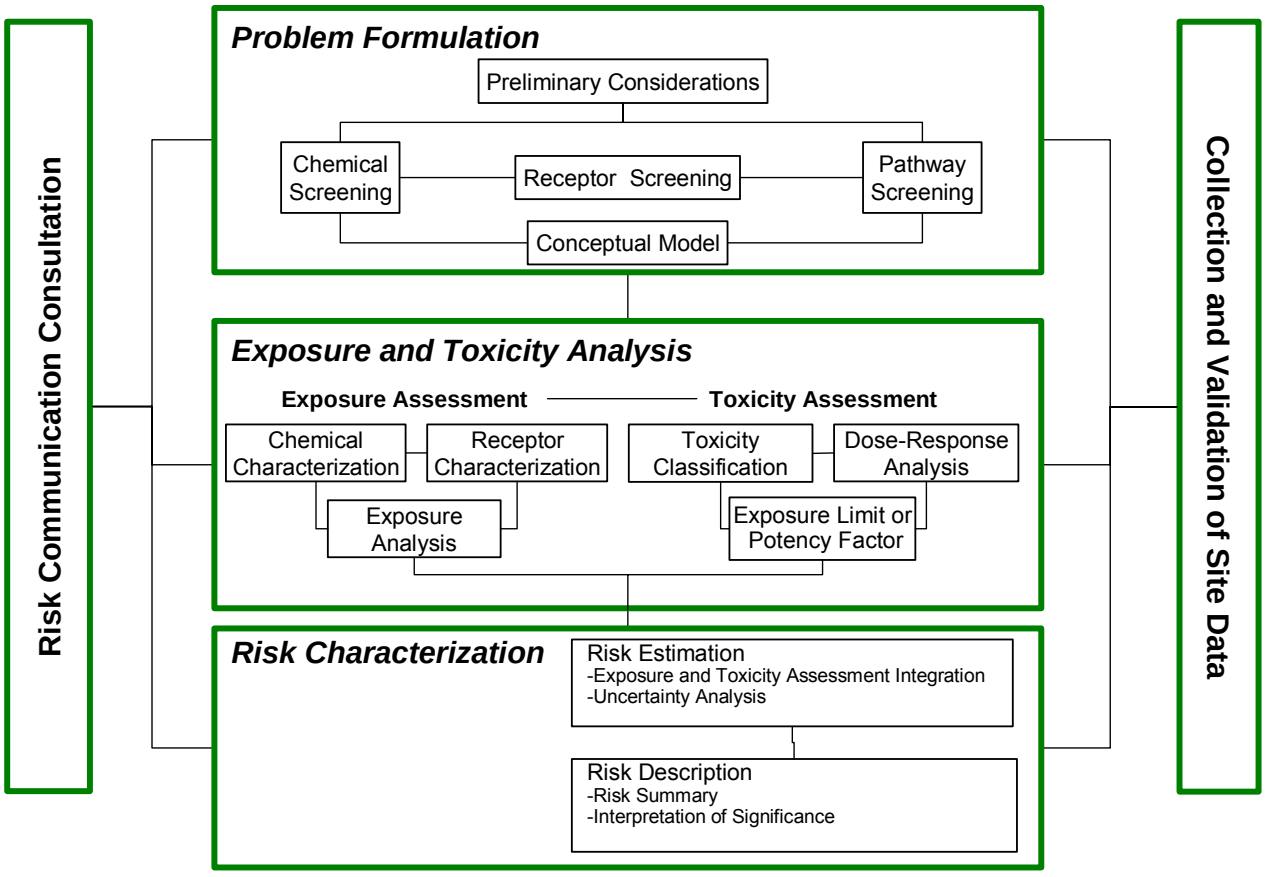

Figure 1-1 Risk Assessment Paradigm

The Problem Formulation is largely an information-gathering and planning stage. It is intended to define the scope and nature of the work to be completed and ensures that the HHRA and TERA are directed at the principal areas of concern. The Problem Formulation involves four key tasks, as follows:

1. Project and site characterization, wherein physical, chemical and biological information for the study area is examined and the potential impacts of the Project on environmental media and human and ecological receptors are considered.

2. Chemical characterization, wherein the primary COPCs associated with the Project are identified.

3. Receptor characterization, wherein the human and ecological receptors that may be affected by the Project's activities are identified and described. Special consideration is given to sensitive or susceptible receptors (*e.g.*, indigenous wildlife species, aboriginal humans who consume large quantities of fish and game).

4. Identification of exposure pathways and routes, wherein the most likely potential pathways and routes of exposure are identified. Consideration is given to the physico-chemical properties of the COPCs, the manner of their release, emission rate, and their behaviour in the environment (*i.e.*, environmental fate and transport characteristics).

In addition to these tasks, regional baseline data collected in support of the Environmental Impact Statement (EIS) were reviewed and assessed as to their suitability for use in the HHRA and TERA. In order to complete the HHRA and TERA, a sampling program was designed and implemented in 2006 in order to provide site specific data required for the risk assessment.

The Problem Formulation, along with a discussion of the baseline environmental setting, is presented in the following sections.

1.1 High Lake Properties – Characterization of the Site

1.1.1 Temporal Considerations

Pending regulatory approval, construction of the Project is scheduled to begin in 2008, with Mine operations extending to 2025. The HHRA and TERA focussed on the potential risks associated with the operational stage activities of the Project. Because emissions from construction activities will be of a short-term and transitory nature and are not expected to contribute to long-term air shed loading, potential risks to humans and terrestrial ecological receptors were not be assessed for the construction stage.

Additionally the scope of the HHRA and TERA did not include potential risks associated with the closure stage as there are no realistic exposure pathways to COPCs in the reclaimed landscape scenario. Open pit mines will be backfilled and capped with a permanent layer of mine rock or formed as a lake. Underground mines will be sealed at all openings, including ventilation raises, using a stable plug structure. Any contaminated or hazardous materials will be removed or is some cases buried in the underground mines. All buildings and facilities will be completely removed and

foundations excavated or covered. Roads will be decommissioned and surfaces loosened to allow the return of flora and fauna.

As the Project's operating life is projected to be 14 years (including development, operation and reclamation), it was assumed that human and ecological receptors would be exposed to COPCs for this entire period (which would exceed the life spans of most wildlife species).

1.1.2 Study Area Description

As illustrated in and Figure 1-3, the Project is located in the Kitikmeot region of Nunavut, extending south from Grays Bay on the Coronation Gulf to include the High Lake Mine. The High Lake Mine site is about 45 km south of Grays Bay and about 1 km west of the Kennarctic River, which flows into Grays Bay. The nearest communities include Kugluktuk (Coppermine) located 175 km west-northwest, Umingmaktok (Bay Chimo) located approximately 128 km east-northeast, Kingaok (Bathurst Inlet) located approximately 135 km east-southeast, and Ikaluktiak (Cambridge Bay) located approximately 300 km northeast of the Mine site.

Grays Bay is on the Coronation Gulf which is open to shipping for three to four months during the summer with connections to the Atlantic or to the Beaufort Sea and Pacific Ocean (GLL 2003). The terrain in the Project area becomes very rugged between Grays Bay and High Lake Mine with bare rock, cliffs, canyons and many water bodies (Legat and Griller 2006; BGC Engineering Inc. 2005). North of the James River, regional drainage is to the north into the Coronation Gulf while between the James and Hood Rivers, regional flow is to the east towards the Bathurst Inlet.

Some of the river systems in the area are used as travel routes by members of the Inuit community and Grays Bay was identified as an important safe haven for travelers (Legat and Griller 2006). The Project area is used for hunting, trapping and fishing; with the presence of caribou in the area identified as being particularly important to the Inuit (Legat and Griller 2006).

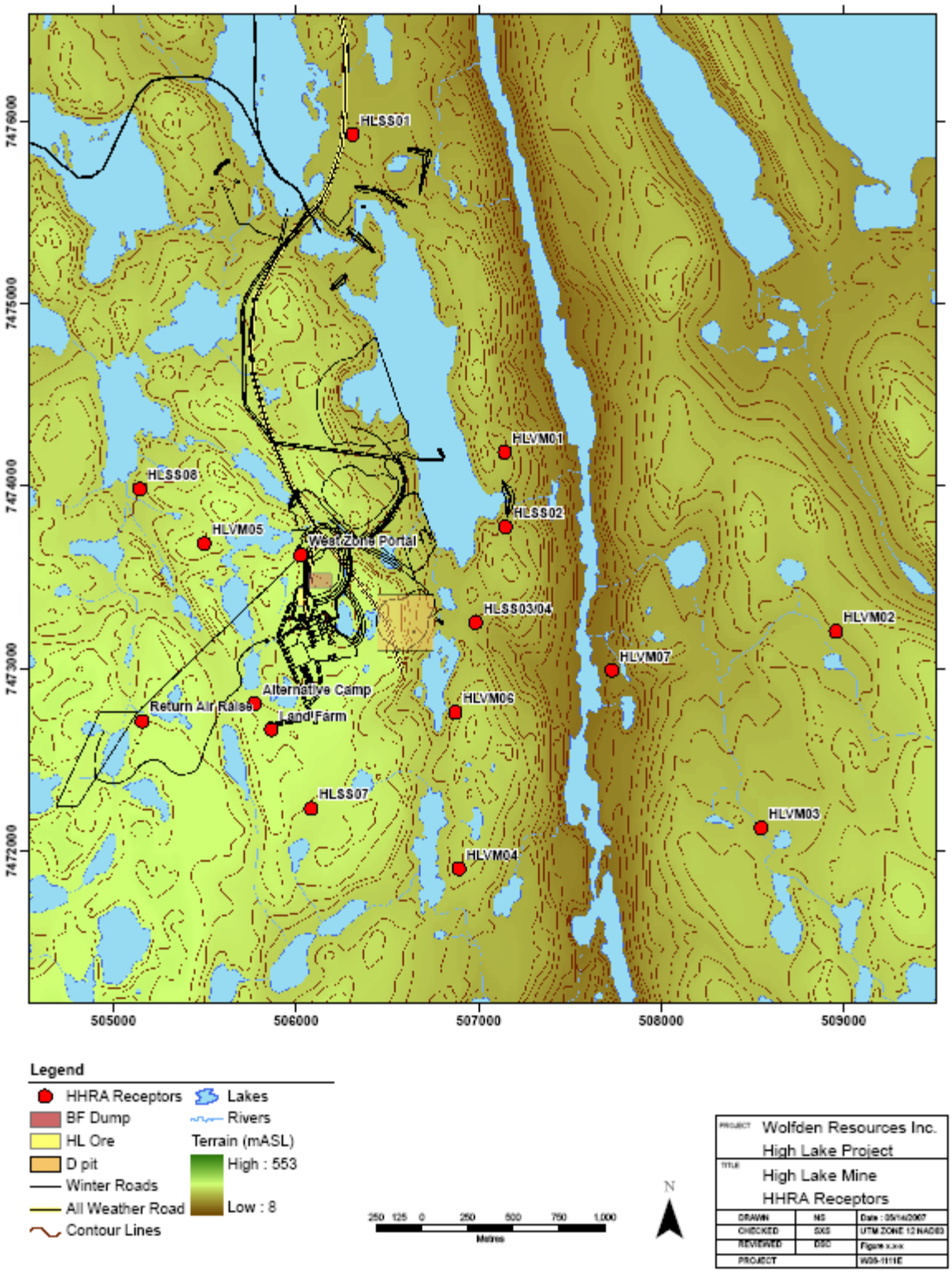

Figure 1-2 High Lake Project Area and Receptor Locations

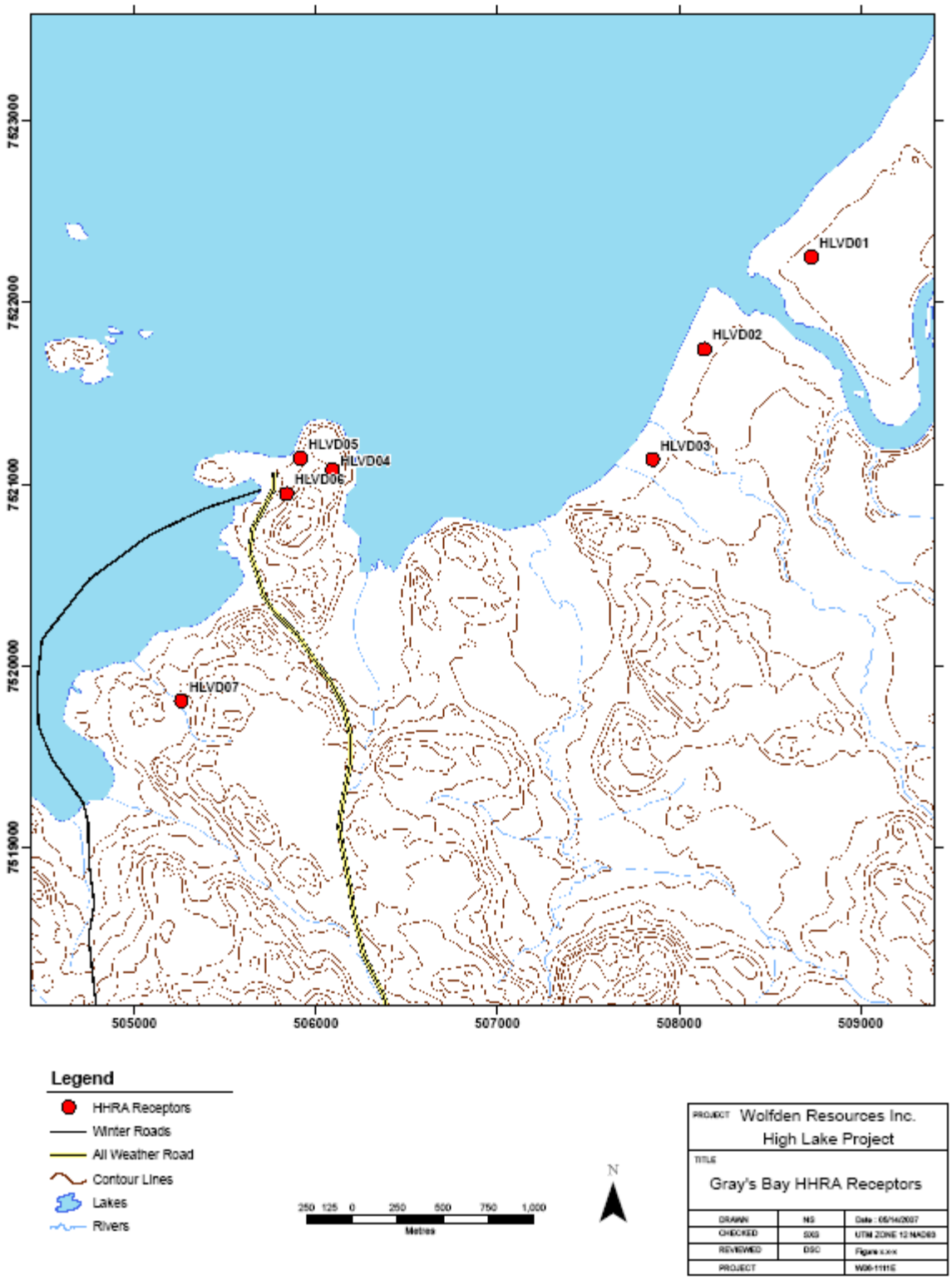

Figure 1-3 Coronation Gulf Area and Receptor Locations

1.2 Project Description

At present, only a small exploration camp is located at the High Lake Mine site. The Project will consist of a number of facilities and activities during the operational stage, including:

- High Lake Mine site facilities and activities
    - Open pit and underground mining at High Lake Mine site (blasting, excavation, drilling, grading, backfilling, equipment and vehicle use)
    - Processing of High Lake ore (process plant complex)
    - Mine haul and access roads
    - Waste rock storage sites
    - Tailings impoundment (High Lake)
    - Accommodations and offices
    - Water supply and wastewater treatment
    - Landfill, land farm, and incinerator for solid waste management
    - Fuel storage (including tank farms, spill containment and dispensing equipment)
    - Maintenance facilities
    - Diesel-fuelled power generators
    - Explosives storage
    - Cold storage
- Grays Bay Dock facilities and activities
    - Summer shipping of supplies to Grays Bay Dock
    - Fuel storage, containment and dispensing equipment
    - Power generation
    - Explosives storage
    - Maintenance garage
    - Helicopter pad
    - Dock facility
    - Loading/unloading equipment
    - Concentrate storage buildings
    - Container storage
    - Accommodations/offices
    - Roads and utility lines for power, piping, communications
    - Equipment, vehicle and helicopter use

- Roads (temporary winter road between the Dock site and the High Lake Mine site that will eventually be replaced by a permanent all-season road)

- Miscellaneous structures and utilities (storage, electricity cabling, piping, ventilation, dust control, water treatment, dams, impoundments, *etc.*)

Three mineral deposits consisting largely of copper and zinc exist at the High Lake Mine site. Two of the deposits will be mined initially by open pit excavation, followed by underground mining, and the third deposit will be mined entirely by underground methods. Surface installations at the High Lake Mine site will occupy an area 3.2 km long and 2.6 km wide.

1.3 Study Objectives

The objective of the HHRA and TERA is to provide the framework and context by which the nature and significance of potential risks to humans and wildlife from the release of COPCs by the proposed Project will be identified and assessed.

2.0 METHODOLOGY

2.1 Human Health Risk Assessment (HHRA) Methods

The primary purpose of the HHRA will be to determine whether people spending time at or near the dock site, mine site or traditional use areas might be exposed to concentrations of chemicals that have the potential to cause adverse health effects. The assessment focussed on those chemicals discharged into surface water or emitted into ambient air as a result of the Mine's normal operating conditions. Specifically, the HHRA addressed the potential health risks associated with environmental exposures. Occupational exposure to hazardous materials and process chemicals are not addressed in the HHRA. Instead, risks associated with potential exposure to these chemicals are addressed in the Mine's occupational health and safety program. At all times, potential risks to workers and the receiving environment will be minimized through implementation of a "best management practice" program.

The assessment of potential occurrences of adverse health effects from chemical exposure is based on the "dose-response" concept that is fundamental to the responses of biological systems to chemicals.

A HHRA evaluates the likelihood (or risk) of health effects following chemical exposures. It requires consideration of the toxic properties of the chemicals, the presence of receptors, and the existence of exposure pathways to the receptors. When all three factors are present (*i.e.,* chemicals, receptors and exposure pathways), there is a potential for adverse health effects to occur if exposures to the chemicals are elevated above acceptable levels.

All methods used to conduct the HHRA are based on procedures endorsed by

regulatory agencies such as Health Canada, the Canadian Council of Ministers of the Environment (CCME), and the United States Environmental Protection Agency (U.S. EPA).

2.1.1 Problem Formulation

Problem Formulation is an important information gathering, planning and interpretation stage which serves to plan and focus the approach of the risk assessment, and to define the nature and scope of the work that needs to be conducted. It permits practical boundaries to be placed on the overall scope of work and ensures that the assessment is directed at the key areas and issues of concern. The data gathered and evaluated in this stage provide information regarding the physical layout of the site, possible exposure scenarios and pathways, identification of receptors, identification of chemicals of potential concern, and any other specific areas or issues of concern to be addressed.

The four main tasks of the Problem Formulation are described below. The outcome of each of these tasks forms the basis of the approach taken in the risk assessment.

2.1.1.1 Site Characterization

Site (or study area) characterization typically includes the following activities: site visit and reconnaissance, review of past site reports, interviews with persons knowledgeable about the site, description of physical characteristics of site (*e.g.,* geology, hydrology, hydrogeology, topography), its historical use, planned future land uses, findings from previous investigations, description of past remedial activities (if any), overview of site regulatory status (*e.g.,* classifications of site by regulatory agencies, description of agreements, compliance issues *etc.)* if applicable.

2.1.1.2 Selection of Exposure Pathways and Scenarios

This step involves determination of the potential environmental pathways and routes of exposure that could occur, and identifies the most likely situations by which humans could come into contact with the COPCs, based on site use patterns and behavioural characteristics of potentially exposed individuals.

People can come into contact with chemicals in their environment in a variety of ways, depending on their daily activities and the land use. The means by which a person comes into contact with a chemical in an environmental medium is through exposure pathways. The means by which a chemical enters the body from the environmental medium is through exposure routes. There are three major exposure routes through which chemicals can enter the body: inhalation; ingestion; and dermal absorption through the skin. For each of these exposure routes, there are a number of potential

sources of chemical exposure or exposure pathways that could be applicable for the High Lake Mine:

- Inhalation of air, vapours, and dusts through the lungs;
- Ingestion of drinking water, vegetation, and wildlife (and incidental ingestion of soils and dust);
- Dermal absorption (uptake through the skin): possible sources of exposure include air, soil, dust and water contact with skin.

The potential for adverse health effects resulting from exposures to elevated chemical concentrations are directly related to the exposure pathways. If there is no possible exposure to a chemical, regardless of its toxic potency, there is no potential for the development of adverse health effects from that chemical.

Exposure pathways selected for the HHRA were based on the current and/or intended use of the site, the historical and/or predicted patterns of contamination, and the physical-chemical and toxicological properties of the COPCs. The selected exposure pathways and parameters for the current HHRA are presented in Section 5.1.3.

Reasonable worst-case exposure scenarios are then developed based on the characteristics of the site and the physical-chemical and toxicological properties of the COPCs. These hypothetical scenarios are conservative in nature, so as to ensure that potential exposures to chemicals and the resultant risks are neither overlooked nor underestimated.

2.1.1.3 Receptor Selection and Characterization

This step involves the identification of persons that may be affected by chemical exposures originating from the site, with special attention directed at aboriginal lifestyles.

A human receptor is described as a person who resides, visits, or works in the area being investigated and is, or could potentially be, exposed to the chemicals identified as being of potential concern. In the case of the High Lake Project, this would include individuals engaged in traditional use of the land near the Mine site and Dock site. It also could include use of the nearby land for transitional or staging purposes.

General physical and behavioural characteristics specific to the receptor type (*e.g.*, body weight, breathing rate, amount of food consumed, *etc*.) were used to determine the amount of chemical exposure received by each receptor. Due to differences in these characteristics between children and adults and between males and females, the exposures received by a female child, a male child, a female adult or a male adult will

be different. Consequently, the potential risks posed by the chemicals being evaluated also will differ depending on the receptor chosen for evaluation.

Since people have varying physical features, lifestyles and habits, it is not possible to evaluate all types of individuals. However, the risk assessment must be sufficiently comprehensive to ensure that those receptors with the greatest potential for exposure to chemicals of concern, and those that have the greatest sensitivity or potential for developing adverse effects from these exposures are included in the evaluation. With this in mind, a selection of hypothetical reasonable "worst-case" receptors, with somewhat exaggerated behavioural characteristics (to ensure a conservative assessment), were considered in the HHRA. If no potential for adverse health effects are identified for the most exposed and/or most sensitive receptors, then no adverse health effects would be expected for less exposed, less sensitive receptors.

2.1.1.4 Identification of Chemicals of Potential Concern to Humans

The chemicals present in the environmental media that pose the greatest potential for exposure and risk are identified as part of this task.

In HHRAs, a screening process is conducted in order to identify chemicals of potential concern (COPCs) regarding risks to human health. COPCs were identified through review of measured surface water quality data, measured chemical concentrations in snow, soil, vegetation, and small mammals, and comparison with appropriate guidelines.

2.1.2 Exposure Assessment

The Exposure Assessment involves the estimation of the amount of chemicals received by individuals per unit time (*i.e.,* the quantity of a chemical and the rate at which that quantity is received). The Exposure Assessment evaluates data related to all chemicals emitted, human receptors, and exposure pathways identified during the Problem Formulation phase of the risk assessment. The rate of exposure to chemicals from the various environmental media (*i.e.,* air, soil, water) is usually expressed as the amount of chemical taken in per body weight per unit time (*e.g.*, mg or µg of chemical/kg body weight/day).

The degree of human exposure to chemicals in the environment depends on the interactions of a number of parameters, including:

- The concentrations of chemicals in various environmental media (*e.g.,* air, water, soil, food) as determined by the quantities of chemicals entering the environment from various sources, their persistence in these media (which is dependent upon the

climate, depth of contamination in soil, *etc*.), and the normal ambient, or background concentrations that exist independent of a specific source.

- The physical/ chemical characteristics of the chemicals emitted, which determine the interaction and behaviour of a chemical with its surrounding environment;
- The various exposure pathways for the transfer of the chemicals from the different environmental media to humans (*e.g.,* inhalation of indoor and outdoor air, soil particles and dusts; ingestion of food items, water, soils/dusts; skin penetration of various chemicals from dusts landing on skin);
- The behavioural and lifestyle characteristics of the people that determine the actual exposures through interactions with the various pathways (*e.g.,* respiration rate, water intake, food intake, soils/dusts intake, time spent at various activities and in different locations); and
- The various physical, chemical and biological factors that determine the ability of people to take the chemicals into their bodies from the exposure pathways (*e.g.,* bioavailability of the chemicals from soil/dust particles, foods, water, air).

For this HHRA the exposure assessment involved estimating a "reasonable maximum exposure" to human receptors based on assumed exposure variable parameter values in combination with measured environmental media concentrations, as described in Section 5.1 and Appendix C in this report.

2.1.3 Hazard (Toxicity) Assessment

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 person is exposed to the chemical). For every chemical, there is a specific dose and duration of exposure necessary to produce a toxic effect in humans (this is referred to as the "dose-response relationship" of a chemical). In the toxicity assessment, information relating to the dose-response relationships of each chemical is evaluated (usually from laboratory animal studies and studies of human exposure in the workplace) in order to determine the maximum dose of chemicals to which humans can be safely exposed to (*i.e.,* the exposure limit).

There are two main types of dose-response relationships for chemicals:

- Threshold Response Chemicals: For these chemicals, there is a dose-response threshold below which no adverse effects would be expected to occur. Exposure limits derived for threshold-response chemicals are referred to as reference doses (RfD), acceptable daily intakes (ADI) or permissible daily intakes (PDI). Exposure limits for chemicals are identified by regulatory agencies such as Health Canada and the U.S. Environmental Protection Agency (EPA). Exposure limits represent

maximum concentrations of chemicals that individuals can be exposed to on a daily basis without the potential occurrence of adverse health effects.

- Non-threshold Response Chemicals: For known or potential carcinogens, a threshold concentration below which health effects may occur is not assumed. In theory, according to this model, any exposure exhibits some risk, so it is necessary to define an "acceptable" degree of risk. In Canada, this "acceptable" degree of risk is defined by Health Canada (Health Canada 2003) as a cancer risk of 1-in-100,000, representing one additional cancer case (*i.e.*, not one additional mortality) in 100,000 people.

It is important to recognize that the assumption of no threshold for carcinogens ignores a large number of factors, such as the ability of the body to repair damage to genetic material, that are known to be important to the responses of people to naturally occurring genotoxic carcinogens. In many cases, the body can repair damage that may be caused by exposures to low levels of carcinogenic chemicals; therefore, adverse effects do not necessarily occur.

Whenever possible, Health Canada's exposure limits were adopted for this HHRA. Where Health Canada has not identified exposure limits for specific COPCs, exposure limits from the following regulatory agencies were identified:

- U.S. Environmental Protection Agency
- World Health Organization
- Netherlands National Institute of Public Health and the Environment
- U.S. Agency for Toxic Substances and Disease Registry

The criteria for adopting the exposure limits also require that limits be:

- Protective of sensitive and vulnerable individuals, including Inuit persons, their children and elderly, and individuals with pre-existing health conditions;
- Established or recommended by reputable scientific or regulatory agencies; and
- Supported by adequate scientific documentation.

2.1.4 Risk Characterization

The final step in the HHRA consisted of a comparison between the predicted total exposures from all pathways and routes, and the exposure limits (*i.e*., the rate of exposure that would not produce observable adverse effects) for each chemical of concern. This comparison is referred to as the Risk Quotient (RQ) for threshold chemicals. RQs were calculated by dividing the estimated level of exposure by the exposure limit, as indicated in the following equation:

$$\text{Risk Quotient (RQ)} = \frac{\text{Estimated Exposure (in mg/kg/day)}}{\text{Exposure Limit (in mg/kg/day)}}$$

Risk characterization for non-threshold or carcinogenic chemicals involved calculation of an Incremental Lifetime Cancer Risk (ILCR), which is defined as the predicted risk of an individual in a population of a given size (100, 000 people) developing cancer over a lifetime.

Interpretation of the RQ and ILCR values is as follows:

- Cases where the RQ or ILCR is less than or equal to 1.0 signify that the exposure estimate is less than or equal to the exposure limit and that the health risk is negligible to low;
- Cases where the RQ or ILCR is greater than 1.0 but is less than or equal to 10 indicate that the exposure estimate exceeds the exposure limit indicating that the potential health risk is low to moderate. The significance of the risk estimate must be balanced against the high degree of conservatism adopted in the HHRA (*i.e.*, the margin of safety may be reduced but not eliminated entirely);
- Cases where the RQ or ILCR is greater than 10 signify a moderate to high potential health risk. Efforts should be directed at determining the likelihood of a potential health impact occurring, given the conservative nature of the HHRA, and then, if appropriate, mitigating or reducing the predicted health risk through design changes or other measures.

The use of RQs and ILCRs helps readers gain a clearer understanding of the HHRA results. They also help define the potential significance of the study's results.

2.2 Terrestrial Ecological Risk Assessment (TERA) Methods

The primary objective of the current TERA was to determine whether chemicals associated with the Project could potentially result in population level effects in ecological receptors foraging in the vicinity of the High Lake Mine Site. The TERA assessed potential terrestrial wildlife population level effects based on highly conservative exposure assumptions (*i.e.*, to ensure that actual risks are not underestimated). A population effect is defined as one that causes a decline or change in abundance or distribution of the population over one or more generations, such that natural recruitment may not re-establish the population to its original or self sustaining level.

The use of a tiered approach to TERA focuses the assessment on the most critical issues in a time and cost effective manner. The scope for a TERA in the initial tier (*i.e.,* Screening Level) is relatively simple, and relies on descriptive more so than predictive techniques, and uses conservative assumptions and readily available data. By using

highly conservative assumptions regarding both chemical exposure and chemical toxicity to ecological receptors, it is possible to increase the sensitivity of the assessment such that if no risks are identified, there is a high degree of confidence that this finding is valid. Therefore, sites and receptors indicating no potential for risk from the contaminants of concern can be excluded from further study. However, in situations where a screening level assessment indicates risk, or where there is insufficient information to complete this level of assessment, further data collection may be required to either validate the results, or facilitate the completion of the study (*i.e.,* a higher tier TERA). This typically involves efforts to refine both the predicted exposure and the expected toxicity of the contaminants of concern to the selected ecological receptors through refinement of input variables, re-evaluation of the conservatism incorporated in the modelling exercise and including additional empirical data, where available.

The methods used for the TERA are based on the same paradigm as that for human health risk assessment (see Figure 1). The steps include:

- Problem Formulation;
- Exposure Assessment;
- Toxicity Assessment; and
- Risk characterization.

2.2.1 Problem Formulation

This task involves the identification of the specific problem or issues related to the site or study area that require assessment. The major problem or issue associated with the High Lake Mine Site is the potential presence of elevated concentrations of COPCs in environmental media. The site is remote and provides habitat for a number of terrestrial wildlife species. In addition, a number of water bodies may potentially be impacted by the Project's facilities and activities.

Site Characterization

Site (or study area) characterization included the following activities by members of the EIS team: site visit and reconnaissance, habitat and/or wildlife surveys, review of past site reports, interviews with persons knowledgeable about the site, description of physical characteristics of site (*e.g.,* geology, hydrology, hydrogeology, topography), its historical use, planned future land uses, and findings from previous investigations.

Identification of Wildlife Receptors

In selecting wildlife receptors, consideration was given to several factors including local wildlife species and habitat conditions, behavioural patterns that would increase the potential for chemical exposure, food chain structure and time spent within potentially

impacted areas. In general, wildlife receptors were selected that have the greatest potential for exposure to COPCs, or those that are most sensitive to the effects of the COPCs.

Selection of Wildlife Exposure Pathways

This task identifies the major ways in which ecological receptors can come into contact with chemicals associated with the Project. Ecological receptors may be potentially exposed to chemicals associated with the Project through inhalation of air and through ingestion of soil, water, sediment and contaminated food sources (plants and animals). Dermal exposure is assumed to be negligible for birds and mammals. The presence of fur and feathers on mammals and birds, respectively, greatly reduces dermal exposure potential by limiting the contact of chemicals of potential concern with the skin of the receptor (Sample and Suter II 1994; Sample *et al.* 1997). In general, the ingestion of contaminated food sources is typically the most important exposure pathway for terrestrial wildlife receptors (Gaudet *et al.* 1994; Suter *et al*. 2000).

Identification of Chemicals of Potential Concern

In this task, chemicals that pose the greatest potential for exposure and risk to ecological receptors are identified. It is noted that background concentrations of some COPCs (*e.g.*, metals) may be naturally elevated in a mineral-rich mining project area.

The environmental media of concern for the assessment of risk to ecological receptors can vary depending upon the receptor(s) that are selected for evaluation. The differences in receptors, in terms of relevant pathways of exposure, habitat and overall chemical sensitivity, may yield different COPCs for different receptor groups.

2.2.2 Exposure Assessment

In screening level ecological assessments it is assumed that exposures are equal to measured concentrations in environmental media. This is a highly conservative assumption that overestimates potential exposure as it ignores organisms' natural barriers to chemical uptake (*i.e.,* bioavailability considerations), and biochemical transformation processes that may occur within cells, tissues and organs, which may reduce the actual dose that reaches a target site within the organism.

As in HHRAs, the degree of exposure of ecological receptors to chemicals from the environment depends on the interactions of a number of parameters, including:

- The concentrations of chemicals in various environmental media as determined by the magnitude of point sources as well as background or ambient concentrations;
- The characteristics of the chemicals of concern which affect environmental fate and persistence (*e.g.*, physical-chemical properties);
- The impact of site-specific characteristics, such as geology, substrate, geography and hydrogeology, on chemical behaviour;
- The physiological and behavioural characteristics of the receptors; and,
- The various physical, chemical and biological factors that determine the bioavailability of chemicals from various exposure pathways.

2.2.3 Hazard (Toxicity) Assessment

As population level effects are the general focus of an ERA, the preferred toxicity endpoints for wildlife toxicological reference values (TRVs) include reproductive and developmental effects, and reduced survival. Carcinogenic endpoints are not generally selected in an ERA as cancer is only considered relevant if it impacts on critical endpoints such as reproduction.

In the hazard assessment, TRVs are determined for each receptor evaluated for each chemical of potential concern. TRVs are generally expressed in terms of the quantity of chemical per kg body weight per day (*e.g.*, mg chemical/kg body weight/day), and are considered to be the maximum safe exposure to a chemical.

Wildlife TRVs are often based on toxicity study LOAELS (*i.e.,* lowest-observable-adverse-effect levels: the lowest chemical concentration in a toxicity test that results in a statistically significant measurable adverse effect in the test species) or NOAELs (*i.e.,* no-observable-adverse-effect levels: the highest chemical concentration in a toxicity test that does not result in a statistically significant measurable adverse effect in the test species compared to the control).

TRVs are selected to evaluate potential population level effects (*e.g.*, growth, survival, reproduction). Typically, preference is given to TRVs derived from LOAELs. However, if a LOAEL-derived TRV is not available, a NOAEL-derived TRV may be identified. When no species-specific TRVs are available, one is derived using toxicity data for other similar species.

2.2.4 Risk Characterization

Risk characterization involves comparison of estimated exposures to wildlife, for each chemical of potential concern, to the appropriate TRV. This involves the calculation of a Risk Quotient (RQ), which is the predicted total exposure divided by the selected TRV, as indicated in the following equation:

$$\text{Risk Quotient (RQ)} = \frac{\text{Estimated Exposure (mg/kg/day)}}{\text{TRV (mg/kg/day)}}$$

The significance of a potential health risk to wildlife receptors was evaluated according to the following definitions, using a weight of evidence approach that considers, for example, the degree of the exceedance of a RQ value, the confidence in the exposure and toxicity data set, limitations of the assessment, the wildlife population under consideration, professional judgement, and the assumptions used in the assessment.

- Cases where the RQ is less than or equal to 1.0 signify that the exposure estimate is less than or equal to the exposure limit and that adverse impacts are negligible to low; and will have no measurable effect on the integrity of the population as a whole.
- Cases where the RQ is greater than 1.0 but is less than or equal to 10 indicate that the exposure estimate exceeds the exposure limit indicating that the potential risk is low to moderate. The significance of the risk estimate must be balanced against the high degree of conservatism adopted in the TERA (*i.e.*, the margin of safety may be reduced but not eliminated entirely);
- Cases where the RQ is greater than 10 signify a moderate to high potential risk in terms of potential localized effects on a wildlife population. Efforts should be directed at determining the likelihood of a potential health impact occurring, given the conservative nature of the TERA, and then, if appropriate, mitigating or reducing the predicted risk through design changes or other measures.

3.0 BASELINE ENVIRONMENTAL CHARACTERIZATION

Human health and ecological risk assessments rely on local measurements of chemical concentrations in environmental media, including air, soil, water and food items (*e.g.*, biota). The use of measured, site-specific data affords added confidence in the accuracy of the risk estimates.

Baseline data have been collected in support of the EIS, and additional site-specific data has been collected to support the HHRA and TERA. The objectives of the sampling plan were to:

- Identify chemicals of potential concern regarding elevated environmental concentrations; and

- Identify appropriate sites for data collection.

A key input into the selection of sampling locations and species is the Kitikmeot Inuit Quajimajatuqangit Report. Interviews with elders and regional stakeholders identified potential issues related to traditional lifestyle and species of importance in establishing potential contaminant pathways. In addition, it was considered important to select both sample collection sites and receptors that will be useful in establishing local baseline conditions for future monitoring initiatives.

Baseline data were gathered on a number of relevant environmental media, including water and fish as part of the EIS. Data collected in support of the HHRA and TERA, and information from other regional studies that may be of value in establishing background chemical characterization was considered and is summarized in the following sections. Data collection activities generated further data for the HHRA and TERA including sampling and analysis of soils and dietary items that are consumed by humans and/or terrestrial wildlife, including: crowberry, sedges, northern Labrador tea, and lichens. A small mammal sampling program was also conducted for the compounds of interest.

Appendix B provides a description of the sampling and summary of media concentrations that were available for the HHRA and TERA.

3.1 Description of Abiotic Data

3.1.1 Air quality

The focus of the air quality assessment, including the baseline assessment, was on local sources of air contaminants commonly associated with mine Projects comparable to the High Lake Project. These contaminants can be broadly grouped as gaseous or particulate emissions and include:

- Particulate matter from combustion sources (*e.g.*, power generation, mine fleet exhaust) and fugitive sources (*e.g.*, haul roads); and
- Nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and carbon monoxide (CO) from combustion sources.

Fugitive sources of particulate matter (PM) include the mine ore, the material used to construct the haul roads and the handling of the ore concentrate. Although the metal concentrations associated with the haul road material and the mined ore will be relatively low (*i.e.*, similar to the natural levels), the concentration of the metals in ore concentrate is higher than natural levels.

A preliminary list of chemicals of potential concern (COPCs) was considered for inclusion in the HHRA and TERA and to provide direction for the 2006 terrestrial sampling program. This list was based on the major atmospheric sources associated with the Project. These compounds include:

- Criteria air contaminants (particulate matter, sulphur dioxide, nitrogen dioxide, and carbon monoxide);
- Metals (comprehensive list of heavy metals);
- Volatile organic compounds (VOCs), and;
- Polycyclic aromatic hydrocarbons (PAHs).

Local background air concentrations for criteria air contaminants were derived from published concentrations for other remote locations, where available, for the Project site.

3.1.2 Snow Quality

Snow is an important receptor and transfer mechanism for contaminants. Through processes of both wet and dry deposition, contaminants will enter, and be retained by the snow pack until it melts. Snow sampling was conducted in May, 2006 to provide baseline information on contaminant levels. Sample locations were based on a consideration of local meteorology and deposition of fine particulate based on preliminary dispersion modelling conducted as part of the EIS.

Snow samples were analyzed for a comprehensive list of metals, polycyclic aromatic hydrocarbons (PAHs), and routine water quality parameters (*i.e.*, major ions, pH, conductivity, alkalinity, hardness, total dissolved solids [TDS] *etc.*). However, to our knowledge, there are no snow quality guidelines that these data can be compared to. Comparison to water quality guidelines or soil quality guidelines is not considered appropriate. However, COPC trends in snow over time can be determined.

3.1.3 Surface Water Quality

The objective of the baseline assessment was to identify surface water quality in the Project area and to identify the location of sensitive areas and potential linkages between water and the aquatic resources.

The focus of the baseline surface water quality assessments was on local sources of contaminants commonly associated with mine Projects comparable to the High Lake Project. The water quality indicators examined in the baseline assessment include:

- Total and dissolved metals;
- Conventional parameters (*i.e.*, pH, hardness, alkalinity, buffering capacity);
- Major ions (*i.e.*, sulphate, sodium, potassium); and
- Nutrients/Organics (*i.e.*, phosphorus, nitrogen, chlorophyll *a*).

3.1.4 Ground Water Quality

Ground water quality has been assessed in the EIS, and has not been included here as groundwater is naturally protected from impacts from project activities by the layer of ground permafrost. Impacts on hydrology were considered not significant. Readers are referred to Volume 5, Section 1 of the EIS for more information.

3.2 Description of Biotic Data

3.2.1 Terrestrial Wildlife

Data on the distribution of small mammals, furbearers, carnivores and ungulates have been collected as part of the wildlife component of the biophysical baseline data program for the High Lake Project (GLL 2005a).

Results of small mammal trapping confirm the presence of northern red-backed voles, meadow voles, and masked shrews in the study area. Lemmings also are likely to be present (GLL 2005a).

Species observations and signs found during tracking surveys undertaken as part of the biophysical baseline studies for this Project (GLL 2005a) included: arctic ground squirrel, caribou, grizzly bear, wolverine, arctic hare, red fox, wolf, willow ptarmigan and peregrine falcon. Moose, muskoxen, grizzly bears (and dens), ptarmigan, red fox, and wolverine also were seen in the study area during aerial ungulate surveys. Muskoxen were observed most frequently between June and October, indicating that their use of the area may be greatest during calving and summer periods. It was presumed that moose are year-round residents (GLL 2005a). However, Inuit from the region noted that moose move north during hot weather and return south when it gets colder. They noted that muskoxen are becoming increasingly common in the region (Legat and Griller 2006). Grizzly bears and wolverines have been observed on the ice offshore in the Grays Bay area. There were two sightings of polar bears – one in eastern Larsen Sound, and one in southern M'Clintock Channel (GLL 2005e,f). During consultations with local Inuit, participants noted that polar bears typically are not found in the Grays Bay area (Wolfden Resources 2006).

3.2.2 Freshwater Fish

Extensive sampling and assessment of freshwater fish and fish habitat was conducted as part of the baseline assessment of aquatic resources. Because fish and other aquatic species may form an important part of the diet of local residents, information on the health of aquatic systems, including contaminants in biological tissues, is important in the context of the HHRA.

Liver and muscle tissue of Arctic char and lake trout were analyzed for a suite of metals of potential concern as well as other trace elements (GLL 2005d). Concentrations of most metals were low (frequently below detection limits).

3.2.3 Terrestrial Vegetation

The levels of metals in plants in the Canadian Arctic are generally low and are rarely studied (INAC 2003). Vegetation samples were collected in July 2006 from five key land use areas. Vegetation collected included Labrador Tea (*Ledum palustre*), Water Sedge (*Carex aquatilis*), Lichen (*Flavocetraria nivalis*) and Crowberry (*Empetrum nigrum*).

Inuit elders from the Kitikmeot have identified certain plant species as an important food item for moose and caribou. For example, sedge is a vital caribou food source and is common throughout the study area.

4.0 SUMMARY OF INUIT ENVIRONMENTAL CONCERNS

An Inuit Qaujimajatuqangit (traditional knowledge) study (IQ study) that incorporated a review of previous research, scoping sessions, and one-on-one interviews was conducted in order to include Inuit ways of knowing into the assessment process for the High Lake Project (Legat and Griller 2006). Inuit Qaujimajatuqangit work is ongoing.

The Project is in the traditional territory of Inuit people who now live in Kugluktuk and who use the area for travel, hunting, fishing and trapping. This area of the Arctic Ocean in the Grays Bay area includes two important rivers where Arctic char spawn and where people fish for lake trout, grayling, white fish, *etc.*, as well as hunt caribou and trap small fur mammals. The coastal area continues to be used extensively in all seasons while inland areas are used less frequently due to an extremely rugged landscape. Most participants speculate that when a winter road is constructed it will be used to travel into the area where wildlife can be found.

The following is a summary of general perceptions and concerns of Inuit elders provided by Legat and Griller (2006).

- Quality of the water in the tailings ponds and the potential health impacts associated with drinking this water;
- Concern that they may not be made aware of information regarding possible contamination of caribou meat;
- Concern that metals could leach from tailing ponds (including personal knowledge of accidents);
- Concern that salty or polluted water may not freeze (but appearing frozen) and thus cause the movement of contaminants. Concern this will happen at the base of the tailings if High Lake is used, just as they fear leakage over the dike when the tailings freeze and expand;
- Concern that fish may frequent High Lake during certain seasons or while moving from one spot to another;
- Concern regarding all aspects of fish life, including fish nurseries and spawning areas;
- Concern regarding fish migration – *e.g.*, how fish will travel through culverts if there is too much ice build-up around them;
- Concern for their own safety and safety of caribou when traveling on the sea ice, which has already become hazardous with climate change – they do not want ice breaking to extend the season to move goods;
- Concern that the land and burial sites may be damaged during the construction of the winter road and that fish and wildlife travel and migration routes may be affected by the road;
- Concern regarding oil spills and leakage along the road; and,
- Concern that promises that the land will be cleaned up when the Project is done may not be fulfilled.

Concerns related to potential risks to human health and terrestrial wildlife resulting from exposures to project-related chemical emissions were addressed in the HHRA and TERA, respectively.

5.0 HUMAN HEALTH RISK ASSESSMENT FINDINGS

5.1 Problem Formulation

The problem formulation process was completed previously (Cantox 2006), and is largely repeated here.

5.1.1 Site Characterization

The description of the study area for the Project has been previously described in Sections 1.1.2 and 1.2 of this report.

5.1.2 Human Receptor Identification and Characterization

Two receptor groups were evaluated in the HHRA, including:

- Traditional Land Use group, which includes representative receptors from nearby Inuit communities engaged in traditional land use activities at, and surrounding, the High Lake Mine site and Grays Bay Dock site;
- Worker Camp group, which includes individuals who are employed at the High Lake Mine site and reside at the Mine camp.

When characterizing the potentially exposed individuals for the Traditional Land Use group, it is important to consider sensitive age and gender class. The five age classes or life-stages, as defined by Health Canada (2004a) include:

- Infant (0 to 6 months)
- Toddler (7 months to 4 years)
- Child (5 to 11 years)
- Adolescent (12 to 19 years)
- Adult (20 years and over)

In most instances, toddlers were identified as the most sensitive age group. This is because toddlers possess certain behavioural aspects that tend to increase their exposure relative to other receptors (*e.g.*, greater tendency to accidentally ingest soil and water, *etc.*).

For the assessment of carcinogenic chemicals, a composite receptor (composed of all life stages from infant to adult) is used, representing cumulative exposure over a 75 year lifetime, as per Health Canada (2004a) guidance. For carcinogens, it is appropriate that such substances are evaluated over a lifetime, as development of cancer is a long term process that may take many years to manifest. For this reason, the “lifetime” or “composite” receptor will be selected for evaluation of potential carcinogenic risks to Inuit.

It is assumed that children will not be present at the High Lake Mine site or Grays Bay dock. For this reason, only adult workers were evaluated in the health risk assessment of the Worker Camp group and Grays Bay dock. In addition, adult carcinogenic risks to workers were amortized for 14 years (*i.e.*, planned duration of the project).

It was assumed that Inuit would conduct traditional activities locally, including hunting, fishing and plant ingestion). Information pertaining to the types of traditional foods consumed was obtained from scoping sessions and individual interviews with members of the Inuit community in addition to information provided by Indian and Northern Affairs Canada (INAC) and will be incorporated in the HHRA.

When characterizing potential exposure to the Worker Camp group, general health based guidelines were applied. Although occupational health criteria is generally applied to assess worker health on industrial sites, this more conservative approach was used to address potential health concerns associated with workers living in the on-site camp during their work shift rotations.

5.1.3 Identification of Exposure Scenarios and Pathways

According to the IQ study, the remote High Lake Mine location is not a well-used area. Non-worker human exposure to COPCs associated with the Project would generally be of a transient and intermittent nature. However, with the proposed all-season road linking Grays Bay to the High Lake Mine site, the possibility exists that the Inuit population could begin making more use of the area for the harvesting of game, fish and plant country foods. Thus, human exposure may occur to COPCs present in terrestrial plants, avian and mammalian game species, fish, surface water, sediments, air and soil.

Subsurface soil and groundwater were not be assessed for the Traditional Land Use group as there is presently no potential for human exposure to chemicals in subsurface media, and there is no known anticipated future land use that would result in the direct exposure of non-worker human receptors to subsurface soil and/or groundwater contaminants, apart from the areas where mining and excavation work are occurring (and there is restricted access to these areas).

The potential human exposure pathways identified for the HHRA are identified in Table 5-1 and rationale for their selection is summarized in Table 5-2.

Table 5-1 Human Exposure Pathways Identified for the Two Receptor Types

Exposure Pathway	Receptor Group	
	Traditional Land Use	Worker Camp
Inhalation of air	✓	✓
Inhalation of dust	✓	✓
Inadvertent ingestion of soil/dust	✓	✓
Ingestion of country foods	✓	
Dermal contact with soil	✓	✓
Ingestion of water	✓	

Table 5-2 Rationale for the Selection of the Applicable Human Exposure Pathways

Exposure Pathway		Evaluated or Excluded	Comments/Rationale
Exposure Route	**Environmental Media**		
Inhalation	Ambient Air	Evaluated	Chemicals will be released into the atmosphere from the processing facility, the incinerator and landfill, exhaust from large equipment, power generation, *etc.*
	Soil / Dust	Evaluated	Earthworks, road dust from vehicles and crushing facilities will result in the production of airborne dusts. While dusts will largely be controlled with various dust suppression and dust mitigation methods, inhalation of airborne dusts could still occur.
Ingestion	Edible plants	Evaluated	Plants may accumulate COPCs *via* root uptake from soil and atmospheric deposition onto foliage, with subsequent harvesting and ingestion by humans.
	Wild game (*e.g.*, caribou and hare)	Evaluated	Chemical uptake into wild game could occur through game species exposure to COPCs in environmental media and dietary items. Some COPCs, if bioaccumulative, can be many times higher in game species than in environmental media.
	Locally caught fish	Evaluated	Surface water quality changes due to chemicals released by Project facilities and activities could result in COPCs accumulating within fish, with subsequent human ingestion of fish.
	Soil	Evaluated	Humans may incur incidental soil ingestion exposure while in study area. Study area soils may be enriched naturally with some COPCs and Project facilities and activities are likely to release chemicals to soil (atmospheric deposition, earthworks, stockpiling *etc.*)
	Surface Water	Evaluated	Impacts from direct disturbance of watersheds, mine operations, seepage of process affected waters and alteration of flow regimes could result in changes in water quality such that COPC concentrations become elevated. Lakes, rivers and streams could serve as sources of drinking water for hunters and travelers.
	Sediments	Excluded	It is unlikely that there would be any prolonged or significant contact with sediments by humans hunting, fishing, trapping or traveling in the study area that would result in significant sediment ingestion. Exposures by all other pathways evaluated would be expected to be of much greater significance than this pathway.
Dermal Contact	Soil	Evaluated	Humans may incur incidental dermal contact with soils while in the study area. Study area soils may be enriched naturally with some COPCs and Project facilities and activities are likely to release chemicals to soil (atmospheric deposition, earthworks, stockpiling *etc.*)
	Surface Water	Excluded	While humans may incur incidental dermal contact with surface waters while in the study area, dermal uptake of soluble contaminants in water is unlikely to be significant

Exposure Pathway		
		given the likely small amount of time people's skin would be in contact with study area surface water, and the generally low dermal uptake of chemicals from water.
Sediments	Excluded	While humans may incur incidental dermal contact with sediments while in the study area, dermal uptake of soluble contaminants in water is unlikely to be significant given the likely small amount of time people's skin would be in contact with study area sediments, and the generally low dermal uptake of chemicals from aquatic sediments.

5.1.4 Chemical Selection

A preliminary list of compounds was selected during the problem formulation stage (Draft Project Proposal, Volume 3 Section 3) for consideration in the HHRA, and includes the following:

- Criteria Contaminants included in the air quality assessment (Particulate Matter, Sulphur Dioxide, Nitrogen Dioxide, and Carbon Monoxide);
- Metals (comprehensive list of heavy metals);
- Volatile Organic Compounds (VOCs), and;
- Polycyclic Aromatic Hydrocarbons (PAHs).

The HHRA evaluated all the chemicals identified by the air quality assessment and evaluated the chemicals in surface water that are predicted to increase as a result of the project. Reasonable maximum measured baseline media concentrations (*i.e.*, 95th percentile) were used in the HHRA to characterize media concentrations for the exposure assessment.

5.1.4.1 COPCs Associated with Atmospheric Emissions

Air emissions are primarily related to combustion sources associated with industrial activities. These include carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter ($PM_{2.5}$) and sulphur dioxide (SO_2). These chemicals are commonly referred to as criteria air contaminants (CACs); whereas all other chemicals are referred to as non-criteria air contaminants or non-CACs (Environment Canada 2004). In the current assessment, these included metals, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs).

The non-criteria air contaminants (non-CACs) that were evaluated in the HHRA were based on an inventory of emission sources identified by the air quality team. The

following equipment, structures or facilities were identified as continuous emission sources (Appendix A):

- Waste and Ore Handling in D-pit
- Stockpile Emissions
- Ore Processing
- Haul Road Emissions
- Underground Activities
- Waste Incineration
- Power Generation
- Mobile Engine Emissions (Surface)

Dioxins and furans were also considered as a potential COPC. However, emission of these compounds was not considered significant for the following reasons:

- dioxin and furan emissions associated with conventional combustion equipment (diesel engines, space heating) is considered minimal;
- waste incineration is a potential source however, the following design and operational controls will minimize emissions from this source:
    - the incinerator is a modern design which has been tested through Environment Canada's Environmental Technology Verification (ETV) Program;
    - the design has demonstrated the capability to meet the stringent CCME Canada Wide Standard for dioxin and furan emission of 80 pg/m^3;
    - the incinerator employs an automated control system to ensure complete combustion of waste at design temperatures;
    - the incinerator is operated intermittently on a batch basis;
    - the unit is small relative to other combustion sources (typically contributing less than 1% of CAC emissions; and
    - air quality impacts associated with the incinerator are expected to be very localized and have de-minimus impact on the local study area.

In summary, the proposed incinerator will not be a significant source of dioxin and furans when operated as designed and it is considered unnecessary to include these compounds in the human health risk assessment.

Table 5-3 summarizes chemicals emitted to the atmosphere by the Project.

Table 5-3 Chemical Air Emission Inventory for the Project

Chemical Category	Individual Chemicals
Criteria Air Contaminants	Carbon Monoxide, Nitrogen Dioxide, Particulate Matter ($PM_{2.5}$), Sulphur Dioxide
Metals	Arsenic; Cadmium; Chromium (III); Chromium (VI); Copper; Lead; Manganese; Mercury; Nickel; Selenium; Zinc.
Volatile Organic Compounds	1,3-Butadiene; Acetaldehyde; Acrolein; Benzene; Formaldehyde; Propylene; Toluene; Xylenes.
Polycyclic Aromatic Hydrocarbons	Acenaphthene; Acenaphthylene; Anthracene; Benz(a)anthracene; Benzo(a)pyrene; Benzo(b)fluoranthene; Benzo(e)pyrene; Benzo(g,h,i)fluoranthene; Benzo(g,h,i)perylene; Benzo(k)fluoranthene; Chrysene; Dibenzo(a,h)anthracene; Fluoranthene; Fluorene; Indeno(1,2,3-cd)pyrene; Naphthalene; Phenanthrene; Pyrene

The form of mercury released by the project into the atmosphere is unknown. Concentrations of mercury predicted by the air quality assessment were assumed to comprise of elemental and inorganic mercury. Methyl mercury was added to the HHRA to account for the increased neurological toxicity that is presented by this form of mercury from aquatic environments (*i.e.*, fish and water consumption). Chromium VI comprises 3 to 8% of chromium in ambient air in California (CARB 1985). In addition, chromium VI can be generated from chromium III in the environment through aerobic processes. In the HHRA it was assumed that CrVI comprised 10% of total chromium in all media (*i.e.*, air, soil, water, plants and wildlife).

5.1.4.2 COPCs Associated With Mining Effluents

Changes in surface water quality were included in the HHRA based on possible effects from the mine-related waters on surface water and fish tissue quality (Section 3.0). Impacts from direct disturbance of watersheds, end pit lakes, mine operations, seepage of process affected waters and alteration of flow regimes could result in changes in water quality. Table 5-4 summarizes COPCs identified in the surface water quality assessment.

Table 5-4 Summary of COPCs identified in the surface water assessment

Group	Chemical	Comment
Physical Variables	Conductivity pH Hardness CaCO3 Total suspended solids	Assessed in Surface Water Quality Assessment (GLL 2005g)
Nutrients	Ammonia-N Dissolved organic carbon	Assessed in Surface Water Quality Assessment (GLL 2005g)

Group	Chemical		Comment
	Nitrate+nitrite		
	Sodium		
	Total Kjeldahl nitrogen		
	Total Phosphorous		
Ions and Ion Balances	Chloride		Assessed in Surface Water Quality Assessment (GLL 2005g)
	Sulphate		
	Total alkalinity		
	Total Calcium		
	Dissolved Calcium		
Metals (*i.e.*, total)	Aluminium	Lead	Considered in HHRA; final list of metals included in HHRA provided in Table 5-6.
	Antimony	Manganese	
	Arsenic	Mercury	
	Barium	Molybdenum	
	Boron	Nickel	
	Cadmium	Selenium	
	Chromium	Silver	
	Copper	Zinc	
	Iron		

Table 5-5 outlines the metals with predicted adverse changes (*i.e.*, predicted increase in concentration over baseline) to chemical concentrations in waterways due to mine related activities. Therefore, these chemicals were also added to the HHRA and TERA.

Table 5-5 Predicted Water Quality Changes from Baseline Due to Project Related Activities

Operation	Impacted Watershed	Compound	Source
Road Runoff	Various	Sb, Ba, Mo	Runoff from roads
Dam Construction	Kennarctic River	Cd	Dam construction
High Lake Impound	L15	Cu	Dam seepage
Operations/ Closure	High Lake	Cd, Cu, Zn, Mn	High Lake
		As, Sb	Mine Rock
		Al, Se, Ag, Pb, Cyanide	Mill effluent
		Cr	Groundwater

Due to intermittent occurrence of blasting, their residuals including ammonia, nitrate and nitrite concentrations were predicted to be only marginally higher than existing baseline conditions. These compounds were assessed in the Surface Water Quality Assessment (GLL 2005g) and were not considered further here.

5.1.4.3 COPCs Identified in the Risk Assessment

Table 5-6 provides a list of the chemicals identified for inclusion in the HHRA based on impacts to either air or water quality.

Table 5-6 COPCs Identified for Human Health Risk Assessment

Chemical Category	Individual Chemicals
Criteria Air Contaminants	Carbon Monoxide, Nitrogen Dioxide, Particulate Matter ($PM_{2.5}$), Sulphur Dioxide
Metals	Aluminium, Antimony, Arsenic; Barium; Cadmium; Chromium (III); Chromium (VI); Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Silver; Zinc.
Volatile Organic Compounds	1,3-Butadiene; Acetaldehyde; Acrolein; Benzene; Formaldehyde; Propylene; Toluene; Xylenes.
Polycyclic Aromatic Hydrocarbons	2-Methylnaphthalene; Acenaphthene; Acenaphthylene; Anthracene; Benz(a)anthracene; Benzo(a)pyrene; Benzo(b)fluoranthene; Benzo(e)pyrene; Benzo(g,h,i)fluoranthene; Benzo(g,h,i)perylene; Benzo(k)fluoranthene; Chrysene; Dibenzo(a,h)anthracene; Fluoranthene; Fluorene; Indeno(1,2,3-cd)pyrene; Naphthalene; Phenanthrene; Pyrene

(1) Total PAHs evaluated with toxic equivalency factors (TEFs).

5.1.4.4 Chemical Fate and Persistence Screening for Inclusion in the Multiple-Pathway Exposure Model

PAHs and VOCs were screened based on their physical and chemical properties to determine whether they should be assessed for multiple routes of exposure. This screening exercise was based on the following properties:

- Half-lives in soil ≥ 6 months or 182 days
- BCF ≥ 5,000
- Octanol-water partition coefficient (Log Kow)1 ≥ 5

The Chemicals Control Division of Environment Canada uses the same procedure to categorize substances on Canada's domestic substances list (Environment Canada 2005). The procedure has been further endorsed by Rodan *et al*. (1999) as a technique to provide a scientific basis for determining the persistence and bio-accumulative potential of organic chemicals.

[1] The octanol-water partition coefficient (K_{ow}) is a measure of the equilibrium concentration of a compound between octanol and water that indicates the potential for partitioning into soil organic matter (*i.e.*, a high K_{ow} indicates a compound which will preferentially partition into soil organic matter rather than water). K_{ow} is inversely related to the solubility of a compound in water.

The premise of this screening exercise is that if a COPC does not meet any of the criteria, negligible uptake into environmental media (*e.g.*, soil, vegetation or wildlife) is predicted and the chemical only presents an inhalation risk. However, if a COPC meets any of the criteria, that COPC was assessed *via* direct and indirect exposure pathways or the multiple-pathway exposure model.

The results of the fate and persistence screening for PAHs and VOCs are presented in Table 5-7.

Table 5-7 COPC Fate and Persistence Screening

COPC	Soil Half Life (day)(1)	BCF(2)	Log Kow
1,3-Butadiene	28	70	1.99
Acenaphthene	102	389	3.96
Acenaphthylene	60	129 to 575	4.07
Acetaldehyde	11	3	-0.22
Acrolein	28	344	-0.0088
Anthracene	**460**	162 to **9,200**	4.47
Benzene	23	1.1 to 20	2.14
Benz(a)anthracene	**681**	560 to **18,000**	**5.68**
Benzo(a)pyrene	**531**	8.7 to **100,000**	**6.13**
Benzo(b)fluoranthene	**610**	2,800	**6.20**
Benzo(e)pyrene	**--**	**--**	**6.44**
Benzo(g,h,i) fluoranthene	**--**	**--**	**--**
Benzo(g,h,i)perylene	**650**	**64,000**	**7.23**
Benzo(k)fluoranthene	**2,145**	**27,000 to 310,000**	**6.19**
Chrysene	**1,000**	8.2 to **100,000**	**5.74**
Dibenz(a,h)anthracene	**941**	773	**6.55**
Fluoranthene	**440**	380 to **6,110**	**5.08**
Fluorene	60	1,047 to 2,239	4.17
Formaldehyde	7	3	0.34
Indeno(1,2,3-cd)pyrene	**289**	**10,000**	**6.91**
Naphthalene	48	23 to 168	3.37
Phenanthrene	**201**	**--**	4.55
Propylene	**--**	--	0.03
Pyrene	**1,903**	72 to 970	**5.00**
Toluene	22	90	2.67
Xylenes	28	20	3.17

(1) Taken from Mackay *et al.* (1992). Exceptions are acetaldehyde, benzene and indeno(1,2,3-cd)pyrene which were cited from Boethling and Mackay (2000), Wania and Mackay (2000) and HSDB (2005), respectively and benzo(a)pyrene, benzo(k)fluoranthene, dibenz(a,h)anthracene, naphthalene, phenanthrene and pyrene which were cited from U.S. EPA OSW (2005).

(2) Taken from HSDB (2005).

Bold Parameters represent values that exceed at least one of the fate and persistence criteria.

-- Not available
* no groupings identified

Screening criteria were not available for benzo(g,h,i)fluoranthene, but was carried forward in the multiple exposure pathway assessment as it is expected to be persistent and bio-accumulate in the environment similar to benzo(a)pyrene.

The COPCs that screened on for further evaluation *via* the multiple exposure pathway model include:

- anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(e)pyrene, benzo(g,h,i)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene.

As indicated previously, all potential metal emissions were included in the multiple exposure pathway assessment; these include:

- aluminium, antimony, arsenic, barium, cadmium, chromium, chromium VI, copper, Lead, manganese, mercury, molybdenum, nickel, selenium, silver, zinc.

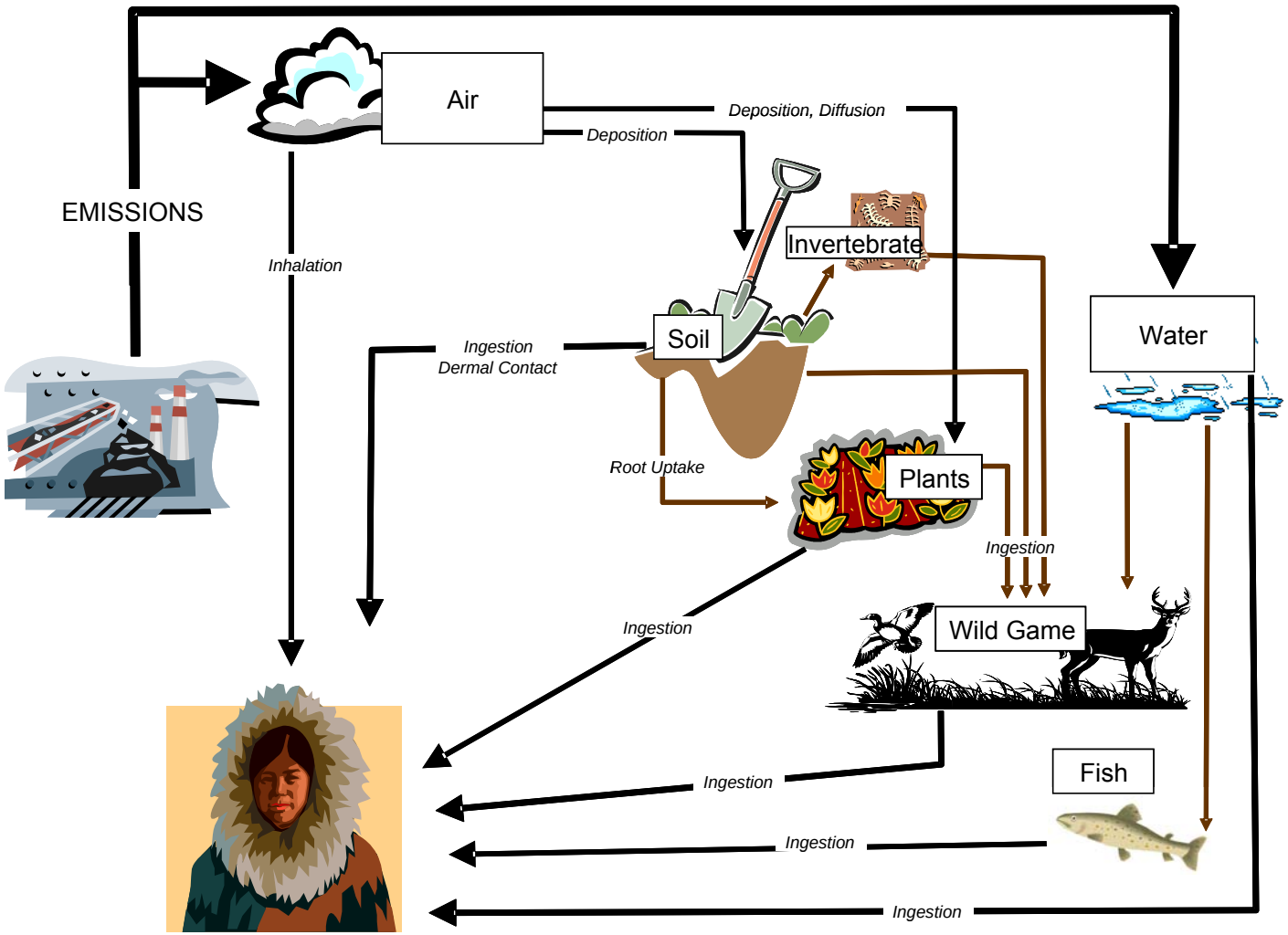

Figure 5-1 Potential Human Health Exposure Pathways

5.2 Exposure Assessment

Potential exposures were largely based on the environmental concentrations of the various chemicals already measured at the site and reported in the site assessment reports (Appendix A). The exposure model that was used for the assessment of chronic health risks associated with multiple exposure pathways (*i.e.*, inhalation, ingestion, dermal contact), is described in the Model Description in Appendix B.

5.2.1 COPC Concentrations

5.2.1.1 COPC Concentrations in Air

The exposure assessment relied extensively on the results of the air dispersion modeling described in the Air Quality Assessment (Appendix A). The results were in the form of predicted ground-level air concentrations for each of the COPCs, expressed as a function of different "averaging periods" (*i.e.*, 10-minute, 1-hour, 8-hour, 24-hour and annual averages) to allow exposures to be calculated on either an acute or chronic basis. Background air concentrations for CACs were incorporated into the air quality assessment as shown in Table 5-8.

Table 5-8 Assumed Background Ambient Air Concentrations for CACs

COPC[1]	Ambient Air Concentration (µg/m^3)[2]	
	Averaging Period	Value
Carbon monoxide	One-hour	200
	8-hour	200
Nitrogen dioxide	One-hour	6
	24-hour	6
	Chronic	6
Particulate matter ($PM_{2.5}$)	24-hour	7
	Chronic	7
Sulphur dioxide	One-hour	16
	24-hour	3
	Chronic	3
TSP	24-hour	7
	Chronic	7

Background concentrations of non-CACs were identified in the air quality assessment.

Consideration of Ambient $PM_{2.5}$ Levels

Ambient $PM_{2.5}$ concentration levels from monitoring stations from several areas were investigated. Monitoring data from pristine environments is not readily available and as a result particulate matter data from Yellowknife, Fort Liard, Norman Wells, Inuvik, Daring Lake and Fort Simpson were used in the HHRA. As these data include a year of strong forest fire activity (2004) and, unlike the current High Lake Project area, are associated with areas which include dirt roads and extensive human activity, the background value of 7µg/m³ should be viewed as conservative.

5.2.2 COPC Concentrations in Abiotic and Biotic Media

Baseline concentrations of metals and PAHs in the following media were measured from areas surrounding the project:

- Soil
- Labrador tea
- Crowberry
- Surface water and
- Fish

A summary of the measured 95th percentile concentration values used in the HHRA are provided in Appendix B. A proxy value of ½ detection limit was used for concentrations reported to be non-detect or below analytical detection limits.

Site-specific bio-concentration factors (BCFs) were developed based on measured baseline concentrations and were used to characterize risks in the multimedia exposure model. Site-specific BCFs were calculated for the following media:

- Soil to Labrador tea
- Soil to crowberry and
- Water to fish

BCF values used in the HHRA are provided in Appendix C.

5.2.3 Exposure Frequency and Duration for the Chronic Inhalation Assessment

5.2.3.1 Carcinogens

Chronic inhalation exposures to carcinogens were amortized for the worker and Inuit receptor. Exposures were amortized to reflect the worst case frequency and duration a receptor might be present at the mine or within the study area. It is unrealistic to

assume that workers or Inuit will be exposed to potential carcinogenic COPCs through inhalation from the project for an entire lifetime or continuous basis.

Workers will be living and working on the project site based on a 2 week rotation cycle. After the completion a work cycle, workers will be flown off-site for two weeks. Chronic inhalation exposures to carcinogens for the worker were amortized with the following factor:

$$AF_W = \frac{D_1 \times D_2}{LE_W} = 0.12 = \frac{[(6/12)\times 14]}{60}$$

Where:

D_1	=	months per year exposed / 12 months
D_2	=	duration of project in years
LE_W	=	Life expectancy of worker (Health Canada 2006c)

Inuit are expected to hunt or trap game, harvest fish and collect traditional plants at the mouth of the Kennarctic River in Grays bay area for 2 to 8 weeks per year. A number of rudimentary cabins are located at the mouth of Kennarctic River. No such structures are present surrounding the project, but the risk assessment assumed that inhalation exposures could also occur in this remote region for a similar period. Inhalation exposures to potential carcinogens from the project are assumed to occur over a lifetime for Inuit, but 2 months per year. This is considered a conservative assumption because the project is only expected to operate for 14 years. However, exposures to potential carcinogens could occur during this period to all life stages; therefore no further amortization was considered. Chronic inhalation exposures to carcinogens for the Inuit were amortized with the following factor:

$$AF_I = D_1 = 0.17 = 2/12$$

Where:

D_1	=	months per year exposed / 12 months

5.2.3.2 Non-Carcinogens

Amortization for inhalation exposure to non-carcinogens was not considered for the worker or Inuit receptor.

5.2.4 Exposure Frequency and Duration for the Chronic Multi-pathway Assessment

5.2.4.1 Carcinogens

Similar to the chronic inhalation assessment, chronic multi-pathway exposures to carcinogens were amortized for the worker and Inuit receptor. Exposures were amortized to reflect the worst case frequency and duration a receptor might be present at the mine or consume traditional foods from the study area. It is unrealistic to assume that workers or Inuit will be exposed to potential carcinogenic COPCs from the project for an entire lifetime or continuous basis.

Similar to chronic inhalation exposures to carcinogens, chronic multi-pathway worker exposures were amortized with the following factor:

$$AF_W = \frac{D_1 \times D_2}{LE_W} = 0.12 = \frac{[(6/12)\times 14]}{60}$$

Where:

D_1	=	months per year exposed / 12 months
D_2	=	duration of project in years
LE_W	=	Life expectancy of worker (Health Canada 2006c)

Inuit are expected to hunt or trap game, harvest fish and collect traditional plants at the mouth of the Kennarctic River in Grays bay area for 2 to 8 weeks per year. However, the harvested food could be prepared (*i.e.*, smoked) and stored (*i.e.*, fridge) for consumption when Inuit are not in the study area. In this situation, the multi-pathway exposure assessment provided a summary of health risks for full exposure to the site and a reduced exposure period.

Risks calculated for full exposure to the study area is considered conservative, because this scenario assumes that Inuit harvest and consume all of their traditional food requirements from the study area. Alternatively, the reduced exposure scenario is considered less conservative and realistic if harvests are low or the study area is not used for harvesting during some seasons. Ideally, risks are expected to range between these two scenarios; therefore, risks are presented for both possibilities with the understanding that actual risks are likely somewhere in between these two extremes.

Chronic multi-pathway exposures to carcinogens for the Inuit were amortized with the following factor:

$$AF_I = D_1 = 0.17 = 2/12$$

Where:
D_1 = months per year exposed / 12 months

5.2.4.2 Non-Carcinogens

Amortization for multi-pathway exposure to non-carcinogens was considered for the worker and Inuit receptor. Risks calculated for full exposure to the study area is considered conservative and a reduced exposure scenario is considered less conservative. Ideally, risks are expected to range between these two scenarios; therefore, risks are presented for both possibilities with the understanding that actual risks are likely somewhere in between these two extremes.

Chronic multi-pathway exposures to non-carcinogens for the Inuit were amortized with the following factor:

$$AF_I = D_1 = 0.17 = 2/12$$

Where:
D_1 = months per year exposed / 12 months

And

Chronic multi-pathway exposures to non-carcinogens for the worker were amortized with the following factor:

$$AF_I = D_1 = 0.5 = 6/12$$

Where:
D_1 = months per year exposed / 12 months

5.2.5 Inorganic Arsenic Content in Traditional Foods

Due to the carcinogenic sensitivity of arsenic risks from exposure to consumption of game and fish harvested from traditional use areas. Chronic multi-pathway exposures to arsenic were modified to account for the portion of inorganic to organic arsenic content of these foods.

Arsenic does not commonly exist in elemental form, but it combines with other elements to form a number of inorganic and organic compounds. Inorganic arsenics such as arsenates (pentavalent arsenic) or arsenites (trivalent arsenic) occur in natural waters or drinking water and at low levels in food. Organic arsenite species such as

arsenobetaine and arsenocholine are abundant in seafood but they are generally considered to be much less harmful to health and are rapidly eliminated from the body in the urine (WHO 2001; Health Canada 2006b). The multi-media exposure assessment conservatively assumed that traditional foods (*i.e.*, game, fish and plants) contain approximately 37% inorganic arsenic, based on ATSDR (2005).

5.2.6 Conservative Assumptions in the Exposure Assessment

Due to uncertainties associated with all health risk assessments, conservative assumptions were applied to exposure estimates as a means of reducing the possibility of exposures being underestimated. Conservative assumptions incorporated in the risk assessment included:

- Risk estimates for workers are based on exposure to predicted outdoor air concentrations and no adjustment is made for time spent indoors. Therefore, for the purpose of the assessment indoor air is equal to predicted outdoor air. This is believed to be a conservative assumption given that indoor air concentrations in the camp and in working environments will be subject to appropriate ventilation and air filtration system to ensure acceptable air quality is maintained.
- Conservative air dispersion modelling of predicted maximum short-term and long-term ground-level air concentrations at the discrete receptor locations. The emissions were assessed for open pit mining, although operations will be underground after 4 years.
- Predicted chronic health risks assumed that workers would be exposed continuously and intermittently (*i.e.*, 24-hours per day, during 2 weeks per month, for 14 years (the planned duration of project) to the predicted COPC concentration.
- Predicted chronic health risks assumed that Inuit would be exposed for 75 years or lifetime, even though the planned duration of project is 14 years. .
- Receptors that are most sensitive to chemical exposure (composite for carcinogens, toddler typically for all other chemicals) were assessed *via* the multiple-exposure pathway model.
- It was assumed that all Inuit persons obtain a large portion of their diet from the local study area (*e.g.* total fish consumption would be obtained locally and contain the 95th percentile contaminant concentrations).
- Predicted environmental media (soil, plant, wild game tissue) concentrations were based on an assumed 14-year continuous operation and chemical deposition on to soil.

5.3 Toxicity Assessment

5.3.1 Selection of Exposure Limits

The two exposure limit durations used in this assessment include:

- Acute exposures: the amount or dose of a chemical that can be tolerated without evidence of adverse health effects on a short-term basis.
- Chronic exposures: the amount of a chemical that is expected to be without effect when exposure occurs continuously or regularly over periods of at least a year and possibly extending over a lifetime.

Health agencies used to identify exposure limits for use in the current risk assessment:

- Canadian regulatory agencies (*e.g.*, Health Canada, CCME, Environment Canada);
- Other recognized regulatory authorities or expert organizations (*e.g.* US EPA, WHO, RIVM).

Overall, exposure limits were based on conservative methods from regulatory agencies and are designed to be protective of public health.

5.3.1.1 Acute Exposure Limits for the HHRA

The acute exposure limits chosen for the HHRA were used to assess the potential health risks that could be presented to the receptor groups from short-term exposure to the COPCs. The sources of the acute exposure limits used in the current HHRA are listed below.

- Health Canada. 2004a. Contaminated Sites Program. Federal Contaminated Site Risk Assessment in Canada. Part II - Toxicological Reference Values;
- Health Canada. 2004b. Existing Substances Division - Health Based Guidance Values for Substances on the Second Priority Substances List;
- OMOE (Ontario Ministry of the Environment). 2006a. Rationale for the Development of Ontario Air Standards for Cadmium and Cadmium Compounds. Standards Development Branch, Ontario Ministry of the Environment. June 2006;
- ATSDR (Agency for Toxic Substances and Disease Registry). 2005. Minimal Risk Levels;
- Alberta Environment. 2005. Alberta Ambient Air Quality Objectives. AENV 2005;

- World Health Organization. 2000. Air Quality Guidelines for Europe (Second Edition) WHO 2000;
- CCME (Canadian Council of Ministers of the Environment). 2000. Canada-Wide Standards for Particulate Matter (PM) and Ozone. Accepted November 29, 1999, for endorsement in May 2000.

The exposure limits used to assess acute health risks for each COPC are provided in Table 5-9.

Table 5-9 Acute Inhalation TRVs for Human Receptors (µg/m^3)

Chemical	Inhalation TRV			Source
	TRV (ug/m3)	Type	Basis	
Acenaphthene	830	24-hour	hepatic	ATSDR 2005
Acenaphthylene	830	24-hour	hepatic	ATSDR 2005
Acetaldehyde	2300	1-hour	respiratory and eye irritation	ACGIH 2006
Acrolein	0.29	1-hour	eye irritation	OEHHA 1999
Arsenic	0.38	1-hour	developmental	OEHHA 1999 (modified from 4-hour to 1-hour using Haber's Law)
Benzene	30	24-hour	immunological	ATSDR 2005
Cadmium	2	1-hour	renal	MOE 2006
Carbon monoxide	15000	1-hour	respiratory	AENV 2005
	6000	8-hour	respiratory	AENV 2005
Chromium VI	1	24-hour	respiratory	ATSDR 2000
Chromium (total)	NA			
Copper	100	1-hour	respiratory	OEHHA 1999
Formaldehyde	50	1-hour	respiratory and eye irritation	ATSDR 2005
Lead	0.8	24-hour	neurological, developmental	OMOE 2006b
Mercury	1.8	1-hour	neurological, developmental	OEHHA 1999
Naphthalene	2000	1-hour	eye irritation	ACGIH 2006
Nickel	6	1-hour	respiratory	OEHHA 1999
Nitrogen dioxide	400	1-hour	respiratory	AENV 2005
	200	24-hour	respiratory	AENV 2005
$PM_{2.5}$	30	24-hour	respiratory	CCME 2000
Propylene	3100	1-hour	respiratory	OEHHA 1999 (propylene oxide)
Sulphur dioxide	500	10-min	respiratory	WHO 2000
	450	1-hour	respiratory	AENV 2005
	150	24-hour	respiratory	AENV 2005
Toluene	37000	1-hour	neurological	ATSDR 2005
Xylenes	8700	1-hour	respiratory	ATSDR 2005

		Inhalation TRV		Source
Zinc	375	1-hour	NA	ACGIH 2006

TSP, total chromium, manganese, selenium and 1,3-butadiene were not evaluated in the acute assessment as no defensible limits was identified.

5.3.1.2 Chronic Exposure Limits Adopted for the HHRA

The chronic exposure limits identified in Table 5-10 were used to assess the potential health risks to the various receptors from long-term exposure to the COPCs. As discussed above the chronic exposure limits were expressed as RfCs, RfDs, RsCs, or RsDs.

The exact terminology by which threshold and non-threshold exposure limits are known differs according to the source and type of exposure. Terminology also varies to some extent between regulatory jurisdictions. Generic nomenclature has been developed, with the following terms and descriptions used in the current HHRA:

Threshold

- Reference Concentration (RfC): refers to safe concentrations of airborne chemicals in which the primary avenue of exposure is through inhalation. It is expressed as a concentration of the chemical in air (*e.g.*, µg/m3). This term only applies to threshold chemicals (*i.e.*, chemicals that do not cause cancer).
- Reference Dose (RfD): refers to safe doses of chemicals to which exposure occurs through multiple pathways (*i.e.*, inhalation or ingestion). It is most commonly expressed in terms of the total intake of the chemical (*e.g.*, in µg/kg body weight (bw)/day). This term also only applies to threshold chemicals.

Non-threshold

- Risk-Specific Concentration (RsC): same meaning as that for RsD, except refers to a concentration rather than a dose and applies to airborne chemicals that act as carcinogens and for which the primary avenue of exposure is through inhalation (expressed in µg/m3). As for RsD, this term only applies to non-threshold chemicals.
- Risk-Specific Dose (RsD): reserved for carcinogens and refers to the dose of the carcinogen that results in a "regulatory acceptable" increased incidence of cancer, typically one in 100,000 in Canada (expressed in µg/kg bw/day). Alternatively, it

may be expressed as the dose that results in an acceptable incremental increase in cancer incidence (*i.e.*, 1 to 5%) above background rates. This term is specific to non-threshold or carcinogenic chemicals.

Table 5-10 Chronic TRVs for Human Receptors (µg/m^3)

Chemical	TRV				Source
	TRV	Units	Type	Basis	
1,3-butadiene	0.3	µg/m^3	RsC	Cancer	U.S. EPA IRIS 2007
Acenaphthene	83	µg/m^3	RfC	Hepatic	U.S. EPA IRIS 2007
Acenaphthylene	83	µg/m^3	RfC	Hepatic	
Acetaldehyde	17.2	µg/m^3	RsC	Cancer	Health Canada 2004b
Acrolein	0.02	µg/m^3	RfC	Respiratory	U.S. EPA IRIS 2007
Aluminium	1000	µg/kg-day	MRL	Neurological	ATSDR 2005
Antimony	0.4	µg/kg-day	RfD	Haematological	U.S. EPA IRIS 2007
Arsenic	0.0016	µg/m^3	RsC	Cancer	Health Canada 2004b
	0.006	µg/kg-day	RsD	Bladder, Lung, Liver	Health Canada 2006b
Barium	16	µg/kg-day	TDI	NA	Health Canada 2004b
Benzene	3.1	µg/m^3	RsC	Cancer	Health Canada 2004b
Benzo(a)pyrene IPM	0.32	µg/m^3	RsC	NA	Health Canada 2004b
	0.0043	µg/kg-day	RsD	NA	Health Canada 2004b
Cadmium	0.001	µg/m^3	RsC	Cancer	Health Canada 2004b
	0.8	µg/kg-day	TDI	NA	Health Canada 2004b
Chromium (total)	60	µg/m^3	TCA	NA	RIVM 2001
	1	µg/kg-day	TDI	NA	Health Canada 2004b
Chromium (VI)	0.000135	µg/m^3	RsC	Cancer	Health Canada 2004b
	1	µg/kg-day	TDI	NA	Health Canada 2004b
Copper	10	µg/m^3	MRL	gastrointestinal	ATSDR 2005
	30	µg/kg-day	TDI	NA	Health Canada 2004b
Formaldehyde	0.8	µg/m^3	RsC	Cancer	U.S. EPA IRIS 2007
Lead	0.5	µg/m^3	TDI	neurological, developmental	WHO 2000
	3.6	µg/kg-day	TDI	NA	Health Canada 2004b
Manganese	0.05	µg/m^3	RfC	Neurological	U.S. EPA IRIS
	140	µg/kg-day	RfD	Neurological	U.S. EPA IRIS 2007
Mercury	0.2	µg/m^3	TCA	Neurological	RIVM 2001
	0.3	µg/kg-day	TDI	NA	Health Canada 2004b
Methylmercury	0.1	µg/kg-day	RfD	neurological, developmental	U.S. EPA IRIS 2007
Molybdenum	5	µg/kg-day	RfD	Inflammation	U.S. EPA IRIS 2007
Naphthalene	3	µg/m^3	RfC	Respiratory	U.S. EPA IRIS 2007
Nickel	0.08	µg/m^3	RsC	Cancer	Health Canada 2004b (nickel oxidic)
	20	µg/kg-day	RfD	decreased liver and kidney weights	U.S. EPA IRIS 2007 (soluble salts)
Nitrogen dioxide	60	µg/m^3	AAQC		AENV 2005
$PM_{2.5}$	12	µg/m^3	RfC	Respiratory	CARB 2002
Propylene	3	µg/m^3	RsC	Cancer	U.S. EPA IRIS 2007

			TRV		
Selenium	20	µg/m^3	REL	Dermal	OEHHA 1999
	5	µg/kg-day	RfD	Liver, dermal	U.S. EPA IRIS 2007
Silver	5	µg/kg-day	RfD	Dermal	U.S. EPA IRIS 2007
Sulphur dioxide	30	µg/m^3	AAQC	Respiratory	AENV 2005
Toluene	3800	µg/m^3	TC	NA	Health Canada 2004b
Total cyanide (assessed as free cyanide)	20	µg/kg-day	RfD	NOAEL	U.S. EPA IRIS 2007
Xylenes	180	µg/m^3	TC	NA	Health Canada 2004b
Zinc	1340	µg/m^3	RfC	haematological	U.S. EPA IRIS 2007
	300	µg/kg-day	RfD	Haematological	U.S. EPA IRIS 2007

The sources of the chronic exposure limits used in the current HHRA are listed below. Reliance was placed on a number of regulatory agencies in the determination of the chronic exposure limits, including:

- Health Canada 2004b
- U.S. EPA Integrated Risk Information System (U.S. EPA 2005)
- Alberta Environment. 2005. Alberta Ambient Air Quality Objectives. AENV 2005;
- Agency for Toxic Substances and Disease Registry. 2005. Minimal Risk Levels;
- California Office of Environmental Health Hazard Assessment. 1999a;
- California Air Resources Board (CARB). 2002. Ambient Air Quality Standards;
- Netherlands National Institute of Public Health and the Environment (RIVM 2001).

The criteria for selecting exposure limits required that they conform to the following criteria:

- Protective of the health of the general public based on the current scientific understanding of the health effects known to be associated with exposures to the COPCs.
- Protective of sensitive individuals, including children and the elderly, through the incorporation of safety factors.
- Established or recommended by reputable scientific or regulatory authorities; and,
- Supported by adequate scientific and/or regulatory documentation.

5.3.2 Chemical Mixtures

Possible additive interactions were identified for those COPCs known to cause respiratory effects, liver and kidney effects, reproductive and developmental, neurological effects and cancer (Table 5-11). The inclusion of a COPC in the chemical mixture was based upon the end

point of the exposure limit used in the current HHRA. Risks to mixtures were calculated by summing the ILCR or RQ values for each exposure duration and chemical identified in the group.

Table 5-11 Potential Additive Interactions among COPCs

Exposure Duration	Potential Health Effect	Toxicant Designation	COPCs
Acute inhalation	Respiratory effects	Respiratory irritants	acetaldehyde, chromium IV, copper, nickel, formaldehyde, NO_2, propylene, SO_2, xylenes, zinc
		Eye irritants	acetaldehyde, acrolein, formaldehyde, naphthalene
	Liver and kidney effects	Hepato- and nephro-toxicants	acenaphthene, acenaphthylene, cadmium
	Reproductive and developmental effects	Reproductive and developmental toxicants	arsenic, lead, mercury
	Neurological effects	CNS depressants	lead, mercury, toluene, xylene
Chronic inhalation	Respiratory effects	Nasal irritants	acrolein, naphthalene
	Liver and kidney effects	Hepato- and nephro-toxicants	acenaphthene, acenaphthylene
	Reproductive and developmental effects	Reproductive and developmental toxicants	lead
	Neurological effects	CNS depressants	lead, manganese, mercury
	Cancer	Carcinogens	1,3-butadiene, arsenic, acetaldehyde, benzene, benzo(a)pyrene, cadmium, chromium IV, nickel, formaldehyde
Chronic ingestion	Liver and kidney effects	Hepato- and nephro-toxicants	nickel, selenium
	Cancer	Carcinogens	arsenic, benzo(a)pyrene,
	Neurological effects	CNS depressants	aluminium, manganese, methylmercury
	Haematological effects		antimony, zinc
	Reproductive and developmental effects	Reproductive and developmental toxicants	methylmercury

5.3.3 Chemical Surrogates

Individual COPCs that lacked toxicological information were assigned a “surrogate” COPC based on the toxicological principle that states that the molecular structure of a chemical has a distinct bearing on its reactivity, biological activity and toxicity. It was assumed that the COPC exhibits toxicity equivalent to that possessed by a chemical of similar molecular structure. Table 5-12 identified those chemicals included in the chemical groupings.

Table 5-12 Project Emission Chemical Surrogates and Groupings

Group Name	Chemical Surrogate	Chemical Constituents[1]
Benzo(a)pyrene group[1]	Benzo(a)pyrene	Anthracene; benz(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; benzo(e)pyrene; benzo(g,h,i)fluoranthene; benzo(k)fluoranthene; chrysene; fluoranthene; fluorene; indeno(1,2,3-cd)pyrene; phenanthrene; pyrene

(1) The benzo(a)pyrene (individual PAH method [IPM]) group represents each individual PAH that exhibits the potential to cause cancer and for which a toxic equivalency factor (TEF) has been developed. TEFs are required for the inclusion of a PAH in the IPM approach.

5.4 Results of the Human Health Risk Assessment

Based on the methodology described above, the risks to human health were estimated for the High Lake mine project. Results are presented for those chemicals considered to pose a potential threat to human health (*i.e.*, exceeded regulatory guidelines).

5.4.1 Acute Health Risk Results

Acute risk estimates (expressed as RQs) associated with maximum predicted short-term air concentrations are listed in Tables 5-13 to 5-15 for the receptor locations that were chosen for the High Lake Mine Project. It should be noted that an alternative camp site was included in the assessment. The air quality assessment predicted exceedance of air quality objectives on the mine site. Therefore, an alternative location for the camp was included in the HHRA. The options to minimize worker risks associated with non-occupational exposure to COPC while at the site include re-location of the camp or providing additional air management controls to improve air quality within camp buildings. These options will be reviewed at the final design stage.

All predictions were based on the "project" case. Receptor locations have been separated into three locations based on their relative proximity to the project site. Table 5-13 presents acute RQs for worker receptors within the High Lake facility footprint or Grays Bay loading site. Table 5-14 presents acute RQs for receptor sites located outside of, but within close proximity to the facility footprint, and Table 5-15 presents acute RQs for Inuit receptor sites located in Grays Bay.

The acute RQs summarized in the Table 5-13 for worker receptors are all less than 1.0 with the exception of carbon monoxide, nitrogen dioxide, particulate matter ($PM_{2.5}$) and lead. For mixtures, RQ exceedances were predicted for respiratory irritants, reproductive/developmental and CNS depressants. Potential acute health risks are discussed below.

The acute RQs summarized in the Table 5-14 for Inuits 'Outside of High Lake Mine Facility Footprint' receptors are all less than 1.0 with the exception of particulate matter. No RQ exceedances were predicted for mixtures. Potential acute health risks are discussed below.

The acute RQs summarized in the Table 5-15 for "Grays Bay" Inuit receptors are all less than 1.0, signifying that acute health risks are not predicted.

5.4.1.1 Acute Health Risks

Carbon Monoxide

The predicted acute RQ values for exposure to carbon monoxide ranged from 1.0 for the 1-hour exposure period to 1.3 for the 8-hour exposure period, both at the maximum point of impingement (MPOI) (Table 5-13).

For this assessment the Alberta Environment AAQOs were assumed (1-hour AAQO of 15,000µg/m^3 and an 8-hour AAQO of 6,000µg/m^3) (AENV 2005). These AAQOs were adopted from the CEPA/FPAC Working Group on Air Quality Objectives and Guidelines, who recommends maximum desirable, acceptable and tolerable objectives for CO. The Alberta objectives are based on the maximum desirable levels (*i.e.*, the lowest objective).

These objectives were developed to protect the subpopulation sensitive to cardio-respiratory effects, and limit carboxyhemoglobin (COHb) blood levels to less than 1% (CEPA/FPAC 1994). For comparison, background levels of COHb in unexposed healthy individuals were reported to be between 0.5% and 1.5%, maternal COHb levels during pregnancy were reported between 0.4% to 2.6%, and tobacco smokers ranged from 5% to 6% COHb blood levels (ACGIH 1996). The CEPA/FPAC maximum acceptable levels of 35,000µg/m^3 (1-hour) and 15,000µg/m^3 (8-hour) for carbon monoxide are designed to limit COHb levels at or below 2% for adults performing light work (CEPA/FPAC 1994). The ACGIH TLV-TWA for CO, considered acceptable for use under industrial MPOI applications, is 25 ppm (*i.e.*, ~29,000µg/m^3) (ACGIH 2006). Maximum predicted CO concentrations for the 1-hour (15,426µg/m^3) and 8-hour (7,746µg/m^3) exposures are considerably lower than either the CEPA/FPAC maximum acceptable levels or the ACGIH TLV-TWA objectives for CO.

Therefore, the use of the maximum desirable objectives for CO are considered overly conservative given the specific application, and the use of the CEPA/FPAC maximum acceptable objectives are considered sufficiently conservative to protect High Lake Mine workers.

Lead

The predicted acute RQ for exposure to air-borne lead ranged from 1.0 to 3.0 for 24-hour exposure at the camp and MPOI locations, respectively (Table 5-13). The assessment was based on OMOE's 24-hour AAQC for lead of 0.8µg/m^3 (OMOE 2006b). The impairment of children's neurological function was considered an appropriate endpoint for assessing low level lead exposure (Cal/EPA 2001; OMOE 2006b). However since no children will be at the mine site during normal operating conditions, assessment of industrial site workers against this AAQC is considered conservative and may over state risks to workers.

The ACGIH TLV-TWA for lead and inorganic compounds (as lead) is 50µg/m^3. All predicted lead air concentrations are considerably less than this objective including the predicted concentration at the MPOI of 2.4µg/m^3. The ACGIH recommended that blood lead levels (µg/dL) are more strongly related to health effects than air lead concentrations (µg/m^3), and noted a curvilinear response when comparing blood lead levels to airborne lead concentrations in occupationally exposed workers (1996). This relationship is partially explained by changes to worker breathing patterns during peak exposure events (*i.e.*, avoidance) and the effect of lead particle size on uptake efficiency. Specifically, larger particles are less apt to penetrate into the deep lung region where maximum absorption efficiency occurs (ACGIH 1996). As much of the airborne lead exposure is expected to originate from dust inhalation, increased particle size may limit the bioavailability and toxicity of lead to occupationally exposed workers.

Nitrogen Dioxide

The predicted acute RQ value for exposure to NO_2 ranged from 1.4 to 1.6 for 1-hour exposure, and 1.4 to 2.3 for 24-hour exposure at the camp and MPOI locations, respectively (Table 5-13).

Short-term exposures to nitrogen dioxide may cause effects on the respiratory system, and people who already have breathing problems may be more sensitive. These short-term effects might include respiratory irritation or difficulties breathing (WHO 2000). Concentrations of 365µg/m^3 to 565µg/m^3 NO_2 have been observed to produce small changes in lung function (*i.e.*, less than 5% drop in functional expiratory volume – FEV) in studies on asthmatics and patients with chronic obstructive pulmonary disease (WHO 2000). This MPOI (655µg/m^3) and camp (543µg/m^3) concentration is within the range reported by WHO. Acute exposures to concentrations greater than 1,990µg/m3 have been reported to affect healthy people. The highest 1-hour NO_2 concentration was 655µg/m^3 at the MPOI location, which is three times lower than the level at which adverse effects are observed. It is difficult to comment on the likelihood of adverse effects, without consideration of an individual's sensitivity or existing breathing problems and the frequency of exposure.

The ACGIH TLV-TWA for NO_2, considered acceptable for use under industrial MPOI applications, is 3ppm (*i.e.*, 5,645µg/m^3) (ACGIH 2006). MPOI predicted concentrations of NO_2 for 24-hour exposure is 460µg/m^3, which is more than 10 times lower than the TLV-TWA objective. No exceedances to the AENV limit were predicted for any of the other receptor locations.

Particulate Matter ($PM_{2.5}$)

With one exception, RQ values for $PM_{2.5}$ were < 10. Many of the exceedances of the Canada-wide Standard were predicted for worker receptors. The predicted acute RQ for exposure to $PM_{2.5}$ ranged from 1.2 to 1.3 just outside of the facility footprint area. The predicted acute RQ for exposure to $PM_{2.5}$ within the facility footprint ranged from 1.8 at Grays Bay loading site to 13 at the MPOI, indicating increased risk from exposure to the mine than loading area.

$PM_{2.5}$ concentrations (24-hour, 98th percentile) at the mine range from 80µg/m^3 to 385µg/m^3 and at the loading site range from 54µg/m^3 to 66µg/m^3 (Appendix A). For comparative purposes, Health Canada recommends that where significant vehicle traffic on contaminated unpaved surfaces is anticipated, dust levels up to 250µg/m^3 may occur (Health Canada 2004a). The primary source of $PM_{2.5}$ emissions is from combustion through power generation at the mine, accounting for approximately 40% of emissions from mine operations. The remaining sources, such as ore stockpiling, processing and crushing, will generate fine PM from crustal sources at the mine surface. Fine crustal sources of PM are not as strongly associated with adverse health effects and can be regarded as less toxic than combustion rated PM (Laden *et al*., 2000; Mar *et al*., 2000; Tsai *et al*., 2000; Ozkaynak *et al*., 1996; Janssen *et al*., 2002). After four years surface mine operations will completely move underground thus reducing a significant number of surface sources of PM. The degree in which $PM_{2.5}$ emissions and air concentrations will reduce after the mine operations move entirely underground is unknown, because this scenario was not modelled by the air quality assessment. The probability of exceeding the Canada-wide standard at the dock site (HLVD04) is 3.6% and increases to 18.6% at the camp location, indicating increased risk from exposure to PM at the mine than loading area.

The exceedances just outside the mine footprint are judged to be acceptable given the remoteness of the location and frequency of exceedances. The study area immediately surrounding the mine is remote and the terrain is rough. Inuit would not be expected to access the area routinely. In addition, the probability that predicted PM2.5 concentrations would exceed the Canada-wide Standard of 30 µg/m^3 is 1.8 and 2.2% for the receptor location HLSS07 and HLVM06, respectively.

5.4.1.2 Acute Mixtures

Respiratory Irritant Mixtures

The RQ values for respiratory irritant mixtures were < 4. Many of the exceedances were marginal (*i.e.*, RQ ≈ 1) and only occurring within the mine or loading dock area. The predicted acute RQ value for exposure to respiratory irritants ranged from 1.1 to 1.3 in the Grays Bay area. The predicted acute RQ values for exposure to respiratory irritants within the facility footprint range from 1.4 to 3.7 at the MPOI, indicating increased possibility of risk from acute exposure at this location.

For the risk assessment of the respiratory irritant mixtures it was conservatively assumed that an additive interaction occurs between certain chemicals with critical effects related to respiratory irritation. The primary contributors to this mixture are NO_2 and copper, which make up approximately 80% of the total mixture concentration. These respiratory irritants behave differently in penetrating the airway. While NO_2 can reach deep into the lungs (*i.e.*, deep-lung irritant), respiratory irritation due to copper occurs "higher up" in the respiratory tract. In addition, both NO_2 and copper toxicity reference values are levels at which adverse effects are not anticipated (*i.e.*, NOAELs). The dose-response relationships for the two chemicals are somewhat unique in that the critical effects occur in different regions of the respiratory tract. For this reason, adding their respective RQs likely overstates the actual cumulative respiratory risk.

In addition, the assessment of acute health risks associated with respiratory irritant exposures was based on the additional conservative assumption that the highest predicted ground-level air concentration for each COPC of the mixture occur simultaneously at each specific receptor location.

Reproductive/Developmental

The exceedances were marginal (*i.e.*, RQ ≤ 3.2), and of no practical significance given the high degree of conservatism embraced by the inhalation assessment and air quality modelling. RQ exceedances within the facility footprint range from 1.1 at the camp location to 3.2 at the MPOI. No acute reproductive or developmental risks were predicted for the Grays Bay area or in areas outside the facility footprint.

The assessment was based on OMOE's 24-hour AAQC for lead of 0.8µg/m^3 (OMOE 2006b). The impairment of children's neurological function was considered an appropriate endpoint for assessing low level lead exposure (Cal/EPA 2001; OMOE 2006b). However since no children will be at the mine site during normal operating conditions, assessment of industrial site workers against this AAQC is considered conservative and may over state risks to workers.

CNS Depressants

Predicted acute RQ values for exposure to CNS Depressants ranged from 1.0 to 3.0 at the camp and MPOI locations, respectively (Table 5-13). The assessment was based on OMOE's 24-hour AAQC for lead of 0.8µg/m^3 (OMOE 2006b). The impairment of children's neurological function was considered an appropriate endpoint for assessing low level lead exposure (Cal/EPA 2001; OMOE 2006b). However since no children will be at the mine site during normal operating conditions, assessment of industrial site workers against this AAQC is considered conservative and may over state neurological risks to workers.

Table 5-13 Acute Risk Quotient (RQ) Values for Worker Receptors Within the High Lake Mine Facility Footprint and Grays Bay Loading Site (Project Case)

COPC[1]	Averaging Time	High Lake Mine Site				Grays Bay Loading Site		
		MPOI	Camp	AltCamp	LandFarm	HLVD04	HLVD05	HLVD06
Acenaphthene	24-hour	1.3E-05	6.6E-06	2.2E-06	2.0E-06	1.5E-06	1.2E-06	1.2E-06
Acenaphthylene	24-hour	3.1E-05	1.5E-05	5.2E-06	4.6E-06	4.8E-06	4.3E-06	4.3E-06
Acetaldehyde	1-hour	9.8E-04	4.1E-04	2.7E-04	2.5E-04	4.4E-04	3.3E-04	3.1E-04
Acrolein	1-hour	9.4E-01	4.2E-01	2.7E-01	2.5E-01	4.2E-01	3.2E-01	2.9E-01
Arsenic	1-hour	1.6E-01	9.6E-02	8.5E-02	9.0E-02	4.5E-02	3.5E-02	3.2E-02
Benzene	24-hour	9.9E-02	4.9E-02	1.7E-02	1.5E-02	2.4E-02	2.2E-02	2.2E-02
Cadmium	1-hour	1.3E-01	8.7E-02	7.2E-02	8.2E-02	5.7E-02	4.4E-02	4.0E-02
Carbon monoxide	1-hour	**1.0E+00**	8.5E-01	3.8E-01	3.1E-01	3.0E-01	2.3E-01	2.1E-01
Carbon monoxide	8-hour	**1.3E+00**	6.5E-01	2.8E-01	2.7E-01	5.6E-01	4.6E-01	4.2E-01
Chromium (VI)	24-hour	7.5E-02	3.9E-02	1.4E-02	1.2E-02	7.7E-03	7.0E-03	7.0E-03
Copper	1-hour	8.0E-01	5.2E-01	4.2E-01	4.8E-01	2.9E-01	2.2E-01	2.1E-01
Formaldehyde	1-hour	6.9E-02	3.0E-02	1.9E-02	1.8E-02	3.1E-02	2.4E-02	2.2E-02
Lead	24-hour	**3.0E+00**	**1.0E+00**	8.3E-01	8.5E-01	3.3E-01	3.0E-01	3.0E-01
Mercury	1-hour	4.4E-03	1.3E-03	1.3E-03	2.0E-03	7.2E-04	5.6E-04	5.2E-04
Naphthalene	1-hour	1.9E-04	1.4E-04	9.0E-05	8.4E-05	5.6E-05	4.7E-05	4.3E-05
Nickel	1-hour	5.1E-02	3.7E-02	2.1E-02	2.0E-02	4.3E-02	4.6E-02	4.6E-02
Nitrogen dioxide	1-hour	**1.6E+00**	**1.4E+00**	8.3E-01	7.2E-01	5.5E-01	5.0E-01	4.9E-01
Nitrogen dioxide	24-hour	**2.3E+00**	**1.4E+00**	7.7E-01	7.1E-01	7.4E-01	7.0E-01	6.2E-01
Particulate matter ($PM_{2.5}$)	24-hour	**1.3E+01**	**7.2E+00**	**3.0E+00**	**2.6E+00**	**2.2E+00**	**2.0E+00**	**1.8E+00**
Propylene	1-hour	3.1E-03	2.2E-03	1.4E-03	1.3E-03	1.1E-03	8.9E-04	8.2E-04
Sulphur dioxide	10-min	8.8E-01	7.3E-01	3.4E-01	2.9E-01	1.9E-01	2.1E-01	2.0E-01
Sulphur dioxide	1-hour	6.8E-01	5.7E-01	2.6E-01	2.3E-01	1.5E-01	1.6E-01	1.6E-01
Sulphur dioxide	24-hour	1.4E-01	1.0E-01	5.8E-02	5.3E-02	6.8E-02	7.5E-02	9.5E-02
Toluene	1-hour	3.3E-05	2.3E-05	1.5E-05	1.5E-05	1.5E-05	1.1E-05	1.1E-05
Xylenes	1-hour	9.6E-05	6.9E-05	4.5E-05	4.2E-05	4.3E-05	3.4E-05	3.1E-05
Zinc	1-hour	2.5E-01	1.7E-01	1.3E-01	1.5E-01	1.0E-01	7.7E-02	7.1E-02

		High Lake Mine Site				Grays Bay Loading Site		
Mixtures[2]								
Respiratory irritants	Acute	**3.7E+00**	**2.3E+00**	**1.4E+00**	**1.4E+00**	**1.3E+00**	**1.1E+00**	**1.1E+00**
Eye irritants	Acute	1.0E+00	4.5E-01	2.9E-01	2.7E-01	4.5E-01	3.4E-01	3.2E-01
Hepato-/ Nephro- toxicants	Acute	1.3E-01	8.7E-02	7.2E-02	8.2E-02	5.7E-02	4.4E-02	4.0E-02
Reproductive/ developmental	Acute	**3.2E+00**	**1.1E+00**	9.2E-01	9.4E-01	3.7E-01	3.3E-01	3.3E-01
CNS depressants	Acute	**3.0E+00**	**1.0E+00**	8.3E-01	8.5E-01	3.3E-01	3.0E-01	3.0E-01

(1) A RQ value equal to or less than 1.0 signifies that the estimated exposure is less than the exposure limit and no health impacts are expected. Boldface values indicate a RQ of greater than 1.0.

(2) The individual chemicals contained within the chemical mixtures are listed in Table 5.8

Table 5-14 Acute Risk Quotient (RQ) Values for Inuit Receptors Outside of the High Lake Mine Site and Within 2km of Site (Project Case)

COPC(1)	Averaging Time	HLVM01	HLVM02	HLVM03	HLVM04	HLVM05	HLVM06	HLVM07	HLSS01	HLSS02	HLSS3_4	HLSS07	HLSS08
Acenaphthene	24-hour	4.3E-07	3.1E-07	2.8E-07	5.4E-07	3.2E-07	1.7E-06	1.6E-07	2.3E-07	5.0E-07	6.2E-07	1.2E-06	1.0E-06
Acenaphthylene	24-hour	9.9E-07	7.0E-07	6.4E-07	1.2E-06	6.9E-07	4.0E-06	3.6E-07	5.3E-07	1.2E-06	1.4E-06	2.7E-06	2.4E-06
Acetaldehyde	1-hour	6.6E-05	3.9E-05	4.0E-05	8.0E-05	5.1E-05	1.8E-04	4.7E-05	2.8E-05	1.1E-04	1.3E-04	2.1E-04	1.0E-04
Acrolein	1-hour	6.7E-02	4.0E-02	4.0E-02	8.1E-02	5.1E-02	1.8E-01	4.8E-02	2.9E-02	1.1E-01	1.3E-01	2.1E-01	1.0E-01
Arsenic	1-hour	1.2E-02	6.8E-03	7.5E-03	1.4E-02	1.2E-02	2.8E-02	9.5E-03	6.0E-03	1.9E-02	2.6E-02	4.4E-02	2.0E-02
Benzene	24-hour	3.1E-03	2.2E-03	2.0E-03	3.5E-03	2.0E-03	1.3E-02	1.1E-03	1.7E-03	3.7E-03	4.6E-03	8.6E-03	7.5E-03
Cadmium	1-hour	7.8E-03	3.6E-03	4.1E-03	6.9E-03	7.3E-03	1.6E-02	6.1E-03	3.9E-03	9.8E-03	1.6E-02	2.8E-02	1.0E-02
Carbon monoxide	1-hour	1.4E-01	9.3E-02	7.3E-02	1.3E-01	7.7E-02	2.7E-01	1.2E-01	5.5E-02	1.3E-01	3.1E-01	1.7E-01	2.1E-01
Carbon monoxide	8-hour	9.7E-02	7.1E-02	8.6E-02	1.0E-01	7.7E-02	2.3E-01	8.4E-02	7.6E-02	1.4E-01	1.7E-01	2.3E-01	1.8E-01
Chromium (VI)	24-hour	1.4E-03	1.1E-03	1.0E-03	1.5E-03	6.7E-04	5.3E-03	4.7E-04	8.6E-04	1.7E-03	2.0E-03	4.7E-03	3.8E-03
Copper	1-hour	2.6E-02	1.5E-02	1.6E-02	3.3E-02	2.9E-02	6.3E-02	2.0E-02	1.7E-02	3.1E-02	6.3E-02	1.3E-01	5.1E-02
Formaldehyde	1-hour	4.8E-03	2.9E-03	2.9E-03	5.9E-03	3.7E-03	1.3E-02	3.5E-03	2.1E-03	7.8E-03	9.6E-03	1.5E-02	7.5E-03
Lead	24-hour	1.9E-02	1.5E-02	1.7E-02	3.7E-02	3.0E-02	5.2E-02	6.9E-03	1.1E-02	3.2E-02	3.0E-02	1.6E-01	5.8E-02
Mercury	1-hour	3.6E-04	1.0E-04	1.1E-04	3.7E-04	4.9E-04	9.9E-04	3.0E-04	1.1E-04	3.9E-04	6.8E-04	8.7E-04	3.2E-04
Naphthalene	1-hour	2.3E-05	1.3E-05	1.3E-05	2.7E-05	2.4E-05	6.2E-05	1.8E-05	9.6E-06	3.6E-05	4.8E-05	6.9E-05	3.4E-05
Nickel	1-hour	4.3E-03	2.7E-03	2.8E-03	5.6E-03	3.5E-03	1.2E-02	3.1E-03	2.1E-03	7.3E-03	9.1E-03	1.6E-02	7.4E-03
Nitrogen dioxide	1-hour	3.8E-01	2.7E-01	2.6E-01	3.5E-01	3.9E-01	5.5E-01	3.5E-01	2.6E-01	4.1E-01	5.9E-01	5.9E-01	4.1E-01
Nitrogen dioxide	24-hour	4.2E-01	3.8E-01	3.8E-01	4.3E-01	4.1E-01	6.1E-01	3.6E-01	3.7E-01	4.5E-01	4.6E-01	6.3E-01	4.9E-01
Particulate matter ($PM_{2.5}$)	24-hour	5.7E-01	3.7E-01	3.9E-01	5.4E-01	4.3E-01	**1.3E+00**	3.6E-01	3.7E-01	6.5E-01	7.2E-01	**1.2E+00**	5.5E-01
Propylene	1-hour	3.6E-04	2.1E-04	2.1E-04	4.3E-04	3.5E-04	9.8E-04	2.8E-04	1.5E-04	5.8E-04	7.5E-04	1.1E-03	5.5E-04
Sulphur dioxide	10-min	1.7E-01	1.2E-01	1.0E-01	1.6E-01	1.0E-01	2.8E-01	1.5E-01	8.5E-02	1.6E-01	3.2E-01	1.5E-01	2.3E-01
Sulphur dioxide	1-hour	1.3E-01	9.1E-02	7.9E-02	1.2E-01	7.9E-02	2.2E-01	1.2E-01	6.6E-02	1.2E-01	2.5E-01	1.1E-01	1.8E-01

COPC(1)	Averaging Time	HLVM01	HLVM02	HLVM03	HLVM04	HLVM05	HLVM06	HLVM07	HLSS01	HLSS02	HLSS3_4	HLSS07	HLSS08
Sulphur dioxide	24-hour	3.3E-02	2.8E-02	2.6E-02	3.2E-02	2.7E-02	4.7E-02	3.1E-02	2.5E-02	3.1E-02	4.9E-02	3.3E-02	4.0E-02
Toluene	1-hour	4.6E-06	2.3E-06	2.3E-06	4.6E-06	3.7E-06	1.0E-05	3.5E-06	1.6E-06	6.6E-06	8.4E-06	1.2E-05	5.9E-06
Xylenes	1-hour	1.1E-05	6.6E-06	6.6E-06	1.3E-05	9.9E-06	3.1E-05	8.4E-06	4.8E-06	1.8E-05	2.3E-05	3.5E-05	1.7E-05
Zinc	1-hour	9.5E-03	5.2E-03	5.5E-03	1.1E-02	1.0E-02	2.2E-02	7.5E-03	5.8E-03	1.2E-02	2.3E-02	4.4E-02	1.7E-02
Mixtures [2]													
Respiratory irritants	Acute	5.0E-01	4.4E-01	4.4E-01	5.2E-01	4.8E-01	7.8E-01	4.3E-01	4.2E-01	5.4E-01	6.2E-01	8.7E-01	6.2E-01
Eye irritants	Acute	7.2E-02	4.3E-02	4.3E-02	8.7E-02	5.5E-02	2.0E-01	5.1E-02	3.1E-02	1.2E-01	1.4E-01	2.2E-01	1.1E-01
Hepato-/ Nephro-toxicants	Acute	7.8E-03	3.6E-03	4.1E-03	6.9E-03	7.3E-03	1.6E-02	6.1E-03	3.9E-03	9.8E-03	1.6E-02	2.8E-02	1.0E-02
Reproductive/ developmental	Acute	3.2E-02	2.2E-02	2.4E-02	5.1E-02	4.2E-02	8.1E-02	1.7E-02	1.7E-02	5.1E-02	5.7E-02	2.0E-01	7.8E-02
CNS depressants	Acute	2.0E-02	1.6E-02	1.7E-02	3.7E-02	3.0E-02	5.3E-02	7.2E-03	1.1E-02	3.3E-02	3.1E-02	1.6E-01	5.9E-02

(1) A RQ value equal to or less than 1.0 signifies that the estimated exposure is less than the exposure limit and no health impacts are expected. Boldface values indicate a RQ of greater than 1.0.A

(2) The individual chemicals contained within the chemical mixtures are listed in Table 5.8.

Table 5-15 Acute Risk Quotient (RQ) Values for Inuit at Grays Bay Traditional Use Sites (Project Case)

COPC(1)	Averaging Time	HLDV01	HLDV02	HLDV03	HLDV07
Acenaphthene	24-hour	5.6E-08	1.0E-07	1.5E-07	2.2E-07
Acenaphthylene	24-hour	1.9E-07	3.4E-07	4.8E-07	7.3E-07
Acetaldehyde	1-hour	3.7E-05	4.3E-05	5.7E-05	1.9E-04
Acrolein	1-hour	3.6E-02	4.1E-02	5.5E-02	1.8E-01
Arsenic	1-hour	3.9E-03	4.4E-03	6.2E-03	1.9E-02
Benzene	24-hour	9.0E-04	1.6E-03	2.3E-03	3.5E-03
Cadmium	1-hour	4.9E-03	5.6E-03	7.6E-03	2.5E-02
Carbon monoxide	1-hour	3.8E-02	4.1E-02	5.1E-02	1.4E-01
Carbon monoxide	8-hour	6.2E-02	7.7E-02	7.8E-02	1.7E-01
Chromium (VI)	24-hour	2.8E-04	5.0E-04	6.9E-04	1.1E-03
Copper	1-hour	2.5E-02	2.9E-02	3.8E-02	1.3E-01
Formaldehyde	1-hour	2.7E-03	3.0E-03	4.1E-03	1.3E-02
Lead	24-hour	1.2E-02	2.1E-02	2.9E-02	4.7E-02
Mercury	1-hour	6.2E-05	7.1E-05	9.8E-05	3.1E-04
Naphthalene	1-hour	5.0E-06	5.7E-06	8.5E-06	2.4E-05

COPC(1)	Averaging Time	HLDV01	HLDV02	HLDV03	HLDV07
Nickel	1-hour	4.8E-03	5.9E-03	6.4E-03	1.3E-02
Nitrogen dioxide	1-hour	2.0E-01	2.0E-01	2.2E-01	3.2E-01
Nitrogen dioxide	24-hour	1.9E-01	2.9E-01	3.6E-01	3.9E-01
Particulate matter ($PM_{2.5}$)	24-hour	2.9E-01	3.1E-01	3.1E-01	4.6E-01
Propylene	1-hour	9.6E-05	1.1E-04	1.6E-04	4.8E-04
Sulphur dioxide	10-min	6.2E-02	6.6E-02	6.8E-02	9.1E-02
Sulphur dioxide	1-hour	4.8E-02	5.1E-02	5.3E-02	7.1E-02
Sulphur dioxide	24-hour	2.7E-02	3.3E-02	3.7E-02	4.4E-02
Toluene	1-hour	1.3E-06	1.4E-06	2.0E-06	6.3E-06
Xylenes	1-hour	3.7E-06	4.3E-06	6.0E-06	1.9E-05
Zinc	1-hour	8.7E-03	9.9E-03	1.3E-02	4.4E-02
Mixtures (2)					
Respiratory irritants	Acute	2.6E-01	3.7E-01	4.6E-01	6.4E-01
Eye irritants	Acute	3.9E-02	4.4E-02	5.9E-02	2.0E-01
Hepato-/ Nephro- toxicants	Acute	4.9E-03	5.6E-03	7.6E-03	2.5E-02
Reproductive/ developmental	Acute	1.6E-02	2.6E-02	3.5E-02	6.6E-02
CNS depressants	Acute	1.2E-02	2.1E-02	2.9E-02	4.7E-02

(1) A RQ value equal to or less than 1.0 signifies that the estimated exposure is less than the exposure limit and no health impacts are expected. **Boldface** values indicate a RQ greater than 1.0.

The individual chemicals contained within the chemical mixtures are listed in Table 5.8.

5.4.2 Chronic Inhalation Results

Chronic health risks were based on assumed long term exposure to maximum predicted air concentrations. The estimated chronic health risks associated with inhalation alone are presented as RQ values in Tables 5-16 to 5-18 for the receptor locations that were chosen for the High Lake Mine Project. Predicted incremental lifetime cancer risks associated with the project are presented as ILCR values in Tables 5-16 to 5-18 for inhalation alone.

The chronic RQ values summarized in the Table 5-16 for "Facility Footprint" receptors are all less than 1.0 with the exception of chromium (hexavalent), manganese, NO_2 and $PM_{2.5}$. For mixtures, RQ exceedances were predicted for CNS depressants and carcinogens. Potential chronic health risks for these exceptions are discussed below.

The chronic RQ values summarized in the Table 5-17 for "Outside of Facility Footprint" receptors are all less than 1.0 with the exception of NO_2. No RQ exceedances were predicted for the mixtures. Potential chronic health risks are discussed below.

The chronic ERs summarized in the Table 5-18 for "Grays Bay" receptors are all less than 1.0.

5.4.2.1 Chronic Health Risks

Chromium (VI)

The only predicted chronic ILCR value above 1.0 for exposure to chromium VI was predicted at the camp (CrVI RQ value = 1.2). All other ILCR values at receptor locations were below acceptable thresholds.

It is important to note that worker exposure will be limited, incorporating 12-hour operational shifts and 2-week rotation cycles off site that will limit the amount of time each worker will be on site and potentially exposed to localized outdoor air episodes. The duration of exposures would not exceed 14 years or the lifetime of the project. In addition, due to the harsh climate, workers are expected to remain indoors for much of the time spent there. ILCR values incorporated a worst case worker amortization factor of 0.12 (defined in Section 5.2.3).

Chronic exposure to chromium VI through inhalation has been identified with increased incidences of cancer in humans. Nasal mucosal irritation, atrophy and perforation have been widely reported following occupational inhalation to chromic acid mists and dissolved hexavalent chromium aerosols (U.S. EPA 1998). An increased incidence of respiratory disease causing death was reported in chrome plating plant workers (Sorahan *et al.* 1987, cited in ATSDR 2000). U.S. EPA identifies CrVI as a known

human carcinogen, There is some debate as to the threshold for carcinogenicity of CrVI due to the reducing capacity in epithelial lining fluid of the gastrointestinal tract, pulmonary macrophages and parenchyma cells resulting in reduced bioavailability of CrVI (RIVM 2001).

Adverse health effects from chromium VI are not expected due to the following:

- ILCR value (1.2 in 100,000) only slightly elevated above assumed acceptable level of 1.0 in 100,000;
- The assumption that hexavalent chromium is emitted from the facility when there lacks data to suggest that it is actually emitted; and
- Indoor air quality will be engineered and appropriately filtered to ensure adequate quality for workers.

Manganese

One slight exceedance of the chronic exposure limit for manganese was predicted at the camp location (*i.e.*, RQ = 1.1). The U.S. EPA RfC of 0.05µg/m^3 was derived from a LOAEL of 50µg/m^3, which is based on an 8-hour TWA occupational exposure (Roels *et al.* 1987, cited in U.S. EPA 1993). An uncertainty factor of 1000 incorporates a factor of 10 to protect sensitive individuals, 10 for the use of a LOAEL, and 10 for 'database limitations' (U.S. EPA 1993).

Occupational studies have identified an apparent dose-response relationship with levels of manganese and effects ranging from neurological impairment to neurological damage in manganese miners (Mergler *et al.* 1999, cited in ATSDR 2000). U.S. EPA identified consistent patterns of evidence indicating neurotoxicity was associated with low-level occupational manganese exposure in workers (1993). Given the conservatism incorporated in the assessment methodology and exposure limits, the possibility that these effects could occur in workers is not anticipated given the uncertainty/safety factors that the RfC incorporates.

Nitrogen Dioxide

The predicted chronic RQ values for exposure to NO_2 ranged from 1.2 to 1.3 for the off-site receptor location (HLVM06) and the camp location, respectively (Table 5-16, 5-17). Animal toxicological studies and epidemiological studies on populations have observed adverse health effects with annual average NO_2 concentrations above 40 µg/m^3 (WHO 2005). However, adverse health effects observed in these studies are also associated with other primary chemicals (*i.e.*, co-exposure to PM) and secondary products. Therefore, it is difficult to determine to what extent the health effects are attributable to NO_2 itself.

Chronic effects from exposure to NO2 will likely be mitigated by incorporating 12-hour operational shifts and 2-week rotation cycles off site that will limit the amount of time

each worker will be on site. Similarly, Inuit are not expected to be continuously harvesting country food within the area surrounding the mine. Based on past history, Inuit may spend 2 to 8 weeks in the study area, mostly likely at Grays Bay, where risks were predicted to be acceptable. The chronic NO_2 RQ values presented for the worker and Inuit are likely overestimated; therefore, adverse health effects from chronic exposures are not anticipated.

Particulate Matter ($PM_{2.5}$)

The predicted chronic RQ for exposure to $PM_{2.5}$ was 1.1 for both the land farm and alternate camp locations, and 1.9 for the camp location (Table 5-16).

The predicted $PM_{2.5}$ air concentrations were compared against the CARB standard of 12µg/m^3 for long-term exposure (CARB 2002). The CARB standard is based on long-term epidemiological studies that link $PM_{2.5}$ with mortality at mean concentrations in the range of 13µg/m^3 to 18µg/m^3 (CARB 2002). Predicted concentrations at the alternate camp (13.3 µg/m^3) and land farm (12.9 µg/m^3) receptor locations fall at the lower end of the 13 to 18 µg/m^3 range.

The highest annual average $PM_{2.5}$ concentration was predicted to occur at the camp receptor location (*i.e.*, 23.1µg/m^3). The $PM_{2.5}$ prediction falls within the range wherein health effects have been noted. Health effects related to long-term concentrations of PM have been observed in studies where reported annual average air concentrations were 18 µg/m^3 (Dockery *et al*. 1993; pope *et al*. 1995; Krewski *et al*. 2000; Pope 2002; Jarrett 2005) and 20 µg/m^3 (Pope *et al*. 2002).

The selection of background values chosen for $PM_{2.5}$ should be considered conservative. Monitoring data from northern environments is not readily available and as a result particulate matter data from Yellowknife, Fort Liard, Norman Wells, Inuvik, Daring Lake and Fort Simpson were used in the HHRA. As these data include a year of strong forest fire activity (2004) and, unlike the current High Lake Project area, are associated with areas which include dirt roads and extensive human activity, the background value of 7µg/m³ should be viewed as conservative. For comparative purposes, long-term average concentrations of $PM_{2.5}$ at Elk Island were 4.4µg/m^3, and the long-term average values at the other sites (*i.e.*, Redwater, Fort Saskatchewan, Lamont, Elk Island) were in the 5.4 to 7.8µg/m^3 range. Cheng *et al.* (2000) identified "rural remote" sites ranging from 1.7 to 3.8µg/m^3.

Finally, indoor air concentrations in the camp and in working environments will be subject to appropriate ventilation and air filtration system to ensure acceptable air quality is maintained. Chronic effects from exposure to PM will also be mitigated by incorporating 12-hour operational shifts and 2-week rotation cycles off site that will limit the amount of time each worker will be on site. The chronic PM RQ values presented

for the worker are likely overestimated; therefore, adverse health effects from chronic exposures is not anticipated.

5.4.2.2 Chronic Mixtures

CNS Depressants

The predicted chronic RQ values for exposure to CNS depressants was 1.2 at the camp location (Table 5-16). Exceedance to the CNS depressant pathway at this location is largely driven by manganese concentrations in air, which has been discussed previously. This indicates minimal impact to human health from chronic exposure to CNS depressants.

Carcinogens

The predicted chronic RQ values for exposure to carcinogenic mixtures within the facility footprint at the camp location (ILCR = 2.2), indicating increased risk from extended exposure at this location. This ILCR value incorporated an amortization factor of 0.12 (Section 5.2.3) to account for the reduced risk from leaving the site 6 months per year and working at the site for 14 years.

Exceedance of the carcinogenic mixture ILCR value at this location is largely driven by exposure to chromium VI. Adverse health effects from chromium VI are not expected due to the assumption that hexavalent chromium is emitted from the facility; and indoor air quality will be engineered and appropriately filtered to ensure adequate quality for workers. Therefore, adverse health effects from exposures to carcinogenic mixtures are not anticipated.

Table 5-16 Chronic Risk Quotient (RQ) Values for Worker Receptors Within the High Lake Mine Facility Footprint and Grays Bay Loading Site (Project Case)

COPC[1]	High Lake Mine Site			Grays Bay Loading Site		
	Camp	**AltCamp**	**LandFarm**	**HLVD04**	**HLVD05**	**HLVD06**
ILCR [2]						
1,3-Butadiene	1.3E-03	4.9E-04	4.6E-04	4.1E-05	5.7E-05	4.6E-05
Arsenic	1.1E-01	4.9E-02	4.8E-02	2.8E-03	3.8E-03	3.2E-03
Benzo(a)pyrene IPM group	1.7E-04	7.6E-05	7.1E-05	1.3E-05	1.8E-05	1.4E-05
Acetaldehyde	2.7E-03	1.0E-03	9.7E-04	9.5E-05	1.3E-04	1.1E-04
Benzene	7.2E-06	2.7E-06	2.5E-06	1.9E-07	2.6E-07	2.2E-07
Cadmium	8.4E-01	3.7E-01	3.7E-01	2.6E-02	3.6E-02	2.8E-02
Chromium (VI)	**1.2E+00**	4.6E-01	4.2E-01	2.3E-02	3.1E-02	2.5E-02
Formaldehyde	6.0E-03	2.6E-03	2.5E-03	4.5E-04	6.3E-04	5.0E-04
Nickel	9.2E-03	3.6E-03	3.3E-03	5.6E-04	7.2E-04	7.7E-04
Propylene	9.0E-03	3.4E-03	3.2E-03	2.8E-04	3.8E-04	3.1E-04
RQ						
Acenaphthene	3.6E-06	1.3E-06	1.2E-06	5.4E-08	7.4E-08	6.5E-08
Acenaphthylene	7.9E-06	2.9E-06	2.7E-06	1.7E-07	2.4E-07	2.0E-07
Acrolein	1.7E-01	7.2E-02	6.8E-02	1.2E-02	1.6E-02	1.3E-02
Chromium (total)	6.3E-04	2.3E-04	8.9E-05	8.0E-05	4.4E-06	6.0E-06
Copper	1.9E-01	8.6E-02	8.6E-02	5.7E-03	7.9E-03	6.1E-03
Lead	9.7E-02	4.8E-02	4.8E-02	1.8E-03	2.4E-03	1.9E-03
Manganese	**1.1E+00**	4.6E-01	4.2E-01	2.0E-02	2.8E-02	2.2E-02
Mercury	6.5E-04	3.0E-04	3.3E-04	1.5E-05	2.0E-05	1.7E-05
Naphthalene	3.2E-03	1.2E-03	1.1E-03	8.1E-05	1.1E-04	9.3E-05
Nitrogen dioxide	**1.3E+00**	9.0E-01	8.7E-01	1.5E-01	1.6E-01	1.6E-01
Particulate matter (PM2.5)	**1.9E+00**	**1.1E+00**	**1.1E+00**	6.1E-01	6.2E-01	6.1E-01
Selenium	3.0E-04	1.2E-04	1.1E-04	9.0E-06	1.2E-05	1.0E-05

		High Lake Mine Site			Grays Bay Loading Site	
Sulphur dioxide	1.1E-01	1.0E-01	1.0E-01	1.0E-01	1.0E-01	1.0E-01
Toluene	8.2E-06	3.3E-06	3.3E-06	2.9E-07	4.0E-07	3.3E-07
Xylenes	1.1E-04	4.2E-05	4.0E-05	4.2E-06	5.8E-06	4.7E-06
Zinc	1.7E-03	7.9E-04	7.8E-04	5.5E-05	7.7E-05	6.0E-05
Mixtures[3]						
Respiratory irritants - Nasal	1.7E-01	7.3E-02	6.9E-02	1.2E-02	1.7E-02	1.3E-02
Hepato- and Nephro- toxicants	1.1E-05	4.1E-06	4.0E-06	2.3E-07	3.2E-07	2.7E-07
CNS depressants	**1.2E+00**	5.1E-01	4.7E-01	2.2E-02	3.0E-02	2.4E-02
Carcinogens	**2.2E+00**	8.9E-01	8.5E-01	5.3E-02	7.3E-02	5.8E-02

(1) A RQ or ILCR equal to or less than 1.0 signifies that the estimated exposure is less than the exposure limit and no health impacts are expected. **Boldface** values indicate a RQ or ILCR value greater than 1.0.

(2) ILCR value adjusted with amortization factor of 0.12; defined in Section 5.2.3

(3) The individual chemicals contained within the chemical mixtures are listed in Table 5.8.

Table 5-17 Chronic Risk Quotient (RQ) Values for Inuit Receptors Outside of the High Lake Mine Site and Within 2km of Site (Project Case)

COPC[1]	HLVM01	HLVM02	HLVM03	HLVM04	HLVM05	HLVM06	HLVM07	HLSS01	HLSS02	HLSS3_4	HLSS07	HLSS08
ILCR [2]												
1,3-Butadiene	3.1E-04	1.1E-04	1.3E-04	2.4E-04	7.2E-05	9.1E-04	1.1E-04	7.8E-05	4.8E-04	7.5E-04	4.6E-04	1.9E-04
Acetaldehyde	1.6E-02	5.5E-03	6.9E-03	1.3E-02	4.2E-03	4.4E-02	5.8E-03	4.1E-03	2.4E-02	3.5E-02	2.7E-02	1.0E-02
Arsenic	4.5E-05	1.5E-05	1.8E-05	3.4E-05	9.9E-06	1.3E-04	1.6E-05	1.2E-05	7.2E-05	1.2E-04	6.9E-05	2.7E-05
Benzene	6.5E-04	2.2E-04	2.8E-04	5.1E-04	1.5E-04	1.9E-03	2.4E-04	1.6E-04	1.0E-03	1.6E-03	9.7E-04	3.9E-04
Benzo(a)pyrene IPM group	1.7E-06	5.9E-07	7.4E-07	1.4E-06	4.0E-07	5.0E-06	6.3E-07	4.3E-07	2.7E-06	4.1E-06	2.5E-06	1.0E-06
Cadmium	6.9E-02	2.6E-02	3.4E-02	6.6E-02	2.3E-02	1.9E-01	2.7E-02	1.9E-02	9.9E-02	1.3E-01	1.7E-01	5.0E-02
Chromium (VI)	2.1E-01	6.7E-02	7.9E-02	1.4E-01	3.7E-02	5.7E-01	7.3E-02	5.0E-02	3.3E-01	5.1E-01	3.3E-01	1.2E-01
Formaldehyde	1.6E-03	5.3E-04	6.3E-04	1.2E-03	3.4E-04	4.6E-03	5.7E-04	4.0E-04	2.5E-03	4.1E-03	2.4E-03	9.4E-04
Nickel	1.8E-03	6.1E-04	7.3E-04	1.3E-03	3.8E-04	5.1E-03	6.5E-04	4.5E-04	2.8E-03	4.4E-03	2.8E-03	1.1E-03
Propylene	2.2E-03	7.4E-04	9.3E-04	1.7E-03	5.0E-04	6.3E-03	7.9E-04	5.4E-04	3.3E-03	5.2E-03	3.2E-03	1.3E-03

COPC[1]	HLVM01	HLVM02	HLVM03	HLVM04	HLVM05	HLVM06	HLVM07	HLSS01	HLSS02	HLSS3_4	HLSS07	HLSS08
RQ												
Acenaphthene	5.8E-07	2.0E-07	2.6E-07	4.7E-07	1.4E-07	1.7E-06	2.1E-07	1.4E-07	8.9E-07	1.4E-06	8.5E-07	3.5E-07
Acenaphthylene	1.3E-06	4.5E-07	5.7E-07	1.0E-06	3.1E-07	3.8E-06	4.8E-07	3.3E-07	2.0E-06	3.1E-06	1.9E-06	7.8E-07
Acrolein	3.0E-02	1.0E-02	1.2E-02	2.3E-02	6.6E-03	8.8E-02	1.1E-02	7.7E-03	4.8E-02	7.8E-02	4.6E-02	1.8E-02
Chromium (total)	2.8E-05	9.0E-06	1.1E-05	1.9E-05	5.0E-06	7.7E-05	9.9E-06	6.8E-06	4.4E-05	6.9E-05	4.4E-05	1.6E-05
Copper	6.2E-03	2.4E-03	3.2E-03	5.9E-03	2.6E-03	1.5E-02	2.4E-03	1.9E-03	8.2E-03	8.6E-03	1.9E-02	5.4E-03
Lead	4.2E-03	1.6E-03	2.1E-03	3.8E-03	1.7E-03	1.0E-02	1.6E-03	1.2E-03	5.7E-03	6.5E-03	1.1E-02	3.5E-03
Manganese	1.2E-01	3.9E-02	4.6E-02	8.1E-02	2.2E-02	3.3E-01	4.3E-02	3.0E-02	1.9E-01	3.0E-01	2.0E-01	7.1E-02
Mercury	6.5E-05	3.0E-05	3.7E-05	1.0E-04	2.6E-05	1.9E-04	3.1E-05	1.8E-05	9.1E-05	1.3E-04	2.2E-04	4.6E-05
Naphthalene	5.3E-04	1.8E-04	2.3E-04	4.2E-04	1.3E-04	1.6E-03	2.0E-04	1.3E-04	8.3E-04	1.3E-03	7.9E-04	3.2E-04
Nitrogen dioxide	4.7E-01	2.3E-01	2.8E-01	4.2E-01	2.0E-01	**1.2E+00**	2.4E-01	1.9E-01	6.5E-01	8.8E-01	6.7E-01	3.3E-01
Particulate matter (PM2.5)	7.4E-01	6.4E-01	6.5E-01	7.0E-01	6.2E-01	9.9E-01	6.4E-01	6.2E-01	8.1E-01	9.2E-01	8.3E-01	6.8E-01
Selenium	4.3E-05	1.5E-05	1.9E-05	3.4E-05	1.0E-05	1.3E-04	1.6E-05	1.1E-05	6.7E-05	1.0E-04	6.7E-05	2.6E-05
Sulphur dioxide	1.0E-01	1.0E-01	1.0E-01	1.0E-01	1.0E-01	1.1E-01	1.0E-01	1.0E-01	1.0E-01	1.1E-01	1.0E-01	1.0E-01
Toluene	1.4E-06	5.0E-07	6.1E-07	1.3E-06	3.5E-07	4.0E-06	5.3E-07	3.5E-07	2.1E-06	3.3E-06	2.5E-06	8.4E-07
Xylenes	1.8E-05	6.3E-06	7.8E-06	1.4E-05	4.2E-06	5.4E-05	6.7E-06	4.6E-06	2.9E-05	4.5E-05	2.7E-05	1.1E-05
Zinc	6.7E-05	2.6E-05	3.4E-05	6.2E-05	2.6E-05	1.7E-04	2.6E-05	2.0E-05	9.3E-05	1.1E-04	1.9E-04	5.5E-05
Mixtures [3]												
Respiratory irritants - Nasal	3.1E-02	1.0E-02	1.2E-02	2.3E-02	6.8E-03	8.9E-02	1.1E-02	7.9E-03	4.9E-02	8.0E-02	4.7E-02	1.8E-02
Hepato- and Nephro- toxicants	1.9E-06	6.5E-07	8.2E-07	1.5E-06	4.4E-07	5.5E-06	6.9E-07	4.7E-07	2.9E-06	4.5E-06	2.8E-06	1.1E-06
CNS depressants	1.3E-01	4.1E-02	4.8E-02	8.4E-02	2.4E-02	3.4E-01	4.4E-02	3.1E-02	2.0E-01	3.0E-01	2.1E-01	7.5E-02
Carcinogens	3.0E-01	1.0E-01	1.2E-01	2.2E-01	6.6E-02	8.2E-01	1.1E-01	7.5E-02	4.6E-01	7.0E-01	5.3E-01	1.8E-01

(1) A RQ or ILCR value equal to or less than 1.0 signifies that the estimated exposure is less than the exposure limit and no health impacts are expected. Boldface values indicate a RQ or ILCR value greater than 1.0.

(2) ILCR value adjusted with amortization factor of 0.17; defined in Section 5.2.3

(3) The individual chemicals contained within the chemical mixtures are listed in Table 5.8.

Table 5-18 Chronic Risk Quotient (RQ) Values for Inuit at Grays Bay Traditional Use Sites (Project Case)

COPC[1]	HLDV01	HLDV02	HLDV03	HLDV07
ILCR [2]				
1,3-Butadiene	3.2E-06	4.0E-06	4.0E-06	7.8E-06
Arsenic	2.3E-04	2.8E-04	2.9E-04	5.5E-04
Acetaldehyde	8.8E-07	1.1E-06	1.1E-06	2.3E-06
Benzene	7.2E-06	9.0E-06	9.1E-06	1.8E-05
Benzo(a)pyrene IPM group	1.6E-08	1.9E-08	2.0E-08	3.7E-08
Cadmium	1.8E-03	2.2E-03	2.3E-03	4.6E-03
Chromium (VI)	1.7E-03	2.1E-03	2.1E-03	4.2E-03
Formaldehyde	3.2E-05	4.0E-05	4.0E-05	8.2E-05
Nickel	7.5E-05	8.6E-05	8.9E-05	1.5E-04
Propylene	2.2E-05	2.7E-05	2.7E-05	5.2E-05
RQ				
Acenaphthene	3.9E-09	4.7E-09	4.7E-09	8.3E-09
Acenaphthylene	1.1E-08	1.3E-08	1.3E-08	2.4E-08
Acrolein	5.6E-04	7.0E-04	7.1E-04	1.5E-03
Chromium (total)	2.3E-07	2.9E-07	2.9E-07	5.7E-07
Copper	2.5E-04	3.2E-04	3.3E-04	6.9E-04
Lead	8.5E-05	1.1E-04	1.1E-04	2.2E-04
Manganese	1.1E-03	1.3E-03	1.3E-03	2.6E-03
Mercury	9.7E-07	1.2E-06	1.2E-06	2.1E-06
Naphthalene	4.8E-06	5.9E-06	6.0E-06	1.1E-05
Nitrogen dioxide	1.0E-01	1.0E-01	1.0E-01	1.1E-01
Particulate matter (PM2.5)	5.9E-01	5.9E-01	5.9E-01	5.9E-01
Selenium	4.9E-07	6.1E-07	6.1E-07	1.2E-06
Sulphur dioxide	1.0E-01	1.0E-01	1.0E-01	1.0E-01
Toluene	1.6E-08	2.0E-08	2.0E-08	3.9E-08
Xylenes	2.2E-07	2.7E-07	2.8E-07	5.5E-07
Zinc	2.5E-06	3.2E-06	3.2E-06	6.7E-06

COPC[1]	HLDV01	HLDV02	HLDV03	HLDV07
Mixtures [3]				
Respiratory irritants - Nasal	5.6E-04	7.1E-04	7.2E-04	1.5E-03
Hepato- and Nephro- toxicants	1.5E-08	1.8E-08	1.8E-08	3.3E-08
CNS depressants	1.1E-03	1.4E-03	1.4E-03	2.8E-03
Carcinogens	3.8E-03	4.8E-03	4.9E-03	9.7E-03

(1) A RQ value equal to or less than 1.0 signifies that the estimated exposure is less than the exposure limit and no health impacts are expected. **Boldface** values indicate a RQ value greater than 1.0.

(2) ILCR value adjusted with amortization factor of 0.17; defined in Section 5.2.3

(3) The individual chemicals contained within the chemical mixtures are listed in Table 5.8.

5.4.3 Chronic Multi Media Exposure Assessment

Chronic exposures to multiple pathways were evaluated a hypothetical Inuit and worker receptor. The Inuit receptor was assumed to forage and consume traditional foods from the area surrounding the project for their entire lifetime and 2 months per year. Alternatively, the worker receptor was assumed to be on-site for the duration of the project (*i.e.*, 14 years) and half the time (*i.e.*, 6 months per year or 2 weeks on and 2 weeks off each year).

5.4.3.1 Inuit Receptor

Table 5-19 provides a summary of the ILCR values for the Inuit receptor foraging the local study area for their entire lifetime (*i.e.*, infant to adult) and for an adjusted period (*i.e.*, two months per year). Table 5-20 provides RQ and reduced RQ values for a toddler and Table 5-21 provides RQ values for an adult.

Table 5-19 Summary of ILCR Values for the Inuit Receptor

Chemical	ILCR for Full Exposure	ILCR for Reduced Exposure (1)
Arsenic (2)	5.2E-01	8.6E-02
Benzo(a)pyrene (IPM)	3.4E-01	5.7E-02

(1) ILCR value adjusted with amortization factor of 0.17; defined in Section 5.2.4

(2) ILCR value modified with inorganic arsenic (*i.e.*, carcinogenic for of arsenic) content of food; assumed to be 37% (See Section 5.2.5 for details)

Table 5-20 Summary of Multi Pathway RQ Values for the Toddler Inuit Receptor

Chemical	Full Exposure			Reduced Exposure(1)		
	Baseline RQ	**Project RQ**	**Baseline + Project**	**Baseline RQ**	**Project RQ**	**Baseline + Project**
Aluminium	3.0E-01	1.0E-05	3.0E-01	5.1E-02	1.7E-06	5.1E-02
Antimony	7.4E-01	**2.8E+00**	**3.5E+00**	1.2E-01	4.7E-01	5.9E-01
Barium	**6.3E+00**	3.0E-02	**6.3E+00**	**1.0E+00**	5.0E-03	**1.1E+00**
Cadmium	2.5E-01	3.5E-02	2.9E-01	4.2E-02	5.8E-03	4.8E-02
Chromium (Total)	**3.9E+00**	3.4E-01	**4.2E+00**	6.5E-01	5.7E-02	7.1E-01
Chromium(VI)	3.9E-01	3.4E-02	4.2E-01	6.5E-02	5.6E-03	7.0E-02
Copper	**1.1E+00**	1.2E-01	**1.2E+00**	1.8E-01	2.0E-02	2.0E-01
Lead	**1.0E+00**	3.5E-02	**1.0E+00**	1.7E-01	5.8E-03	1.7E-01
Manganese	**1.2E+01**	3.4E-01	**1.2E+01**	**2.0E+00**	5.7E-02	**2.0E+00**

	Full Exposure			Reduced Exposure[1]		
Mercury	7.4E-01	2.6E-03	7.4E-01	1.2E-01	4.4E-04	1.2E-01
Mercury(methyl)	**3.3E+01**	0.0E+00	**3.3E+01**	**5.5E+00**	0.0E+00	**5.5E+00**
Molybdenum	3.6E-01	1.3E-02	3.7E-01	6.0E-02	2.1E-03	6.2E-02
Nickel	2.0E-01	1.6E-03	2.0E-01	3.3E-02	2.7E-04	3.3E-02
Selenium	9.7E-01	3.1E-01	**1.3E+00**	1.6E-01	5.1E-02	2.1E-01
Silver	2.1E-02	0.0E+00	2.1E-02	3.5E-03	0.0E+00	3.5E-03
Total Cyanide	0.0E+00	1.9E-04	1.9E-04	0.0E+00	3.2E-05	3.2E-05
Zinc	**1.2E+00**	2.7E-02	**1.2E+00**	1.9E-01	4.5E-03	2.0E-01

(1) RQ value adjusted with amortization factor of 0.17; defined in Section 5.2.4

Table 5-21 Summary of Multi Pathway RQ Values for the Adult Inuit Receptor

Chemical	Full Exposure			Reduced Exposure[1]		
	Baseline RQ	**Project RQ**	**Baseline + Project**	**Baseline RQ**	**Project RQ**	**Baseline + Project**
Aluminium	9.6E-02	5.2E-06	9.6E-02	1.6E-02	8.7E-07	1.6E-02
Antimony	3.3E-01	**1.4E+00**	**1.7E+00**	5.5E-02	2.4E-01	2.9E-01
Barium	**2.4E+00**	1.5E-02	**2.4E+00**	4.0E-01	2.5E-03	4.1E-01
Cadmium	1.2E-01	1.9E-02	1.4E-01	2.0E-02	3.2E-03	2.3E-02
Chromium (Total)	**2.1E+00**	1.8E-01	**2.3E+00**	3.5E-01	3.0E-02	3.8E-01
Chromium(VI)	2.1E-01	1.8E-02	2.3E-01	3.5E-02	3.0E-03	3.8E-02
Copper	4.6E-01	6.1E-02	5.2E-01	7.6E-02	1.0E-02	8.7E-02
Lead	5.1E-01	1.8E-02	5.3E-01	8.5E-02	2.9E-03	8.8E-02
Manganese	**4.6E+00**	1.3E-01	**4.7E+00**	7.6E-01	2.1E-02	7.8E-01
Mercury	3.6E-01	1.4E-03	3.6E-01	6.0E-02	2.4E-04	6.0E-02
Mercury(methyl)	**1.7E+01**	0.0E+00	**1.7E+01**	**2.8E+00**	0.0E+00	**2.8E+00**
Molybdenum	1.6E-01	6.4E-03	1.6E-01	2.6E-02	1.1E-03	2.7E-02
Nickel	9.5E-02	9.4E-04	9.6E-02	1.6E-02	1.6E-04	1.6E-02
Selenium	4.9E-01	1.6E-01	6.5E-01	8.2E-02	2.6E-02	1.1E-01
Silver	8.8E-03	0.0E+00	8.8E-03	1.5E-03	0.0E+00	1.5E-03
Total Cyanide	0.0E+00	1.1E-04	1.1E-04	0.0E+00	1.8E-05	1.8E-05
Zinc	5.1E-01	1.3E-02	5.3E-01	8.6E-02	2.1E-03	8.8E-02

(1) RQ value adjusted with amortization factor of 0.17; defined in Section 5.2.4

Table 5-19 indicates that incremental lifetime cancer risks are predicted to be below threshold level of one in 100,000 assuming full exposure to the site. Predicted ILCR for arsenic are driven by exposure to fish (51%) and game (30%) consumed from the local study area.

Table 5-20 indicates that toddler exposures to antimony, barium, total chromium, copper, lead, manganese, methyl mercury, selenium and zinc exceed the threshold value of 1.0 for the Baseline + Project case, assuming full exposure to the site on a continuous basis. All RQ values are below 10 with the exception of methyl mercury (RQ = 33). The exceedance of RQ values in Table 5-20 are largely based on calculated Baseline risks that are based on conservative exposure point concentrations (*i.e.*, fish total mercury 95th percentile = 0.54 mg/kg), assumed high consumption rates and also assumed that people are continuously living/harvesting country food at the site. Table 5-20 demonstrates that, with the exception of barium, manganese and methyl mercury, all RQ values are below the threshold value of 1.0 if exposures are adjusted to represent only two months per year from the site.

Predicted antimony risks in the project case are entirely due to the predicted increase in fish muscle concentrations from one lake primarily (*i.e.*, largest increase predicted to occur in L23) and the assumption that 100% of fish consumed by Inuit is derived from lakes and streams surrounding the proposed mine. Surface water antimony concentrations in L23 are predicted to increase 0.46μg/L from a baseline maximum non-detect value of <0.1μg/L. The predicted increase in surface water concentrations results in an increase in fish tissue concentrations from 0.019 to 0.18 mg/kg ww. The incremental increase in antimony concentrations from other water bodies in the study area (*i.e.*, L21, L24, L6, L1-L3, East Dam, L8, West Zone, South Drainage and L15) are predicted to range from 0.0003 to 0.44μg/L. All other water bodies show no change in surface water antimony concentrations (*i.e.*, L5, L4, Kennarctic River, Diversion L15 to L4 and High Lake). This assessment is based on the conservative assumption that lakes and streams surrounding the mine are harvested for fish on a chronic basis and that the fish populations in the lakes can sustain such harvesting. However, the mouth of the Kennarctic River has been identified as the primary source for harvesting of fish by Inuit and that predicted changes in the Kennarctic River are not expected to occur as a result of the project. Therefore, risks to antimony from fish consumption are not expected.

Predicted barium risks are primarily due to baseline conditions and are represented by exposure to traditional plants. Measured baseline 95th percentile barium concentrations in Labrador tea (*i.e.*, 100 mg/kg dw or 15 mg/kg ww) are assumed to be consumed 67 grams/day by the toddler (a 2004). Measured 95th percentile barium concentrations in crowberry were substantially less (*i.e.*, 31 mg/kg dw or 4.7 mg/kg ww), suggesting that Labrador tea may accumulate higher concentrations of barium than other traditional plants like crowberry.

Similarly, manganese risks are largely due to predicted baseline exposures to traditional plants. The 95th percentile concentration of manganese in Labrador tea and crowberry were 1565 mg/kg dw and 576 mg/kg dw, respectively. Combining the Labrador tea concentration on a wet weight basis with the consumption rate of 67 grams per day for the toddler (Health Canada 2004a) results in baseline exposures above the US EPA reference dose of 140 µg/kg/day.

Methyl mercury risks are entirely due to the combination of the Baseline methyl mercury concentration (*i.e.*, 95th percentile) and the consumption rate (94 grams per day; Health Canada 2004a) assumed for toddler Inuit. Baseline 95th percentile concentrations of total mercury in fish muscle from the local study area is 0.54 mg/kg wet weight (*i.e.*, Kennarctic River), which slightly exceeds the Canadian consumption guideline for commercial fish of 0.5 mg/kg (Health Canada 2007). The average total mercury concentration was measured to be 0.24 mg/kg wet weight from the Kennarctic River. The project is predicted to have no impact on increasing total mercury concentrations in fish and currently Environment Canada has no territorial fish advisories in Nunavut (Environment Canada 2007).

Table 5-21 indicates that adult exposures to antimony, barium, total chromium, manganese and methyl mercury exceed the threshold value of 1.0 for the Baseline + Project case, assuming full exposure to the site on a continuous basis. All RQ values are below 10 with the exception of methyl mercury. With the exception of antimony, the exceedance of RQ values in Table 5-21 are largely based on calculated "baseline" risks in combination with conservative exposure point concentrations (*i.e.*, 95th percentile), assumed high consumption rates and the assumption of people living continuously at the site.

Antimony risks are predicted to increase due to the project; however, this is entirely due to the predicted increase in fish concentrations in lakes surrounding the mine. The assessment is based on the conservative assumption that lakes and streams surrounding the mine are harvested for fish on a chronic basis and that the fish populations in the lakes can sustain such harvesting. However, the mouth of the Kennarctic River has been identified as the primary source for harvesting of fish by Inuit and that predicted changes in the Kennarctic River are not expected to occur as a result of the project. Therefore, risks to antimony from fish consumption by adult Inuit are not expected.

Methyl mercury risks are entirely due to the combination of baseline concentration (*i.e.*, 95th percentile of 0.54 mg/kg) and the consumption rate (220 grams per day; Health Canada 2004a) assumed for adult Inuit. Table 5-21 demonstrates that, with the

exception of methyl mercury, all RQ values are below the threshold value of 1.0 if exposures are adjusted to only represent two months per year from the site. Baseline concentrations of fish muscle slightly exceed the Health Canada consumption guideline for commercial fish currently Environment Canada has no territorial fish advisories in Nunavut (Environment Canada 2007). The project is not expected to increase methyl mercury concentrations in fish.

5.4.3.2 Worker Receptor

Table 5-22 provides a summary of the ILCR values for the worker receptor and for an adjusted period (*i.e.*, 6 months per year). Table 5-23 provides RQ values and adjusted RQ values for a hypothetical adult worker.

Table 5-22 Summary of ILCR Values for the Worker Receptor

	ILCR for Full Exposure	ILCR for Reduced Exposure [(1)]
Arsenic	7.1E-01	8.6E-02
Benzo(a)pyrene (IPM)	3.0E-04	3.6E-05

[(1)] ILCR value adjusted with amortization factor of 0.12; defined in Section 5.2.4

Table 5-23 Summary of Multi Pathway RQ Values for the Worker Receptor

Chemical	Full Exposure			Reduced Exposure[(1)]		
	Baseline RQ	Project RQ	Baseline + Project	Baseline RQ	Project RQ	Baseline + Project
Aluminium	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Antimony	1.9E-04	0.0E+00	1.9E-04	2.3E-05	0.0E+00	2.3E-05
Barium	1.4E-03	0.0E+00	1.4E-03	1.6E-04	0.0E+00	1.6E-04
Cadmium	3.1E-04	1.0E-03	1.3E-03	3.7E-05	1.2E-04	1.6E-04
Chromium (Total)	2.0E-02	2.1E-03	2.2E-02	2.4E-03	2.6E-04	2.6E-03
Chromium(VI)	1.2E-03	0.0E+00	1.2E-03	1.4E-04	0.0E+00	1.4E-04
Copper	9.4E-04	2.0E-01	2.0E-01	1.1E-04	2.3E-02	2.4E-02
Lead	1.3E-03	1.0E-01	1.0E-01	1.6E-04	1.2E-02	1.2E-02
Manganese	0.0E+00	**1.2E+00**	**1.2E+00**	0.0E+00	1.4E-01	1.4E-01
Mercury	7.8E-05	6.6E-04	7.4E-04	9.3E-06	8.0E-05	8.9E-05
Mercury(methyl)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Molybdenum	7.5E-05	0.0E+00	7.5E-05	8.9E-06	0.0E+00	8.9E-06
Nickel	3.2E-04	2.4E-05	3.4E-04	3.8E-05	2.8E-06	4.1E-05

	Full Exposure			Reduced Exposure[(1)]		
Selenium	2.7E-05	4.0E-04	4.2E-04	3.2E-06	4.8E-05	5.1E-05
Silver	1.8E-05	0.0E+00	1.8E-05	2.2E-06	0.0E+00	2.2E-06
Total Cyanide	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	1.1E-04	2.4E-03	2.5E-03	1.4E-05	2.9E-04	3.0E-04

(1) RQ value adjusted with amortization factor of 0.5; defined in Section 5.2.4

All ILCR values in Table 5-22 are below the threshold value of one in 100,000 indicating that ILCR is below acceptable levels. Table 5-23 indicates that RQ values are below the threshold value of 1.0 for all COPCs with the exception of manganese. Risks to manganese in the Project case are predicted to be derived from direct inhalation. Section 5.4.2.1 provides a description of conservative assumptions used in the derivation of the exposure limit and describes how risks are over predicted. Therefore adverse effects from exposure to manganese are not expected due to the project.

5.5 Conclusions of the Human Health Risk Assessment

5.5.1 Acute Health Risks

Predicted short-term air concentrations for individual COPCs were less than the health-based guidelines for most of the COPCs, with exception for carbon monoxide, lead, nitrogen dioxide and $PM_{2.5}$. Mixtures that exceeded health based criteria included respiratory irritants, reproductive and CNS depressant mixtures. Most exceedances of health guidelines were predicted to occur within the facility footprint and would not impact traditional use areas. Due to the harsh environment and dedicated shift rotations, no significant effects on workers are anticipated. Workers will occupy indoor areas during time off with artificially engineered air quality, thus reducing their exposure to outside airborne contaminants.

The predicted peak fine particulate concentrations on the mine site and loading dock are elevated (*i.e.*, ranging from 54 to 380 µg/m^3) and could be associated with adverse health effects to workers unless dust management and/or respiratory protection is provided. Potential adverse health effects could be influenced by peak elevated NO_2 concentrations. Appropriate protection or mitigation measures should again be considered.

5.5.2 Chronic Health Risks

The predicted long-term air concentrations met the health-based guidelines for most COPCs. Exceedances within the actual mine site *per se* were predicted for chromium (hexavalent), manganese, NO_2 and $PM_{2.5}$. Mixtures that exceeded chronic health based criteria within the mine site included CNS depressant and carcinogen groups.

It is important to note that worker exposure to the outside air will be limited, considering 12-hour operational shifts and 2-week rotation cycles off site. Therefore risk estimates presented herein are conservative.

Chronic country food consumption related risks predicted through the multi pathway exposure assessment indicated that the majority of predicted exposures are associated with “baseline” conditions and that project-related contributions are minimal compared to the baseline. ILCR for the Inuit and worker receptor were within acceptable thresholds. Unacceptable cancer risks were not predicted for the project.

Potential health risks to Inuit receptors were predicted for the Baseline + Project case for methyl mercury only (with baseline contributing the majority of predicted exposure). For other COPCs including antimony, barium, chromium and manganese, predicted risks were judged to be overly conservative due to the assumption that Inuit are continuously harvesting all of their traditional foods from the study area as well as other highly conservative assumptions. In addition, predicted risks for these COPCs were primarily due to baseline exposures and not the project. Adverse effects from consumption of traditional foods from the study area surrounding the mine site and traditional use areas on an occasional basis (up to a few months per year) are not expected. This conclusion is further strengthened by the fact that predicted baseline condition exposures to incremental project exposures, which indicate that the project is expected to have a very small contribution to predicted overall chronic exposures and risks to Inuit in the study area.

6.0 TERRESTRIAL ECOLOGICAL RISK ASSESSMENT (TERA)

6.1 Problem Formulation

6.1.1 Receptor Identification and Selection

Based on the studies, surveys and consultations conducted to date in relation to the Project (see Chapter 3 in Volume 6), indigenous wildlife receptor groups were identified for assessment in the TERA that represent valued ecosystem components (VECs). The receptor groups and the representative species that were either carried forward or excluded from further evaluation, along with the rationale for this decision process, are presented in Tables 6.1 and 6.2.

Table 6-1 Ecological Receptors to be Considered in the TERA

Receptor Group	Include or Exclude?	Comments / Rationale
Terrestrial vegetation	**Include**	Terrestrial vegetation is an important indicator of soil quality, since the root systems are in constant contact with soil particles

Receptor Group	Include or Exclude?	Comments / Rationale
		and associated chemicals. Uptake of chemicals through the roots can be an important exposure pathway. Vegetation is also consumed by herbivorous wildlife and some types of vegetation are consumed by Inuit residents of the area as well (links to HHRA).
Terrestrial invertebrates/soil microorganisms	**Include**	Terrestrial invertebrates are important for the maintenance of soil quality, through their activities which break down organic matter, release nutrients, and improve aeration, drainage and soil aggregation. In addition, soil invertebrates are sources of food for a number of terrestrial wildlife species. Soil micro-organisms are important consumers of organic matter and convert detritus into soil nutrients that are available for uptake by vegetation and higher trophic level organisms. As such, soil micro-organisms are critical components of the natural nutrient cycling processes within soils (Will and Suter II 1995).
Amphibians/reptiles	Exclude	Amphibian and reptile species are not known to inhabit the study area and have not been identified within the study area in any study, survey or consultation program to date.
Carnivorous terrestrial birds (raptors)	**Include**	Carnivorous avian species do occur in the study area and such species are migratory and have large home and foraging ranges, which would limit their potential for exposure to Project-associated contaminants. However, a raptor was selected because it is listed with special concern by COSEWIC (Volume 6; Section 3; Table 3.5-4; Wolfden Resources 2006)
Inland waterfowl	Exclude	According to the wildlife baseline assessment (EIS, Chapter 3 in Volume 6), very few waterfowl were observed on the region's inland lakes and river systems. Lakes on the Precambrian Shield are oligotrophic, nutrient poor and often acidic and are unproductive for vegetation and invertebrates. As a result, waterfowl were not selected as a valued ecosystem component in the wildlife assessment.
Herbivorous terrestrial birds (upland breeding birds)	**Include**	Some upland breeding (or game) birds are likely year-round residents within the regional study area. As a result, this receptor group would be expected to spend more time in the study area and possibly incur higher exposures due to Project-related chemicals than some of the other seasonal migratory birds. Further, some upland birds are important prey items for carnivores and also an important food item for local Inuit (links to HHRA).
Small mammals (herbivores and insectivores)	**Include**	A number of small mammals (*e.g.*, mice, rabbit, shrew, voles) were either observed or are likely to be found within the study area. These species have small home ranges and could be exposed to Project contaminants *via* the ingestion of contaminated food (*e.g.*, vegetation, invertebrates) and soil.
Carnivorous or omnivorous small mammals (including piscivores)	**Include**	Carnivorous mammalian species such as the fox and wolverine have been observed within the study area and would likely feed considerably on the local small mammal and fish populations.
Large mammals (herbivores)	**Include**	Large mammals (*e.g.*, muskoxen, caribou) are abundant in the study area. While large ungulate herbivorous mammals would not be expected to spend a significant amount of time in the study area or obtain a significant amount of food from the study area

Receptor Group	Include or Exclude?	Comments / Rationale
		due to their large home range, and the relatively small area of the mine site, these receptors are an important food resource for the local Inuit (links to HHRA), and larger mammalian carnivores and omnivores.
Carnivorous or omnivorous large mammals	Exclude	Large carnivores (such as wolves and bears) have a large home range and would not be expected to obtain a significant portion of their diet from the study area. While there is evidence that these receptors do occur in the study area, mines and other major industrial developments in northern regions have been found to have a significant negative effect on the occurrence of these receptors, due to displacement (Johnson *et al.* 2005).

Based on the receptor screening procedure, the following ecological receptor groups were selected for assessment:

- terrestrial vegetation
- terrestrial invertebrates and soil micro-organisms
- terrestrial upland breeding birds
- small mammals (herbivores, insectivores)
- small mammals (carnivores, omnivores, piscivores)
- large mammals (herbivores-ungulates)

Terrestrial vegetation, and soil invertebrates and soil microorganisms were evaluated in the TERA as broad receptor groups. For the terrestrial wildlife component of the TERA, surrogate (or representative) species were selected from the receptor groups noted above to allow for a more detailed evaluation of exposure. Surrogate selection was based on available study area data, consultations held with the local Inuit, and professional judgment and considered the following:

- prevalence (number of individuals) observed on or near the site;
- home range and seasonal migratory behaviour of species and how much time the species would be expected to spend in the immediate area;
- proportion of their diet the species would be expected to obtain from on-site sources;
- importance of species to local community (food source, cultural significance, *etc.*);
- availability of exposure and toxicological information;
- results from previous surveys and studies of the study area.

Individual species that were selected as surrogates for their wildlife receptor groups in the TERA are identified in Table 6.2.

Table 6-2 Species that will be Selected as Surrogates for the Wildlife Receptor Groups in the TERA

Receptor Group	Surrogate Species	Rationale for Selection
Small mammals (herbivores, insectivores)	Masked shrew	The masked shrew is an insectivorous terrestrial receptor that is expected to be found in the study area year round and has a high potential for exposure due to its close contact with the soil, consumption of soil-dwelling organisms and its small home range. Due to the small home range of the shrew, it is possible that some individuals could spend their entire life in areas of greatest chemical impact. The shrew would be consumed by predators. Several behavioural factors influence the extent of chemical exposure of the shrew, which makes it a very sensitive receptor. This species has a high potential for exposure to chemicals within surface soils, due to its burrowing behaviour. Shrews build underground nests and runways usually within the top 10 cm of soil but may be as deep as 50 cm (George *et al.* 1986). In addition, the shrew has a small home range (0.03 to 2.2 ha) (U.S. EPA 1993) so they could spend a significant portion of their life in the most impacted areas of a site. Shrews also consume large quantities of insects, worms, snails and other soil invertebrates on a daily basis, and incidentally ingest significant quantities of soil (U.S. EPA 1993). These features make the shrew a good "worst case" sentinel receptor for assessing chemical exposures from a specific environmental location.
	Northern red-backed vole	The vole was selected for further evaluation as it was identified as the most common prey species found within the Project area (GLL 2005). Voles primarily consume fungi, lichens, grasses, moss and berries.
	Arctic hare	Similar to the shrew, arctic hare have a high potential for exposure due to close contact with soil, ingestion of vegetation, and relatively small home range. Arctic hare was included because it's been identified as a source of food for Inuit.
Upland birds	Ptarmigan	Most avian species migrate away from the regional study area outside the normal breeding and rearing seasons (*i.e.*, May to August). Ptarmigan are one of the few upland species that remain. The inclusion of ptarmigan forms an important link with the HHRA, as they are commonly hunted for food by the local Inuit communities.
Raptor	Peregrine Falcon	Numerous raptors nests were found in and around the Bathurst Inlet and peregrine falcon were the most numerous. The peregrine falcon is designated as secure by the Government of Nunavut and as a "species of special concern" by COSEWIC.
Small mammals (carnivores, omnivores, piscivores)	Wolverine and Arctic Fox	Both are opportunistic carnivores and/or omnivores that will consume various mammals, birds, fish and other food items as available. Both occur in the study area and both can have relatively small home ranges. The wolverine as been identified as threatened or of special concern species by Environment Canada (2004).

Receptor Group	Surrogate Species	Rationale for Selection
large mammals (herbivores-ungulates)	Caribou	While unlikely to receive significant exposures to chemicals associated with the Project, caribou are an important food resource for the local Inuit (links to HHRA), and are of considerable cultural significance and concern.

6.1.1.1 Exposure Pathway Screening

Potential exposure pathways for wildlife include;

- ingestion of food;
- inadvertent soil ingestion while foraging;
- ingestion of surface water;
- dermal contact with soils, and;
- direct inhalation of air and dust.

It was assumed that oral exposure is the prominent potential exposure pathway for most wildlife receptors (*i.e.,* food, water, incidental soil). Following deposition of chemicals onto soils, chemicals become incorporated into plants and, depending on the chemicals' environmental fate characteristics and physico-chemical properties, may be taken up by animals. Uptake of chemicals from dermal and inhalation pathways was not assessed as recommended by Suter (Suter *et al.* 2000) and CCME (2006).

The exposure pathways considered for each receptor group or surrogate species in the TERA are presented in Table 6.3, below.

Table 6-3 Selected Exposure Pathways and Routes for the TERA

Receptor Group or Surrogate Species	Exposure Pathways/Routes
Terrestrial Vegetation	- direct contact with soil
Terrestrial Invertebrates and Soil Micro-organisms	- direct contact with soil
Ptarmigan	-ingestion of invertebrates and plants -ingestion of lichen -ingestion of surface water -ingestion of soil
Masked Shrew	-ingestion of soil (including grooming activity) -ingestion of soil invertebrates and plants -ingestion of prey
Northern red-backed vole	-ingestion of plants and invertebrates -ingestion of soil
Arctic hare	-ingestion of plants -ingestion of soil

Receptor Group or Surrogate Species	Exposure Pathways/Routes
Wolverine	-ingestion of soil -ingestion of prey -ingestion of fish -ingestion of surface water -ingestion of plants
Arctic Fox	-ingestion of soil -ingestion of prey -ingestion of fish -ingestion of surface water -ingestion of plants and invertebrates
Caribou	-ingestion of plants -ingestion of soil -ingestion of surface water -ingestion of lichen

6.1.1.2 Chemical Screening

COPCs that are potentially persistent and bio-accumulate as determined in the HHRA were adopted for the TERA. The following COPCs were evaluated in the TERA:

- Acenaphthene
- Acenaphthylene
- Aluminium
- Anthracene
- Antimony
- Arsenic
- Barium
- Benz(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(e)pyrene
- Benzo(g,h,i)fluoranthene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Cadmium
- Chromium
- Chromium VI
- Chrysene
- Copper
- Dibenzo(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Lead
- Manganese
- Mercury
- Mercury Methyl
- Molybdenum
- Naphthalene
- Nickel
- Phenanthrene
- Pyrene
- Selenium
- Silver
- Total Cyanide
- Zinc

6.1.2 Exposure Assessment

6.1.2.1 Terrestrial COPC Concentrations

Baseline concentrations of metals and PAHs were measured in soil and biota for use in the TERA. Samples were taken from 5 main locations, including mine, reference, traditional, dock and road sites. Concentrations of metals and PAHs were available from the following media:

- Soil
- Voles
- Sedge
- Lichen
- Surface water and
- Fish

A summary of the baseline concentrations in soil and biota used in the ecological risk assessment is provided in Appendix D, Table D-1

Measured baseline concentrations in soil, water and biota were used to develop site-specific bio-concentration factors (BCFs) to predict concentrations in dietary components from the project. BCFs were developed for the following media:

- Soil to sedge
- Soil to lichen
- Water to fish
- Soil to vole or prey

Literature-derived terrestrial invertebrate models were required to estimate insect concentrations based on soil. All trophic transfer models used in the TERA are provided in Appendix D, Table D-23.

6.1.2.2 Receptor and Parameter Assumptions

Details regarding the exposure concentrations, exposure parameters, portion of diet, TRVs, free metabolic rate (FMR), physical and chemical properties, trophic transfer models (*e.g.*, BCFs) and bio-transfer factors (BTFs) used in the TERA are provided in Appendix D.

6.1.3 Toxicity Assessment

6.1.3.1 Toxicity to Terrestrial Wildlife Receptors

A wildlife toxicity assessment was conducted to determine exposure limits for the chemicals of concern. Where available, TRVs from the U.S. EPA Ecological Soil Screening Levels (Eco-SSLs) for this TERA were selected for plant, invertebrate, avian and mammal species. The Eco-SSL methodology provides a comprehensive evaluation of ecological toxicity and prescribes TRVs based on conservative assumptions. The Eco-SSLs derived by the U.S. EPA are designed to be protective of ecological receptors, including plants, soil invertebrates, birds and mammals (U.S. EPA 2005). Where Eco-SSLs were not available, toxicity limits from other sources were used to characterize contaminants in this TERA (*e.g.*, U.S. EPA 1999).

Specific assessment and measurement endpoints that are proposed for the TERA are presented in Table 6-4. The following criteria were used as a guide to identify TRVs for each VEC:

- Selection of a TRV for a closely related species that is provided by a regulatory agency.
- Toxicity data derived from species that are closely related to the VEC
- Feeding studies
- TRVs based on multiple exposure levels
- TRVs that developed from studies conducted during sensitive life stages (*e.g.*, reproduction or development)

TRVs selected for evaluating risks to VECs are provided in Appendix D, Table D-1 (plant and invertebrate) and Table D-6 (avian and mammalian wildlife).

Table 6-4 Assessment and Measurement Endpoints Selected for the TERA

Receptor Group or Surrogate Species	Assessment Endpoint	Preferred Measurement Endpoint
Terrestrial Vegetation	Chronic effects likely to result in reduction of population of vegetation species	Soil toxicity benchmarks determined to be protective of terrestrial vegetation
Terrestrial Invertebrates and Soil Micro-organisms	Chronic effects likely to result in reduction of terrestrial invertebrate and soil microbe populations	Soil toxicity benchmarks established to be protective of terrestrial invertebrates and soil microbial processes
Ptarmigan	Chronic effects (growth, body weight, developmental effects, reproductive	Avian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-

Receptor Group or Surrogate Species	Assessment Endpoint	Preferred Measurement Endpoint
	effects, *etc.*,) likely to result in reduction of ptarmigan populations.	effect-level (LOAEL) or a no-observed-adverse-effect level (NOAEL).
Peregrine Falcon	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of falcon populations.	Avian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed-adverse-effect level (NOAEL).
Masked shrew	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of populations of shrew.	Mammalian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed- adverse-effect level (NOAEL).
Northern Red-backed Vole	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of populations of voles.	Mammalian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed- adverse-effect level (NOAEL).
Arctic Hare	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of populations of hare.	Mammalian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed- adverse-effect level (NOAEL).
Wolverine	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of populations of wolverines.	Mammalian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed- adverse-effect level (NOAEL).
Arctic Fox	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of populations of arctic fox.	Mammalian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed- adverse-effect level (NOAEL).
Caribou	Chronic effects (growth, body weight, developmental effects, reproductive effects, *etc.*,) likely to result in reduction of populations of caribou.	Mammalian Toxicity Reference Values (TRVs) representing a lowest-observed-adverse-effect-level (LOAEL) or a no-observed- adverse-effect level (NOAEL).

6.1.4 Conservative Assumptions Associated with Exposure Estimations

The following conservative assumptions were used in the estimation of exposures to terrestrial wildlife:

(i) All wildlife receptors (except caribou) were assumed to spend 100% of their time feeding on-site.

(ii) Conservative reasonable worst case exposure point concentrations (*i.e.*, 95th percentile) were used in the TERA exposure model.

(iii) Conservative TRVs were used in the TERA that are often NOAELS or LOAELS for sensitive endpoints.

Generally, the assumptions made in selecting the various receptor characteristics and environmental fate parameters for the chemicals of concern tend to provide conservative, yet realistic, estimates of chemical exposure in the receptors.

6.2 Results of the Ecological Risk Assessment

RQ values for wildlife exposure to Baseline, Project and Baseline + Project concentrations are provided in Tables 6-5 to 6-7, respectively. Discussion of RQ exceedances is provided below.

Table 6-5 Wildlife RQ Values for the Baseline Case

Chemical	Arctic hare	Caribou	Fox	Peregrine falcon	Ptarmigan	Shrew	Vole	Wolverine
Acenaphthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aluminium	1.6E-01	2.5E-01	1.2E-01	2.4E-02	2.0E-01	3.3E-01	9.4E-01	7.3E-02
Anthracene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Antimony	6.4E-02	1.4E-02	2.7E-02	0.0E+00	0.0E+00	1.6E-01	3.8E-01	3.7E-02
Arsenic	4.9E-02	1.6E-02	2.1E-02	2.9E-03	9.2E-02	4.2E-01	3.2E-01	2.1E-02
Barium	2.2E-02	6.4E-03	4.7E-03	1.2E-02	1.4E-01	7.2E-02	1.3E-01	5.1E-03
Benz(a)anthracene	1.7E-03	7.3E-04	2.1E-03	7.0E-01	4.7E-01	9.7E-03	1.1E-02	2.9E-03
Benzo(a)pyrene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Benzo(b)fluoranthene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Benzo(e)pyrene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(g,h,i)fluoranthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(g,h,i)perylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(k)fluoranthene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Cadmium	4.7E-03	4.6E-03	2.1E-02	3.0E-03	3.5E-02	**1.4E+00**	9.5E-02	1.3E-02
Chromium	1.5E-01	3.8E-02	3.7E-02	1.9E-02	3.7E-01	**1.2E+00**	9.4E-01	3.5E-02
Chromium VI	6.3E-03	1.6E-03	2.4E-03	5.0E-03	1.1E-01	1.5E-01	4.5E-02	1.5E-03
Chrysene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Copper	4.2E-02	1.1E-02	2.6E-02	6.8E-03	3.3E-02	3.3E-01	2.7E-01	3.2E-02
Dibenzo(a,h)anthracene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Fluoranthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluorene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Indeno(1,2,3-cd)pyrene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Lead	9.5E-03	5.2E-03	6.5E-03	1.0E-02	1.4E-01	2.5E-01	7.0E-02	4.9E-03
Manganese	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury	1.3E-03	8.6E-04	4.3E-03	1.1E-03	2.0E-03	5.7E-02	1.1E-02	5.1E-03
Mercury Methyl	6.7E-05	4.9E-05	8.5E-02	2.4E-04	2.8E-04	1.3E-04	1.1E-04	1.1E-01
Molybdenum	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	1.3E-01	5.6E-02	4.3E-02	9.2E-03	1.1E-01	6.5E-01	8.0E-01	0.0E+00
Phenanthrene	2.2E-03	8.0E-04	2.5E-03	7.4E-01	7.0E-01	2.8E-02	1.5E-02	0.0E+00
Pyrene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	0.0E+00
Selenium	6.2E-03	2.5E-03	2.1E-02	3.3E-02	3.5E-02	1.6E-01	4.6E-02	0.0E+00

Chemical	Arctic hare	Caribou	Fox	Peregrine falcon	Ptarmigan	Shrew	Vole	Wolverine
Silver	4.4E-04	1.4E-04	9.9E-04	5.6E-03	8.4E-03	5.4E-02	5.4E-03	0.0E+00
Total cyanide	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	1.8E-02	8.7E-03	1.6E-02	1.5E-02	6.0E-02	6.7E-01	1.4E-01	0.0E+00
Total PAH	1.4E-02	5.9E-03	1.8E-02	**5.7E+00**	**4.1E+00**	1.1E-01	9.2E-02	1.8E-02

Table 6-6 Wildlife RQ Values for the Project Case

Chemical	Arctic hare	Caribou	Fox	Peregrine falcon	Ptarmigan	Shrew	Vole	Wolverine
Acenaphthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aluminium	2.1E-08	1.5E-08	2.1E-06	2.9E-09	3.4E-09	4.2E-08	3.5E-08	2.7E-06
Anthracene	7.0E-07	1.1E-07	3.1E-07	0.0E+00	0.0E+00	2.6E-06	4.3E-06	4.5E-07
Antimony	6.7E-04	4.9E-04	1.0E-02	0.0E+00	0.0E+00	1.3E-03	1.1E-03	1.3E-02
Arsenic	6.5E-04	1.0E-04	1.3E-04	1.4E-06	6.4E-04	2.3E-03	3.9E-03	1.6E-04
Barium	8.5E-07	6.2E-07	8.2E-06	1.5E-06	1.8E-06	1.7E-06	1.4E-06	1.1E-05
Benz(a)anthracene	1.9E-04	3.3E-05	2.0E-05	2.8E-03	3.2E-02	3.3E-04	1.1E-03	2.7E-05
Benzo(a)pyrene	7.1E-05	1.2E-05	3.7E-06	3.3E-08	1.1E-02	1.1E-04	4.1E-04	4.9E-06
Benzo(b)fluoranthene	9.3E-06	1.6E-06	4.8E-07	1.1E-07	1.5E-03	1.4E-05	5.4E-05	6.5E-07
Benzo(e)pyrene	4.2E-05	6.9E-06	3.4E-06	3.7E-04	6.8E-03	7.1E-05	2.4E-04	4.7E-06
Benzo(g,h,i)fluoranthene	5.2E-09	8.6E-10	2.7E-10	4.6E-13	8.1E-07	7.9E-09	3.0E-08	3.6E-10
Benzo(g,h,i)perylene	1.4E-03	2.3E-04	7.2E-05	1.2E-07	2.2E-01	2.1E-03	8.1E-03	9.6E-05
Benzo(k)fluoranthene	7.5E-05	1.2E-05	3.9E-06	2.8E-08	1.2E-02	1.1E-04	4.4E-04	5.2E-06
Cadmium	2.6E-03	5.0E-04	1.7E-03	7.5E-05	4.1E-03	7.7E-02	1.9E-02	1.4E-03
Chromium	3.2E-03	5.3E-04	5.1E-04	3.3E-05	6.0E-03	7.9E-03	1.9E-02	6.6E-04
Chromium VI	1.4E-04	2.2E-05	2.3E-05	8.7E-06	1.6E-03	5.0E-04	8.2E-04	2.8E-05
Chrysene	7.1E-05	1.2E-05	3.7E-06	7.8E-08	1.1E-02	1.1E-04	4.1E-04	4.9E-06
Copper	2.5E-02	4.0E-03	3.8E-03	2.1E-04	1.4E-02	1.3E-01	1.5E-01	4.1E-03
Dibenzo(a,h)anthracene	3.1E-03	5.2E-04	1.6E-04	1.2E-07	4.9E-01	4.7E-03	1.8E-02	2.1E-04
Fluoranthene	2.8E-05	4.7E-06	1.5E-06	4.0E-08	4.5E-03	4.4E-05	1.7E-04	2.0E-06
Fluorene	2.2E-06	3.6E-07	3.5E-07	7.1E-05	3.8E-04	4.7E-06	1.3E-05	4.9E-07
Indeno(1,2,3-cd)pyrene	1.0E-04	1.7E-05	5.4E-06	1.8E-07	1.6E-02	1.6E-04	6.1E-04	7.3E-06
Lead	2.0E-03	3.4E-04	2.8E-04	6.9E-05	1.3E-02	8.1E-03	1.2E-02	3.3E-04
Manganese	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury	7.9E-05	1.7E-05	2.5E-04	8.0E-06	3.3E-04	3.0E-02	1.9E-03	2.2E-05
Mercury Methyl	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Molybdenum	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	2.4E-03	4.1E-04	3.0E-04	1.2E-05	1.3E-03	5.2E-03	1.4E-02	0.0E+00
Phenanthrene	2.0E-05	3.3E-06	1.0E-06	4.8E-08	3.1E-03	3.0E-05	1.1E-04	0.0E+00
Pyrene	2.3E-05	3.8E-06	1.2E-06	4.9E-08	3.6E-03	3.5E-05	1.3E-04	0.0E+00
Selenium	5.4E-03	9.4E-04	5.3E-03	2.1E-03	1.8E-02	2.9E-02	3.3E-02	0.0E+00
Silver	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total cyanide	3.2E-07	2.3E-07	3.3E-07	1.4E-04	1.6E-04	6.4E-07	5.3E-07	0.0E+00
Zinc	4.4E-03	8.4E-04	2.1E-03	3.8E-04	1.2E-02	2.0E-01	3.5E-02	0.0E+00
Total PAH	5.1E-03	8.6E-04	2.8E-04	3.3E-03	8.1E-01	7.9E-03	3.0E-02	3.7E-04

Table 6-7 Wildlife RQ Values for the Baseline + Project Case

Chemical	Arctic hare	Caribou	Fox	Peregrine falcon	Ptarmigan	Shrew	Vole	Wolverine
Acenaphthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aluminium	1.6E-01	2.5E-01	1.2E-01	2.4E-02	2.0E-01	3.3E-01	9.4E-01	7.3E-02
Anthracene	7.0E-07	1.1E-07	3.1E-07	0.0E+00	0.0E+00	2.6E-06	4.3E-06	4.5E-07
Antimony	6.4E-02	1.5E-02	3.7E-02	0.0E+00	0.0E+00	1.6E-01	3.8E-01	5.1E-02
Arsenic	5.0E-02	1.6E-02	2.1E-02	2.9E-03	9.3E-02	4.3E-01	3.2E-01	2.1E-02
Barium	2.2E-02	6.4E-03	4.7E-03	1.2E-02	1.4E-01	7.2E-02	1.3E-01	5.1E-03
Benz(a)anthracene	1.9E-03	7.7E-04	2.2E-03	7.1E-01	5.0E-01	1.0E-02	1.2E-02	3.0E-03
Benzo(a)pyrene	1.8E-03	7.5E-04	2.2E-03	7.0E-01	4.9E-01	1.3E-02	1.1E-02	3.0E-03
Benzo(b)fluoranthene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Benzo(e)pyrene	4.2E-05	6.9E-06	3.4E-06	3.7E-04	6.8E-03	7.1E-05	2.4E-04	4.7E-06
Benzo(g,h,i)fluoranthene	5.2E-09	8.6E-10	2.7E-10	4.6E-13	8.1E-07	7.9E-09	3.0E-08	3.6E-10
Benzo(g,h,i)perylene	1.4E-03	2.3E-04	7.2E-05	1.2E-07	2.2E-01	2.1E-03	8.1E-03	9.6E-05
Benzo(k)fluoranthene	1.8E-03	7.5E-04	2.2E-03	7.0E-01	5.0E-01	1.3E-02	1.1E-02	3.0E-03
Cadmium	7.2E-03	5.1E-03	2.3E-02	3.1E-03	3.9E-02	**1.4E+00**	1.1E-01	1.4E-02
Chromium	1.5E-01	3.8E-02	3.8E-02	1.9E-02	3.7E-01	**1.3E+00**	9.6E-01	3.6E-02
Chromium VI	6.5E-03	1.6E-03	2.4E-03	5.0E-03	1.2E-01	1.5E-01	4.6E-02	1.5E-03
Chrysene	7.1E-05	1.2E-05	3.7E-06	7.8E-08	1.1E-02	1.1E-04	4.1E-04	4.9E-06
Copper	6.7E-02	1.5E-02	3.0E-02	7.0E-03	4.7E-02	4.7E-01	4.2E-01	3.6E-02
Dibenzo(a,h)anthracene	4.8E-03	1.2E-03	2.3E-03	7.0E-01	9.7E-01	1.7E-02	2.9E-02	3.2E-03
Fluoranthene	2.8E-05	4.7E-06	1.5E-06	4.0E-08	4.5E-03	4.4E-05	1.7E-04	2.0E-06
Fluorene	2.2E-06	3.6E-07	3.5E-07	7.1E-05	3.8E-04	4.7E-06	1.3E-05	4.9E-07
Indeno(1,2,3-cd)pyrene	1.8E-03	7.5E-04	2.2E-03	7.0E-01	5.0E-01	1.3E-02	1.2E-02	3.0E-03
Lead	1.2E-02	5.5E-03	6.8E-03	1.0E-02	1.6E-01	2.6E-01	8.3E-02	5.3E-03
Manganese	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury	1.4E-03	8.7E-04	4.6E-03	1.1E-03	2.3E-03	8.7E-02	1.2E-02	5.1E-03
Mercury Methyl	6.7E-05	4.9E-05	8.5E-02	2.4E-04	2.8E-04	1.3E-04	1.1E-04	1.1E-01
Molybdenum	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	1.3E-01	5.7E-02	4.3E-02	9.3E-03	1.1E-01	6.6E-01	8.1E-01	0.0E+00
Phenanthrene	2.2E-03	8.0E-04	2.5E-03	7.4E-01	7.0E-01	2.8E-02	1.5E-02	0.0E+00
Pyrene	1.7E-03	7.4E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	0.0E+00
Selenium	1.2E-02	3.5E-03	2.6E-02	3.5E-02	5.3E-02	1.9E-01	7.8E-02	0.0E+00
Silver	4.4E-04	1.4E-04	9.9E-04	5.6E-03	8.4E-03	5.4E-02	5.4E-03	0.0E+00
Total cyanide	3.2E-07	2.3E-07	3.3E-07	1.4E-04	1.6E-04	6.4E-07	5.3E-07	0.0E+00
Zinc	2.3E-02	9.5E-03	1.8E-02	1.5E-02	7.2E-02	8.7E-01	1.8E-01	0.0E+00
Total PAH	1.9E-02	6.8E-03	1.8E-02	**5.7E+00**	**4.9E+00**	1.2E-01	1.2E-01	1.8E-02

With the exception of cadmium and chromium for the shrew and total PAHs for the ptarmigan and peregrine falcon, all RQ values are below the threshold value of 1.0. Predicted cadmium (RQ = 1.4) and chromium (RQ = 1.3) risks to the shrew were driven by predicted exposures from insects. Exposures to cadmium and chromium in insects contributed 99 and 73% of exposure, respectively and were predicted to be dominated from Baseline conditions. Project related exposures contribute less than 5% to total risks. These RQ values are likely conservative given the use of upper exposure point

concentrations (*i.e.*, 95th percentile in all exposure media) in combination with conservative TRVs. Adverse effects to the shrew are not expected.

The exceedance of the Baseline RQ value of 1.0 for ptarmigan and falcon exposures the total PAHs is very conservative due to the following:

- Measured baseline concentrations of PAHs in media were all non-detect. Predicted exposures were based on a proxy value of ½ the detection limit.
- TRVs for wildlife exposure to PAHs are considered conservative due to the application of uncertainty factors and the use of a single PAH compound (*i.e.*, benzo(a)pyrene) as a surrogate for the group without any consideration or adjustment with Toxicity Equivalency Factors (TEFs).

Based on the conservatism in exposure point concentrations and uncertainty in PAH TRVs, adverse effects are not expected.

6.3 Ecological Risk Assessment Conclusions

A multi pathway exposure model was developed for the High lake Mine Project based on a large degree of site-specific data. Reasonable worst case concentrations (*i.e.*, 95th percentile) were selected as exposure point concentrations and used to develop site-specific bio-transfer models (*i.e.*, BCFs). TRVs were also selected that were considered conservative because they are typically based on a NOAEL, LOAEL or incorporate uncertainty factors, and were conservatively adopted for the protection of individual organisms as opposed to wildlife populations. Predicted risks to VECs were below threshold levels for all COPCs, with the exception of cadmium, chromium and PAHs. Potential risks associated with cadmium, chromium and PAHs were considered to be highly conservative thus no adverse ecological risks are expected. Again, predicted exposures were primarily derived from Baseline conditions, not the Project. Overall, adverse effects to wildlife are not expected due to the project.

7.0 OVERALL SUMMARY AND CONCLUSIONS

Quantitative human health risk assessment (HHRA) and terrestrial ecological risk assessment (TERA) were completed for the proposed High Lake Mine Project. The risk assessments were largely based on site-specific information acquired from field surveys

and interviews with communities that use the study area for harvesting traditional foods (*e.g.*, measured data from foods consumed by Inuit and wildlife).

Risks to humans were quantified for on-site workers and off-site Inuit on an acute and chronic basis. Certain potential acute health risks were identified within the facility "footprint" and are not expected to pose any health risk to Inuit traditional use areas. Exceptions include $PM_{2.5}$ in locations outside of the mine, but in close proximity to the facility footprint, where low health risks are predicted, based on the infrequent nature of the peak air quality events (probability of 1.8 to 2.2%) in combination with the lack of people present under most circumstances. This not only includes the Inuit which traditionally spend little time at a given location near the project site but it includes the on-site shift workers as well, who are expected to stay in camps with buildings that will reduce their potential exposure to outside airborne contaminants.

Similarly, potential chronic health risks were predicted for on-site workers. However, it is important to note that worker exposure will be limited, incorporating 12-hour operational shifts and 2-week rotation cycles off site that will limit the amount of time each worker will be on site and potentially exposed to localized outdoor air episodes. The duration of exposures would not exceed 14 years or the lifetime of the project. In addition, due to the harsh climate, workers will remain indoors for much of the time spent on site.

Potential chronic health risks to Inuit based on traditional country food consumption are low, and were related primarily to Baseline conditions. Predicted project exposures are much lower than Baseline exposures and contributed very little to potential health risks associated with traditional food consumption. In addition, incremental lifetime cancer risk (ILCR) estimates for both the Inuit and worker receptor were within acceptable risk assumptions.

Potential risks to wildlife from cadmium, chromium and PAHs were predicted based on a site-specific ecological exposure model. Once again these predicted risks to wildlife were demonstrated to be largely driven by baseline conditions and are also a function of the highly conservative nature of the risk assessment.

Adverse effects to humans and wildlife populations surrounding the project site are not expected. Adverse effects to on-site workers are not expected since the risk assessment incorporated several highly conservative assumptions including peak predicted air concentrations. However, consideration should be given to limiting the frequency and duration of exposures of workers to airborne dust and particulate matter while working on the Project site.

8.0 REFERENCES

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APPENDIX A

RWDI AIR QUALITY REPORT

Appendices

Revision Date	Person	Comment
May 17, 2007	Stephen Sulis - RWDI	Appendix written
June 13, 2007	Graham Latonas - GLL	Comments added
June 19, 2007	Stephen Sulis - RWDI	Comments addressed
June 25, 2007	Stephen Sulis - RWDI	Comments accepted by Graham - ** formatting still required **

Appendix A

High Lake Human Health and Ecological Risk Assessment Air Quality Modeling

Intro

Specified Contaminants Modeled

Changes in Modeling from August 2006 EIS

High Lake Emissions Inventory

- emission factors and base quantity tables

- emissions parameter tables

- emission rate tables

Grays Bay Emissions Inventory

- emission factors and base quantity tables

- emissions parameter tables

- emission rate tables

Results

- results tables

Introduction

The following appendix details the air quality portion of the Human Health and Ecological Risk Assessment (HHERA) for the High Lake Project. Specifically, it provides the emission inventory and the air quality concentration modeling results for the Criteria Air Contaminants (CACs), metals, and VOC and PAH species as presented in Table 1. These contaminants were selected to determine potential human health implications of the High Lake Project emissions.

Table 1. Contaminants Evaluated for the Human Health and Ecological Risk Assessment

Contaminant Name		
CACs	**PAHs**	Phenanthrene
SO_2	Acenaphthene	
NO_2	Acenaphthylene	**VOCs**
CO	Anthracene	1,3-Butadiene
$PM_{2.5}$	Benz(a)anthracene	Acetaldehyde
TSP	Benzo(a)pyrene	Acrolein
	Benzo(b)fluoranthene	Benzene
Metals	Benzo(e)pyrene	Formaldehyde
Arsenic	Benzo(g,h,i)fluoranthene	Propylene
Cadmium	Benzo(g,h,i)perylene	Toluene
Chromium	Benzo(k)fluoranthene	Xylenes
Copper	Chrysene	
Lead	Dibenzo(a,h)anthracene	
Manganese	Fluoranthene	
Mercury	Fluorene	
Nickel	Indeno(1,2,3-cd)pyrene	
Selenium	Naphthalene	
Zinc	Pyrene	

Changes in Modeling from the August 2006 EIS

The original RWDI AIR air quality assessment conducted for the High Lake Project was submitted in August, 2006 and contains information regarding the study area, indicator thresholds, baseline ambient air quality data and impact assessment methodology. This information has not changed for the Human Health and Ecological Risk Assessment and can thus be referenced from the EIS. Some changes have however, been made to emission inventory parameters and to the model set-up due to new information that has been made available after the submission of the original EIS as well as fine-tuning of the dispersion model. Specifically, model changes include:

- The exit temperature at the West Zone portal was changed from 273 C to 10 C (the former number being incorrect) and the location was moved north (NAD 83, Zone 12 - 506028, 7473618) of the ore and waste stock piles. Due to the relatively minor emission contributions from the West Zone portal, the changes in exit temperature and location do not impact previously determined significance ratings or conclusions.

- Receptors within 100 m of modeled point, area and volume sources were removed due to complexities in predicting plume behaviour in building wake and pit and stock pile mixing zones.

- Building downwash parameters were set to align to the UTM grid.

- In the August 2006 EIS, just over 13 months of meteorological data were used. This period was assumed to be annual and annual averages were calculated over the entire period. For the Human Health and Ecological Risk Assessment, annual averages are averaged over 12 months.

The following are changes specific to the Human Health and Ecological Risk Assessment:

- High contaminant concentrations were predicted to occur at the original camp location. Therefore, an alternative camp location was recommended by RWDI (NAD83, Zone 12 – 505775, 7472804) and was incorporated into the model.

- Human Health and Ecological Risk Assessment specific receptors were added. These included receptors at Grays Bay, High Lake, along the all-season roadway between High Lake and Grays Bay and to the south of High Lake. The CALPUFF modeling domain was expanded to include these receptors.

- Grays Bay emissions were considered in detail. An emissions inventory was developed (see below) which includes emissions from power generation, material handling and ship emissions. In addition to providing 1-hr and 24-hr concentrations, the Grays Bay emissions inventory was annualized (to account for the fact that the Grays Bay facilities do not operate every day) to provide annual concentrations.

Because of these changes, there are differences between model results for this assessment and those presented in the original EIS. A comparison of MPOI numbers from the two assessments is provided in Table 2. Human Health and Ecological Risk Assessment concentrations are generally lower but the changes are not large enough to affect previously determined significance ratings. Note that although the MPOI location changes with contaminant and averaging period they typically occur within 200 m of an emission source.

Table 2 A Comparison of MPOI Concentrations between the August, 2006 EIS and the Human Health and Ecological Risk Assessment (HHERA).

Contaminant[1.]	Averaging Period	Predicted Concentrations (µg/m^3)		Indicator Threshold (µg/m^3)
		MPOI[2.] from EIS	MPOI[2.] for HHERA	
TSP	24 hr	**5,314**	**4,995**	120
	Annual	**483**	**375**	60
$PM_{2.5}$	98th Percentile	**417**	**385**	30
SO_2	1 hr	330	308	450
	24 hr	22.4	21	150
	Annual	4.8	3.9	30
NO_2	1 hr	**697**	**655**	400
	24 hr	**477**	**461**	200
	Annual	**97.4**	**97.9**	60
CO	1 hr	**16,988**	**15,426**	15000
	8 hr	**8,164**	**7746**	6000

Notes:

1. Bold values denote concentrations that are predicted to exceed their respective Indicator Threshold.
2. MPOI represents the concentration at the Maximum Point of Impingement.

High Lake Emission Inventory

This section presents information used to develop the emission inventory for High Lake operations. The project emission factors, base quantities, source parameters and other assumptions used to develop the emission rates for modeling are detailed. Years 3 and 4 of mining operations were selected as worst-case since material movement will be at or near peak, full-scale pit operations will be occurring, and the High Lake West underground operations will be in production.

All references to AP-42 refer to the United States Environmental Protection Agency's (U.S. EPA) AP-42 emission factor documentation.

Emission factors and base quantities used to develop the High Lake emission inventory are detailed in Table 3.

Table 3. Emission Factors and Base Quantities Used to Develop the High Lake Emission Inventory

Power Generation	
Emission factors	• AP-42 Section 3.4 was used to calculate SO_2, NO_x, CO and $PM_{2.5}$ emissions from the power generators • All particulate matter was assumed to be in the $PM_{2.5}$ size fraction • The CATEF (California Air Toxics Emission Factor) database was used to calculate metal emissions for the power generators • AP-42 Section 3.4 was used to calculate speciated VOC and PAH species emissions from the power generators. Where no AP-42 emission factor was available, the CATEF database was used
Base quantities	• High Lake has a total of 13,700 kW of power generation: - older generators (5 engines) account for 8,700 kW - new generators (2 engines) account for 5,000 kW • Ultra-low sulphur fuel (i.e., 15 ppm by volume) was assumed
Source parameters	• Exhaust is divided into three steams: copper dryer, zinc dryer and heating/bypass • Stack diameters of 1.22, 1.22 and 1.83 m, respectively, were used as provided by Wardrop Engineering • Exit temperatures as calculated by Wardrop were 74 ºC, 74 ºC and 121 ºC, respectively • Stack heights of 18.4 m above ground level were based on drawings from the Nanisivik mill
Emission controls	• No emission controls were assumed

Underground Activities	
Emission factors	• Blasting, excavating, dumping and loading of the haul trucks was considered • $PM_{2.5}$, and TSP emissions from blasting operations were estimated using AP-42 Section 11.9 • SO_2, NO_x and CO emissions were determined with AP-42 Section 13.3 • AP-42 Section 13.2.4 was used to determine $PM_{2.5}$ and TSP emissions from loading and dumping drop operations • Metal emissions from blasting, excavating, dumping and loading activities were proportioned from TSP based on the ratio of each specific metal to rock as provided in the ore and waste assays • See Mobile Engine Emissions (Underground) for engine emissions
Base quantities	• A material flow-rate of 2,837 t/d was assumed for underground operations • Blasting was considered to occur daily for one hour (at 16:00) and ANFO (ammonium nitrate/fuel oil) usage was approximated to be 1,229 kg/blast • A blast area of 11.7 m^2 was assumed • A wind speed of 1.7 m/s was used for underground operations based on the High Lake West portal exit velocity provided • The moisture content of 2.1% was assumed, based on AP-42 Sec. 13.2.4-1

Source parameters	• Emissions from underground activities was distributed between the Exhaust Raise and the Portal • Exit velocities were calculated to be 10.4 and 1.7 m/s, respectively • The vent areas were calculated to be 12.2 and 27.5 m^2, respectively • The exit temperature at the vents was assumed to be 10º C
Emission controls	• No emission controls were assumed

Mobile Engine Emissions (Surface)	
Emission factors	• The generation of SO_2, NO_x, CO and $PM_{2.5}$ from the combustion of diesel fuel was accounted for • U.S. EPA Tier II/III Non-Road CI standards were used to calculate emission rates for the off-road fleet • U.S. EPA Heavy-Duty Highway Engine standards were used to calculate emissions for on-road equipment (i.e., pick-up trucks) • All engine PM emissions were assumed to be in the $PM_{2.5}$ size fraction • The CATEF (California Air Toxics Emission Factor) database was used to calculate mobile engine metal emissions • AP-42 Section 3.4 was used to calculate VOC and PAH species emissions from mobile engines greater than 600 hp. AP-42 Section 3.3 was used for mobile engines below 600 hp. Where no AP-42 emission factor was available, the CATEF database was used
Base quantities	• The equipment fleet was based on the project description • Main units include Cat 777 haul trucks (7), Hitachi Ex 1900 Shovels (2), DM-45 drills (2) and support equipment • A total of 11,437 kW was assumed for the surface fleet • Equipment usage was adjusted according to utilization rates • Ultra-low sulphur fuel (i.e., 15 ppm by volume) was assumed
Source parameters	• Surface fleet engine emissions were divided between the pit (81.6%) and the haul road (18.4%) based on the time the haul trucks spent in each area
Emission controls	• No emission controls were assumed

Mobile Engine Emissions (Underground)	
Emission factors	• The generation of SO_2, NO_x, CO and $PM_{2.5}$ from the combustion of diesel fuel was accounted for • U.S. EPA Tier II/III Non-Road CI standards were used to calculate emission rates • All engine PM emissions were assumed to be in the $PM_{2.5}$ size fraction • The CATEF (California Air Toxics Emission Factor) database was used to calculate mobile engine metal emissions • AP-42 Section 3.3 was used to calculate VOC and PAH species emissions. Where no AP-42 emission factor was available, the CATEF database was used
Base quantities	• The equipment fleet was based on the project description • Main units include Atlas Copco Boomer 282 (2), 8yd Toro 0010 LHD (6),

	40t Toro 40 haul truck (6), Cubex 5200 ITH Drill (4), Getman A64 Scissor lift (5) and support equipment • A total of 4,693 kW was assumed for the underground fleet • Equipment usage was adjusted according to utilization rates • Ultra-low sulphur fuel (i.e., 15 ppm) was assumed
Source parameters	• Emissions from underground activities were distributed between the Exhaust Raise and the Portal • Exit velocities were calculated to be 10.4 and 1.7 m/s, respectively • The vent areas were calculated to be 12.2 and 27.5 m^2, respectively • The exit temperature at the vents was assumed to be 10º C
Emission controls	• No emission controls were assumed

Haul Road Emissions	
Emission factors	• Dust generation from vehicular activity on surface roads was considered • AP-42 Section 13.2.2 was used to calculate $PM_{2.5}$ and TSP emissions • Metal emissions resulting from dust generation from vehicular activity were proportioned from TSP, based on the ratio of each specific metal to waste rock, as provided in the waste assay • Haul road emissions from the underground were not considered due to the domination of surface activities
Base quantities	• The equipment fleet (type, quantity) was based on the project description • A mean vehicle weight of 29,157 kg was used to represent the range of surface fleet vehicles used • The Cat 777 haul truck (empty weight of 64,400 kg, payload of 100,000 kg) was the dominating factor • A cycle time of 24.5 minutes was used over a distance of 3.2 km (D-pit to the crusher house and underground back-fill dump) • Equipment usage was adjusted according to utilization rates • A silt content of 8.3% was assumed as per AP-42 Section 13.2.2
Source parameters	• Surface fleet haul road emissions were divided between haul road volume sources (38.5%) and the D-pit area source (61.5%). This was based on the distance travelled on the haul road versus that in the pit.
Emission controls	• A dust suppression efficiency of 80.0% was used as per AP-42 Section 13.2.2

Open Pit Emissions	
Emission factors	• Emissions from drilling, grading, loading haul trucks, road dust, mobile equipment engines and blasting were considered • Drilling PM emissions were estimated using AP-42 Section 11.19.2 and the particle size multipliers used (0.31 for $PM_{2.5}$ and 2.11 for TSP) were based on AP-42 Section 13.2.4 • PM emissions from the grading of roads were calculated using AP-42 Section 11.9 • PM drop operation emissions from the loading of haul trucks were based on

	AP-42 Section 13.2.4 • Metal emissions resulting from dust generation from drilling, grading, loading haul trucks and blasting were proportioned from TSP, based on the ratio of each specific metal to rock, as provided in the ore and waste assays • For road dust emissions, see Haul Road Emissions • For engine emissions, see Mobile Engine Emissions (Surface) • Blasting operations used AP-42 Section 11.9 to determine PM emissions and AP-42 Section 13.3 to determine SO_2, NO_x and CO emissions
Base quantities	• Drilling and loading emissions were based on a pit material flow-rate of 23,883 t/d • Blasting was considered to occur daily for one hour (at 16:00) and ANFO (ammonium nitrate/fuel oil) usage was approximated at 7,143 kg/blast • A blast area of 25 m^2 was assumed • An average wind speed of 4.4 m/s was used for the area • A moisture content of 2.1% was assumed, based on AP-42 Section 13.2.4 • The grader was assumed to operate at 12 km/h, 24 hours per day
Source parameters	• Emissions from D-pit were modelled as an area source with an area of 96,100 m^2
Emission controls	• The drills are equipped with dust suppression so an emission factor for wet drilling was used • For grading, a dust suppression control efficiency of 80.0% was used as per AP-42 Section 13.2.2

Stockpile Emissions	
Emission factors	• $PM_{2.5}$ and TSP emissions associated with haul truck dumping and wind erosion were considered for the underground back-fill waste dump and the High Lake ore stock piles • Haul truck dumping emissions were estimated using AP-42 Section 13.2.4 • Wind erosion emissions were conservatively estimated using AP-42 Section 11.9 • Metal emissions resulting from dust generation from haul truck dumping and wind erosion were proportioned from TSP, based on the ratio of each specific metal to rock, as provided in the ore and waste assays
Base quantities	• Material flow rates (for haul truck dumping) for the waste and ore piles were estimated at 20,097 t/d and 2,624 t/d, respectively • Dumping to the crusher hopper was also considered at 4,000 t/d • An average wind speed of 4.4 m/s for the area was used • A moisture content of 2.1% was assumed, based on AP-42 Section 13.2.4
Source parameters	• Stockpile emissions were modelled as area sources • Active area of the back-fill stock pile was assumed to be 10,080 m^2 • Active area of the ore stock pile was assumed to be 2,500 m^2
Emission controls	• No emission controls were assumed

Ore Processing	
Emission factors	• Emissions associated with primary and secondary crushing, Cu and Zn concentrate drying and concentrate handling were considered • $PM_{2.5}$, and PM_{30} emissions associated with these operations were estimated using AP-42 Section 11.24 • Where required, PM emission factors were scaled from PM_{10} or TSP using AP-42 Section 13.2.4 • Metal emissions resulting from dust from crushing and concentrate drying and handling were proportioned from TSP, based on the ratio of each specific metal to rock, as provided in the ore and concentrate assays
Base quantities	• A material flow rate of 4,000 t/d was used for the High Lake mill's primary and secondary crushing • A material flow rate of 1,500 t/d was used for the back-fill crusher • Material flow rates of 326 and 237 t/d were used for the copper and zinc concentrates, respectively
Source parameters	• Mill emissions were modelled as a volume source
Emission controls	• Baghouse efficiencies for all crusher operations were assumed to be 99% as per AP-42 Section 11.24
Incinerator	
Emission factors	• SO_2, NO_x, CO, $PM_{2.5}$ and TSP emissions from the incinerator were based on AP-42 Section 2.1 • Metal, VOC species and PAH species emission factors were based on information provided by the incinerator manufacturer (Eco Waste Solutions)
Base quantities	• The quantity of material burned was given as 725 kg/day • Material burned will be limited to household waste, packaging, used oil, and wood
Source parameters	• Approximate exit temperature, exit velocity, stack height and diameter were supplied by Eco Solutions Inc.
Emission controls	• No emission controls were assumed

Emission rates for High Lake CACs, metals and VOC and PAH species are shown in Tables 4, 5, 6 and 7, respectively.

Table 4 CAC Emission Sources and Estimated Emission Rates due to Operations of the High Lake Mine Site

Emission Source	**TSP (g/s)**	**$PM_{2.5}$ (g/s)**	**SO_2 (g/s)**	**NO_x (g/s)**	**CO (g/s)**
Waste and Ore Handling in D-pit	0.78	0.12	2.0	15.9	67.5
Stockpile Emissions	3.03	0.45	-	-	-
Ore Processing	1.17	0.18	-	-	-
Haul Road Emissions	20.9	0.90	-	-	-
Underground Activities	0.34	0.29	0.35	8.10	18.1
Waste Incineration	0.063	0.063	0.010	0.008	0.084
Power Generation	1.62	1.62	0.028	55.6	12.7
Mobile Engine Emissions (Surface)	0.61	0.61	0.023	15.5	26.0
High Lake Operations Total (g/s)	**28.5**	**4.22**	**2.40**	**95.0**	**124.4**
High Lake Operations Total (t/d)	**2.46**	**0.36**	**0.21**	**8.21**	**10.7**

Table 5 Metal Emission Sources and Estimated Emission Rates due to Operations of the High Lake Mine Site

Emission Source	As (g/s)	Cd (g/s)	Cr (g/s)	Cu (g/s)	Pb (g/s)	Mn (g/s)	Hg (g/s)	Ni (g/s)	Se (g/s)	Zn (g/s)
Waste and Ore Handling in D-pit	5.49E-07	7.84E-08	6.17E-05	3.79E-05	3.72E-06	2.45E-04	7.84E-09	1.65E-05	3.92E-07	4.31E-05
Stockpile Emissions	2.76E-05	5.15E-05	2.17E-04	2.08E-02	1.41E-03	1.10E-03	6.57E-07	6.29E-05	2.78E-05	1.98E-02
Ore Processing	4.61E-05	4.59E-04	3.16E-05	1.45E-01	2.88E-03	6.17E-04	3.75E-06	2.35E-05	6.72E-05	1.75E-01
Haul Road Emissions	1.46E-05	2.09E-06	1.64E-03	1.01E-03	9.91E-05	6.53E-03	2.09E-07	4.38E-04	1.04E-05	1.15E-03
Underground Activities	4.68E-05	8.63E-05	1.16E-04	1.89E-03	2.59E-04	1.48E-04	2.44E-06	1.98E-04	3.33E-04	9.03E-03
Waste Incineration	1.46E-06	1.35E-04	5.98E-05	2.41E-04	2.77E-04	1.62E-05	3.31E-05	5.97E-06	3.16E-06	1.58E-04
Power Generation	1.30E-04	2.40E-04	3.31E-04	5.61E-04	4.22E-04	3.44E-04	6.96E-06	5.74E-04	9.66E-04	2.16E-02
Mobile Engine Emissions (Surface)	1.09E-04	2.00E-04	2.76E-04	4.69E-04	3.52E-04	2.87E-04	5.81E-06	4.80E-04	8.06E-04	1.81E-02
High Lake Operations Total (g/s)	**3.77E-04**	**1.17E-03**	**2.74E-03**	**1.70E-01**	**5.70E-03**	**9.29E-03**	**5.30E-05**	**1.80E-03**	**2.21E-03**	**2.45E-01**
High Lake Operations Total (t/d)	**3.25E-05**	**1.01E-04**	**2.36E-04**	**1.47E-02**	**4.92E-04**	**8.03E-04**	**4.58E-06**	**1.55E-04**	**1.91E-04**	**2.12E-02**

Table 6 VOC Emission Sources and Estimated Emission Rates due to Operations of the High Lake Mine Site

Emission Source	1,3-Butadiene (g/s)	Acetalde-hyde (g/s)	Acrolein (g/s)	Benzene (g/s)	Formalde-hyde (g/s)	Propylene (g/s)	Toluene (g/s)	Xylenes (g/s)
Waste and Ore Handling in D-pit	-	-	-	-	-	-	-	-
Stockpile Emissions	-	-	-	-	-	-	-	-
Ore Processing	-	-	-	-	-	-	-	-
Haul Road Emissions	-	-	-	-	-	-	-	-
Underground Activities	2.25E-04	4.42E-03	5.33E-04	5.38E-03	6.80E-03	1.49E-02	2.36E-03	1.64E-03
Waste Incineration	2.06E-06	-	-	2.02E-05	-	-	2.57E-03	-
Power Generation	6.56E-04	4.24E-04	1.33E-04	1.31E-02	1.33E-03	4.70E-02	4.73E-03	3.25E-03
Mobile Engine Emissions (Surface)	5.47E-04	5.21E-03	6.65E-04	1.19E-02	8.32E-03	3.78E-02	4.79E-03	3.31E-03
High Lake Operations Total (g/s)	**1.43E-03**	**1.01E-02**	**1.33E-03**	**3.04E-02**	**1.65E-02**	**9.97E-02**	**1.44E-02**	**8.21E-03**
High Lake Operations Total (t/d)	**1.24E-04**	**8.69E-04**	**1.15E-04**	**2.63E-03**	**1.42E-03**	**8.61E-03**	**1.25E-03**	**7.09E-04**

Table 7 PAH Emission Sources and Estimated Emission Rates due to Operations of the High Lake Mine Site

Emission Source	Acenaphthene (g/s)	Acenaphthylene (g/s)	Anthracene (g/s)	Benz(a)anthracene (g/s)	Benzo(a)pyrene (g/s)	Benzo(b)fluoranthene (g/s)	Benzo(e)pyrene (g/s)	Benzo(g,h,i)fluoranthene (g/s)	Benzo(g,h,i)perylene (g/s)
Waste and Ore Handling in D-pit	-	-	-	-	-	-	-	-	-
Stockpile Emissions	-	-	-	-	-	-	-	-	-
Ore Processing	-	-	-	-	-	-	-	-	-
Haul Road Emissions	-	-	-	-	-	-	-	-	-
Underground Activities	8.19E-06	2.92E-05	1.08E-05	9.69E-06	1.08E-06	5.71E-07	4.36E-07	-	2.81E-06
Waste Incineration	7.50E-11	5.97E-10	9.01E-10	3.38E-10	-	1.66E-09	5.97E-10	1.13E-10	3.38E-10
Power Generation	7.88E-05	1.55E-04	2.07E-05	1.05E-05	4.33E-06	1.87E-05	1.27E-06	-	9.36E-06
Mobile Engine Emissions (Surface)	4.44E-05	1.02E-04	2.15E-05	1.57E-05	3.16E-06	8.98E-06	1.06E-06	-	7.36E-06
High Lake Operations Total (g/s)	**1.31E-04**	**2.87E-04**	**5.30E-05**	**3.58E-05**	**8.57E-06**	**2.82E-05**	**2.77E-06**	**1.13E-10**	**1.95E-05**
High Lake Operations Total (t/d)	**1.14E-05**	**2.48E-05**	**4.58E-06**	**3.10E-06**	**7.40E-07**	**2.44E-06**	**2.39E-07**	**9.74E-12**	**1.69E-06**

Table 7 PAH Emission Sources and Estimated Emission Rates due to Operations of the High Lake Mine Site (continued)

Emission Source	Benzo(k)fluoranthene (g/s)	Chrysene (g/s)	Dibenzo(a,h)anthracene (g/s)	Fluoranthene (g/s)	Fluorene (g/s)	Indeno(1,2,3-cd)pyrene (g/s)	Naphthalene (g/s)	Phenanthrene (g/s)	Pyrene (g/s)
Waste and Ore Handling in D-pit	-	-	-	-	-	-	-	-	-
Stockpile Emissions	-	-	-	-	-	-	-	-	-
Ore Processing	-	-	-	-	-	-	-	-	-
Haul Road Emissions	-	-	-	-	-	-	-	-	-
Underground Activities	8.94E-07	2.04E-06	3.36E-06	4.39E-05	1.68E-04	2.16E-06	4.89E-04	1.70E-04	2.76E-05
Waste Incineration	1.92E-10	8.23E-10	-	3.61E-09	1.43E-09	4.85E-10	-	1.25E-08	2.93E-09
Power Generation	3.67E-06	2.58E-05	5.82E-06	6.78E-05	2.15E-04	6.97E-06	2.19E-03	6.87E-04	6.25E-05
Mobile Engine Emissions (Surface)	2.65E-06	1.38E-05	6.41E-06	8.01E-05	2.87E-04	5.56E-06	1.53E-03	4.99E-04	5.91E-05
High Lake Operations Total (g/s)	**7.21E-06**	**4.16E-05**	**1.56E-05**	**1.92E-04**	**6.71E-04**	**1.47E-05**	**4.21E-03**	**1.36E-03**	**1.49E-04**
High Lake Operations Total (t/d)	**6.23E-07**	**3.59E-06**	**1.35E-06**	**1.66E-05**	**5.80E-05**	**1.27E-06**	**3.64E-04**	**1.17E-04**	**1.29E-05**

Source characteristics for High Lake point, area and volume sources are presented in Tables 8, 9 and 10, respectively

Table 8 Point Source Characteristics for High Lake Sources

Source Description	Source Name	Easting (m)	Northing (m)	Elevation (m ASL)	Stack Height (m)	Stack Diameter (m)	Exit Temperature (K)	Exit Velocity (m/s)
Exhaust raise	Vent1	505,159	7,472,708	355.0	2.0	3.95	283	10.4
Portal	Vent2	506,028	7,473,618	340.0	0.0	5.92	283	1.7
Generator exhaust (by-pass)	Gen1	506,130	7,473,210	347.8	18.4	1.83	394	2.0
Generator exhaust through Cu dryer	Gen2	506,141	7,473,213	347.9	18.4	1.22	347	20.8
Generator exhaust through Zn dryer	Gen3	506,154	7,473,224	348.6	18.4	1.22	347	14.6
Incinerator	Inctr	506,106	7,472,706	348.6	10.1	0.51	952	6.2
Exhaust raise	UG_Blast1	505,159	7,472,708	355.0	2.0	3.95	283	10.4
Portal	UG_Blast2	506,028	7,473,618	340.0	0.0	5.92	283	1.7

Table 9 Area Source Characteristics for High Lake Sources

Source Description	Source Name	Easting NE Corner (m)	Northing NE Corner (m)	Area (m^2)	Elevation (m ASL)	Release Height (m)	Sigma z (m)
D-pit (drilling, blasting, loading, hauling)	D_pit	506,755	7,473,405	96,100	339.7	0.0	16.0
Backfill stockpile (D-pit waste)	BF_Dump	506,196	7,473,520	10,080	336.2	9.0	4.2
High Lake ore stockpile	HL_Ore	506,038	7,473,440	2,500	349.8	3.0	1.4
Blasting in D-pit	S_Blast	506,755	7,473,405	96,100	339.7	0.0	16.0

Table 10 Volume Source Characteristics for High Lake Sources

Source Description	Source Name	Easting (m)	Northing (m)	Elevation (m ASL)	Release Height (m)	Sigma y (m)	Sigma z (m)
Mill crushers and processing	Mill	506,125	7,473,220	348.2	6.14	27.2	5.7
Haul road	HaulRoad1[1]	506,727	7,473,413	339.7	2.57	12.66	2.39
	…	…	…	…	…	…	…
	HaulRoad32[1]	506,073	7,473,366	339.7	2.57	13.49	2.39

1. A total of thirty-two haul road volume sources exist. As the parameters are very similar, only the first and last are shown.

Grays Bay Inventory

As part of the Human Health and Ecological Risk Assessment, an emissions inventory was developed for the Grays Bay dock operations. The emission factors and base quantities used are detailed in Table 11.

All references to AP-42 refer to the United States Environmental Protection Agency's (U.S. EPA) AP-42 emission factor documentation.

Table 11 Emission Factors and Base Quantities used to Develop the Grays Bay Emission Inventory

Power Generation	
Emission factors	• AP-42 Section 3.4 was used to calculate SO_2, NO_x, CO and $PM_{2.5}$ emissions from the power generators • All particulate matter was assumed to be in the $PM_{2.5}$ size fraction • The CATEF (California Air Toxics Emission Factor) database was used to calculate metal emissions for the power generators • AP-42 Section 3.4 was used to calculate VOC and PAH species emissions from the power generators. Where no AP-42 emission factor was available, the CATEF database was used
Base quantities	• Grays Bay uses 800 kW of power generation when loading ships • Ultra-low sulphur fuel (i.e., 15 ppm) was assumed
Source parameters	• A stack height of 5 m and stack diameter of 0.3 m were assumed • The exit temperature was assumed to be 100 ºC • An exit velocity of 12.0 m/s was calculated
Emission controls	• No emission controls were assumed

Mobile Engine Emissions (Surface)	
Emission factors	• The generation of SO_2, NO_x, CO and $PM_{2.5}$ from the combustion of diesel fuel in diesel engines was considered • U.S. EPA Tier II/III Non-Road CI standards were used to calculate emission rates for the off-road equipment • U.S. EPA Heavy-Duty Highway Engine standards were used to calculate emissions for on-road equipment (i.e., pick-up trucks) • All engine PM emissions were assumed to be in the $PM_{2.5}$ size fraction • The CATEF (California Air Toxics Emission Factor) database was used to calculate mobile engine metal emissions • AP-42 Section 3.3 was used to calculate VOC and PAH species emissions from mobile engines (all less than 600 hp). Where no AP-42 emission factor was available, the CATEF database was used
Base quantities	• A reasonable mix of front-end loaders, highway trucks, pick-ups and light towers was taken as the Grays Bay equipment fleet • A total of 4,828 kW was assumed for this fleet

	• Ultra-low sulphur fuel (i.e., 15 ppm) was assumed
Source parameters	• Grays Bay mobile engine emissions were included as a portion of a 56,640 m^2 area source
Emission controls	• No emission controls were assumed

Engine Emissions (Ship)	
Emission factors	• The generation of SO_2, NO_x, CO and $PM_{2.5}$ from the combustion of fuel oil in marine auxiliary engines was considered • For NO_x, CO and $PM_{2.5}$, U.S. EPA "Analysis of Commercial Marine Vessels and Fuel Consumption Data" emission factors were used • For SO_2, a mass balance approach was taken • For metals and the specified VOC and PAH species, AP-42 Section 1.3 was used
Base quantities	• Auxiliary engine power was assumed to be 1000 kW as per U.S. EPA "Analysis of Commercial Marine Vessels and Fuel Consumption Data" • No. 6 fuel oil with a heating value of 150,000 BTU/gal (as per AP-42 Section 1.3) and density of 7.88 lb/gal was considered • A sulphur level of 1.5% for residual oil as per Entec's "Quantification of Ship Emissions" was used
Source parameters	• Ship auxiliary engine emissions were modeled as a point source • A stack height of 35 m ASL and a stack diameter of 1.5 m were assumed. • The exit temperature was assumed to be 100 ºC. • An exit velocity of 1.0 m/s was calculated.
Emission controls	• No emission controls were assumed

Road Dust Emissions	
Emission factors	• Dust generation from vehicular activity on surface roads was considered • AP-42 Section 13.2.2 was used to calculate $PM_{2.5}$ and TSP emissions • Metal emissions resulting from dust generation from vehicular activity were proportioned from TSP, based on the ratio of each specific metal to waste rock, as provided in the waste assay
Base quantities	• A reasonable mix of front-end loaders, highway trucks and pick-ups was assumed as the Grays Bay equipment fleet • A mean vehicle weight of 25,482 kg was used to represent the fleet • A silt content of 8.3% was assumed as per AP-42 Section 13.2.2
Source parameters	• Grays Bay road dust emissions were included as a portion of a 56,640 m^2 area source
Emission controls	• A dust suppression efficiency of 80.0% was used as per AP-42 Section 13.2.2

Material Handling	
Emission factors	• $PM_{2.5}$ and TSP emissions from concentrate dumping, loading and conveying were considered for Grays Bay • Haul truck dumping and conveyor loading emissions inside the concentrate building were estimated using AP-42 Section 11.24

	• Conveyor transfer point and drop point emissions were estimated using AP-42 Section 13.2.4 • Wind erosion of the concentrate pile was considered using AP-42 Section 11.9 - this is conservative as the stock pile will be located indoors • Metal emissions resulting from the dust generation were proportioned from TSP, based on the ratio of each specific metal to rock, as provided in the concentrate assay
Base quantities	• The material flow rate was estimated at 18,000 t/d • A moisture content of 6.0% was used • An average wind speed of 4.4 m/s was used. A wind speed of 0.5 m/s was used in regard to the indoor concentrate pile
Source parameters	• Material handling emissions were included as a portion of a 56,640 m² area source
Emission controls	• The baghouse efficiency for the concentrate building was assumed to be 99% as per AP-42 Section 11.24

Emission rates for Grays Bay CACs, metals and VOC and PAH species are shown in Tables 12, 13, 14 and 15, respectively. Note that because operations at Grays Bay do not take place all year, the emission rates shown in these tables were "annualized" when considering annual averages. Since a typical scenario would see 7 ships visiting Grays Bay for 3 days at a time, the emission rates presented in the emission rate tables were scaled by 21/365 when modeling annual concentrations.

Table 12 CAC Emission Sources and Estimated Emission Rates due to Operations at Grays Bay

Emission Source	**TSP (g/s)**	**$PM_{2.5}$ (g/s)**	**SO_2 (g/s)**	**NO_x (g/s)**	**CO (g/s)**
Material Handling	0.51	0.076	-	-	-
Stockpile Emissions	0.15	0.023	-	-	-
Haul Road Emissions	5.95	0.26	-	-	-
Power Generation	0.094	0.094	0.002	3.24	0.74
Mobile Engine Emissions (Surface)	0.24	0.24	0.010	4.79	19.1
Ship Emissions	0.073	0.073	0.97	2.94	0.28
Grays Bay Operations Total (g/s)	**7.02**	**0.76**	**0.98**	**11.0**	**20.1**
Grays Bay Operations Total (t/d)	**0.61**	**0.066**	**0.08**	**0.95**	**1.74**

Table 13 Metal Emission Sources and Estimated Emission Rates due to Operations at Grays Bay

Emission Source	As (g/s)	Cd (g/s)	Cr (g/s)	Cu (g/s)	Pb (g/s)	Mn (g/s)	Hg (g/s)	Ni (g/s)	Se (g/s)	Zn (g/s)
Material Handling	2.04E-05	3.33E-04	4.77E-06	1.02E-01	1.42E-03	2.61E-04	2.59E-06	1.02E-05	3.68E-05	1.27E-01
Stockpile Emissions	6.00E-06	9.77E-05	1.40E-06	3.01E-02	4.17E-04	7.66E-05	7.60E-07	3.00E-06	1.08E-05	3.73E-02
Haul Road Emissions	4.16E-06	5.95E-07	4.68E-04	2.88E-04	2.83E-05	1.86E-03	5.95E-08	1.25E-04	2.97E-06	3.27E-04
Power Generation	7.62E-06	1.40E-05	1.93E-05	3.28E-05	2.46E-05	2.01E-05	4.06E-07	3.35E-05	5.64E-05	1.26E-03
Mobile Engine Emissions (Surface)	4.60E-05	8.45E-05	1.17E-04	1.98E-04	1.49E-04	1.21E-04	2.45E-06	2.02E-04	3.40E-04	7.63E-03
Ship Emissions	7.05E-05	2.13E-05	4.51E-05	9.40E-05	8.06E-05	1.60E-04	6.04E-06	4.51E-03	3.65E-05	1.55E-03
Grays Bay Operations Total (g/s)	**1.55E-04**	**5.51E-04**	**6.55E-04**	**1.33E-01**	**2.12E-03**	**2.50E-03**	**1.23E-05**	**4.89E-03**	**4.84E-04**	**1.75E-01**
Grays Bay Operations Total (t/d)	**1.34E-05**	**4.76E-05**	**5.66E-05**	**1.15E-02**	**1.83E-04**	**2.16E-04**	**1.06E-06**	**4.22E-04**	**4.18E-05**	**1.51E-02**

Table 14 VOC Emission Sources and Estimated Emission Rates due to Operations at Grays Bay

Emission Source	1,3-Butadiene (g/s)	Acetaldehyde (g/s)	Acrolein (g/s)	Benzene (g/s)	Formaldehyde (g/s)	Propylene (g/s)	Toluene (g/s)	Xylenes (g/s)
Material Handling	-	-	-	-	-	-	-	-
Stockpile Emissions	-	-	-	-	-	-	-	-
Haul Road Emissions	-	-	-	-	-	-	-	-
Power Generation	3.83E-05	2.48E-05	7.75E-06	7.63E-04	7.76E-05	2.74E-03	2.76E-04	1.90E-04
Mobile Engine Emissions (Surface)	2.31E-04	4.55E-03	5.49E-04	5.53E-03	7.00E-03	1.53E-02	2.43E-03	1.69E-03
Ship Emissions	-	-	-	1.14E-05	1.76E-03	-	3.31E-04	5.82E-06
Grays Bay Operations Total (g/s)	**2.69E-04**	**4.57E-03**	**5.56E-04**	**6.31E-03**	**8.84E-03**	**1.80E-02**	**3.03E-03**	**1.89E-03**
Grays Bay Operations Total (t/d)	**2.33E-05**	**3.95E-04**	**4.81E-05**	**5.45E-04**	**7.64E-04**	**1.56E-03**	**2.62E-04**	**1.63E-04**

Table 15 PAH Emission Sources and Estimated Emission Rates due to Operations at Grays Bay

Emission Source	Acenaphthene (g/s)	Acenaphthylene (g/s)	Anthracene (g/s)	Benz(a)anthracene (g/s)	Benzo(a)pyrene (g/s)	Benzo(b)fluoranthene (g/s)	Benzo(e)pyrene (g/s)	Benzo(g,h,i)fluoranthene (g/s)	Benzo(g,h,i)perylene (g/s)
Material Handling	-	-	-	-	-	-	-	-	-
Stockpile Emissions	-	-	-	-	-	-	-	-	-
Haul Road Emissions	-	-	-	-	-	-	-	-	-
Power Generation	4.60E-06	9.07E-06	1.21E-06	6.11E-07	2.53E-07	1.09E-06	7.43E-08	-	5.47E-07
Mobile Engine Emissions (Surface)	8.42E-06	3.00E-05	1.11E-05	9.97E-06	1.12E-06	5.88E-07	4.48E-07	-	2.90E-06
Ship Emissions	1.13E-06	1.35E-08	6.52E-08	2.14E-07	-	-	-	-	1.21E-07
Grays Bay Operations Total (g/s)	**1.42E-05**	**3.91E-05**	**1.24E-05**	**1.08E-05**	**1.37E-06**	**1.68E-06**	**5.23E-07**	**-**	**3.57E-06**
Grays Bay Operations Total (t/d)	**1.22E-06**	**3.38E-06**	**1.07E-06**	**9.32E-07**	**1.18E-07**	**1.45E-07**	**4.52E-08**	**-**	**3.08E-07**

Table 15 PAH Emission Sources and Estimated Emission Rates due to Operations at Grays Bay (continued)

Emission Source	Benzo(k)fluoranthene (g/s)	Chrysene (g/s)	Dibenzo(a,h)anthracene (g/s)	Fluoranthene (g/s)	Fluorene (g/s)	Indeno(1,2,3-cd)pyrene (g/s)	Naphthalene (g/s)	Phenanthrene (g/s)	Pyrene (g/s)
Material Handling	-	-	-	-	-	-	-	-	-
Stockpile Emissions	-	-	-	-	-	-	-	-	-
Haul Road Emissions	-	-	-	-	-	-	-	-	-
Power Generation	2.14E-07	1.50E-06	3.40E-07	3.96E-06	1.26E-05	4.07E-07	1.28E-04	4.01E-05	3.65E-06
Mobile Engine Emissions (Surface)	9.20E-07	2.09E-06	3.46E-06	4.51E-05	1.73E-04	2.22E-06	5.03E-04	1.74E-04	2.84E-05
Ship Emissions	-	1.27E-07	8.92E-08	2.59E-07	2.39E-07	1.14E-07	6.04E-05	5.61E-07	2.27E-07
Grays Bay Operations Total (g/s)	**1.13E-06**	**3.73E-06**	**3.89E-06**	**4.94E-05**	**1.86E-04**	**2.75E-06**	**6.91E-04**	**2.15E-04**	**3.22E-05**
Grays Bay Operations Total (t/d)	**9.80E-08**	**3.22E-07**	**3.36E-07**	**4.27E-06**	**1.61E-05**	**2.37E-07**	**5.97E-05**	**1.86E-05**	**2.78E-06**

Source characteristics for Grays Bay point and area sources are presented in Tables 16 and 17, respectively.

Table 16 Point Source Characteristics for Grays Bay Sources

Source Description	Source Name	Easting (m)	Northing (m)	Elevation (m ASL)	Stack Height (m)	Stack Diameter (m)	Exit Temperature (K)	Exit Velocity (m/s)
Power generation (land)	GB_gensets	505584	7521112	20.0	5.0	0.3	373	12.0
Power generation (ship)	GB_ship	505448	7521236	0.0	35.0	1.5	373	1.0

Table 17 Area Source Characteristics for Grays Bay Sources

Source Description	Source Name	Easting NE Corner (m)	Northing NE Corner (m)	Area (m^2)	Elevation (m ASL)	Release Height (m)	Sigma z (m)
Material handling, road dust, stockpile emissions	GB_area	505848	7521160	56,640	20.0	10.0	10.0

Results

Air quality concentrations were modelled at 26 discrete receptors specific to the Human Health and Ecological Risk Assessment. The modeling results for these receptors are listed in Tables 18 through 21.

Predicted values of TSP, $PM_{2.5}$, SO_2, NO_2 and CO include background values as detailed in the August, 2006 EIS. While an attempt has been made to select reasonable background values, the values chosen for TSP and $PM_{2.5}$ should be considered to be conservative. Monitoring data from pristine environments is not readily available, and as a result, particulate matter data from Yellowknife, Fort Liard, Norman Wells, Inuvik, Daring Lake and Fort Simpson were used. As these data include a year of strong forest fire activity (2004) and are associated with areas which include dirt roads and extensive human activity (unlike the current High Lake Project area), the background value selected (7 $\mu g/m^3$) should be viewed as conservative, or an overestimate of typical background levels at the project site.

Interpretation of the results can be found in the Human Health and Ecological Risk Assessment where maximum predicted concentrations at each receptor are compared to human health or ecological exposure limits.

Table 18 High Lake Project Air Quality Summary Sheet for CACs (Including Ambient Background).

Contaminant and Averaging Time			SO_2 (µg/m³)			NO_2 (µg/m³)			CO (µg/m³)		$PM_{2.5}$ (µg/m³) [3]		TSP (µg/m³)	
Receptor Name	**UTM[1] E**	**UTM[1] N**	**1 hr**	**24 hr**	**Annual**	**1 hr**	**24 hr**	**Annual**	**1 hr**	**8 hr**	**24[4] hr**	**Annual**	**24 hr**	**Annual**
MPOI	varies	varies	307.9	20.5	3.9	654.8	461.0	97.9	15,426	7,746	385.4	42.6	4,995	374.4
Original camp	506050	7473050	254.8	14.9	3.4	542.8	284.4	78.9	12,700	3,910	214.9	23.1	2,656	119.5
AltCmp	505775	7472804	117.5	8.7	3.1	330.9	154.7	54.1	5,685	1,689	90.0	13.3	886	47.4
LandFm	505867	7472663	101.4	7.9	3.1	289.4	141.8	52.4	4,713	1,608	79.1	12.9	744	43.9
Calvng	513420	7412175	16.2	3.1	3.0	24.5	13.2	6.2	214	207	7.4	7.0	8	7.0
HLVD01	508730	7522250	21.8	4.1	3.0	78.6	38.2	6.2	564	369	8.8	7.0	24	7.1
HLVD02	508141	7521741	23.0	4.9	3.0	80.7	57.4	6.2	616	464	9.2	7.0	51	7.1
HLVD03	507855	7521134	23.7	5.5	3.0	87.6	72.1	6.2	766	471	9.4	7.0	65	7.1
HLVD04	506092	7521078	68.1	10.2	3.1	219.9	148.2	8.8	4,442	3,384	65.8	7.3	639	9.3
HLVD05	505915	7521141	71.7	11.3	3.1	199.8	139.1	9.8	3,446	2,756	59.0	7.4	634	10.5
HLVD06	505839	7520944	71.1	14.3	3.1	195.0	124.4	9.5	3,201	2,518	54.0	7.3	493	9.7
HLVD07	505260	7519804	31.9	6.7	3.0	127.7	78.2	6.4	2,042	1,002	13.8	7.0	75	7.2
HLVM01	507145	7474183	60.0	5.0	3.1	150.7	83.4	28.2	2,164	584	17.2	8.8	152	23.4
HLVM02	508959	7473202	41.0	4.2	3.0	106.4	76.7	14.0	1,388	425	11.0	7.6	99	11.7
HLVM03	508549	7472123	35.5	3.9	3.0	104.4	76.5	16.6	1,100	516	11.7	7.8	93	12.7
HLVM04	506894	7471900	54.9	4.7	3.1	139.8	86.9	25.3	1,972	613	16.2	8.4	151	16.6
HLVM05	505498	7473681	35.7	4.0	3.0	154.1	81.5	12.3	1,158	464	13.0	7.5	76	10.0
HLVM06	506874	7472758	97.8	7.1	3.3	220.2	122.6	69.7	4,008	1,383	40.1	11.9	426	50.0
HLVM07	507732	7472987	51.9	4.7	3.0	139.7	73.0	14.4	1,859	507	10.7	7.7	49	13.1
HLVR01	503360	7503867	18.8	3.3	3.0	32.4	12.0	6.3	240	220	7.4	7.0	10	7.0
HLVR02	503624	7503441	19.1	3.4	3.0	33.2	12.6	6.3	251	221	7.4	7.0	10	7.0
HLVR03	504317	7503353	18.6	3.5	3.0	27.3	14.3	6.2	258	225	7.4	7.0	10	7.0
HLVT01	506847	7480822	19.6	3.3	3.0	73.4	27.7	6.8	374	225	8.0	7.1	14	7.3
HLSS01	506312	7475926	29.7	3.7	3.0	106.0	73.4	11.7	828	455	11.1	7.5	79	10.3
HLSS02	507148	7473774	55.3	4.7	3.1	162.4	89.4	39.0	1,953	823	19.6	9.8	180	33.5
HLSS3_4	506986	7473249	111.0	7.4	3.3	237.7	92.2	52.9	4,707	1,049	21.6	11.1	196	50.9
HLSS07	506085	7472229	51.4	4.9	3.1	235.5	125.4	40.3	2,556	1,405	36.0	9.9	298	23.8
HLSS08	505145	7473980	79.3	6.1	3.0	164.0	98.6	19.7	3,160	1,077	16.4	8.1	319	14.3
Objective[2]			**450**	**150**	**30**	**400**	**200**	**60**	**15,000**	**6,000**	**30**		**120**	**60**
Ambient Background Value			**16**	**3**	**3**	**6**	**6**	**6**	**200**	**200**	**7**	**7**	**7**	**7**

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.
2. All objectives are from AAAQO except for 24-hr $PM_{2.5}$ which is based on the CWS.
3. 24-hour $PM_{2.5}$ concentrations are 98th percentile values.

Table 19 High Lake Project Air Quality Summary Sheet for Metals.

Contaminant and Averaging Time			As (µg/m³)			Cd (µg/m³)			Cr (µg/m³)			Cu (µg/m³)			Pb (µg/m³)		
Receptor Name	**UTM[1] E (m)**	**UTM[1] N (m)**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**
MPOI	varies	varies	6.27E-02	5.71E-02	3.37E-03	2.50E-01	2.12E-01	1.17E-02	7.52E-01	7.52E-01	3.78E-02	8.05E+01	6.35E+01	3.43E+00	3.34E+00	2.41E+00	1.33E-01
Original camp	506050	7473050	3.65E-02	2.92E-02	1.52E-03	1.74E-01	1.24E-01	7.21E-03	5.39E-01	3.92E-01	1.36E-02	5.20E+01	3.22E+01	1.88E+00	1.18E+00	8.27E-01	4.86E-02
AltCmp	505775	7472804	3.24E-02	1.65E-02	6.73E-04	1.45E-01	8.27E-02	3.20E-03	3.12E-01	1.42E-01	5.32E-03	4.16E+01	2.43E+01	8.64E-01	1.23E+00	6.63E-01	2.40E-02
LandFm	505867	7472663	3.43E-02	1.62E-02	6.60E-04	1.63E-01	8.24E-02	3.20E-03	2.89E-01	1.21E-01	4.83E-03	4.78E+01	2.45E+01	8.64E-01	1.37E+00	6.80E-01	2.41E-02
Calvng	513420	7412175	1.37E-04	4.32E-05	1.41E-06	4.86E-04	2.20E-04	5.10E-06	1.30E-03	4.24E-04	1.17E-05	1.21E-01	5.96E-02	9.84E-04	3.89E-03	1.39E-03	2.89E-05
HLVD01	508730	7522250	1.48E-03	3.81E-04	2.24E-06	9.78E-03	2.41E-03	1.06E-05	1.12E-02	2.78E-03	1.39E-05	2.51E+00	6.15E-01	2.54E-03	3.81E-02	9.39E-03	4.24E-05
HLVD02	508141	7521741	1.68E-03	6.67E-04	2.72E-06	1.12E-02	4.32E-03	1.34E-05	1.28E-02	4.97E-03	1.71E-05	2.87E+00	1.10E+00	3.25E-03	4.36E-02	1.68E-02	5.33E-05
HLVD03	507855	7521134	2.36E-03	9.75E-04	2.77E-06	1.51E-02	6.00E-03	1.36E-05	1.74E-02	6.91E-03	1.74E-05	3.84E+00	1.52E+00	3.29E-03	5.86E-02	2.33E-02	5.41E-05
HLVD04	506092	7521078	1.70E-02	9.98E-03	3.80E-05	1.14E-01	6.71E-02	2.25E-04	1.31E-01	7.69E-02	2.62E-04	2.95E+01	1.73E+01	5.71E-02	4.47E-01	2.62E-01	8.78E-04
HLVD05	505915	7521141	1.34E-02	9.09E-03	5.18E-05	8.71E-02	6.12E-02	3.11E-04	1.00E-01	7.01E-02	3.61E-04	2.22E+01	1.58E+01	7.91E-02	3.39E-01	2.39E-01	1.21E-03
HLVD06	505839	7520944	1.23E-02	9.06E-03	4.35E-05	8.05E-02	6.10E-02	2.44E-04	9.25E-02	6.99E-02	2.84E-04	2.05E+01	1.57E+01	6.13E-02	3.13E-01	2.39E-01	9.46E-04
HLVD07	505260	7519804	7.40E-03	1.47E-03	5.26E-06	4.96E-02	9.58E-03	2.78E-05	5.69E-02	1.10E-02	3.40E-05	1.28E+01	2.45E+00	6.89E-03	1.94E-01	3.73E-02	1.10E-04
HLVM01	507145	7474183	4.63E-03	1.04E-03	1.50E-04	1.55E-02	2.79E-03	4.13E-04	5.21E-02	1.41E-02	1.67E-03	2.56E+00	5.14E-01	6.17E-02	7.68E-02	1.54E-02	2.08E-03
HLVM02	508959	7473202	2.60E-03	8.57E-04	5.25E-05	7.15E-03	2.26E-03	1.57E-04	3.45E-02	1.06E-02	5.42E-04	1.46E+00	3.70E-01	2.39E-02	4.51E-02	1.24E-02	7.85E-04
HLVM03	508549	7472123	2.84E-03	8.23E-04	6.60E-05	8.15E-03	2.32E-03	2.03E-04	3.58E-02	9.99E-03	6.37E-04	1.56E+00	4.18E-01	3.24E-02	4.78E-02	1.34E-02	1.04E-03
HLVM04	506894	7471900	5.29E-03	1.52E-03	1.20E-04	1.39E-02	4.79E-03	3.98E-04	7.09E-02	1.51E-02	1.14E-03	3.27E+00	9.73E-01	5.87E-02	9.33E-02	2.93E-02	1.92E-03
HLVM05	505498	7473681	4.70E-03	9.70E-04	3.99E-05	1.47E-02	3.48E-03	1.40E-04	4.16E-02	6.74E-03	3.02E-04	2.90E+00	7.84E-01	2.63E-02	9.40E-02	2.36E-02	8.30E-04
HLVM06	506874	7472758	1.07E-02	3.99E-03	4.20E-04	3.28E-02	7.17E-03	1.13E-03	1.48E-01	5.32E-02	4.59E-03	6.27E+00	1.59E+00	1.50E-01	1.77E-01	4.13E-02	5.05E-03
HLVM07	507732	7472987	3.60E-03	4.15E-04	5.56E-05	1.21E-02	1.20E-03	1.62E-04	3.74E-02	4.74E-03	5.93E-04	2.04E+00	2.10E-01	2.43E-02	6.26E-02	5.51E-03	8.14E-04
HLVR01	503360	7503867	2.77E-04	6.74E-05	1.71E-06	1.07E-03	3.37E-04	5.77E-06	1.22E-03	3.98E-04	1.43E-05	2.75E-01	8.35E-02	1.03E-03	4.17E-03	1.30E-03	2.91E-05
HLVR02	503624	7503441	2.97E-04	7.49E-05	1.72E-06	1.36E-03	3.64E-04	5.79E-06	1.56E-03	4.25E-04	1.44E-05	3.51E-01	8.99E-02	1.03E-03	5.33E-03	1.40E-03	2.93E-05
HLVR03	504317	7503353	2.68E-04	1.05E-04	1.61E-06	1.55E-03	4.37E-04	5.43E-06	1.78E-03	5.14E-04	1.33E-05	4.00E-01	1.07E-01	9.72E-04	6.08E-03	1.68E-03	2.73E-05
HLVT01	506847	7480822	4.11E-04	9.09E-05	5.35E-06	1.42E-03	3.06E-04	1.70E-05	4.14E-03	7.62E-04	4.83E-05	2.61E-01	5.22E-02	2.84E-03	7.94E-03	1.62E-03	9.00E-05
HLSS01	506312	7475926	2.28E-03	6.44E-04	3.92E-05	7.71E-03	1.69E-03	1.14E-04	2.75E-02	8.60E-03	4.06E-04	1.68E+00	2.68E-01	1.86E-02	4.99E-02	8.74E-03	6.12E-04
HLSS02	507148	7473774	7.05E-03	1.37E-03	2.28E-04	1.97E-02	4.58E-03	5.92E-04	9.00E-02	1.66E-02	2.65E-03	3.05E+00	9.34E-01	8.20E-02	9.61E-02	2.57E-02	2.86E-03
HLSS3_4	506986	7473249	9.96E-03	1.63E-03	3.36E-04	3.26E-02	4.36E-03	7.91E-04	1.11E-01	2.03E-02	4.17E-03	6.30E+00	7.71E-01	8.57E-02	1.88E-01	2.40E-02	3.27E-03
HLSS07	506085	7472229	1.67E-02	3.54E-03	2.62E-04	5.65E-02	1.75E-02	1.00E-03	2.15E-01	4.75E-02	2.65E-03	1.32E+01	4.64E+00	1.88E-01	3.87E-01	1.24E-01	5.50E-03
HLSS08	505145	7473980	7.52E-03	2.99E-03	9.82E-05	2.10E-02	7.78E-03	3.02E-04	9.56E-02	3.76E-02	9.63E-04	5.08E+00	1.33E+00	5.39E-02	1.50E-01	4.66E-02	1.75E-03

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 19 High Lake Project Air Quality Summary Sheet for Metals (continued).

Contaminant and Averaging Time			Mn (µg/m³)			Hg (µg/m³)			Ni (µg/m³)			Se (µg/m³)			Zn (µg/m³)		
Receptor Name	**UTM[1] E** (m)	**UTM[1] N** (m)	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**	**1 hr**	**24 hr**	**Ann**
MPOI	varies	varies	2.99E+00	2.87E+00	1.45E-01	7.98E-03	2.61E-03	3.30E-04	3.04E-01	3.04E-01	1.60E-02	2.17E-01	2.16E-01	1.23E-02	9.28E+01	7.22E+01	3.97E+00
original camp	506050	7473050	2.13E+00	1.59E+00	5.66E-02	2.38E-03	1.62E-03	1.30E-04	2.21E-01	1.58E-01	6.28E-03	1.66E-01	1.19E-01	5.96E-03	6.32E+01	4.04E+01	2.34E+00
AltCmp	505775	7472804	1.35E+00	6.40E-01	2.30E-02	2.36E-03	9.40E-04	5.98E-05	1.28E-01	5.81E-02	2.45E-03	1.11E-01	4.85E-02	2.37E-03	5.00E+01	2.92E+01	1.05E+00
LandFm	505867	7472663	1.30E+00	5.62E-01	2.11E-02	3.68E-03	9.32E-04	6.65E-05	1.19E-01	5.05E-02	2.27E-03	1.03E-01	4.50E-02	2.28E-03	5.73E+01	2.93E+01	1.05E+00
Calvng	513420	7412175	5.31E-03	1.78E-03	4.34E-05	1.27E-05	6.05E-06	1.77E-07	1.12E-03	4.53E-04	6.93E-06	5.64E-04	2.23E-04	7.34E-06	1.51E-01	7.42E-02	1.31E-03
HLVD01	508730	7522250	4.39E-02	1.08E-02	5.25E-05	1.12E-04	2.90E-05	1.94E-07	2.90E-02	5.90E-03	3.60E-05	7.58E-03	1.91E-03	9.84E-06	3.26E+00	8.00E-01	3.34E-03
HLVD02	508141	7521741	5.01E-02	1.93E-02	6.51E-05	1.28E-04	5.05E-05	2.32E-07	3.53E-02	9.56E-03	4.12E-05	8.68E-03	3.44E-03	1.21E-05	3.72E+00	1.43E+00	4.26E-03
HLVD03	507855	7521134	6.74E-02	2.68E-02	6.61E-05	1.77E-04	7.41E-05	2.36E-07	3.86E-02	1.26E-02	4.25E-05	1.23E-02	4.83E-03	1.23E-05	5.00E+00	1.98E+00	4.32E-03
HLVD04	506092	7521078	5.15E-01	3.02E-01	1.02E-03	1.30E-03	7.64E-04	2.93E-06	2.61E-01	4.75E-02	3.84E-04	8.69E-02	5.09E-02	1.80E-04	3.82E+01	2.24E+01	7.43E-02
HLVD05	505915	7521141	3.89E-01	2.75E-01	1.40E-03	1.01E-03	6.96E-04	3.99E-06	2.77E-01	4.69E-02	4.91E-04	6.95E-02	4.64E-02	2.49E-04	2.89E+01	2.05E+01	1.03E-01
HLVD06	505839	7520944	3.60E-01	2.75E-01	1.10E-03	9.32E-04	6.94E-04	3.35E-06	2.74E-01	6.06E-02	5.30E-04	6.40E-02	4.63E-02	2.01E-04	2.67E+01	2.04E+01	7.99E-02
HLVD07	505260	7519804	2.23E-01	4.29E-02	1.31E-04	5.66E-04	1.11E-04	4.30E-07	7.82E-02	1.81E-02	7.20E-05	3.79E-02	7.53E-03	2.38E-05	1.66E+01	3.18E+00	9.00E-03
HLVM01	507145	7474183	1.92E-01	5.02E-02	6.07E-03	6.56E-04	1.14E-04	1.30E-05	2.60E-02	6.96E-03	8.68E-04	2.57E-02	6.53E-03	8.66E-04	3.56E+00	6.64E-01	9.03E-02
HLVM02	508959	7473202	1.27E-01	3.93E-02	1.95E-03	1.88E-04	7.41E-05	6.09E-06	1.64E-02	5.15E-03	2.91E-04	1.48E-02	4.79E-03	3.00E-04	1.94E+00	5.30E-01	3.42E-02
HLVM03	508549	7472123	1.35E-01	3.74E-02	2.29E-03	1.95E-04	4.96E-05	7.48E-06	1.68E-02	4.80E-03	3.52E-04	1.51E-02	4.44E-03	3.74E-04	2.06E+00	5.79E-01	4.57E-02
HLVM04	506894	7471900	2.63E-01	5.71E-02	4.03E-03	6.75E-04	1.47E-04	2.07E-05	3.35E-02	7.84E-03	6.33E-04	3.00E-02	7.93E-03	6.85E-04	4.07E+00	1.30E+00	8.32E-02
HLVM05	505498	7473681	1.60E-01	2.58E-02	1.11E-03	8.87E-04	1.12E-04	5.21E-06	2.08E-02	4.09E-03	1.80E-04	2.47E-02	4.64E-03	2.08E-04	3.75E+00	9.93E-01	3.48E-02
HLVM06	506874	7472758	5.33E-01	1.86E-01	1.63E-02	1.78E-03	2.47E-04	3.88E-05	7.27E-02	2.78E-02	2.45E-03	6.68E-02	2.65E-02	2.51E-03	8.23E+00	1.98E+00	2.30E-01
HLVM07	507732	7472987	1.34E-01	1.70E-02	2.14E-03	5.49E-04	5.50E-05	6.29E-06	1.87E-02	2.49E-03	3.13E-04	1.99E-02	2.42E-03	3.18E-04	2.81E+00	2.81E-01	3.51E-02
HLVR01	503360	7503867	4.80E-03	1.53E-03	5.16E-05	2.35E-05	5.22E-06	2.06E-07	1.34E-02	1.69E-03	1.23E-05	8.10E-04	2.91E-04	9.19E-06	3.56E-01	1.09E-01	1.41E-03
HLVR02	503624	7503441	6.13E-03	1.62E-03	5.19E-05	2.53E-05	5.76E-06	2.07E-07	1.49E-02	1.74E-03	1.24E-05	1.03E-03	3.14E-04	9.24E-06	4.55E-01	1.18E-01	1.41E-03
HLVR03	504317	7503353	7.00E-03	1.96E-03	4.81E-05	2.24E-05	8.25E-06	1.94E-07	1.24E-02	2.69E-03	1.20E-05	1.18E-03	3.81E-04	8.60E-06	5.19E-01	1.40E-01	1.33E-03
HLVT01	506847	7480822	1.54E-02	2.73E-03	1.74E-04	5.45E-05	1.23E-05	6.35E-07	3.97E-03	1.53E-03	2.88E-05	2.16E-03	5.02E-04	2.96E-05	3.50E-01	7.16E-02	3.94E-03
HLSS01	506312	7475926	1.07E-01	3.18E-02	1.48E-03	1.94E-04	4.51E-05	3.58E-06	1.25E-02	4.06E-03	2.16E-04	1.10E-02	3.64E-03	2.19E-04	2.19E+00	3.90E-01	2.62E-02
HLSS02	507148	7473774	3.31E-01	6.01E-02	9.56E-03	7.10E-04	1.27E-04	1.83E-05	4.35E-02	8.23E-03	1.36E-03	4.03E-02	7.78E-03	1.34E-03	4.44E+00	1.25E+00	1.24E-01
HLSS3_4	506986	7473249	4.18E-01	7.34E-02	1.49E-02	1.22E-03	1.43E-04	2.62E-05	5.44E-02	1.02E-02	2.13E-03	5.20E-02	9.69E-03	2.07E-03	8.47E+00	1.10E+00	1.44E-01
HLSS07	506085	7472229	8.41E-01	1.79E-01	9.87E-03	1.57E-03	6.39E-04	4.45E-05	9.37E-02	2.19E-02	1.34E-03	7.89E-02	1.89E-02	1.34E-03	1.66E+01	5.69E+00	2.48E-01
HLSS08	505145	7473980	3.63E-01	1.41E-01	3.56E-03	5.75E-04	1.58E-04	9.22E-06	4.42E-02	1.79E-02	5.11E-04	3.90E-02	1.62E-02	5.29E-04	6.36E+00	1.87E+00	7.37E-02

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 20 High Lake Project Air Quality Summary Sheet for VOCs.

Contaminant and Averaging Time			1,3-Butadiene (µg/m³)			Acetaldehyde (µg/m³)			Acrolein (µg/m³)			Benzene (µg/m³)		
Receptor Name	UTM[1] E (m)	UTM[1] N (m)	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual
MPOI	varies	varies	1.38E-01	1.37E-01	7.71E-03	2.26E+00	1.30E+00	6.74E-02	2.72E-01	1.66E-01	8.67E-03	3.01E+00	2.98E+00	1.67E-01
Original camp	506050	7473050	9.92E-02	6.74E-02	3.31E-03	9.45E-01	6.42E-01	2.52E-02	1.21E-01	8.20E-02	3.30E-03	2.16E+00	1.47E+00	7.08E-02
AltCmp	505775	7472804	6.41E-02	2.29E-02	1.26E-03	6.11E-01	2.18E-01	1.12E-02	7.79E-02	2.79E-02	1.44E-03	1.40E+00	4.99E-01	2.72E-02
LandFm	505867	7472663	6.04E-02	2.04E-02	1.20E-03	5.76E-01	1.95E-01	1.05E-02	7.34E-02	2.48E-02	1.35E-03	1.32E+00	4.45E-01	2.59E-02
Calvng	513420	7412175	3.26E-04	1.41E-04	4.58E-06	2.87E-03	1.17E-03	3.56E-05	3.69E-04	1.52E-04	4.65E-06	7.06E-03	3.03E-03	9.80E-05
HLVD01	508730	7522250	4.50E-03	1.13E-03	5.84E-06	8.60E-02	2.11E-02	9.10E-05	1.04E-02	2.55E-03	1.11E-05	1.07E-01	2.69E-02	1.35E-04
HLVD02	508141	7521741	5.15E-03	2.05E-03	7.20E-06	9.83E-02	3.78E-02	1.15E-04	1.19E-02	4.58E-03	1.41E-05	1.23E-01	4.86E-02	1.67E-04
HLVD03	507855	7521134	7.39E-03	2.87E-03	7.28E-06	1.32E-01	5.23E-02	1.17E-04	1.60E-02	6.33E-03	1.43E-05	1.74E-01	6.78E-02	1.69E-04
HLVD04	506092	7521078	5.13E-02	3.01E-02	1.06E-04	1.01E+00	5.92E-01	1.96E-03	1.22E-01	7.14E-02	2.38E-04	1.23E+00	7.21E-01	2.52E-03
HLVD05	505915	7521141	4.15E-02	2.74E-02	1.47E-04	7.63E-01	5.40E-01	2.72E-03	9.23E-02	6.51E-02	3.29E-04	9.80E-01	6.57E-01	3.48E-03
HLVD06	505839	7520944	3.81E-02	2.74E-02	1.19E-04	7.05E-01	5.38E-01	2.11E-03	8.53E-02	6.49E-02	2.56E-04	9.03E-01	6.55E-01	2.80E-03
HLVD07	505260	7519804	2.24E-02	4.47E-03	1.41E-05	4.38E-01	8.40E-02	2.40E-04	5.28E-02	1.02E-02	2.92E-05	5.36E-01	1.06E-01	3.29E-04
HLVM01	507145	7474183	1.63E-02	4.31E-03	5.58E-04	1.52E-01	4.04E-02	4.70E-03	1.94E-02	5.16E-03	6.07E-04	3.52E-01	9.37E-02	1.20E-02
HLVM02	508959	7473202	9.51E-03	3.07E-03	1.93E-04	9.08E-02	2.81E-02	1.59E-03	1.16E-02	3.60E-03	2.06E-04	2.07E-01	6.67E-02	4.15E-03
HLVM03	508549	7472123	9.51E-03	2.81E-03	2.40E-04	9.10E-02	2.63E-02	1.86E-03	1.16E-02	3.36E-03	2.43E-04	2.07E-01	6.12E-02	5.13E-03
HLVM04	506894	7471900	1.93E-02	4.95E-03	4.40E-04	1.84E-01	3.61E-02	3.49E-03	2.35E-02	4.73E-03	4.55E-04	4.21E-01	1.06E-01	9.43E-03
HLVM05	505498	7473681	1.55E-02	2.82E-03	1.30E-04	1.16E-01	1.82E-02	1.02E-03	1.49E-02	2.43E-03	1.33E-04	3.25E-01	5.97E-02	2.78E-03
HLVM06	506874	7472758	4.41E-02	1.78E-02	1.64E-03	4.20E-01	1.70E-01	1.36E-02	5.36E-02	2.17E-02	1.76E-03	9.62E-01	3.88E-01	3.52E-02
HLVM07	507732	7472987	1.27E-02	1.56E-03	2.05E-04	1.08E-01	1.37E-02	1.70E-03	1.38E-02	1.77E-03	2.20E-04	2.70E-01	3.38E-02	4.41E-03
HLVR01	503360	7503867	4.78E-04	1.71E-04	5.81E-06	9.40E-03	2.88E-03	4.98E-05	1.13E-03	3.50E-04	6.43E-06	1.14E-02	3.99E-03	1.25E-04
HLVR02	503624	7503441	6.11E-04	1.84E-04	5.84E-06	1.20E-02	3.10E-03	5.00E-05	1.45E-03	3.77E-04	6.45E-06	1.46E-02	4.30E-03	1.26E-04
HLVR03	504317	7503353	6.97E-04	2.18E-04	5.43E-06	1.37E-02	3.67E-03	4.69E-05	1.65E-03	4.47E-04	6.05E-06	1.67E-02	5.10E-03	1.17E-04
HLVT01	506847	7480822	1.35E-03	3.19E-04	1.89E-05	1.11E-02	2.44E-03	1.52E-04	1.44E-03	3.19E-04	1.98E-05	2.91E-02	6.81E-03	4.05E-04
HLSS01	506312	7475926	6.86E-03	2.34E-03	1.40E-04	6.53E-02	2.21E-02	1.20E-03	8.33E-03	2.82E-03	1.55E-04	1.49E-01	5.10E-02	3.03E-03
HLSS02	507148	7473774	2.59E-02	5.13E-03	8.68E-04	2.44E-01	4.86E-02	7.39E-03	3.11E-02	6.21E-03	9.54E-04	5.64E-01	1.12E-01	1.87E-02
HLSS3_4	506986	7473249	3.35E-02	6.31E-03	1.36E-03	3.01E-01	5.87E-02	1.22E-02	3.86E-02	7.50E-03	1.56E-03	7.20E-01	1.37E-01	2.94E-02
HLSS07	506085	7472229	4.96E-02	1.19E-02	8.33E-04	4.72E-01	1.13E-01	7.12E-03	6.03E-02	1.45E-02	9.19E-04	1.08E+00	2.59E-01	1.80E-02
HLSS08	505145	7473980	2.45E-02	1.03E-02	3.34E-04	2.34E-01	9.42E-02	2.80E-03	2.98E-02	1.21E-02	3.62E-04	5.34E-01	2.24E-01	7.20E-03

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 20 High Lake Project Air Quality Summary Sheet for VOCs (continued).

Contaminant and Averaging Time			Formaldehyde (µg/m³)			Propylene (µg/m³)			Toluene (µg/m³)			Xylenes (µg/m³)		
Receptor Name	UTM[1] E (m)	UTM[1] N (m)	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual
MPOI	varies	varies	3.47E+00	2.08E+00	1.08E-01	9.54E+00	9.43E+00	5.35E-01	1.21E+00	1.19E+00	6.78E-02	8.39E-01	8.27E-01	4.59E-02
original camp	506050	7473050	1.51E+00	1.03E+00	4.10E-02	6.86E+00	4.66E+00	2.30E-01	8.68E-01	5.90E-01	3.13E-02	6.01E-01	4.08E-01	1.92E-02
AltCmp	505775	7472804	9.75E-01	3.49E-01	1.80E-02	4.43E+00	1.58E+00	8.69E-02	5.61E-01	2.01E-01	1.26E-02	3.88E-01	1.39E-01	7.50E-03
LandFm	505867	7472663	9.19E-01	3.11E-01	1.69E-02	4.17E+00	1.41E+00	8.27E-02	5.66E-01	1.79E-01	1.27E-02	3.66E-01	1.24E-01	7.12E-03
Calvng	513420	7412175	4.61E-03	1.99E-03	5.79E-05	2.26E-02	9.77E-03	3.18E-04	2.88E-03	1.50E-03	4.65E-05	1.94E-03	8.32E-04	2.67E-05
HLVD01	508730	7522250	1.33E-01	3.29E-02	1.52E-04	2.99E-01	7.53E-02	3.93E-04	4.68E-02	1.18E-02	6.15E-05	3.26E-02	8.14E-03	3.98E-05
HLVD02	508141	7521741	1.51E-01	5.84E-02	1.91E-04	3.42E-01	1.37E-01	4.84E-04	5.35E-02	2.11E-02	7.56E-05	3.73E-02	1.47E-02	4.94E-05
HLVD03	507855	7521134	2.04E-01	8.20E-02	1.94E-04	4.93E-01	1.91E-01	4.90E-04	7.52E-02	2.96E-02	7.66E-05	5.23E-02	2.05E-02	5.00E-05
HLVD04	506092	7521078	1.55E+00	9.11E-01	3.12E-03	3.40E+00	1.99E+00	7.07E-03	5.39E-01	3.16E-01	1.11E-03	3.75E-01	2.20E-01	7.61E-04
HLVD05	505915	7521141	1.18E+00	8.31E-01	4.30E-03	2.77E+00	1.82E+00	9.77E-03	4.25E-01	2.88E-01	1.53E-03	2.96E-01	2.01E-01	1.05E-03
HLVD06	505839	7520944	1.09E+00	8.28E-01	3.40E-03	2.54E+00	1.81E+00	7.94E-03	3.92E-01	2.87E-01	1.24E-03	2.73E-01	2.00E-01	8.41E-04
HLVD07	505260	7519804	6.74E-01	1.30E-01	3.92E-04	1.48E+00	2.97E-01	9.42E-04	2.35E-01	4.63E-02	1.48E-04	1.63E-01	3.22E-02	9.84E-05
HLVM01	507145	7474183	2.42E-01	6.46E-02	7.56E-03	1.13E+00	2.98E-01	3.87E-02	1.71E-01	3.95E-02	5.19E-03	9.65E-02	2.60E-02	3.30E-03
HLVM02	508959	7473202	1.45E-01	4.50E-02	2.56E-03	6.57E-01	2.12E-01	1.34E-02	8.49E-02	2.71E-02	1.90E-03	5.76E-02	1.85E-02	1.13E-03
HLVM03	508549	7472123	1.45E-01	4.21E-02	3.02E-03	6.57E-01	1.95E-01	1.67E-02	8.54E-02	2.50E-02	2.34E-03	5.76E-02	1.70E-02	1.40E-03
HLVM04	506894	7471900	2.94E-01	5.86E-02	5.65E-03	1.33E+00	3.46E-01	3.05E-02	1.70E-01	4.15E-02	4.84E-03	1.17E-01	2.86E-02	2.57E-03
HLVM05	505498	7473681	1.86E-01	3.00E-02	1.65E-03	1.09E+00	1.97E-01	9.01E-03	1.35E-01	2.79E-02	1.34E-03	8.61E-02	1.60E-02	7.58E-04
HLVM06	506874	7472758	6.71E-01	2.71E-01	2.19E-02	3.05E+00	1.23E+00	1.14E-01	3.87E-01	1.57E-01	1.53E-02	2.67E-01	1.08E-01	9.65E-03
HLVM07	507732	7472987	1.73E-01	2.21E-02	2.75E-03	8.80E-01	1.08E-01	1.42E-02	1.30E-01	1.60E-02	2.01E-03	7.33E-02	9.32E-03	1.21E-03
HLVR01	503360	7503867	1.45E-02	4.80E-03	8.17E-05	3.17E-02	1.15E-02	4.03E-04	5.03E-03	1.77E-03	5.87E-05	3.50E-03	1.19E-03	3.45E-05
HLVR02	503624	7503441	1.85E-02	5.23E-03	8.21E-05	4.05E-02	1.23E-02	4.05E-04	6.42E-03	1.92E-03	5.90E-05	4.47E-03	1.28E-03	3.46E-05
HLVR03	504317	7503353	2.11E-02	6.62E-03	7.72E-05	4.62E-02	1.46E-02	3.76E-04	7.32E-03	2.36E-03	5.50E-05	5.10E-03	1.52E-03	3.23E-05
HLVT01	506847	7480822	1.79E-02	3.96E-03	2.47E-04	9.40E-02	2.22E-02	1.31E-03	1.40E-02	3.26E-03	1.88E-04	7.97E-03	1.85E-03	1.11E-04
HLSS01	506312	7475926	1.04E-01	3.53E-02	1.93E-03	4.74E-01	1.62E-01	9.73E-03	6.10E-02	2.09E-02	1.32E-03	4.15E-02	1.41E-02	8.32E-04
HLSS02	507148	7473774	3.89E-01	7.77E-02	1.19E-02	1.79E+00	3.55E-01	6.02E-02	2.43E-01	4.49E-02	7.96E-03	1.56E-01	3.11E-02	5.15E-03
HLSS3_4	506986	7473249	4.82E-01	9.38E-02	1.95E-02	2.33E+00	4.36E-01	9.38E-02	3.10E-01	5.96E-02	1.24E-02	1.97E-01	3.80E-02	8.12E-03
HLSS07	506085	7472229	7.54E-01	1.81E-01	1.15E-02	3.43E+00	8.23E-01	5.77E-02	4.34E-01	1.05E-01	9.50E-03	3.00E-01	7.21E-02	4.94E-03
HLSS08	505145	7473980	3.74E-01	1.51E-01	4.51E-03	1.69E+00	7.14E-01	2.32E-02	2.17E-01	9.03E-02	3.18E-03	1.49E-01	6.20E-02	1.97E-03

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 21 High Lake Project Air Quality Summary Sheet for PAHs.

Contaminant and Averaging Time			Acenaphthene (µg/m³)			Acenaphthylene (µg/m³)			Anthracene (µg/m³)			Benz(a)anthracene (µg/m³)			Benzo(a)pyrene (µg/m³)		
Receptor Name	UTM[1] E (m)	UTM[1] N (m)	1 hr	24 hr	Ann	1 hr	24 hr	Ann	1 hr	24 hr	Ann	1 hr	24 hr	Ann	1 hr	24 hr	Ann
MPOI	varies	varies	1.12E-02	1.11E-02	6.52E-04	2.58E-02	2.55E-02	1.48E-03	5.50E-03	5.36E-03	2.97E-04	4.95E-03	3.91E-03	2.12E-04	7.97E-04	7.88E-04	4.51E-05
original camp	506050	7473050	8.05E-03	5.47E-03	2.96E-04	1.86E-02	1.26E-02	6.54E-04	3.89E-03	2.65E-03	1.24E-04	2.84E-03	1.93E-03	8.57E-05	5.73E-04	3.89E-04	1.97E-05
AltCmp	505775	7472804	5.20E-03	1.86E-03	1.05E-04	1.20E-02	4.28E-03	2.39E-04	2.52E-03	8.99E-04	4.86E-05	1.84E-03	6.56E-04	3.48E-05	3.70E-04	1.32E-04	7.31E-06
LandFm	505867	7472663	4.90E-03	1.65E-03	1.01E-04	1.13E-02	3.81E-03	2.28E-04	2.37E-03	8.01E-04	4.61E-05	1.73E-03	5.84E-04	3.30E-05	3.48E-04	1.18E-04	6.97E-06
Calvng	513420	7412175	2.75E-05	1.22E-05	4.06E-07	6.23E-05	2.73E-05	8.99E-07	1.26E-05	5.38E-06	1.73E-07	8.99E-06	3.80E-06	1.20E-07	1.90E-06	8.28E-07	2.71E-08
HLVD01	508730	7522250	1.77E-04	4.67E-05	3.25E-07	5.99E-04	1.54E-04	8.93E-07	2.14E-04	5.34E-05	2.60E-07	1.90E-04	4.72E-05	2.19E-07	2.19E-05	5.57E-06	3.04E-08
HLVD02	508141	7521741	2.02E-04	8.62E-05	3.86E-07	6.86E-04	2.81E-04	1.08E-06	2.45E-04	9.63E-05	3.23E-07	2.18E-04	8.48E-05	2.74E-07	2.51E-05	1.01E-05	3.72E-08
HLVD03	507855	7521134	3.29E-04	1.24E-04	3.90E-07	1.04E-03	3.96E-04	1.10E-06	3.43E-04	1.34E-04	3.27E-07	2.99E-04	1.18E-04	2.78E-07	3.69E-05	1.42E-05	3.76E-08
HLVD04	506092	7521078	2.02E-03	1.20E-03	4.50E-06	6.68E-03	3.95E-03	1.45E-05	2.46E-03	1.45E-03	4.99E-06	2.21E-03	1.30E-03	4.41E-06	2.48E-04	1.45E-04	5.25E-07
HLVD05	505915	7521141	1.79E-03	1.02E-03	6.18E-06	5.74E-03	3.57E-03	2.00E-05	1.94E-03	1.32E-03	6.90E-06	1.71E-03	1.18E-03	6.09E-06	2.06E-04	1.32E-04	7.24E-07
HLVD06	505839	7520944	1.64E-03	9.98E-04	5.44E-06	5.21E-03	3.55E-03	1.67E-05	1.79E-03	1.31E-03	5.51E-06	1.58E-03	1.18E-03	4.81E-06	1.88E-04	1.32E-04	5.95E-07
HLVD07	505260	7519804	8.38E-04	1.81E-04	6.86E-07	2.93E-03	6.04E-04	2.03E-06	1.07E-03	2.11E-04	6.45E-07	9.61E-04	1.87E-04	5.57E-07	1.08E-04	2.20E-05	7.13E-08
HLVM01	507145	7474183	1.40E-03	3.59E-04	4.80E-05	3.15E-03	8.18E-04	1.08E-04	6.26E-04	1.68E-04	2.14E-05	4.56E-04	1.22E-04	1.51E-05	9.57E-05	2.51E-05	3.28E-06
HLVM02	508959	7473202	7.71E-04	2.54E-04	1.67E-05	1.78E-03	5.81E-04	3.74E-05	3.73E-04	1.20E-04	7.34E-06	2.72E-04	8.63E-05	5.16E-06	5.49E-05	1.78E-05	1.13E-06
HLVM03	508549	7472123	7.70E-04	2.30E-04	2.13E-05	1.78E-03	5.29E-04	4.72E-05	3.74E-04	1.10E-04	9.04E-06	2.73E-04	7.99E-05	6.26E-06	5.49E-05	1.63E-05	1.42E-06
HLVM04	506894	7471900	1.56E-03	4.51E-04	3.86E-05	3.61E-03	9.90E-04	8.59E-05	7.58E-04	1.85E-04	1.66E-05	5.53E-04	1.26E-04	1.16E-05	1.11E-04	2.96E-05	2.60E-06
HLVM05	505498	7473681	1.53E-03	2.67E-04	1.14E-05	3.25E-03	5.76E-04	2.54E-05	5.55E-04	1.03E-04	4.90E-06	3.55E-04	6.83E-05	3.40E-06	9.53E-05	1.71E-05	7.67E-07
HLVM06	506874	7472758	3.58E-03	1.44E-03	1.42E-04	8.25E-03	3.33E-03	3.17E-04	1.73E-03	6.99E-04	6.24E-05	1.26E-03	5.10E-04	4.39E-05	2.55E-04	1.03E-04	9.63E-06
HLVM07	507732	7472987	1.14E-03	1.32E-04	1.77E-05	2.51E-03	2.99E-04	3.96E-05	4.73E-04	6.03E-05	7.81E-06	3.28E-04	4.31E-05	5.50E-06	7.53E-05	9.13E-06	1.20E-06
HLVR01	503360	7503867	3.77E-05	8.63E-06	4.96E-07	7.71E-05	2.49E-05	1.12E-06	2.29E-05	7.79E-06	2.23E-07	2.06E-05	6.72E-06	1.59E-07	2.36E-06	8.70E-07	3.40E-08
HLVR02	503624	7503441	3.85E-05	9.29E-06	4.99E-07	7.94E-05	2.68E-05	1.12E-06	2.93E-05	8.39E-06	2.24E-07	2.63E-05	7.24E-06	1.59E-07	2.95E-06	9.36E-07	3.42E-08
HLVR03	504317	7503353	2.85E-05	1.13E-05	4.62E-07	9.06E-05	3.18E-05	1.04E-06	3.35E-05	9.97E-06	2.09E-07	3.00E-05	8.63E-06	1.49E-07	3.36E-06	1.11E-06	3.18E-08
HLVT01	506847	7480822	1.17E-04	2.84E-05	1.65E-06	2.63E-04	6.28E-05	3.68E-06	5.16E-05	1.20E-05	7.16E-07	3.62E-05	8.27E-06	5.01E-07	7.97E-06	1.89E-06	1.11E-07
HLSS01	506312	7475926	5.98E-04	1.91E-04	1.20E-05	1.29E-03	4.39E-04	2.70E-05	2.69E-04	9.17E-05	5.38E-06	1.96E-04	6.67E-05	3.82E-06	3.96E-05	1.35E-05	8.22E-07
HLSS02	507148	7473774	2.11E-03	4.18E-04	7.43E-05	4.86E-03	9.62E-04	1.67E-04	1.01E-03	2.01E-04	3.33E-05	7.37E-04	1.47E-04	2.36E-05	1.50E-04	2.97E-05	5.09E-06
HLSS3_4	506986	7473249	2.94E-03	5.18E-04	1.13E-04	6.55E-03	1.19E-03	2.57E-04	1.27E-03	2.46E-04	5.26E-05	9.19E-04	1.79E-04	3.78E-05	1.98E-04	3.65E-05	7.89E-06
HLSS07	506085	7472229	4.02E-03	9.66E-04	7.09E-05	9.27E-03	2.23E-03	1.60E-04	1.95E-03	4.67E-04	3.19E-05	1.42E-03	3.41E-04	2.27E-05	2.86E-04	6.87E-05	4.87E-06
HLSS08	505145	7473980	1.99E-03	8.55E-04	2.88E-05	4.58E-03	1.95E-03	6.46E-05	9.63E-04	4.01E-04	1.28E-05	7.02E-04	2.89E-04	9.02E-06	1.41E-04	5.99E-05	1.96E-06

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 21 High Lake Project Air Quality Summary Sheet for PAHs (continued).

Contaminant and Averaging Time			Benzo(b)fluoranthene (µg/m³)			Benzo(e)pyrene (µg/m³)			Benzo(g,h,i)fluoranthene (µg/m³)			Benzo(g,h,i)perylene (µg/m³)			Benzo(k)fluoranthene (µg/m³)		
Receptor Name	UTM[1] E (m)	UTM[1] N (m)	1 hr	24 hr	Ann	1 hr	24 hr	Ann	1 hr	24 hr	Ann	1 hr	24 hr	Ann	1 hr	24 hr	Ann
MPOI	varies	varies	2.26E-03	2.24E-03	1.35E-04	2.68E-04	2.65E-04	1.50E-05	2.71E-08	7.45E-09	9.83E-10	1.86E-03	1.84E-03	1.04E-04	6.68E-04	6.61E-04	3.78E-05
original camp	506050	7473050	1.63E-03	1.11E-03	6.28E-05	1.93E-04	1.31E-04	6.42E-06	6.57E-09	1.96E-09	1.50E-10	1.33E-03	9.07E-04	4.51E-05	4.80E-04	3.27E-04	1.65E-05
AltCmp	505775	7472804	1.05E-03	3.75E-04	2.16E-05	1.24E-04	4.45E-05	2.43E-06	7.82E-09	1.66E-09	7.87E-11	8.62E-04	3.08E-04	1.69E-05	3.11E-04	1.11E-04	6.13E-06
LandFm	505867	7472663	9.90E-04	3.34E-04	2.07E-05	1.17E-04	3.96E-05	2.32E-06	1.20E-08	2.40E-09	1.04E-10	8.12E-04	2.74E-04	1.61E-05	2.92E-04	9.87E-05	5.85E-06
Calvng	513420	7412175	5.67E-06	2.54E-06	8.57E-08	6.33E-07	2.73E-07	8.87E-09	2.67E-11	1.21E-11	3.45E-13	4.41E-06	1.92E-06	6.22E-08	1.60E-06	6.96E-07	2.28E-08
HLVD01	508730	7522250	1.98E-05	4.52E-06	4.75E-08	8.73E-06	2.20E-06	1.13E-08	9.32E-12	2.12E-12	1.00E-13	5.67E-05	1.43E-05	7.62E-08	1.81E-05	4.60E-06	2.53E-08
HLVD02	508141	7521741	2.47E-05	8.74E-06	5.43E-08	9.99E-06	3.98E-06	1.40E-08	9.38E-12	2.21E-12	1.02E-13	6.49E-05	2.60E-05	9.36E-08	2.07E-05	8.38E-06	3.09E-08
HLVD03	507855	7521134	3.74E-05	1.31E-05	5.47E-08	1.43E-05	5.57E-06	1.41E-08	9.42E-12	2.26E-12	1.03E-13	9.40E-05	3.65E-05	9.47E-08	3.05E-05	1.18E-05	3.12E-08
HLVD04	506092	7521078	2.37E-04	1.20E-04	4.46E-07	9.97E-05	5.84E-05	2.06E-07	9.37E-12	2.40E-12	1.11E-13	6.45E-04	3.78E-04	1.35E-06	2.04E-04	1.20E-04	4.34E-07
HLVD05	505915	7521141	1.90E-04	8.84E-05	6.09E-07	8.05E-05	5.33E-05	2.85E-07	9.00E-12	2.34E-12	1.08E-13	5.26E-04	3.44E-04	1.86E-06	1.70E-04	1.09E-04	5.98E-07
HLVD06	505839	7520944	1.86E-04	7.11E-05	6.17E-07	7.40E-05	5.31E-05	2.31E-07	8.98E-12	2.34E-12	1.09E-13	4.83E-04	3.43E-04	1.52E-06	1.56E-04	1.09E-04	4.92E-07
HLVD07	505260	7519804	1.01E-04	2.07E-05	8.55E-08	4.35E-05	8.68E-06	2.73E-08	8.94E-12	2.40E-12	1.15E-13	2.82E-04	5.66E-05	1.81E-07	8.94E-05	1.81E-05	5.91E-08
HLVM01	507145	7474183	2.91E-04	7.36E-05	9.99E-06	3.16E-05	8.36E-06	1.08E-06	1.40E-09	2.38E-10	1.81E-11	2.21E-04	5.81E-05	7.56E-06	8.04E-05	2.10E-05	2.75E-06
HLVM02	508959	7473202	1.56E-04	5.19E-05	3.49E-06	1.85E-05	5.96E-06	3.74E-07	5.05E-10	1.92E-10	1.15E-11	1.28E-04	4.14E-05	2.61E-06	4.60E-05	1.50E-05	9.53E-07
HLVM03	508549	7472123	1.55E-04	4.68E-05	4.50E-06	1.85E-05	5.46E-06	4.65E-07	5.63E-10	1.21E-10	1.37E-11	1.28E-04	3.79E-05	3.26E-06	4.60E-05	1.37E-05	1.20E-06
HLVM04	506894	7471900	3.16E-04	9.66E-05	8.13E-06	3.75E-05	9.61E-06	8.52E-07	2.20E-09	4.43E-10	4.90E-11	2.60E-04	6.77E-05	5.96E-06	9.35E-05	2.49E-05	2.18E-06
HLVM05	505498	7473681	3.39E-04	5.81E-05	2.42E-06	3.01E-05	5.47E-06	2.51E-07	2.53E-09	2.09E-10	1.06E-11	2.14E-04	3.87E-05	1.76E-06	8.04E-05	1.44E-05	6.45E-07
HLVM06	506874	7472758	7.23E-04	2.92E-04	2.96E-05	8.56E-05	3.46E-05	3.17E-06	4.83E-09	8.34E-10	5.82E-11	5.93E-04	2.40E-04	2.22E-05	2.14E-04	8.63E-05	8.09E-06
HLVM07	507732	7472987	2.43E-04	2.72E-05	3.69E-06	2.45E-05	3.03E-06	3.97E-07	1.53E-09	1.74E-10	1.16E-11	1.72E-04	2.11E-05	2.77E-06	6.34E-05	7.66E-06	1.01E-06
HLVR01	503360	7503867	8.66E-06	1.84E-06	1.03E-07	9.28E-07	3.32E-07	1.13E-08	2.21E-11	7.58E-12	3.76E-13	6.01E-06	2.21E-06	7.87E-08	1.96E-06	7.21E-07	2.86E-08
HLVR02	503624	7503441	8.82E-06	1.87E-06	1.03E-07	1.19E-06	3.57E-07	1.13E-08	2.27E-11	7.65E-12	3.79E-13	7.67E-06	2.39E-06	7.91E-08	2.43E-06	7.76E-07	2.87E-08
HLVR03	504317	7503353	6.51E-06	1.77E-06	9.54E-08	1.35E-06	4.23E-07	1.05E-08	2.22E-11	7.14E-12	3.53E-13	8.75E-06	2.86E-06	7.35E-08	2.77E-06	9.20E-07	2.67E-08
HLVT01	506847	7480822	2.46E-05	6.02E-06	3.46E-07	2.63E-06	6.18E-07	3.66E-08	1.20E-10	2.54E-11	1.20E-12	1.84E-05	4.33E-06	2.56E-07	6.70E-06	1.59E-06	9.36E-08
HLSS01	506312	7475926	1.30E-04	3.86E-05	2.49E-06	1.33E-05	4.54E-06	2.72E-07	4.58E-10	9.61E-11	5.33E-12	9.22E-05	3.15E-05	1.90E-06	3.32E-05	1.13E-05	6.91E-07
HLSS02	507148	7473774	4.29E-04	8.54E-05	1.54E-05	5.03E-05	9.96E-06	1.68E-06	1.75E-09	2.92E-10	2.27E-11	3.49E-04	6.91E-05	1.18E-05	1.26E-04	2.49E-05	4.28E-06
HLSS3_4	506986	7473249	6.18E-04	1.05E-04	2.32E-05	6.51E-05	1.22E-05	2.63E-06	2.84E-09	3.53E-10	3.12E-11	4.55E-04	8.49E-05	1.83E-05	1.67E-04	3.07E-05	6.62E-06
HLSS07	506085	7472229	8.13E-04	1.95E-04	1.47E-05	9.62E-05	2.31E-05	1.61E-06	4.79E-09	1.89E-09	1.04E-10	6.67E-04	1.60E-04	1.13E-05	2.40E-04	5.77E-05	4.09E-06
HLSS08	505145	7473980	4.01E-04	1.75E-04	5.99E-06	4.76E-05	2.00E-05	6.48E-07	1.58E-09	2.83E-10	1.42E-11	3.30E-04	1.39E-04	4.53E-06	1.19E-04	5.03E-05	1.65E-06

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 21 High Lake Project Air Quality Summary Sheet for PAHs (continued).

Contaminant and Averaging Time			Chrysene (µg/m³)			Dibenzo(a,h)anthracene (µg/m³)			Fluoranthene (µg/m³)			Fluorene (µg/m³)		
Receptor Name	UTM[1] E (m)	UTM[1] N (m)	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual
MPOI	varies	varies	3.48E-03	3.44E-03	2.04E-04	1.72E-03	1.60E-03	8.84E-05	2.24E-02	2.00E-02	1.10E-03	8.59E-02	7.17E-02	3.91E-03
original camp	506050	7473050	2.50E-03	1.70E-03	9.33E-05	1.16E-03	7.90E-04	3.67E-05	1.45E-02	9.87E-03	4.54E-04	5.21E-02	3.54E-02	1.60E-03
AltCmp	505775	7472804	1.62E-03	5.76E-04	3.28E-05	7.51E-04	2.69E-04	1.45E-05	9.38E-03	3.35E-03	1.80E-04	3.37E-02	1.20E-02	6.42E-04
LandFm	505867	7472663	1.52E-03	5.13E-04	3.14E-05	7.07E-04	2.39E-04	1.37E-05	8.83E-03	2.98E-03	1.71E-04	3.17E-02	1.07E-02	6.08E-04
Calvng	513420	7412175	8.59E-06	3.82E-06	1.28E-07	3.74E-06	1.60E-06	5.11E-08	4.65E-05	1.98E-05	6.31E-07	1.66E-04	7.01E-05	2.23E-06
HLVD01	508730	7522250	4.75E-05	1.22E-05	9.17E-08	6.65E-05	1.66E-05	8.02E-08	8.66E-04	2.16E-04	1.03E-06	3.31E-03	8.22E-04	3.85E-06
HLVD02	508141	7521741	5.50E-05	2.27E-05	1.08E-07	7.61E-05	2.99E-05	9.99E-08	9.91E-04	3.88E-04	1.28E-06	3.79E-03	1.48E-03	4.81E-06
HLVD03	507855	7521134	8.86E-05	3.28E-05	1.09E-07	1.06E-04	4.17E-05	1.01E-07	1.38E-03	5.40E-04	1.30E-06	5.23E-03	2.06E-03	4.88E-06
HLVD04	506092	7521078	5.46E-04	3.16E-04	1.17E-06	7.68E-04	4.50E-04	1.55E-06	1.00E-02	5.88E-03	2.01E-05	3.84E-02	2.26E-02	7.68E-05
HLVD05	505915	7521141	4.75E-04	2.61E-04	1.61E-06	6.01E-04	4.11E-04	2.15E-06	7.81E-03	5.36E-03	2.78E-05	2.98E-02	2.06E-02	1.06E-04
HLVD06	505839	7520944	4.42E-04	2.48E-04	1.45E-06	5.56E-04	4.09E-04	1.71E-06	7.23E-03	5.34E-03	2.21E-05	2.76E-02	2.05E-02	8.40E-05
HLVD07	505260	7519804	2.28E-04	4.70E-05	1.87E-07	3.34E-04	6.57E-05	2.00E-07	4.36E-03	8.54E-04	2.58E-06	1.67E-02	3.26E-03	9.74E-06
HLVM01	507145	7474183	4.38E-04	1.12E-04	1.50E-05	1.87E-04	5.03E-05	6.34E-06	2.33E-03	6.27E-04	7.86E-05	8.37E-03	2.25E-03	2.79E-04
HLVM02	508959	7473202	2.39E-04	7.91E-05	5.24E-06	1.12E-04	3.56E-05	2.18E-06	1.39E-03	4.44E-04	2.70E-05	5.00E-03	1.59E-03	9.56E-05
HLVM03	508549	7472123	2.39E-04	7.16E-05	6.70E-06	1.12E-04	3.28E-05	2.67E-06	1.39E-03	4.09E-04	3.30E-05	5.00E-03	1.47E-03	1.16E-04
HLVM04	506894	7471900	4.86E-04	1.43E-04	1.21E-05	2.26E-04	5.44E-05	4.92E-06	2.83E-03	6.70E-04	6.09E-05	1.01E-02	2.35E-03	2.15E-04
HLVM05	505498	7473681	4.89E-04	8.48E-05	3.60E-06	1.62E-04	3.03E-05	1.45E-06	1.97E-03	3.71E-04	1.79E-05	6.76E-03	1.29E-03	6.33E-05
HLVM06	506874	7472758	1.11E-03	4.49E-04	4.44E-05	5.17E-04	2.09E-04	1.85E-05	6.45E-03	2.61E-03	2.30E-04	2.32E-02	9.35E-03	8.14E-04
HLVM07	507732	7472987	3.59E-04	4.12E-05	5.54E-06	1.40E-04	1.80E-05	2.32E-06	1.72E-03	2.23E-04	2.87E-05	6.06E-03	7.95E-04	1.02E-04
HLVR01	503360	7503867	1.22E-05	2.73E-06	1.55E-07	7.15E-06	2.42E-06	6.63E-08	9.34E-05	3.11E-05	8.23E-07	3.58E-04	1.17E-04	2.93E-06
HLVR02	503624	7503441	1.24E-05	2.76E-06	1.56E-07	9.14E-06	2.61E-06	6.67E-08	1.19E-04	3.35E-05	8.27E-07	4.58E-04	1.26E-04	2.94E-06
HLVR03	504317	7503353	9.19E-06	3.03E-06	1.44E-07	1.04E-05	3.11E-06	6.21E-08	1.36E-04	3.97E-05	7.71E-07	5.22E-04	1.50E-04	2.74E-06
HLVT01	506847	7480822	3.69E-05	8.95E-06	5.18E-07	1.53E-05	3.54E-06	2.12E-07	1.89E-04	4.37E-05	2.63E-06	6.71E-04	1.54E-04	9.29E-06
HLSS01	506312	7475926	1.90E-04	5.92E-05	3.75E-06	8.03E-05	2.74E-05	1.60E-06	1.00E-03	3.41E-04	1.98E-05	3.60E-03	1.22E-03	7.05E-05
HLSS02	507148	7473774	6.57E-04	1.30E-04	2.33E-05	3.02E-04	6.01E-05	9.89E-06	3.77E-03	7.50E-04	1.23E-04	1.35E-02	2.69E-03	4.36E-04
HLSS3_4	506986	7473249	9.24E-04	1.61E-04	3.53E-05	3.78E-04	7.35E-05	1.57E-05	4.72E-03	9.16E-04	1.95E-04	1.69E-02	3.28E-03	6.95E-04
HLSS07	506085	7472229	1.25E-03	3.00E-04	2.22E-05	5.81E-04	1.39E-04	9.49E-06	7.26E-03	1.74E-03	1.18E-04	2.60E-02	6.25E-03	4.19E-04
HLSS08	505145	7473980	6.17E-04	2.66E-04	9.01E-06	2.87E-04	1.20E-04	3.79E-06	3.59E-03	1.49E-03	4.70E-05	1.29E-02	5.32E-03	1.67E-04

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

Table 21 High Lake Project Air Quality Summary Sheet for PAHs (continued).

Contaminant and Averaging Time			Indeno(1,2,3-cd)pyrene (µg/m³)			Naphthalene (µg/m³)			Phenanthrene (µg/m³)			Pyrene (µg/m³)		
Receptor Name	UTM[1] E (m)	UTM[1] N (m)	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual	1 hr	24 hr	Annual
MPOI	varies	varies	1.40E-03	1.39E-03	7.87E-05	3.86E-01	3.82E-01	2.19E-02	1.26E-01	1.24E-01	7.12E-03	1.49E-02	1.48E-02	8.24E-04
original camp	506050	7473050	1.01E-03	6.85E-04	3.39E-05	2.78E-01	1.89E-01	9.63E-03	9.04E-02	6.14E-02	3.11E-03	1.07E-02	7.29E-03	3.48E-04
AltCmp	505775	7472804	6.52E-04	2.33E-04	1.28E-05	1.79E-01	6.40E-02	3.55E-03	5.84E-02	2.09E-02	1.15E-03	6.93E-03	2.48E-03	1.34E-04
LandFm	505867	7472663	6.13E-04	2.07E-04	1.22E-05	1.69E-01	5.70E-02	3.39E-03	5.50E-02	1.86E-02	1.10E-03	6.52E-03	2.20E-03	1.28E-04
Calvng	513420	7412175	3.33E-06	1.45E-06	4.69E-08	9.27E-04	4.07E-04	1.33E-05	3.01E-04	1.31E-04	4.29E-06	3.49E-05	1.50E-05	4.83E-07
HLVD01	508730	7522250	4.34E-05	1.10E-05	5.82E-08	9.95E-03	2.55E-03	1.45E-05	3.43E-03	8.73E-04	4.78E-06	5.48E-04	1.37E-04	6.83E-07
HLVD02	508141	7521741	4.97E-05	1.99E-05	7.15E-08	1.14E-02	4.63E-03	1.77E-05	3.93E-03	1.59E-03	5.84E-06	6.27E-04	2.48E-04	8.47E-07
HLVD03	507855	7521134	7.18E-05	2.79E-05	7.23E-08	1.69E-02	6.55E-03	1.79E-05	5.78E-03	2.23E-03	5.91E-06	8.87E-04	3.46E-04	8.57E-07
HLVD04	506092	7521078	4.94E-04	2.90E-04	1.04E-06	1.12E-01	6.56E-02	2.42E-04	3.88E-02	2.27E-02	8.22E-05	6.30E-03	3.69E-03	1.29E-05
HLVD05	505915	7521141	4.03E-04	2.64E-04	1.43E-06	9.41E-02	5.97E-02	3.34E-04	3.23E-02	2.07E-02	1.13E-04	5.00E-03	3.37E-03	1.78E-05
HLVD06	505839	7520944	3.69E-04	2.63E-04	1.17E-06	8.58E-02	5.96E-02	2.78E-04	2.95E-02	2.06E-02	9.33E-05	4.61E-03	3.36E-03	1.43E-05
HLVD07	505260	7519804	2.16E-04	4.33E-05	1.39E-07	4.90E-02	1.00E-02	3.35E-05	1.70E-02	3.44E-03	1.12E-05	2.74E-03	5.43E-04	1.68E-06
HLVM01	507145	7474183	1.66E-04	4.39E-05	5.70E-06	4.66E-02	1.22E-02	1.60E-03	1.51E-02	3.96E-03	5.18E-04	1.74E-03	4.64E-04	5.94E-05
HLVM02	508959	7473202	9.66E-05	3.13E-05	1.97E-06	2.66E-02	8.65E-03	5.53E-04	8.66E-03	2.81E-03	1.79E-04	1.03E-03	3.30E-04	2.04E-05
HLVM03	508549	7472123	9.66E-05	2.86E-05	2.46E-06	2.66E-02	7.90E-03	6.95E-04	8.66E-03	2.57E-03	2.25E-04	1.03E-03	3.03E-04	2.53E-05
HLVM04	506894	7471900	1.96E-04	5.09E-05	4.49E-06	5.40E-02	1.45E-02	1.27E-03	1.76E-02	4.69E-03	4.10E-04	2.09E-03	5.19E-04	4.64E-05
HLVM05	505498	7473681	1.61E-04	2.91E-05	1.33E-06	4.71E-02	8.42E-03	3.75E-04	1.51E-02	2.70E-03	1.21E-04	1.59E-03	2.92E-04	1.37E-05
HLVM06	506874	7472758	4.48E-04	1.81E-04	1.67E-05	1.23E-01	4.98E-02	4.70E-03	4.02E-02	1.62E-02	1.52E-03	4.77E-03	1.93E-03	1.74E-04
HLVM07	507732	7472987	1.30E-04	1.59E-05	2.09E-06	3.69E-02	4.44E-03	5.87E-04	1.19E-02	1.44E-03	1.90E-04	1.33E-03	1.67E-04	2.17E-05
HLVR01	503360	7503867	4.61E-06	1.69E-06	5.94E-08	1.10E-03	4.13E-04	1.66E-05	3.70E-04	1.37E-04	5.37E-06	5.87E-05	2.03E-05	6.19E-07
HLVR02	503624	7503441	5.88E-06	1.83E-06	5.97E-08	1.33E-03	4.47E-04	1.67E-05	4.61E-04	1.47E-04	5.40E-06	7.50E-05	2.19E-05	6.22E-07
HLVR03	504317	7503353	6.71E-06	2.19E-06	5.55E-08	1.52E-03	5.45E-04	1.55E-05	5.26E-04	1.74E-04	5.02E-06	8.55E-05	2.60E-05	5.80E-07
HLVT01	506847	7480822	1.38E-05	3.26E-06	1.93E-07	3.89E-03	9.26E-04	5.44E-05	1.26E-03	2.99E-04	1.76E-05	1.44E-04	3.35E-05	2.00E-06
HLSS01	506312	7475926	6.97E-05	2.38E-05	1.43E-06	1.92E-02	6.55E-03	4.00E-04	6.25E-03	2.13E-03	1.30E-04	7.41E-04	2.53E-04	1.49E-05
HLSS02	507148	7473774	2.63E-04	5.22E-05	8.86E-06	7.26E-02	1.44E-02	2.48E-03	2.36E-02	4.68E-03	8.04E-04	2.79E-03	5.54E-04	9.25E-05
HLSS3_4	506986	7473249	3.43E-04	6.42E-05	1.38E-05	9.68E-02	1.77E-02	3.83E-03	3.13E-02	5.77E-03	1.25E-03	3.55E-03	6.79E-04	1.45E-04
HLSS07	506085	7472229	5.04E-04	1.21E-04	8.49E-06	1.39E-01	3.33E-02	2.37E-03	4.52E-02	1.08E-02	7.70E-04	5.36E-03	1.29E-03	8.87E-05
HLSS08	505145	7473980	2.49E-04	1.05E-04	3.41E-06	6.85E-02	2.91E-02	9.57E-04	2.23E-02	9.46E-03	3.10E-04	2.65E-03	1.11E-03	3.55E-05

1. UTM coordinates are based on NAD83, Zone 12, and the units are in meters.

APPENDIX B
BASELINE ENVIRONMENTAL DATA FOR HIGH LAKE MINE

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B1.0 BASELINE CONCENTRATIONS IN FISH

During the summer of 2004 and 2005, approximately 490 fish samples including large Artic Char and Lake Trout were collected from the study area. These species have been identified as valued ecosystem components (VECs) since fish resources are important to the surrounding Inuit communities and wildlife, as well as researchers and regulators, and fish habitat is protected under federal the Fisheries Act (Wolfden Resources 2006). Filet and liver analysis for metals was completed. As whole body analysis was not undertaken on fish samples, the ecological risk assessment used the average concentration between the filet and liver sample to estimate whole body concentrations in fish. Whole body concentrations for preferred for estimating wildlife exposure to fish, where as, fillet concentrations are used for estimating human exposures to fish consumption.

A statistical summary of metal concentrations in fish tissue is provided in Tables B1-1 to B1-6. Where values were reported as non-detect half the detection limit was used as a proxy in calculations.

Table B1-1 Statistical Summary of Fish Concentrations: Kennarctic River Drainage Control (Duck Lake)

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Lake Trout					
Aluminium	2.92	1.45	13	1.70 - 7.10	5.00
Antimony	0.0050		13	0.0050	0.0050
Arsenic	0.050	0.021	13	0.029 - 0.090	0.089
Barium	0.015	0.010	13	0.0050 - 0.035	0.033
Cadmium	0.46	0.25	13	0.18 - 1.08	0.90
Chromium	0.050		13	0.050	0.050
Cobalt	0.12	0.045	13	0.063 - 0.21	0.21
Copper	7.18	5.01	13	0.75 - 19.0	14.8
Lead	0.020	0.017	13	0.010 - 0.062	0.051
Magnesium	243	22.3	13	201 - 276	274
Manganese	1.44	0.92	13	0.52 - 4.16	2.98
Mercury	0.38	0.38	13	0.16 - 1.61	0.91
Molybdenum	0.076	0.030	13	0.028 - 0.12	0.12
Nickel	0.055	0.011	13	0.050 - 0.085	0.079
Selenium	1.29	0.45	13	0.61 - 1.93	1.89
Thallium	0.065	0.027	13	0.028 - 0.12	0.11
Tin	0.025		13	0.025	0.025
Uranium	0.0013	0.00054	13	0.0010 - 0.0026	0.0023

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	***+/- SD***	***Count***	***Range (Min to Max)***	***95 Percentile***
Vanadium	0.053	0.010	13	0.050 - 0.085	0.064
Zinc	25.4	5.55	13	17.3 - 38.0	32.8
Moisture (%)	75.8	2.33	13	70.1 - 78.7	78.3
Fish Fork Length (mm)	405	120	26	62 - 720	528
Arctic Char					
Aluminium	NA				
Antimony	NA				
Arsenic	NA				
Barium	NA				
Cadmium	NA				
Chromium	NA				
Cobalt	NA				
Copper	NA				
Lead	NA				
Magnesium	NA				
Manganese	NA				
Mercury	NA				
Molybdenum	NA				
Nickel	NA				
Selenium	NA				
Thallium	NA				
Tin	NA				
Uranium	NA				
Vanadium	NA				
Zinc	NA				
Moisture (%)	NA				
Fish Fork Length (mm)	NA				

(1) Summary statistics of mean fish specific liver and tissue concentrations. Non-detect data included at ½ detection limit.

Table B1-2 Statistical Summary of Fish Liver Concentrations: Kennarctic River Sub-Drainage

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Lake Trout					
Aluminium	2.51	2.33	7	1.00 - 7.00	6.19
Antimony	0.0050		7	0.0050	0.0050
Arsenic	0.045	0.027	7	0.021 - 0.084	0.084
Barium	0.021	0.014	7	0.0050 - 0.041	0.039
Cadmium	0.14	0.24	7	0.0025 - 0.66	0.53
Chromium	0.050		7	0.050	0.050
Cobalt	0.081	0.13	7	0.010 - 0.38	0.29
Copper	2.74	4.50	7	0.21 - 12.4	9.96
Lead	0.019	0.015	7	0.010 - 0.045	0.042
Magnesium	268	37.8	7	211 - 327	319
Manganese	0.55	0.66	7	0.12 - 1.86	1.61
Mercury	0.26	0.24	7	0.65	0.59
Molybdenum	0.041	0.075	7	0.0050 - 0.21	0.16
Nickel	0.050		7	0.050	0.050
Selenium	0.94	0.69	7	0.39 - 2.31	2.04
Thallium	0.014	0.015	7	0.0050 - 0.040	0.038
Tin	0.025		7	0.025	0.025
Uranium	0.0023	0.0034	7	0.010	0.0073
Vanadium	0.091	0.11	7	0.050 - 0.34	0.25
Zinc	11.1	12.9	7	2.98 - 37.2	31.9
Moisture (%)	76.6	2.31	7	73.6 - 79.3	79.2
Fish Fork Length (mm)	450	191	21	71 - 950	683
Arctic Char					
Aluminium	NA				
Antimony	NA				
Arsenic	NA				
Barium	NA				
Cadmium	NA				
Chromium	NA				
Cobalt	NA				
Copper	NA				
Lead	NA				
Magnesium	NA				
Manganese	NA				
Mercury	NA				
Molybdenum	NA				
Nickel	NA				

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Selenium	NA				
Thallium	NA				
Tin	NA				
Uranium	NA				
Vanadium	NA				
Zinc	NA				
Moisture (%)	NA				
Fish Fork Length (mm)	626	217	14	138 - 785	782

(1) Summary statistics of mean fish specific liver and tissue concentrations. Non-detect data included at ½ detection limit.

Table B1-3 Statistical Summary of Fish Liver Concentrations: Granite Lake Sub-Drainage

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Lake Trout					
Aluminium	4.63	2.84	21	1.00 - 11.2	9.75
Antimony	0.0052	0.0011	21	0.0050 - 0.010	0.0050
Arsenic	0.025	0.020	21	0.0050 - 0.087	0.052
Barium	0.044	0.045	21	0.010 - 0.18	0.16
Cadmium	0.16	0.18	21	0.0025 - 0.62	0.47
Chromium	0.057	0.018	21	0.050 - 0.10	0.10
Cobalt	0.050	0.041	21	0.010 - 0.18	0.095
Copper	4.45	3.82	21	0.20 - 12.9	10.7
Lead	0.018	0.011	21	0.010 - 0.044	0.042
Magnesium	245	48.4	21	188 - 368	335
Manganese	0.74	0.57	21	0.090 - 2.20	1.84
Mercury	0.15	0.090	21	0.025 - 0.30	0.28
Molybdenum	0.047	0.036	21	0.0050 - 0.11	0.10
Nickel	0.055	0.014	21	0.050 - 0.10	0.10
Selenium	0.99	0.55	21	0.32 - 2.27	1.85
Thallium	0.024	0.021	21	0.0050 - 0.070	0.061
Tin	0.026	0.0055	21	0.025 - 0.050	0.025
Uranium	0.0014	0.00058	21	0.0010 - 0.0028	0.0023
Vanadium	0.052	0.011	21	0.050 - 0.10	0.050
Zinc	19.2	12.5	21	3.13 - 48.7	41.8
Moisture (%)	77.3	2.03	21	73.9 - 83.7	79.5
Fish Fork	284	150	100	107 - 740	590

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Length (mm)					
Arctic Char					
Aluminium	6.19	7.46	14	1.00 - 31.2	16.1
Antimony	0.0055	0.0011	14	0.0050 - 0.0075	0.0075
Arsenic	0.051	0.050	14	0.0050 - 0.18	0.13
Barium	0.068	0.080	14	0.018 - 0.31	0.23
Cadmium	0.33	0.21	14	0.0025 - 0.69	0.63
Chromium	0.059	0.016	14	0.050 - 0.10	0.084
Cobalt	0.13	0.069	14	0.010 - 0.23	0.22
Copper	9.03	7.42	14	0.27 - 24.7	20.3
Lead	0.058	0.15	14	0.010 - 0.59	0.23
Magnesium	279	40.3	14	230 - 362	343
Manganese	1.45	0.91	14	0.13 - 3.51	2.77
Mercury	0.10	0.051	14	0.041 - 0.24	0.18
Molybdenum	0.10	0.046	14	0.0050 - 0.17	0.15
Nickel	0.070	0.036	14	0.050 - 0.19	0.12
Selenium	0.95	0.32	14	0.36 - 1.46	1.39
Thallium	0.015	0.010	14	0.0050 - 0.033	0.033
Tin	0.028	0.0053	14	0.025 - 0.038	0.038
Uranium	0.0033	0.0035	14	0.0010 - 0.012	0.010
Vanadium	0.064	0.026	14	0.050 - 0.15	0.10
Zinc	19.6	6.69	14	4.57 - 26.9	25.8
Moisture (%)	74.5	2.37	14	68.7 - 78.4	77.5
Fish Fork Length (mm)	293	79.2	20	185 - 455	455

(1) Summary statistics of mean fish specific liver and tissue concentrations. Non-detect data included at ½ detection limit.

Table B1-4 Statistical Summary of Fish Liver Concentrations: Granite Lake (Control)

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Lake Trout					
Aluminium	7.38	4.42	10	2.00 - 14.9	14.5
Antimony	0.0058	0.0017	10	0.0050 - 0.010	0.0089
Arsenic	0.021	0.013	10	0.010 - 0.050	0.042
Barium	0.061	0.042	10	0.020 - 0.16	0.13
Cadmium	0.28	0.23	10	0.0025 - 0.64	0.57
Chromium	0.12	0.19	10	0.050 - 0.66	0.41

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	***+/- SD***	***Count***	***Range (Min to Max)***	***95 Percentile***
Cobalt	0.088	0.069	10	0.010 - 0.22	0.18
Copper	9.36	8.26	10	0.25 - 25.6	22.5
Lead	0.031	0.022	10	0.010 - 0.083	0.068
Magnesium	268	20.6	10	234 - 296	296
Manganese	0.97	0.56	10	0.15 - 1.68	1.61
Mercury	0.19	0.12	10	0.065 - 0.45	0.39
Molybdenum	0.086	0.059	10	0.0050- 0.15	0.15
Nickel	0.070	0.030	10	0.050 - 0.14	0.12
Selenium	1.29	0.64	10	0.20 - 1.99	1.92
Thallium	0.014	0.0069	10	0.0050 - 0.022	0.022
Tin	0.029	0.0084	10	0.025 - 0.050	0.044
Uranium	0.0033	0.0030	10	0.0010 - 0.0094	0.0086
Vanadium	0.071	0.024	10	0.050 - 0.11	0.11
Zinc	30.4	19.9	10	4.60 - 64.9	63.2
Moisture (%)	76.8	2.79	10	73.6 - 82.9	80.9
Fish Fork Length (mm)	371	196	54	93 - 775	750
Arctic Char					
Aluminium	3.10	0.78	5	2.20 - 3.70	3.70
Antimony	0.0050		5	0.0050	0.0050
Arsenic	0.019	0.023	5	0.0050 - 0.059	0.050
Barium	0.046	0.033	5	0.024 - 0.10	0.091
Cadmium	0.074	0.15	5	0.0025 - 0.35	0.28
Chromium	0.24	0.40	5	0.050 - 0.97	0.79
Cobalt	0.038	0.061	5	0.010 - 0.15	0.12
Copper	3.71	7.24	5	0.35 - 16.7	13.4
Lead	0.023	0.030	5	0.010 - 0.077	0.064
Magnesium	294	20.9	5	265 - 323	318
Manganese	0.35	0.42	5	0.088 - 1.09	0.92
Mercury	0.13	0.029	5	0.11 - 0.18	0.17
Molybdenum	0.047	0.095	5	0.0050 - 0.22	0.17
Nickel	0.11	0.14	5	0.050 - 0.36	0.29
Selenium	0.51	0.36	5	0.33 - 1.15	0.99
Thallium	0.0060	0.0022	5	0.0050 - 0.010	0.0090
Tin	0.030	0.012	5	0.025 - 0.051	0.046
Uranium	0.0010		5	0.0010	0.0010
Vanadium	0.050		5	0.050	0.050
Zinc	12.5	12.2	5	3.83 - 32.5	29.1
Moisture (%)	75.5	1.74	5	73.2 - 77.4	77.2
Fish Fork Length (mm)	304	59.9	12	179 - 355	355

(1) Summary statistics of mean fish specific liver and tissue concentrations. Non-detect data included at ½ detection limit.

Table B1-5 Statistical Summary of Fish Liver Concentrations: High Lake Drainage[1]

Chemical	Fish Concentrations [µg/g WW][2]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Lake Trout					
Aluminium	11.5	13.7	52	1.00 - 83.7	35.7
Antimony	0.0068	0.0035	52	0.0050 - 0.025	0.010
Arsenic	0.042	0.036	52	0.0050 - 0.14	0.11
Barium	0.056	0.083	52	0.0050 - 0.49	0.18
Cadmium	0.21	0.30	52	0.0025 - 1.42	0.89
Chromium	0.071	0.038	52	0.050 - 0.27	0.10
Cobalt	0.080	0.077	52	0.010 - 0.38	0.25
Copper	5.31	5.41	52	0.22 - 28.8	14.9
Lead	0.039	0.13	52	0.010 - 0.92	0.063
Magnesium	290	83.1	52	157 - 797	356
Manganese	1.25	1.20	52	0.11 - 5.24	4.32
Mercury	0.20	0.095	52	0.037 - 0.45	0.34
Molybdenum	0.050	0.037	52	0.0050 - 0.12	0.10
Nickel	0.099	0.17	52	0.050 - 1.17	0.21
Selenium	1.02	0.54	52	0.20 - 2.19	1.83
Thallium	0.027	0.028	52	0.0050 - 0.15	0.072
Tin	0.031	0.0084	52	0.025 - 0.050	0.050
Uranium	0.0034	0.0066	52	0.0010 - 0.035	0.014
Vanadium	0.088	0.092	52	0.050 - 0.59	0.18
Zinc	22.3	12.3	52	3.67 - 55.5	43.0
Moisture (%)	76.1	2.66	52	70.2 - 82.7	80.4
Fish Fork Length (mm)	235	51.0	67	121 - 335	316
Arctic Char					
Aluminium	NA				
Antimony	NA				
Arsenic	NA				
Barium	NA				
Cadmium	NA				
Chromium	NA				
Cobalt	NA				
Copper	NA				
Lead	NA				
Magnesium	NA				
Manganese	NA				

Chemical	Fish Concentrations [µg/g WW][2]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Mercury	NA				
Molybdenum	NA				
Nickel	NA				
Selenium	NA				
Thallium	NA				
Tin	NA				
Uranium	NA				
Vanadium	NA				
Zinc	NA				
Moisture (%)	NA				
Fish Fork Length (mm)					

(1) Includes Upper High lake Drainage lakes

(2) Summary statistics of mean fish specific liver and tissue concentrations. Non-detect data included at ½ detection limit.

Table B1-6 Statistical Summary of Fish Liver Concentrations: West Ore Sub-Drainage

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	*+/- SD*	*Count*	*Range (Min to Max)*	*95 Percentile*
Lake Trout					
Aluminium	16.0	3.92	2	13.3 - 18.8	18.5
Antimony	0.0050		2	0.0050	0.0050
Arsenic	0.065	0.0057	2	0.061 - 0.069	0.069
Barium	0.11	0.050	2	0.071 - 0.14	0.14
Cadmium	0.45	0.13	2	0.35 - 0.54	0.53
Chromium	0.050		2	0.050	0.050
Cobalt	0.073	0.0049	2	0.070 - 0.077	0.076
Copper	11.9	0.36	2	11.6 - 12.1	12.1
Lead	0.031	0.013	2	0.022 - 0.040	0.039
Magnesium	214	21.9	2	198 - 229	227
Manganese	1.38	0.25	2	1.20 - 1.56	1.54
Mercury	0.19	0.047	2	0.15 - 0.22	0.22
Molybdenum	0.095	0.032	2	0.072 - 0.12	0.12
Nickel	0.050		2	0.050	0.050
Selenium	1.34	0.064	2	1.30 - 1.39	1.38
Thallium	0.047	0.012	2	0.039 - 0.055	0.054
Tin	0.025		2	0.025	0.025
Uranium	0.0045	0.0021	2	0.0030 - 0.0060	0.0059

Chemical	Fish Concentrations [µg/g WW][1]				
	Average	***+/- SD***	***Count***	***Range (Min to Max)***	***95 Percentile***
Vanadium	0.093	0.018	2	0.080 - 0.11	0.10
Zinc	23.1	1.30	2	22.2 - 24.0	23.9
Moisture (%)	78.2	2.26	2	76.6 - 79.8	79.6
Fish Fork Length (mm)	206	105	22	95 - 560	377
Arctic Char					
Aluminium	17.8	7.67	3	9.00 - 23.1	22.9
Antimony	0.0058	0.0014	3	0.0050 - 0.0075	0.0073
Arsenic	0.027	0.0053	3	0.022 - 0.032	0.031
Barium	0.059	0.025	3	0.040 - 0.087	0.083
Cadmium	0.84	0.14	3	0.67 - 0.92	0.92
Chromium	0.058	0.014	3	0.050 - 0.075	0.073
Cobalt	0.36	0.12	3	0.26 - 0.49	0.48
Copper	9.08	2.55	3	6.29 - 11.3	11.1
Lead	0.026	0.0094	3	0.015 - 0.032	0.032
Magnesium	219	15.2	3	207 - 236	234
Manganese	2.29	0.53	3	1.75 - 2.81	2.76
Mercury	0.19	0.025	3	0.17 - 0.21	0.21
Molybdenum	0.14	0.0065	3	0.13 - 0.15	0.15
Nickel	0.12	0.040	3	0.075 - 0.15	0.15
Selenium	1.38	0.16	3	1.27 - 1.57	1.54
Thallium	0.038	0.0028	3	0.035 - 0.041	0.040
Tin	0.029	0.0072	3	0.025 - 0.038	0.036
Uranium	0.0037	0.0013	3	0.0022 - 0.0049	0.0048
Vanadium	0.075	0.025	3	0.050 - 0.10	0.10
Zinc	20.5	0.70	3	20.0 - 21.3	21.2
Moisture (%)	77.5	0.43	3	77.2 - 78.0	77.9
Fish Fork Length (mm)	NA				

(1) Summary statistics of mean fish specific liver and tissue concentrations. Non-detect data included at ½ detection limit.

B2.0 BASELINE CONCENTRATION IN SOIL

Soil samples were collected in July 2006 from four (4) key areas of use, reference sites, mine site, traditional dock site and road site. The reference site was comprised of samples collected from six (6) locations, three (3) of which were tested for metals. The mine site was comprised of samples collected from thirteen (13) locations, twelve (12) of which were tested for metals. The traditional use dock site was comprised of samples collected from five (5) locations, four (4) of which were tested for metals. The road site was as a single sample collection. Table B2-1 outlines a statistical summary for soil results from sampling sites.

Table B2-1 Baseline Soil Concentrations

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Antimony (Sb)	<0.2		0	0.25	0.071	2	-			<0.2		0	<0.2		
Arsenic (As)	10.9	1.29	3	11.1	5.79	12	-			5.53	5.43	4	9.7		
Barium (Ba)	57.3	47.2	3	37.3	16.6	12	-			92.0	39.6	4	28		1
Beryllium (Be)	<1		0	<1		0	-			<1		0	<1		1
Cadmium (Cd)	0.60		1	0.90		2	-			<0.5		0	<0.5		1
Chromium (Cr)	26.2	8.05	3	28.6	10.2	12	-			40.9	17.7	4	35.5		1
Cobalt (Co)	13.3	6.81	3	11.3	4.72	12	-			13.5	6.19	4	11		
Copper (Cu)	31.7	15.5	3	36.4	25.2	12	-			120	91.1	4	21.0		1
Lead (Pb)	12.3	1.53	3	11.9	8.06	10	-			10.8	3.77	4	9		
Mercury (Hg)	0.055	0.0071	2	0.084	0.026	7	-			0.088	0.017	4	<0.05		1
Molybdenum (Mo)	<1		0	1.25	0.50	4	-			2.50	0.71	2	<1		1
Nickel (Ni)	18.7	4.73	3	24.0	8.99	12	-			29.8	10.0	4	25		
Selenium (Se)	0.40		1	0.48	0.21	4	-			0.57	0.46	3	<0.2		
Silver (Ag)	<1		0	<1		0	-			<1		0	<1		1
Thallium (Tl)	<1		0	<1		0	-			<1		0	<1		
Tin (Sn)	<5		0	<5		0	-			<5		0	<5		
Uranium (U)	<40		0	<40		0	-			<40		0	<40		1
Vanadium (V)	38.7	6.35	3	32.1	13.3	12	-			45.8	18.0	4	35		1
Zinc (Zn)	76.7	15.3	3	146.7	294	12	-			90.0	40.8	4	60		1
Polycyclic Aromatic Hydrocarbons															
Benzo(a)anthracene	<0.01		0	<0.01		0	-			<0.02		0	-		
Benzo(a)pyrene	<0.01		0	<0.01		0	-			<0.02		0	-		
Benzo(b)fluoranthene	<0.01		0	<0.01		0	-			<0.02		0	-		
Benzo(k)fluoranthene	<0.01		0	<0.01		0	-			<0.02		0	-		

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
Dibenzo(a,h)anthracene	<0.01		0	<0.01		0	-			<0.02		0	-		
Indeno(1,2,3-cd)pyrene	<0.01		0	<0.01		0	-			<0.02		0	-		
Naphthalene	0.01		1	<0.01		0	-			<0.02		0	-		
Phenanthrene	0.01		1	<0.01		0	-			0.04		1	-		
Pyrene	<0.01		0	<0.01		0	-			<0.02		0	-		

- Values not available

B3.0 BASELINE CONCENTRATIONS IN RED-BACKED VOLES

Red-backed Vole samples were collected in July 2006 from four (4) key areas of use, reference sites, mine site and traditional use (regional site and dock site) site. The reference site was comprised of samples collected from three (3) locations. The mine, traditional use and traditional use dock sites were all comprised of samples collected from one (1) location. Table B3-1 outlines a statistical summary for Red-backed Vole sampling results.

Table B3-1 Baseline Red-Backed Vole Concentrations

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Aluminium (Al)	23.0	11.8	3	16		1	23		1	11.0		1	-		
Antimony (Sb)	<0.05		0	<0.05			0.070		1	<0.05			-		
Arsenic (As)	<0.05		0	<0.05			0.11		1	<0.05			-		
Barium (Ba)	3.03	0.59	3	1.2		1	1.10		1	1.50		1	-		
Beryllium (Be)	<0.2		0	<0.2			<0.2			<0.2			-		
Cadmium (Cd)	0.023	0.0058	3	0.02		1	0.070		1	<0.01			-		
Calcium (Ca)	9,437	1,445	3	12300		1	4630		1	11600		1	-		
Chromium (Cr)	0.17	0.058	3	0.3		1	0.80		1	<0.1			-		
Cobalt (Co)	0.10		2	<0.1			0.20		1	<0.1			-		
Copper (Cu)	3.61	0.58	3	4.43		1	2.33		1	2.85		1	-		
Iron (Fe)	83.7	3.79	3	76		1	93.0		1	80.0		1	-		
Lead (Pb)	0.12	0.13	3	0.11		1	0.10		1	0.070		1	-		
Magnesium (Mg)	490	19.0	3	494		1	304		1	607		1	-		
Manganese (Mn)	3.87	1.42	3	5.3		1	9.80		1	3.10		1	-		
Mercury (Hg)	0.030	0.010	3	0.05		1	0.030		1	0.020		1	-		
Molybdenum (Mo)	0.11	0.015	3	0.17		1	0.16		1	0.13		1	-		
Nickel (Ni)	0.33	0.32	3	0.31		1	0.90		1	0.090		1	-		
Selenium (Se)	0.22	0.006	3	0.18		1	0.19		1	0.18		1	-		
Silver (Ag)	0.20		1	<0.05			<0.05			<0.05			-		
Sodium (Na)	1,440	69.3	3	1400		1	1180		1	1600		1	-		
Strontium (Sr)	5.41	0.70	3	2.89		1	5.12		1	10.1		1	-		
Thallium (Tl)	<0.05		0	<0.05			0.080		1	<0.05			-		
Tin (Sn)	<0.1		0	<0.1			0.10		1	<0.1			-		
Titanium (Ti)	4.09	0.25	3	3.91		1	1.87		1	5.35		1	-		

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
Vanadium (V)	<0.1		0	<0.1			0.20		1	<0.1			-		
Zinc (Zn)	23.3	2.15	3	25.5		1	17.8		1	22.7		1	-		
Polycyclic Aromatic Hydrocarbons															
Acenaphthene	<0.02			<0.02			<0.02			<0.02			-		
Acenaphthylene	<0.02			<0.02			<0.02			<0.02			-		
Anthracene	<0.02			<0.02			<0.02			<0.02			-		
Benzo(a)anthracene	<0.02			<0.02			<0.02			<0.02			-		
Benzo(a)pyrene	<0.02			<0.02			<0.02			<0.02			-		
Benzo(b)fluoranthene	<0.02			<0.02			<0.02			<0.02			-		
Benzo(ghi)perylene	<0.02			<0.02			<0.02			<0.02			-		
Benzo(k)fluoranthene	<0.02			<0.02			<0.02			<0.02			-		
Chrysene	<0.02			<0.02			<0.02			<0.02			-		
Dibenzo(a,h)anthracene	<0.02			<0.02			<0.02			<0.02			-		
Fluoranthene	<0.02			<0.02			<0.02			<0.02			-		
Fluorene	<0.02			<0.02			<0.02			<0.02			-		
Naphthalene	<0.02			<0.02			<0.02			<0.02			-		
Phenanthrene	<0.02			<0.02			<0.02			<0.02			-		
Pyrene	<0.02			<0.02			<0.02			<0.02			-		

- Values not available

B4.0 BASELINE CONCENTRATIONS IN VEGETATION

Vegetation samples were collected in July 2006 from five (5) key areas of use, including reference sites, mine site, traditional use and dock site, and road site. Vegetation collected included Labrador Tea (*Ledum palustre*), Water Sedge (*Carex aquatilis*), Lichen (*Flavocetraria nivalis*) and Crowberry (*Empetrum nigrum*).

Table B4-1 outlines a statistical summary for vegetation sampling results for Labrador Tea (*Ledum palustre*). Samples of *Ledum palustre* were collected from two (2) key areas of use, reference and mine sites. The reference site was comprised of samples collected from six (6) locations, three (3) of which were tested for metals. The mine site was comprised of samples collected from fourteen (14) locations, twelve (12) of which were tested for metals.

Table B4-2 outlines a statistical summary for vegetation sampling results for Water Sedge (*Carex aquatilis*). Samples of *Carex aquatilis* were collected from four (4) key areas of use, reference sites, mine site and traditional use (regional site and dock site) site. The reference site was comprised of samples collected from six (6) locations, three (3) of which were tested for metals. The mine site was comprised of samples collected from three (3) locations. The traditional use and traditional use dock sites were comprised of samples collected from three (3) and four (4) locations, respectively. Carex rupestris (Rock Sedge) was collected at the mine site instead of Carex aquatilis (water sedge).

Table B4-3 outlines a statistical summary for vegetation sampling results for Lichen (*Flavocetraria nivalis*). Samples of *Flavocetraria nivalis* were collected from four (4) key areas of use, reference sites, mine site, traditional use dock site and road site. The reference site was comprised of samples collected from six (6) locations, three (3) of which were tested for metals. The mine site was comprised of samples collected from twelve (12) locations. The traditional use dock site was comprised of samples collected from three (3) locations and the mine site was comprised of one (1) sampling location.

Table B4-4 outlines a statistical summary for vegetation sampling results for Crowberry (*Empetrum nigrum*). Samples of *Empetrum nigrum* were collected from four (4) key areas of use, reference sites, mine site, traditional use dock site and road site, and included leaves, stem and berry collection.

The reference site was comprised of samples collected from six (6) locations, three (3) of which were tested for metals. The mine site was comprised of samples collected from twelve (12) locations. The traditional use dock site was comprised of samples collected from three (3) locations and the mine site was comprised of one (1) sampling location.

Table B4-1 Baseline Concentrations of Labrador Tea

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Aluminium (Al)	66.7	11.5	3	89.2	49.1	12	-			-			-		
Antimony (Sb)	0.47		1	<0.05		0	-			-			-		
Arsenic (As)	<0.2		0	<0.2		0	-			-			-		
Barium (Ba)	82.5	9.46	3	70.6	20.2	12	-			-			-		
Beryllium (Be)	<0.2		0	<0.2		0	-			-			-		
Boron (B)	20.7	3.51	3	18.1	4.12	12	-			-			-		
Cadmium (Cd)	<0.05		0	<0.05		0	-			-			-		
Calcium (Ca)	5,573	318	3	6,228	780	12	-			-			-		
Chromium (Cr)	0.30		2	0.53	0.44	7	-			-			-		
Cobalt (Co)	0.13	0.058	3	0.20	0.12	11	-			-			-		
Copper (Cu)	3.60	0.10	3	3.24	0.30	12	-			-			-		
Iron (Fe)	33.0	2.00	3	57.3	43.3	12	-			-			-		
Lead (Pb)	0.037	0.0058	3	0.10	0.11	12	-			-			-		
Lithium (Li)	<0.5		0	<0.5		0	-			-			-		
Magnesium (Mg)	1,127	96.1	3	1,190	222	12	-			-			-		
Manganese (Mn)	803	87.5	3	951	391	12	-			-			-		
Mercury (Hg)	0.030		2	0.030	0.0074	12	-			-			-		
Molybdenum (Mo)	<0.05		0	0.12	0.055	5	-			-			-		
Nickel (Ni)	0.63	0.15	3	1.02	0.51	12	-			-			-		
Selenium (Se)	<0.2		0	<0.2		0	-			-			-		
Silicon (Si)	156	51.4	3	245	75.7	12	-			-			-		
Silver (Ag)	<0.1		0	<0.1		0	-			-			-		
Sodium (Na)	60.0	56.6	2	97.8	22.2	9	-			-			-		
Strontium (Sr)	10.5	2.42	3	8.07	2.34	12	-			-			-		

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
Thallium (Tl)	0.16	0.035	3	0.29	0.20	12	-			-			-		
Tin (Sn)	<0.1		0	<0.1		0	-			-			-		
Titanium (Ti)	1.25	0.49	3	2.27	1.62	12	-			-			-		
Uranium (U)	<0.05		0	<0.05		0	-			-			-		
Vanadium (V)	<0.1		0	0.23	0.23	3	-			-			-		
Zinc (Zn)	30.6	1.48	3	31.9	12.8	12	-			-			-		
Polycyclic Aromatic Hydrocarbons															
Benzo(a)anthracene	<0.01			<0.01			-			-			-		
Benzo(a)pyrene	<0.01			<0.01			-			-			-		
Benzo(b)fluoranthene	<0.01			<0.01			-			-			-		
Benzo(k)fluoranthene	<0.01			<0.01			-			-			-		
Dibenzo(a,h)anthracene	<0.01			<0.01			-			-			-		
Indeno(1,2,3-cd)pyrene	<0.01			<0.01			-			-			-		
Naphthalene	<0.01			<0.01			-			-			-		
Phenanthrene	<0.01			<0.01			-			-			-		
Pyrene	<0.01			<0.01			-			-			-		

- Values not available

Table B4-2 Baseline Concentrations of Water Sedge

Chemical	Reference Sites			Mine Site[1]			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Aluminium (Al)	16.7	5.77	3	53.3	11.5	3	90.0	52.9	3	50.0	18.26	4	-		
Antimony (Sb)	0.080		1	0.11	0.064	2	0.080		1	<0.05		0	-		
Arsenic (As)	0.30		1	<0.2		0	<0.2		0	<0.2		0	-		
Barium (Ba)	15.9	3.30	3	27.5	7.74	3	6.70	1.41	3	17.1	8.93	4	-		
Beryllium (Be)	<0.2		0	<0.2		0	<0.2		0	<0.2		0	-		
Boron (B)	11.0	5.20	3	9.33	0.58	3	18.7	1.53	3	15.8	4.43	4	-		
Cadmium (Cd)	0.050		1	0.050		1	<0.05		0	<0.05		0	-		
Calcium (Ca)	3,555	1,252	2	5,883	401	3	2,457	744	3	4,578	824	4	-		
Chromium (Cr)	3.20	3.39	3	3.53	1.55	3	1.73	1.62	3	3.60	4.02	4	-		
Cobalt (Co)	0.20	0.10	3	<0.1		0	0.10		2	0.10		1	-		
Copper (Cu)	7.80	1.67	3	5.53	1.32	3	4.97	1.76	3	5.30	1.85	4	-		
Iron (Fe)	140	70.0	2	97.7	17.2	3	159	58.3	3	111	32.0	4	-		
Lead (Pb)	0.043	0.012	3	0.27	0.035	3	0.077	0.029	3	0.11	0.044	4	-		
Lithium (Li)	<0.5		0	<0.5		0	<0.5		0	0.95	0.071	2	-		
Magnesium (Mg)	1,403	247	3	697	307	3	2,060	399	3	1,415	274	4	-		
Manganese (Mn)	449	141	3	148	46.7	3	360	187	3	431	183	4	-		
Mercury (Hg)	0.020		1	0.030		3	0.025	0.0071	2	0.033	0.0050	4	-		
Molybdenum (Mo)	1.52	0.99	3	0.54	0.18	3	0.30	0.22	3	0.62	0.31	4	-		
Nickel (Ni)	4.23	2.00	3	1.03	0.25	3	2.10	0.82	3	0.75	0.13	4	-		
Selenium (Se)	<0.2		0	<0.2		0	<0.2		0	<0.2		0	-		
Silicon (Si)	6,093	2,637	3	9,343	1,181	3	5,503	1,184	3	6,293	2,279	4	-		
Silver (Ag)	<0.1		0	<0.1		0	<0.1		0	<0.1		0	-		
Sodium (Na)	93.3	58.6	3	33.3	5.77	3	483	232	3	528	130	4	-		

Chemical	Reference Sites			Mine Site[1]			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Strontium (Sr)	11.5	1.97	3	11.1	4.34	3	22.6	8.71	3	16.2	7.59	4	-		
Thallium (Tl)	<0.05		0	<0.05		0	<0.05		0	<0.05		0	-		
Tin (Sn)	<0.1		0	<0.1		0	<0.1		0	<0.1		0	-		
Titanium (Ti)	0.72	0.17	3	3.62	0.64	3	3.02	1.30	3	2.8	1.28	4	-		
Uranium (U)	<0.05		0	<0.05		0	<0.05		0	<0.05		0	-		
Vanadium (V)	<0.1		0	0.17	0.058	3	0.17	0.058	3	0.13	0.058	3	-		
Zinc (Zn)	43.0	3.99	3	19.3	6.32	3	42.2	12.9	3	28.7	5.13	4	-		
Polycyclic Aromatic Hydrocarbons															
Benzo(a)anthracene	<0.01						-			-			-		
Benzo(a)pyrene	<0.01			-			-			-			-		
Benzo(b)fluoranthene	<0.01			-			-			-			-		
Benzo(k)fluoranthene	<0.01			-			-			-			-		
Dibenzo(a,h)anthracene	<0.01			-			-			-			-		
Indeno(1,2,3-cd)pyrene	<0.01			-			-			-			-		
Naphthalene	<0.01			-			-			-			-		
Phenanthrene	<0.01			-			-			-			-		
Pyrene	<0.01			-			-			-			-		

(1) Carex rupestris (Rock Sedge) was collected at the mine site instead of Carex aquatilis (water sedge)

- Values not available

Table B4-3 Baseline Concentrations of Lichen

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Aluminium (Al)	167	60.3	3		105.04	12	-			543	673	3	-		
Antimony (Sb)	<0.05		0	<0.05		0	-			<0.05		0	-		
Arsenic (As)	<0.2		0	5.50		1	-			0.60		1	-		
Barium (Ba)	13.4	2.30	3	11.5	4.99	12	-			6.07	2.80	3	-		
Beryllium (Be)	<0.2		0	<0.2		0	-			<0.2		0	-		
Boron (B)	4.00		1	4.13	2.30	8	-			5.00		3	-		
Cadmium (Cd)	0.15	0.035	3	0.21	0.16	12	-			0.13	0.12	3	-		
Calcium (Ca)	2,987	792	3	4,807	1,758	12	-			4,547	2,113	3	-		
Chromium (Cr)	1.03	0.60	3	1.37	0.53	12	-			3.53	2.90	3	-		
Cobalt (Co)	0.33	0.15	3	0.32	0.11	12	-			49.6	69.9	2	-		
Copper (Cu)	0.77	0.058	3	0.94	0.17	12	-			19.8	32.5	3	-		
Iron (Fe)	89.7	50.6	3	138	78.9	12	-			1,230	1,974	3	-		
Lead (Pb)	0.54	0.14	3	0.69	0.41	12	-			1.45	1.69	3	-		
Lithium (Li)	<0.5		0	<0.5		0	-			6.60		1	-		
Magnesium (Mg)	1,051	174	3	919	176	12	-			2,237	1,685	3	-		
Manganese (Mn)	121	13.53	3	148	63.9	12	-			54.6	10.0	3	-		
Mercury (Hg)	0.053	0.015	3	0.058	0.015	12	-			0.053	0.0058	3	-		
Molybdenum (Mo)	<0.05		0	<0.05		0	-			0.18		1	-		
Nickel (Ni)	0.53	0.25	3	0.69	0.22	12	-			20.1	34.0	3	-		
Selenium (Se)	<0.2		0	<0.2		0	-			0.40		1	-		
Silicon (Si)	307	193	3	414	234	10	-			1,533	2,050	3	-		
Silver (Ag)	<0.1		0	<0.1		0	-			<0.1		0	-		
Sodium (Na)	453	76.4	3	400	67.0	12	-			663	131	3	-		

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Strontium (Sr)	12.6	2.97	3	9.93	3.09	12	-			26.4	11.2	3	-		
Thallium (Tl)	<0.05		0	<0.05		0	-			<0.05		0	-		
Tin (Sn)	<0.1		0	<0.1		0	-			<0.1		0	-		
Titanium (Ti)	7.66	3.09	3	9.55	4.07	12	-			11.3	6.11	3	-		
Uranium (U)	<0.05		0	<0.05		0	-			<0.05		0	-		
Vanadium (V)	0.27	0.12	3	0.33	0.16	12	-			3.20	5.11	3	-		
Zinc (Zn)	25.5	6.55	3	27.9	14.3	12	-			32.7	28.9	3	-		
Polycyclic Aromatic Hydrocarbons															
Benzo(a)anthracene	<0.01			-			-			-			-		
Benzo(a)pyrene	<0.01			-			-			-			-		
Benzo(b)fluoranthene	<0.01			-			-			-			-		
Benzo(k)fluoranthene	<0.01			-			-			-			-		
Dibenzo(a,h)anthracene	<0.01			-			-			-			-		
Indeno(1,2,3-cd)pyrene	<0.01			-			-			-			-		
Naphthalene	<0.01			-			-			-			-		
Phenanthrene	<0.01			-			-			-			-		
Pyrene	<0.01			-			-			-			-		

- Values not available

Table B4-4 Baseline Concentrations of Crowberry

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Aluminium (Al)	53.3	40.4	3	-			100	64.8	4	47.5	17.1	4	-		
Antimony (Sb)	0.50	0.30	2	-			<0.05		0	<0.05		0	-		
Arsenic (As)	<0.2		0	-			<0.2		0	<0.2		0	-		
Barium (Ba)	27.5	7.17	3	-			12.2	12.4	6	19.5	3.83	4	-		
Beryllium (Be)	<0.2		0	-			<0.2		0	<0.2		0	-		
Boron (B)	17.7	2.52	3	-			23.3	10.4	4	30.8	5.85	4	-		
Cadmium (Cd)	<0.05		0	-			<0.05		0	<0.05		0	-		
Calcium (Ca)	4,847	323	3	-			2,082	2,168	6	4,310	237	4	-		
Chromium (Cr)	0.40	0.14	2	-			1.15	0.64	2	0.37	0.058	3	-		
Cobalt (Co)	0.13	0.058	3	-			0.23	0.12	3	0.27	0.058	3	-		
Copper (Cu)	4.57	0.74	3	-			2.30	1.43	6	4.05	0.69	4	-		
Iron (Fe)	47.3	17.2	3	-			41.3	29.1	6	43.3	13.7	4	-		
Lead (Pb)	0.053	0.025	3	-			0.058	0.024	4	0.045	0.013	4	-		
Lithium (Li)	<0.05		0	-			0.60		1	<0.05		0	-		
Magnesium (Mg)	1,403	172	3	-			702	720	6	1,240	144	4	-		
Manganese (Mn)	340	69.1	3	-			238	280	6	255	75.1	4	-		
Mercury (Hg)	0.025	0.0071	2	-			0.025	0.0071	2	<0.02		0	-		
Molybdenum (Mo)	0.060		1	-			<0.05		0	<0.05		0	-		
Nickel (Ni)	1.57	0.23	3	-			1.20	1.28	6	3.03	1.32	4	-		
Selenium (Se)	<0.2		0	-			<0.2		0	<0.2		0	-		
Silicon (Si)	188	70.0	2	-			188	105	6	232	41.8	4	-		
Silver (Ag)	<0.1		0	-			<0.1		0	<0.1		0	-		
Sodium (Na)	70.0	62.4	3	-			130	113	5	220	80.8	4	-		
Strontium (Sr)	10.6	2.00	3	-			7.18	7.34	6	9.33	1.28	4	-		

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Thallium (Tl)	<0.05		0	-			<0.05		0	<0.05		0	-		
Tin (Sn)	<0.1		0	-			<0.1		0	<0.1		0	-		
Titanium (Ti)	1.88	1.55	3	-			1.57	1.36	6	2.03	0.79	4	-		
Uranium (U)	<0.05		0	-			<0.05		0	<0.05		0	-		
Vanadium (V)	0.10		1	-			0.15	0.071	2	0.10		1	-		
Zinc (Zn)	11.0	0.35	3	-			7.12	4.38	6	10.6	1.27	4	-		
Polycyclic Aromatic Hydrocarbons															
Benzo(a)anthracene	<0.01			-			<0.01			<0.01			-		
Benzo(a)pyrene	<0.01			-			<0.01			<0.01			-		
Benzo(b)fluoranthene	<0.01			-			<0.01			<0.01			-		
Benzo(k)fluoranthene	<0.01			-			<0.01			<0.01			-		
Dibenzo(a,h)anthracene	<0.01			-			<0.01			<0.01			-		
Indeno(1,2,3-cd)pyrene	<0.01			-			<0.01			<0.01			-		
Naphthalene	<0.01			-			<0.01			<0.01			-		
Phenanthrene	0.05			-			<0.01			<0.01			-		
Pyrene	<0.01			-			<0.01			<0.01			-		

- Values not available

B5.0 BASELINE CONCENTRATIONS IN SNOW

Snow samples were collected in May 2006 from three (3) key areas of use, including reference sites, mine site and traditional use dock site.

With the exception of naphthalene, no PAHs were detected at concentrations above the laboratory analytical detection limit (DL) in any of the 10 snow samples. In two of the 10 samples, naphthalene was measured at 0.00002 mg/L and 0.00008 mg/L, which is only slightly above the DL of 0.00001 mg/L.

In most snow samples, for most parameters, measurable concentrations were at, or only slightly above their DLs. An exception occurred in one sample which had high concentrations of anions (chloride, sulphate, carbonate, bicarbonate etc.) and major cations (such as calcium, potassium, magnesium etc.). However, this sample was similar to the other nine snow samples in terms of metals and PAH concentrations. The pH range of the 10 snow samples was 5.3 to 6.2, indicating slightly acidic conditions. Most snow samples contained measurable concentrations of nitrate, nitrite, and chloride, while a few contained measurable sulphate and bicarbonate/carbonate concentrations. Most metals were measurable at trace levels in one or more snow samples. The most frequently detected metals across the 10 snow samples were aluminium, barium, copper, nickel, lead, tin, strontium, iron, manganese and zinc. Other metals were either only detected in a few samples or not at all in any of the samples.

Table B5-1 outlines a statistical summary for snow sample results. The reference site was comprised of samples collected from two (s) locations, the mine site was comprised of samples collected from eight (8) locations, and traditional use dock site comprised two (2) sampling locations.

Table B5-1 Statistical Summary for Snow Sample Results

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Metals															
Aluminium (Al)	0.035	0.0071	2	0.036	0.0079	7	-			0.060	0.014	2	-		
Antimony (Sb)	<0.0004		0	0.00070		1	-			<0.0004		0	-		
Arsenic (As)	<0.0004		0	<0.0004		0	-			0.0012		1	-		
Barium (Ba)	0.00055	0.00021	2	0.00068	0.00020	8	-			0.0014	0.0011	2	-		
Beryllium (Be)	<0.001		0	<0.001		0	-			<0.001		0	-		
Bismuth (Bi)	<0.0001		0	<0.0001		0	-			<0.0001		0	-		
Boron (B)	<0.02		0	<0.02		0	-			0.040		1	-		
Cadmium (Cd)	<0.0002		0	<0.0002		0	-			<0.0002		0	-		
Calcium (Ca)	<0.5		0	<0.5		0	-			4.20		1	-		
Chromium (Cr)	0.0012	0.00028	2	<0.0008		0	-			0.0015	0.000071	2	-		
Cobalt (Co)	<0.0002		0	<0.0002		0	-			<0.0002		0	-		
Copper (Cu)	0.0015	0.00071	2	0.0019	0.0014	8	-			0.0025	0.00071	2	-		
Iron (Fe)	0.031	0.0014	2	0.032	0.0094	8	-			0.045	0.022	2	-		
Lead (Pb)	0.00050		1	0.00021	0.000038	7	-			0.00015	0.000071	2	-		
Magnesium (Mg)	<0.1		0	0.10		4	-			12.7		1	-		
Manganese (Mn)	0.0010		1	0.0013	0.00046	8	-			0.0010		1	-		
Mercury (Hg)-Total	<0.0002		0	<0.0002		0	-			<0.0002		0	-		
Molybdenum (Mo)	<0.0001		0	<0.0001		0	-			0.00030		1	-		
Nickel (Ni)	<0.0002		0	0.00058	0.00045	4	-			<0.0002		0	-		
Selenium (Se)	0.00040		1	<0.0004		0	-			0.0048		1	-		
Silver (Ag)	<0.0004		0	<0.0004		0	-			<0.0004		0	-		
Sodium (Na)	<1		0	<1		0	-			96.0		1	-		
Strontium (Sr)	0.0015	0.00071	2	0.0016	0.00034	8	-			0.055	0.076	2	-		
Thallium (Tl)	<0.0001		0	<0.0001		0	-			0.00010		1	-		

Chemical	Reference Sites			Mine Site			Traditional Use Site			Traditional Dock Site			Road Site		
	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n	Mean	StDev	n
Tin (Sn)	0.00055	0.000071	2	0.00091	0.00059	7	-			<0.0004		1	-		
Titanium (Ti)	<0.005		0	<0.005		0	-			<0.005		0	-		
Uranium (U)	<0.0001		0	<0.0001		0	-			<0.0001		0	-		
Vanadium (V)	0.00030		2	0.00020		1	-			0.0017	0.0019	2	-		
Zinc (Zn)	0.0040		1	0.011	0.0048	7	-			<0.004		0	-		
Polycyclic Aromatic Hydrocarbons															
Acenaphthene	<0.00001			<0.00001			-			<0.00001			-		
Anthracene	<0.00001			<0.00001			-			<0.00001			-		
Benzo(a)anthracene	<0.00001			<0.00001			-			<0.00001			-		
Benzo(a)pyrene	<0.00001			<0.00001			-			<0.00001			-		
Benzo(b)fluoranthene	<0.00001			<0.00001			-			<0.00001			-		
Benzo(k)fluoranthene	<0.00001			<0.00001			-			<0.00001			-		
Chrysene	<0.00001			<0.00001			-			<0.00001			-		
Dibenzo(a,h)anthracene	<0.00001			<0.00001			-			<0.00001			-		
Fluoranthene	<0.00001			<0.00001			-			<0.00001			-		
Fluorene	<0.00001			<0.00001			-			<0.00001			-		
Indeno(1,2,3-cd)pyrene	<0.00001			<0.00001			-			<0.00001			-		
Naphthalene	<0.00001			0.000050	0.000042	2	-			<0.00001			-		
Phenanthrene	<0.00001			<0.00001			-			<0.00001			-		
Pyrene	<0.00001			<0.00001			-			<0.00001			-		

- Values not available

APPENDIX C
HUMAN HEALTH RISK ASSESSMENT

EXPOSURE MODEL
FOR HIGH LAKE MINE

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C1.0 INTRODUCTION

This appendix provides technical information related to the quantitative assessment of chronic exposure and the potential risks to humans from chemicals associated with the High Lake Mine Project, herein referred to as "the project".

Intrinsik Environmental Inc. (Intrinsik) estimated exposures to chemicals of potential concern (COPCs), at specified receptor locations, based on the following factors:

- Background or existing exposure to be estimated with relevant and available measured information;
- Specific physical, chemical and biological factors that determine the rate and amount of uptake of chemicals into the body;
- Physical and chemical characteristics which determine the interaction and behaviour of a chemical with its surrounding environment (*e.g.*, water solubility, volatility, tendency to bind to particles);
- Characteristics of the site and surrounding area;
- Characteristics of the environmental media at the site (*e.g.*, air and soil), as well as the concentrations of chemicals entering the environment from various sources, and their persistence in the environment;
- Behavioural and lifestyle characteristics of potentially exposed human receptors (*e.g.*, respiration rate, body weight); and,
- Assumed empirical or theoretical mathematical or statistical relationships between human exposure variables.

Baseline exposures were estimated based on available environmental data from the study area surrounding the site. A summary of the available data (chemical concentrations) in soil, plants and game that were used to characterize baseline exposures is provided in Appendix B. Baseline exposures were estimated separately from the predicted Project case. Project exposures were added to the Baseline case for threshold chemicals. Incremental lifetime cancer risks (not including baseline risks) were estimated for non-threshold chemicals (*i.e.*, carcinogens) as recommended by Health Canada (2006).

Measured baseline concentrations in soil, plants and game from the study area were available for a wide range of metals and polycyclic aromatic hydrocarbons (PAHs). Volatile organic compounds (VOCs) have not been measured as they are highly volatile and are not deposited to the terrestrial or aquatic environments. Therefore, baseline measurements in soil, water, plants and game were largely restricted to metals. Project exposures to persistent and bio-accumulative PAHs and VOCs were estimated from

models that predicted uptake to environmental media (*i.e.*, soil, plants and game) from predicted air concentrations.

In order to facilitate the understanding of the multimedia exposure model, a "worked example" is provided for a hypothetical adult Inuit receptor exposed to a specific COPC (the example was based on lead) for the project case.

C2.0 ASSUMPTIONS AND METHODS USED WITH ENVIRONMENTAL MEDIA CONCENTRATIONS

In order to quantify potential human exposures (and associated health impacts) as a result of emissions from the proposed project, measured and predicted chemical concentrations in various environmental media were required to estimate exposures and characterize risks. Chemical concentrations were estimated based on air concentrations in the following media:

- Soil;
- Soil pore water;
- Indoor air and dusts;
- Traditional plants (*i.e.*, cattail root, mint tea, and berries); and,
- Wildlife game (*i.e.*, moose, ruffed grouse and snowshoe hare).

Similarly, chemical concentrations in fish were estimated based on predicted changes in water quality in the local study area.

Many of the equations and assumptions used to predict environmental media concentrations were provided by the U.S. EPA OSW (2005). In addition to providing the equations and algorithms used to estimate environmental media concentrations, the following sections provide the methods used to estimate human chemical exposures, and to predict risks. Maximum annual average ground level air concentrations were predicted at several receptor locations identified in the Problem Formulation of the main report. The chronic health risk assessment included potential traditional food exposures for Inuit receptor locations.

C2.1 Chemical Concentrations in Soil

C2.1.1 Baseline Soil Concentrations

Baseline concentrations in soil were investigated from sampling sites in the study area. Table C-1 provides a summary of the measured concentrations (i.e., 95th percentile) that were used as the exposure point concentrations for COPCs in the baseline assessment. PAH concentrations in soil were either reported non-detect or were not

measured. Therefore, background PAH concentrations in soil were assumed to be ½ detection limits.

C2.1.2 Predicted Soil Concentrations

Predicted chemical concentrations in soil were based on predicted maximum annual average ground level air concentrations. Soil concentrations were estimated by applying deposition rates to air quality modeling results, and then calculating soil concentrations based on equations described below. Predicted soil concentrations are presented in Table C-1.

Table C-1 Summary of Soil Concentrations used in the HHRA and TERA [mg/kg]

Chemical	Baseline	Comment	Project
Acenaphthene	0.00E+00	Not analyzed	4.35E-08
Acenaphthylene	5.80E-01	Not analyzed	4.69E-09
Aluminium	3.19E+04	Not analyzed; Calculated soil with plant BCF value	0.00E+00
Anthracene	0.00E+00	Not analyzed	1.02E-06
Antimony	2.05E-01	2/20 detected at 0.2 ppm	0.00E+00
Arsenic	1.99E+01	95th percentile	7.79E-03
Barium	1.12E+02	95th percentile	0.00E+00
Benz(a)anthracene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	3.49E-05
Benzo(a)pyrene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	4.10E-10
Benzo(b)fluoranthene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	1.35E-09
Benzo(e)pyrene	0.00E+00	Not analyzed	4.64E-06
Benzo(g,h,i)fluoranthene	0.00E+00	Not analyzed	5.74E-15
Benzo(g,h,i)perylene	0.00E+00	Not analyzed	1.54E-09
Benzo(k)fluoranthene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	3.52E-10
Cadmium	9.00E-01	95th percentile; most samples non-detect	2.25E-02
Chromium VI	5.24E+00	10% of chromium	8.46E-02
Chromium	5.24E+01	95th percentile	8.46E-03
Chrysene	0.00E+00	Not analyzed	9.70E-10
Copper	1.10E+02	95th percentile	3.36E+00
Dibenzo(a,h)anthracene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	1.47E-09
Fluoranthene	0.00E+00	Not analyzed	4.99E-10
Fluorene	0.00E+00	Not analyzed	8.78E-07
Indeno(1,2,3-cd)pyrene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	2.26E-09
Lead	1.60E+01	95th percentile	1.10E-01
Manganese	5.59E+03	Not analyzed; Calculated soil with plant BCF value	3.05E-01
Mercury Methyl	0.00E+00	Aquatic concern	8.30E-04
Mercury	1.11E-01	95th percentile	0.00E+00

Chemical	Baseline	Comment	Project
Molybdenum	2.05E+00	95th percentile	0.00E+00
Naphthalene	1.00E-02	1/6 detected at 0.01 to 0.02 ppm	8.93E-08
Nickel	3.53E+01	95th percentile	4.43E-02
Phenanthrene	3.25E-02	2/6 detected at 0.01 to 0.02 ppm	2.11E-09
Pyrene	8.75E-03	All non-detect at 0.01 to 0.02 ppm	6.09E-10
Selenium	7.20E-01	95th percentile	4.48E-02
Silver	5.00E-01	All non-detect at 1 ppm	0.00E+00
Total Cyanide	0.00E+00	Not analyzed	0.00E+00
Zinc	1.87E+02	95th percentile	4.87E+00

C2.1.2.1 Soil Deposition

Atmospheric deposition of organic and inorganic chemicals occurs in two modes: wet and dry deposition (Golomb *et al*. 1997). In wet deposition, aerosols and gases are dissolved or suspended in precipitation: rain, snow, hail, fog and mist. Dry deposition of particles occurs by direct impaction and gravitational settling on land or water surfaces.

Calculating the wet vapour deposition velocity:

$$V_{wvd} = P_a \times SR \times CF$$

Where:

V_{wvd} = velocity of wet vapour deposition [m/s]
P_a = annual precipitation rate [m/year]
SR = scavenging ratio [200,000 unitless]
CF = conversion factor from years to seconds [3.1709979E-08 year/s]

The scavenging ratio represents the ratio between the volume of air a typical raindrop will sweep through as it falls to the earth relative to the volume of the rain drop. Therefore, a typical raindrop will fall through a volume equal to 200,000 (Mackay 1991) times its volume prior to landing on land or water. Canadian climate normals recorded at Fort McMurray, Alberta between 1971 and 2000 provides a precipitation rate of 249.3 mm/year (Environment Canada 2007). Using this value the wet deposition velocity is estimated to be 0.002 m/s. The human health risk assessment assumed a wet deposition velocity of 0.004 m/s which is conservative and consistent with previous assessments performed by Intrinsik.

0.003 = 0.2493 × 200,000 × 3.17E-08

C2.1.2.2 Converting the Air Concentration to a Deposition Rate

Combining the predicted ground level air concentration with the wet vapour deposition velocity will yield the loading rate of chemical to soil.

$$D = C_a \times VP_f \times V \times CF1 \times CF2$$

Where:

D	=	vapour or particulate deposition rate [mg/m^2/year]
C_a	=	concentration in air [μg/m^3]
VP_f	=	vapour or particulate phase fraction [%]
V	=	vapour or particulate phase deposition velocity [m/s]
CF1	=	conversion factor 3.1536E+07 [s/year]
CF2	=	conversion factor 0.001 [mg/μg]

The above equation can be used to calculate the following forms of chemical deposition to soil:

- Wet vapour deposition (D_{wv})
- Wet particle deposition (D_{wp})
- Dry vapour deposition (D_{dv})
- Dry particle deposition (D_{dp})
- D_{wv} = 0 = 2.21E-03 × 0% × 0.004 × 3.1536E+07 × 0.001
- D_{wp} = 2.79E-01 = 2.21E-03 × 100% × 0.004 × 3.1536E+07 × 0.001
- D_{dv} = 0 = 2.21E-03 × 0% × 0.03 × 3.1536E+07 × 0.001
- D_{dp} = 2.09E+00 = 2.21E-03× 100% × 0.03 × 3.1536E+07 × 0.001
- total deposition =2.37E+00 = 0 + 2.79E-01 + 0 + 2.09E-00

C2.1.2.3 Calculating the Deposition Term and Soil Concentration

The following illustrates the methodology used to derive soil concentrations on a mass per mass basis (μg/g), given the appropriate air dispersion data. Deposition to soil was calculated using the following equation.

$$D_s = \frac{(Ddp + Dwp)}{Z_s \times BD}$$

Where:

D_s	=	chemical specific deposition (mg of chemical /kg of soil/year)
Ddp	=	chemical-specific dry vapour and particle deposition rate (mg/m^2/year)
Dwp	=	chemical-specific wet vapour and particle deposition rate (mg/m^2/year)
Z_s	=	soil mixing zone depth (m)

BD = soil bulk density (kg soil/m^3 soil)

$$D_s = 7.9\times10^{-3} = \frac{2.37}{0.2\times1500}$$

$$C_s = \frac{D_s \times \left[1-\exp\left(-ks\times tD\right)\right]}{ks}$$

Where:

C_s = average soil concentration over exposure duration (mg/kg soil)

D_s = deposition term (mg of chemical/kg soil/year for untilled and tilled soils, respectively)

ks = chemical soil loss constant due to all processes ($year^{-1}$; calculated below)

tD = time period over which deposition occurs (years)

$$C_s = 0.11 = \frac{7.9\times10^{-3} \times \left[1-\exp\left(-6.93\times10^{-5}\times14\right)\right]}{6.93\times10^{-5}}$$

C2.1.3 Calculating Chemical Loss Constants

There are several processes by which chemical concentrations may be reduced in soil through losses. These processes may or may not occur simultaneously. The total rate at which a chemical is lost from soil was designated as *ks*. There are five mechanisms by which compounds may be lost from soil: leaching, runoff, erosion, biotic and abiotic degradation and volatilization. Only abiotic and biotic degradation and volatilization processes were considered for PAHs and VOCs in this assessment. Metals were assumed to accumulate in the environment for 14 years or no losses from soil.

Chemical Loss via Biotic and Abiotic Degradation

The degradation rate can be calculated as follows if the soil half-life ($t_{1/2}$) is known.

$$ksg = \frac{0.693}{t_{1/2}}$$

For organics, soil half-life values for abiotic and biotic degradation were obtained from U.S. EPA OSW 2005; Howard *et al*. 1991; and Mackay *et al*. 1992.

Ksg = 6.93E-05 yr^{-1}

Chemical Loss via Volatilization

The $t_{1/2}$ can also be predicted with established relationships between vapour pressure, water solubility and soil adsorption coefficient as follows (Swan *et al*. 1979).

$$t_{1/2} = 1.58 \times 10^{-8} \left(\frac{K_{oc} S}{P_{vp}} \right) \quad days$$

Where:

$t_{1/2}$	=	soil half-life (volatilization) [days]
K_{oc}	=	soil sorption coefficient [(μg/g) / (μg/ml)]
S	=	water solubility [mg/L]
P_{vp}	=	vapour pressure [mm Hg]

$$t_{1/2} = 0 = 1.58 \times 10^{-8} \times \left(\frac{0 \times 0}{0} \right)$$

The half-life is then converted to a rate constant using the following equation:

$$ksv = \frac{0.693}{t_{1/2} / CF}$$

Where:

K_{sv}	=	volatilization loss rate [$years^{-1}$]
$t_{1/2}$	=	volatilization half life [days]
CF	=	conversion factor [365 days/year]

$$k_{sv} = 0 = \frac{0.693}{0 / 365}$$

Total Soil Loss Constant

$$ks = ksg + ksv$$

Where:

ks	=	chemical-specific soil loss constant due to all processes ($year^{-1}$)
ksg	=	chemical-specific soil loss constant due abiotic and biotic degradation ($year^{-1}$)
ksv	=	chemical-specific soil loss constant due to volatilization ($year^{-1}$)

$$k_s = 6.93E\text{-}05 = 6.93E\text{-}05 + 0$$

C2.2 Surface Water Concentrations for Wildlife and Human Ingestion

Baseline water quality predicted from the surface water quality assessment was equivalent to measured concentrations in the local study area. Measured median concentrations from surface water bodies (*i.e.*, lakes, ditches and streams) were used for the Baseline case and the predicted maximum incremental increase in surface water concentrations were used for the Project case. Surface water concentrations were used in the HHRA and TERA for estimating tissue concentrations in wild game and exposure to wildlife and humans from ingestion. Table C-2 provides the median Baseline and maximum incremental changes in water quality for the Project case. In some circumstances, water quality in the Project case was predicted to improve (i.e., reduce in concentration) or not change at all. In other cases, chemicals were neither measured nor predicted (i.e., PAHs & mercury). In either case, a concentration of zero was assumed was these chemicals. High Lake itself was excluded from the HHRA and TERA because the lake is currently unsuitable for supporting aquatic life, will be part of mine operations and access will be restricted to wildlife and humans.

The following lakes and streams were included in the assessment:

- Diversion of L15 to L4 (YR100-149)
- Diversion of L18 to Kennarctic River
- Existing High Lake and
- L15
- L21
- L23
- L4 (YR 100-149)
- L5
- L8
- Treated Effluent Water Quality
- Diversion of L15 to L4 (YR1-50)
- East Dam
- Kennarctic River
- L1-L3
- L22
- L24
- L4 (YR 1-50)
- L6
- South Drainage
- West Zone

Table C-2 Summary of Surface Water Concentrations Used In the HHRA and TERA [mg/L]

Chemical	Baseline (Median)	Project [1]	Location of Incremental Increase
Acenaphthene	0.00E+00	0.00E+00	
Acenaphthylene	0.00E+00	0.00E+00	
Aluminium	2.26E-02	4.74E-06	Diversion of L18 to Kennarctic River
Anthracene	0.00E+00	0.00E+00	
Antimony	5.00E-05	4.62E-04	L23
Arsenic	1.60E-04	8.99E-06	L8
Barium	0.00E+00	5.14E-04	L23

Chemical	Baseline (Median)	Project [1]	Location of Incremental Increase
Benz(a)anthracene	0.00E+00	0.00E+00	
Benzo(a)pyrene	0.00E+00	0.00E+00	
Benzo(b)fluoranthene	0.00E+00	0.00E+00	
Benzo(e)pyrene	0.00E+00	0.00E+00	
Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	
Benzo(g,h,i)perylene	0.00E+00	0.00E+00	
Benzo(k)fluoranthene	0.00E+00	0.00E+00	
Cadmium	7.40E-05	7.83E-06	Kennarctic River
Chromium VI	2.50E-05	1.13E-05	
Chromium	2.50E-04	1.13E-04	L15
Chrysene	0.00E+00	0.00E+00	
Copper	2.10E-03	2.56E-06	Diversion of L18 to Kennarctic River
Dibenzo(a,h)anthracene	0.00E+00	0.00E+00	
Fluoranthene	0.00E+00	0.00E+00	
Fluorene	0.00E+00	0.00E+00	
Indeno(1,2,3-cd)pyrene	0.00E+00	0.00E+00	
Lead	5.00E-05	6.21E-08	Diversion of L18 to Kennarctic River
Manganese	0.00E+00	5.68E-06	Diversion of L18 to Kennarctic River
Mercury Methyl	2.50E-05	0.00E+00	
Mercury	2.50E-05	0.00E+00	
Molybdenum	5.00E-05	9.66E-05	L15
Naphthalene	0.00E+00	0.00E+00	
Nickel	1.06E-03	0.00E+00	
Phenanthrene	0.00E+00	0.00E+00	
Pyrene	0.00E+00	0.00E+00	
Selenium	5.00E-04	1.59E-04	L15
Silver	0.00E+00	0.00E+00	
Total Cyanide	0.00E+00	8.88E-05	L15
Zinc	2.05E-02	2.44E-06	Diversion of L18 to Kennarctic River

(1) Represents maximum incremental increase over baseline in water quality

C2.3 Plant Concentrations

C2.3.1 Measured Plant Concentrations

Measured traditional plant concentrations are available from the following vegetation:

- Labrador tea (*Ledum palustre*);
- Sedge (*Carex aquatilis*);
- Lichen (*Flavocetraria nivalis*); and
- Crowberry (*Empetrum nigrum*).

Table C-3 provides a summary of the measured 95th percentile concentrations for COPCs that were used in the Baseline case for the HHRA and TERA. Concentrations of PAHs were essentially non-detect; therefore, ½ the detection limit was used as a proxy value. Measured concentrations in soil (Table C-1) and concentrations in plants (Table C-3) were used to calculate site-specific bio-concentration factors (BCFs) for COPCs where data were available. The calculated Baseline BCFs were used to estimate incremental changes in plant concentrations for the Project case based on potential impacts from the Project (*i.e.*, atmospheric deposition and root uptake). Table C-4 provides a summary of the site-specific BCFs that were used for the HHRA and TERA. In some circumstances, site-specific BCF values were not available from the baseline information; therefore, literature values were used where available (Appendix D, Table D-23).

Table C-3 Summary of Measured Plant Concentrations Used in the HHRA and TERA (mg/kg wet weight)

Chemical	Tea [1]	Sedge [2]	Lichen [3]	Crowberry [4]
Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	0.00E+00	7.60E-02	0.00E+00	0.00E+00
Aluminium	3.96E+01	2.35E+01	4.27E+02	3.13E+01
Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Antimony	3.65E-02	2.50E-02	2.25E-02	1.04E-01
Arsenic	2.3E-02	4.12E-02	9.80E-01	2.3E-02
Barium	2.31E-01	6.70E+00	1.48E+01	7.02E+00
Benz(a)anthracene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Benzo(a)pyrene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Benzo(b)fluoranthene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.15E-03	0.00E+00	0.00E+00	1.15E-03
Benzo(k)fluoranthene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Cadmium	5.75E-03	1.16E-02	2.98E-01	5.75E-03
Chromium	2.25E-01	1.81E+00	3.49E+00	2.25E-01
Chromium VI	0.00E+00	1.81E-01	3.49E-01	0.00E+00
Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	8.35E-01	1.92E+00	6.21E+00	1.17E+00
Dibenzo(a,h)anthracene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Lead	4.90E-02	6.24E-02	1.82E+00	1.93E-02
Manganese	3.60E+02	1.45E+02	2.14E+02	1.33E+02
Mercury	9.2E-03	7.91E-03	6.48E-02	6.9E-03
Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum	3.22E-02	4.62E-01	3.65E-02	8.97E-03

Chemical	Tea [1]	Sedge [2]	Lichen [3]	Crowberry [4]
Naphthalene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Nickel	4.28E-01	1.05E+00	6.15E+00	9.11E-01
Phenanthrene	1.15E-03	1.12E-03	4.50E-03	8.28E-03
Pyrene	1.15E-03	1.15E-03	4.50E-03	1.15E-03
Selenium	2.3E-02	2.32E-02	1.17E-01	2.3E-02
Silver	1.15E-02	1.15E-02	4.50E-02	1.15E-02
Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	1.05E+01	1.12E+01	5.92E+01	2.72E+00

(1) Based on moisture content of 77% (Suter et al. 2000)
(2) Based on moisture content of 77% (Suter et al. 2000)
(3) Based on moisture content of 10% (Suter et al. 2000)
(4) Based on moisture content of 77% (Suter et al. 2000)

Table C-4 Summary of Site-specific Plant BCFs Used in the HHRA and TERA ((mg COPC / kg dw) / (mg COPC / kg soil))

Chemical	Tea	Sedge	Lichen	Crowberry
Acenaphthene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Acenaphthylene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Aluminium	NA	NA	NA	NA
Anthracene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Antimony	7.73E-01	5.30E-01	1.22E-01	2.2E+00
Arsenic	5.02E-03	9.00E-03	5.47E-02	5.02E-03
Barium	8.92E-01	2.60E-01	1.47E-01	2.71E-01
Benz(a)anthracene	5.70E-01	5.70E-01	5.71E-01	5.71E-01
Benzo(a)pyrene	5.70E-01	5.70E-01	5.71E-01	5.71E-01
Benzo(b)fluoranthene	5.70E-01	5.70E-01	5.71E-01	5.71E-01
Benzo(e)pyrene	5.70E-01	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Benzo(g,h,i)fluoranthene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Benzo(g,h,i)perylene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Benzo(k)fluoranthene	5.70E-01	5.70E-01	5.71E-01	5.70E-01
Cadmium	2.78E-02	5.60E-02	3.68E-01	2.78E-02
Chromium	1.87E-02	1.50E-01	7.41E-02	2.02E-02
Chromium VI	1.87E-02	1.50E-01	7.41E-02	2.02E-02
Chrysene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Copper	3.31E-02	7.60E-02	6.30E-02	4.65E-02
Dibenzo(a,h)anthracene	5.70E-01	5.70E-01	5.71E-01	5.70E-01
Fluoranthene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Fluorene	5.70E-01 [1]	5.70E-01 [1]	0.00E+00	5.70E-01 [1]
Indeno(1,2,3-cd)pyrene	5.7E-01	5.70E-01	5.71E-01	5.70E-01
Lead	1.34E-02	1.70E-02	1.27E-01	5.27E-03
Manganese	NA	NA	NA	NA
Mercury	3.60E-01	3.10E-01	6.49E-01	2.70E-01

Chemical	Tea	Sedge	Lichen	Crowberry
Mercury Methyl	NA	NA	NA	NA
Molybdenum	6.83E-02	9.80E-01	1.98E-02	1.90E-02
Naphthalene	5E-01	5.00E-01	5.00E-01	5E-01
Nickel	5.28E-02	1.30E-01	1.94E-01	1.12E-01
Phenanthrene	1.54E-01	1.50E-01	1.54E-01	1.54E-01
Pyrene	5.7E-01	5.70E-01	5.71E-01	5.70E-01
Selenium	1.39E-01	1.40E-01	1.81E-01	1.39E-01
Silver	1E-01	1.00E-01	1.00E-01	1E-01
Total Cyanide	NA	NA	NA	NA
Zinc	2.45E-01	2.60E-01	3.52E-01	6.33E-02

(1) Assumed equal to benzo(a)pyrene

NA indicates site-specific BCF not available from measured concentrations; used literature values see Appendix D, Table D-23.

C2.3.2 Predicting Chemical Concentrations in Plants for the Project Case

The uptake of chemicals into plants (*i.e.*, root, leafy portion, forage and fruit) is a topic that has been extensively reviewed in the literature. Chemical emissions to the atmosphere may be taken up by vegetation from three sources: particulate in air (dust or aerosols); vapours in air (gases); and, subsurface compartments (soil, water) (Rolfe 1972; Baes 1982; Travis and Hattemer-Frey 1988; Boon and Sultanpour 1992; Muller *et al*. 1993; Schroll and Scheunert 1993; McCrady and Maggard 1993). The magnitude of uptake from these sources has been correlated with physical/chemical parameters (vapour pressure, octanol water partition coefficient, *etc*.), soil parameters (fraction of organic carbon, soil moisture, clay content, *etc*.), plant parameters (lipid content, moisture content, *etc*.) and with chemical concentrations in air and other environmental media (U.S. EPA OSW 2005).

The methodology used to estimate the contribution from each route of chemical uptake in vegetation is described in the following sections. Predicted plant tissue concentrations are presented in Appendix D, Table D-1 based on the maximum air concentration at the 12 receptor locations surrounding the project. The following sources of chemical uptake into the tissues of plants were considered, and are described in detail below.

- Direct deposition of particles onto plant produce
- Air to aboveground plant produce (vapour transfer to leaves / foliage)
- Soil to aboveground plant produce
- Soil to belowground plant produce

C2.3.3 Plant Chemical Concentration Due to Direct Deposition

Atmospheric deposition was only considered for plants whose edible portions are above the ground and where the chemical potentially exists in particulate form. The following equations were used to predict produce concentration due to direct wet and dry deposition processes.

$$Pd = \frac{0.001 \times \left[Ddp + \left(Fw \times Dwp\right)\right] \times R_p \times \left[1.0 - \exp\left(-kp \times Tp\right)\right]}{Yp \times kp}$$

Where:

Pd	=	plant (aboveground produce) concentration due to direct (wet and dry) deposition (mg of chemical/ kg DW)
Ddp	=	yearly average dry deposition from particle phase (µg/m^2/year)
Dwp	=	yearly average wet deposition from particle phase (µg/m^2/year)
0.001	=	mg/µg
R_p	=	intercept fraction of edible portions of plant (unitless)
kp	=	plant surface loss coefficient (year^{-1})
Tp	=	length of plant exposure to deposition per harvest of the edible portion of the i^{th} plant group (unitless)
Yp	=	crop yield or productivity (kg DW(dry weight)/m^2)
Fw	=	fraction of chemical wet deposition that adheres to plant (unitless; 0.2 for anions and 0.6 for cations and most organics recommended; used 0.6)

$$Pd = 2.2E\text{-}04 = \frac{0.001 \times \left[2.0 + \left(0.6 \times 0.2\right)\right] \times 0.39 \times \left[1 - \exp\left(-18 \times 0.16\right)\right]}{2.24 \times 18}$$

Pd = 2.5E-03 mg of chemical/ kg WW = 2.0E-02 x (1-0.85) x 0.85 (Food washing factor)

Intercept Fraction

The U.S. EPA OSW recommends the use of the default Rp value since it represents the most current information available with respect to productivity and relative ingestion rates. Experimental studies as summarized by Baes *et al*. (1984), suggested a correlation between interception fractions and productivity (standing crop biomass (Yp) Chamberlain 1970):

$$Rp = 1 - e^{-\gamma Yp}$$

Where:

Rp	=	intercept fraction of the edible portion of the plant (unitless)
γ	=	empirical constant Chamberlain (1970) presents a range of 2.3 to 3.3

Yp = yield or standing crop biomass (productivity) (kg WW/m^2)

Initially, Baes *et al*. (1984) developed intercept fractions values for three classes of vegetation (vegetables, silage and exposed produce). These intercept fractions were independent of plant specific crop yields and as a result led to surface plant concentration predictions that were unreasonable. Baes *et al*. (1984) used an empirical constant developed by Chamberlain (1970), which was then used to generate class-specific empirical constants (γ). The U.S. EPA (1994c) and U.S. EPA (1995b) proposed a default aboveground Rp value of 0.05. These values were weighted by relative ingestion of each class to derive a weighted average. The relative ingestion rates used by U.S. EPA (1994c) and U.S. EPA (1995b) were not consistent with the Exposure Factors Handbook (U.S. EPA 1997), and therefore the suggested value of 0.05 is no longer used. As a result, produce classes were combined into two groups - exposed fruit and exposed vegetables. The exposed produce constant (γ) of 0.0324 developed by Baes *et al*. (1984) was used to estimate an Rp value. Since the exposed produce category includes leafy vegetables and fruiting vegetables, Rp was calculated for both leafy and fruiting vegetables. For exposed vegetables, Rp was determined by a weighted average of the crop yields of leafy and fruiting vegetables. Relative ingestion rates from the Exposure Factors Handbook (U.S. EPA 1997) were then used to derive a weighted Rp value 0.39 for garden produce and 0.5 for forage (U.S. EPA OSW 2005).

Plant Surface Loss Coefficient

The U.S. EPA (1990) identified several processes that contributed to the loss of contaminants on vegetative surfaces. The three mechanisms of removal considered included wind removal, water removal and growth dilution. These three mechanisms or processes contribute to the reduction of contaminant that has deposited on vegetative surfaces. The *kp* value is a measure of the amount of contaminant loss due to these three mechanisms. Miller and Hoffman (1983) used the following relationship to relate half-life times to *kp* values.

$$kp = (\ln 2 / t_{1/2}) \times 365\, days / year$$

Where:

$t_{1/2}$ = half-life (days)

Miller and Hoffman (1983) reported half-life values of 2.8 to 34 days for a number of different chemicals on vegetative surfaces, which resulted in *kp* values of 7.44 to 90.36 ($year^{-1}$). As a result, the U.S. EPA (1993), U.S. EPA (1994a) and the U.S. EPA OSW (2005) recommend a default *kp* value of 18, which corresponds to a 14 day half-life.

Growing Season or Length of Plant Exposure per Year

Belcher and Travis (1989) estimated that forage crops are exposed on average approximately 60 days during the growing season, before harvest. U.S. EPA (1990), U.S. EPA (1993) and the NC DEHNR (1997) recommend a value of 60 days or 0.164 years. Similar assumptions were made for the growing season of traditional plants.

Yield or Standing Crop Biomass or Productivity

The U.S. EPA OSW (2005) recommends using a value of 0.24 kg DW/m^2 for forage and 2.24 kg DW/m^2 for traditional produce. Based on a review of recent literature, these values appeared to be the most appropriate. The following equation is used to estimate the forage or crop yield.

$$Yp = \frac{Yh_i}{Ah_i}$$

Where:

Yp	=	yield (kg/ DW/m^2)
Yh_i	=	harvest yield of the i^{th} crop (kg DW)
Ah_i	=	area planted to the i^{th} crop (m^2)

Fraction of Chemical that Adheres to Plant Surfaces

The U.S. EPA OSW (2005) recommends using the chemical class-specific values of 0.2 for anions and 0.6 for cationic compounds. This parameter describes the fraction of wet deposition that would adhere to plant surfaces.

Empirical Correction Factor

Lipophilic compounds (*i.e.*, those compounds with Log K_{ow} greater than 4) are generally not able to pass through the skin to the inner portions of bulky produce as easily as those compounds which tend to be more water soluble (*i.e.*, with Log K_{ow} less than 4). Therefore the U.S. EPA OSW (2005) recommends using an empirical constant of 0.01 for those compounds considered more lipophilic (*i.e.*, Log K_{ow} greater than 4) and a constant of 1 for those with Log K_{ow} less than 4.

C2.3.4 The Air-to-Plant Biotransfer Factor for Aboveground Produce

The air-to-plant biotransfer factor (Bv) can be defined as the ratio of chemical in aboveground plant parts to the concentration of chemical in ground-level air (U.S. EPA OSW 2005). According to the U.S. EPA (1995a), root vegetables are protected from this mechanism of uptake. For all organic chemicals, the air-to-plant transfer factors were based on work with azalea leaves by Bacci *et al*. (1990 and 1992).

The following equation was used to calculate aboveground plant tissue concentrations.

$$P_v = \frac{Cair \times B_v}{\rho_{air}} \times \left(1 - \int_{water}\right)$$

Where:

P_v	=	COPC concentration in plant (mg/kg wet weight)
Cair	=	COPC concentration in air (mg/m^3)
B_v	=	mass-based air-to-plant biotransfer factor (µg/g dry-weight plant / µg/g air)
ρ_{air}	=	density of air 1.19 kg/m^3 (Weast 1981)
f_{water}	=	0.85 (fraction of forage that is water; McCrady and Maggard 1993)

$$Pv = 0 = \frac{2.21 \times 10^{-3} \times 0}{1200} \times (1 - 0.85)$$

Note: *Pv is zero in the example calculation, which was based on lead. There would be no direct uptake of metals by plants from the atmosphere.*

Studies based on the Welsch-Pausch, McLachlan, and Umlauf (1995) experiments, as by Lorber (1995), suggested a factor of 100 be applied to all biotransfer factors for organics estimated using the Bacci *et al*. (1992) methodology.

The following equation was derived by Bacci *et al*. (1992) and is based on the evaluation of 14 different compounds to develop a relationship with K_{ow} and Henry's Law.

$$\log B_{vol} = 1.065 \log K_{ow} - \log\left(\frac{H}{RT}\right) - 1.654$$

Where:

B_{vol}	=	volumetric air-to-plant biotransfer factor (fresh-weight basis)
log K_{ow}	=	log of the octanol-water partition coefficient (unitless)
H	=	Henry's Law constant of the compound (atm m3/mol)
T	=	room temperature in Kelvin (293 K)
R	=	gas constant (8.207E-05 atm m^3/K mol)

$$logB_{vol} = 0 = 1.065 \times \log(0) - \log\left(\frac{0}{0.000082 \times 288}\right) - 1.654$$

The mass based air-to-plant biotransfer factor is calculated with the following equation.

$$B_v = \frac{\rho_{air} \times B_{vol}}{\left(1 - \int_{water}\right) \times \rho_{forage}}$$

Where:

Bv	=	mass-based air-to-plant biotransfer factor (µg/g dry-weight plant / µg/g air)
ρ_{air}	=	density of air 1.19 g/L (Weast 1981)
ρ_{forage}	=	770 g/L (McCrady and Maggard 1993) density of forage
f_{water}	=	0.85 (fraction of forage that is water; McCrady and Maggard 1993)

$$B_v = 0 = \frac{1.19 \times 0/100}{(1 - 0.85) \times 770}$$

C2.3.5 Above and Below Ground Vegetation Concentrations

Contaminants present in soil may be taken up into edible portions of above and belowground produce. As a result, two methods of predicting contaminated concentration in edible plant concentrations have been recommended by the U.S. EPA OSW (2005). These methods are consistent with other U.S. EPA guidance documents (U.S. EPA 1994b; U.S. EPA 1994c; and U.S. EPA 1995b).

Aboveground Produce

$$\mathrm{Pr} = \left(Cs \times Br_{ag} \right) \times (1 - MC)$$

Where:

Pr	=	contaminant concentration in produce as a result of root uptake (mg/kg)
Cs	=	tilled soil concentration (mg/kg soil)
Br_{ag}	=	plant-soil bioconcentration factor for aboveground produce (unitless; calculated below for organics)
MC	=	0.85 (fraction of forage that is water; McCrady and Maggard 1993)

Pr = 1.0E-04 = (0.1 × 0.009) × (1-0.85) x 0.85 (washing factor)

A substantial amount of empirical data available in the literature demonstrates there is significant uptake of organics into plants. Organic chemicals in soils were reported to be taken up by vegetation (*i.e.*, carrots, tomatoes, potatoes and narcissus) through the roots (Iwata and Gunther 1976; Cocucci *et al*. 1979; Bacci and Gaggi 1985; Travis and Arms 1988; Schroll and Scheunert 1993). Travis and Arms (1988) reported that uptake of organic chemicals by vegetation is correlated to octanol-water partition coefficients (K_{ow}).

The method of Travis and Arms (1988), as modified by Travis and Blaylock (1992), was used to estimate the bioconcentration of organic chemicals from soil to vegetation *via* root uptake. This method was based on measured data that demonstrated that the bioconcentration factor for an organic chemical in vegetation is inversely proportional to the square root of the octanol-water partition coefficient (K_{ow}). Root uptake of organics has been correlated with K_{ow} and has been shown to decrease as K_{ow} increases (Briggs *et al*. 1982; in Travis and Blaylock 1992). A geometric mean regression analysis of data for 29 different organic chemicals demonstrated a relationship between bioconcentration factors in vegetation and octanol-water partition coefficients (r = 0.73) (Travis and Arms 1988). The first step of the method of Travis and Arms (1988), as modified by Travis and Blaylock (1992), is to calculate a chemical-specific bioconcentration factor for vegetation. The bioconcentration factor for aboveground vegetation (Br_{ag}) is defined as the ratio of the concentration in the plant (µg of chemical/g of dry plant) to the concentration of the chemical in the soil (µg of chemical/g of dry soil). The Br_{ag} can be calculated for organic chemicals according to the formula.

For organics only:

$$Br_{ag} = 38.73 K_{ow}^{-0.578}$$

C2.3.6 Belowground Produce

Belowground produce would refer to all root-vegetables and therefore concentrations derived using this methodology would only be applied to root-vegetable consumption rates.

$$\mathrm{Pr}_{bg} = \left(Cs \times Br_{rootveg} \times Vg_{root} \right) \times \left(1 - MC\right)$$

Where:

Pr_{bg}	=	contaminant concentration in belowground produce as a result of root uptake (mg/kg)
Cs	=	soil concentration (mg/kg soil)
$Br_{rootveg}$	=	plant-soil bioconcentration factor for belowground produce (unitless; calculated below for organics only)
Vg_{root}	=	empirical correction factor for belowground produce (1; unitless)
MC	=	0.85 (fraction of forage that is water; McCrady and Maggard 1993)

Vg_{root} is dependant on the lipophilic nature of the chemical of concern. For compounds with a Log K_{ow} greater than 4, an empirical correction factor of 0.01 was assigned. For a compound with a Log K_{ow} less than 4, a value of 1.0 was applied.

Where the plant-soil bioconcentration factor for belowground produce is as follows:

$$Br_{rootveg} = \frac{RCF}{Kd_s}$$

The root concentration factor (RCF) for organic compounds has been obtained from Briggs *et al.* 1982. (Note; the example calculation is for lead so there is no root uptake).

The following equation estimates a RCF value in fresh weight. The following equation must be adjusted to a dry weight basis using a moisture content of 85 percent in root vegetables (Pennington 1994). This relationship is recommended by other regulatory documents such as U.S. EPA (1994a).

$$Log(RCF - 0.85) = 0.77 LogK_{ow} - 1.52$$

The soil-water partitioning coefficient (Kd_s) describes the partitioning of a chemical between soil pore-water and soil particles. For organics, Kd_s has been defined by the following equation.

$$Kd_s = K_{oc} \times f_{oc,s}$$

Where:

K_{oc} = soil organic carbon-water partition coefficient (mL/g)

$f_{oc,s}$ = fraction organic carbon in soil (U.S. EPA OSW 1998)

C2.4 Game Tissue Concentrations

C2.4.1 Predicted Game Concentrations

Wildlife game tissue concentrations were calculated based on U.S. EPA OSW (2005) guidance. For the purpose of estimating wildlife tissue residue levels, it was assumed that wildlife were exposed to chemicals through consumption of food, drinking water and incidental soil ingestion. Forage concentration estimates were based on a similar methodology to that used for predicting vegetation concentrations as described previously. Calculations and predicted wildlife game tissue concentrations are listed in Appendix D Table D-3.

The following equations were used to calculate the total daily dose of a chemical of concern via the ingestion of forage and soil for an animal. Biotransfer factors (BTF) have been included based on the U.S. EPA OSW (2005) to translate the estimated daily dose of a chemical to a tissue concentration. When empirical data are lacking, one of the most widely used approaches is the regression model developed by Travis and Arms (1988), however these regressions are hampered by the limited log Kow range and questions surrounding the validity of the underlying biotransfer data set. New biotransfer models have been developed (RTI 2005) and incorporated within the

assessment as recommended by U.S. EPA OSW (2005). The following equation was developed to predict the transfer the rate of chemical intake into a tissue concentration *(lead exposure is shown in the example calculations)*.

$$\log(BTF) = -0.099 \times \log(K_{ow})^2 + 1.07 \times \log(K_{ow}) - 3.56$$

Where:

BTF = biotransfer factor ([mg/kg-fat] / [mg/day])

K_{ow} = octanol water coefficient

The BTF was adjusted to account for the fat content of milk or muscle. Game, snowshoe hare and grouse meat fat content was assumed to be 19%, 19%, and 14% respectively (U.S. EPA OSW 2005). The BTF equation is appropriate for organic chemicals lacking empirical biotransfer data and having a log K_{ow} between -0.67 and 8.2.

The BTF was adjusted to account for the amount of fat in the tissue based on the following equation for organics only.

$$BTF_a = BTF \times FC$$

Where:

BTF_a = adjusted BTF for fat content of tissue ([mg/kg-tissue] / [mg/day])

BTF = biotransfer factor ([mg/kg-fat] / [mg/day])

FC = fat content of tissue (%)

Predictive models for metals were based on total concentrations of the COPC; therefore, in some cases concentrations were adjusted to reflect the form of chemical in which the exposure limit is based. For example, predicted arsenic concentrations in game meat were estimated as total arsenic concentrations. However, the exposure limit for arsenic is derived based on inorganic exposures. Therefore, inorganic arsenic concentrations in game meat were adjusted to provide an inorganic arsenic concentration. In this case measured or predicted total arsenic concentrations were multiplied by 0.37 (37%) to convert to predicted inorganic arsenic concentrations in game meat.

C2.5 Calculation of Breast Milk Biotransfer Factor

The potential health effects associated with the ingestion of chemical-impacted breast milk by nursing infants was considered in the current assessment. Chemicals with the tendency to bio-accumulate were assessed for the infant's exposure to the mother's milk. The maximum fraction of chemical expected to bioaccumulate was calculated using the following approach (example given for lead).

BM_{BTF} = 2.0e-07 × K_{ow} (McKone 1992)

Where:

BM_{BTF} = breast milk biotransfer factor ([μg/kg milk]/[μg/day intake])

K_{ow} = octanol-water partition coefficient

BM_{BTF} = 0 = 2.0E-07 × 0

C2.5.1 Calculation of Chemical Concentration in Breast Milk

$$CBM = \frac{EXP_{mother} \times BW_{mother} \times BM_{BTF}}{1000}$$

Where:

CBM = chemical concentration in breast milk (μg/g milk)

EXP_{mother} = mother's total daily exposure to chemical *via* all routes (μg/kg/day)

BW_{mother} = mother's body weight (kg)

BM_{BTF} = breast milk biotransfer factor (μg/kg milk)/(μg/day intake)

1000 = unit conversion factor (g/kg)

$$CBM = 0 = \frac{9.6 \times 10^{-2} \times 70.9 \times 0}{1000}$$

C2.6 Fish Concentrations

C2.6.1 Baseline Fish Concentrations

Measured 95th percentile baseline concentrations in fish liver and muscle were used to characterize exposures to Inuit and wildlife that consume fish from the study area. Table D-1 in Appendix D provides a summary of tissue concentrations that were used in the HHRA (fish muscle concentrations) and TERA (whole fish concentrations). Whole fish concentrations were not measured; therefore, the TERA average the concentrations between the muscle and liver to estimate the whole body concentrations.

C2.6.2 Predicted Fish Concentrations

Site-specific BCFs (Bioconcentration factors) were calculated for fish muscle and whole fish. Table D-23 in Appendix D provides a summary of the site-specific and literature derived BCFs that were used to estimate Project concentrations based on changes in surface water quality. Site-specific BCFs were based on the ratio of 95UCLM fish concentration to measured median baseline water concentrations. The following equation was used to calculate chemical specific BCFs.

$$BCF = \frac{C_i}{C_W}$$

$$C_i = C_M \times BCF$$

Where BCF for whole fish is:

BCF = bioconcentration factor ([(mg/kg-fish) / (mg/L-water)])
C_i = COPC concentration in whole fish (mg COPC/kg dw)
C_W = COPC concentration in water (mg COPC/L)

$$BCF = 22{,}326 = \frac{1.12}{5\times10^{-5}}$$

Or, where BCF for fish muscle is:

BCF = bioconcentration factor ([(mg/kg-fish) / (mg/L-water)])
C_i = COPC concentration in fish muscle (mg COPC/kg dw)
C_W = COPC concentration in water (mg COPC/L)

$$BCF = 41{,}243 = \frac{2.06}{5\times10^{-5}}$$

C2.7 Conversion from Dry Weight to Wet Weight

The current methodology estimates vegetation concentrations on a dry weight basis. Since home-grown produce will be consumed on a fresh weight basis, dry weight concentration estimates were converted to a fresh (or wet) weight basis. A moisture content of 85% was used to represent average moisture content of vegetation. The following equation was used to estimate media concentrations on a fresh (or wet) weight basis.

$$\left(Wet\ Weight\ Conc.\right) = \left(Dry\ Weight\ Conc.\right) \times \left(1 - \frac{moisture\ content}{100}\right)$$

C3.0 HUMAN RECEPTOR CHARACTERISTICS

C3.1 Receptor Selection

Receptor characteristics for Inuit were based on Health Canada (1994; 2004, 2006) and Indian and Northern Affairs Canada (2003). One hypothetical receptor type was evaluated in the multi-pathway assessment – Inuit Receptor (Table C-5).

Table C-5 Assumed physical characteristics and consumption rates for the Inuit receptor

Variable	Units	Adolescent	Adult	Child	Infant	Toddler	Reference
Physiological Parameters							
Body weight	kg	59.7	70.7	32.9	8.2	16.5	Health Canada 2006
Breathing rate	m^3/day	15.8	15.8	14.5	2.1	9.3	Health Canada 2006
Whole body surface area	m^2	1.5	1.7	1.0	0.4	0.6	O'Connor and Richardson 1997
Hand surface area	m^2	0.076	0.083	0.059	0.032	0.043	O'Connor and Richardson 1997
Soil adherence factor	g/m^2/day	0.1	0.1	0.1	0.1	0.1	CCME 2000 and Health Canada 2003
Soil adherence factor – hands only	g/m^2/day	1	1	1	1	1	CCME 2000
Summer outdoors	m^2	0.376	0.419	0.254	0.0878	0.151	O'Connor and Richardson 1997
Winter outdoors	m^2	0.151	0.168	0.102	0.0351	0.0605	O'Connor and Richardson 1997
Summer indoors	m^2	0.376	0.419	0.254	0.0878	0.151	O'Connor and Richardson 1997
Winter indoors	m^2	0.151	0.168	0.102	0.0351	0.0605	O'Connor and Richardson 1997
Consumption Rates							
Incidental soil/dust ingestion rate	g/day	0.02	0.02	0.02	0.02	0.08	Health Canada 2006
Root vegetables	g/day	227	188	161	83	105	Health Canada 2006
Leafy vegetables	g/day	120	137	98	72	67	Health Canada 2006
Fruit [1]	g/day	54	44	67	4	39	Health Canada 1994
Game	g/day	175	270	125	0	85	Health Canada 2006
Fish	g/day	200	220	170	0	95	Health Canada 2006
Breast milk	g/day	0	0	0	664	0	O'Connor and Richardson 1997

(1) Consists of raw apples, apple sauce, cherries, strawberries, blueberries, jams and honey.

C4.0 EQUATIONS AND ALGORITHMS USED TO ESTIMATE HUMAN EXPOSURE RATES

The following section identifies the algorithms used to estimate human exposure. Similar methods were used to evaluate all receptors, receptor locations, and COPCs. The example calculations are based on Inuit lead exposure in the Project case.

Total Exposure from Consumption of Traditional Foods

Consumption of Belowground Produce

$$EVR = \frac{CVR \times AVC \times WP \times RF_{oral} \times FHP}{BW}$$

Where:

EVR	=	daily exposure from belowground vegetables (μg/kg/day)
CVR	=	total plant concentration as a result of root uptake (μg/g fresh weight)
AVC	=	amount of root vegetables consumed per day (g/day)
RF_{oral}	=	relative bioavailability of compound (%)
FHP	=	fraction of vegetation that is from home garden (%)
BW	=	receptor body weight (kg)
WP	=	washing and food perpetration factor (15% reduction, U.S. EPA OSW 1998; 100 - 15 = 85% or 0.85).

$$EVR = 3E\text{-}04 = \frac{1.4 \times 10^{-4} \times 188 \times 0.85 \times 100\% \times 100\%}{70.7}$$

Consumption of Aboveground Leafy Vegetables

$$EVL = \frac{CVL \times AVL \times WP \times RF_{oral} \times FHP}{BW}$$

Where:

EVL	=	daily exposure from aboveground leafy vegetables (μg/kg/day)
CVL	=	total plant concentration (μg/g fresh weight)
AVL	=	amount of leafy vegetables consumed per day (g/day)
RF_{oral}	=	relative oral bioavailability of compound (%)
FHP	=	fraction of vegetation that is from home garden (%)
BW	=	receptor body weight (kg)
WP	=	washing and food perpetration factor (15% reduction, U.S. EPA OSW 1998; 100 – 15 = 85% or 0.85)

$$EVL = 5E\text{-}03 = \frac{3 \times 10^{-3} \times 137 \times 0.85 \times 100\% \times 100\%}{70.7}$$

Consumption of Fruit/Berries

$$EVF = \frac{CVF \times AVF \times WP \times RF_{oral} \times FHP}{BW}$$

Where:

EVF	=	daily exposure from fruits (µg/kg/day)
CVF	=	total fruit concentration (µg/g fresh weight)
AVF	=	amount of fruit consumed per day (g/day)
RF_{oral}	=	relative oral bioavailability of compound (%)
FHP	=	fraction of fruit that is from impacted site (%)
BW	=	receptor body weight (kg)
WP	=	washing and food perpetration factor (0% reduction for fruits; U.S. EPA OSW 1998; 100 - 0 = 100% or 1.0).

$$EVF = 2E\text{-}03 = \frac{3\times10^{-3}\times54\times100\%\times100\%}{70.7}$$

Total Home-grown Produce Exposure

$$EVT = EVL + EVF + EVR$$

Where:

EVT	=	total exposure from fruits and vegetables (µg/kg/day)

$$EVT = 7E\text{-}03 = 3E\text{-}04 + 5E\text{-}03 + 2E\text{-}03$$

Calculation of Human Exposure via Consumption of Game or Fish Tissue

The chemical exposure from consumption of game is shown below.

$$Exp_{tissue} = \frac{C_{tissue}\times R_{tissue}\times BIO_{oral}}{BW}$$

Where:

Exp_{tissue}	=	receptor's daily exposure to chemical (µg/kg/day)
C_{tissue}	=	chemical concentration in tissue (µg/g fresh weight)
R_{tissue}	=	amount game tissue consumed (g/day)
BIO_{oral}	=	relative oral bioavailability of the compound (%)
BW	=	receptors body weight (kg)

$$Exp_{tissue} = 3.7E\text{-}02 = \frac{9.58\times10^{-3}\times270\times100\%}{70.7}$$

C4.1 Estimation of Exposure from Air

C4.1.1 Direct Air Inhalation

Direct Air Inhalation Exposure on Outdoor days:

$$AirInh_{outdoor} = \frac{AIAct \times RF_{inh} \times cair \times (rSAS + rSAW)}{BW \times DPY}$$

Where:

$AirInh_{outdoor}$	=	inhalation exposure from chemicals in the air during outdoor days (μg/kg/day)
AIAct	=	amount of air inhaled on outdoor days (m^3/day)
cair	=	site air concentration (μg/m^3)
RF_{Inh}	=	relative inhalation bioavailability of the compound (%)
rSAS	=	outdoor summer days spent (days/year)
rSAW	=	outdoor winter days spent (days/year)
BW	=	receptor body weight (kg)
DPY	=	days per year (365 days/year)

$$AirInh_{outdoor} = 2.5E\text{-}04 = \frac{15.8 \times 100\% \times 2.21 \times 10^{-3} \times (106.46 + 76.04)}{70.7 \times 365}$$

Inhalation Exposure Calculations on Indoor days

$$AirInh_{indoor} = \frac{AIPass \times RF_{inh} \times cair \times (rSPS + rSPW) \times Inf}{BW \times DPY}$$

Where:

$AirInh_{indoor}$	=	inhalation exposure from chemicals in the air during indoor day (μg/kg/day)
AIPass	=	amount of air inhaled on indoor days (m^3/day)
RF_{Inh}	=	relative inhalation bioavailability of the compound (1; unitless)
cair	=	site air concentration (μg/m^3)
rSPS	=	indoor summer days spent (days)
rSPW	=	indoor winter days spent (days)
Inf	=	fraction of indoor air that is from outdoor air (1; Hawley 1985)
BW	=	receptor body weight (kg)
DPY	=	days per year (365 days/year)

$$AirInh_{indoor} = 2.5E\text{-}04 = \frac{15.8 \times 100\% \times 100\% \times 2.21 \times 10^{-3} \times (106.46 + 76.04) \times 1}{70.9 \times 365}$$

Exposure via Direct Air Inhalation

$$Air_{Total} = AirInh_{indoor} + AirInh_{outdoor}$$

Where:

Air_{Total} = total inhalation exposure from chemical as vapour in air (µg/kg/day)
$AirInh_{outdoor}$ = inhalation exposure from chemicals in the air during outdoor days (µg/kg/day)
$AirInh_{indoor}$ = inhalation exposure from chemicals in the air during indoor day (µg/kg/day)

Air_{total} = 5E-04 =2.5E-04 + 2.5E-04

C4.2 Calculation of Exposure from Soil/Dust

C4.2.1 Assumptions Defining Dust Levels Generated by Soils

- Background outside dust levels: 42 µg/m³ (MOEE 1994)
- Percent of dust produced from soil: 50% (Hawley 1985)
- Percent of outside dust level indoors: 75% (Roberts *et al*. 1974)

Sample calculation concerning the level of dust generated from soil alone (*i.e.*, background levels), suspended in air:

- Outside: 42 µg/m³ x 0.50 / 1,000,000 µg/g = 2.1E-05 g/m³
- Indoors: 42 µg/m³ x 0.50 x 0.75 / 1,000,000 µg/g =1.57E-05 g/m³

The exposure contributions from chemically impacted soil were considered for three routes of exposure: i) inhalation of resuspended dusts, ii) incidental ingestion of soil, and iii) dermal contact with skin.

Inhalation Exposure from Dust on Outdoor Summer Days

Contribution from outside airborne dust:

$$EXP_{SIAO} = \frac{AI \times SL \times RF_{inh} \times SODL \times SOD}{BW \times DPY}$$

Where:

EXP_{SIAO} = inhalation exposure to chemical from summer outside airborne dust (µg/kg/day)
AI = amount of air inhaled (m^3/day)
SL = concentration of chemical in untilled soil (µg/g)
RF_{inh} = relative inhalation bioavailability (1; unitless)

SODL = background dust level in outside air (g/m^3)
SOD = number of summer days spent outside per year (days/year)
BW = receptor body weight (kg)
DPY = days per year (365 days/year)

$$EXP_{SIAO} = 1.4E\text{-}06 = \frac{15.8 \times 1.0 \times 100\% \times 2.1 \times 10^{-5} \times 106.46}{70.7 \times 365}$$

Contribution from indoor airborne dust on summer days:

$$EXP_{SIAI} = \frac{AI \times SL \times RF_{inh} \times SIDL \times SID}{BW \times DPY}$$

Where:

EXP_{SIAI} = summer inhalation exposure to chemical from summer indoor airborne dust (µg/kg/day)
AI = amount of air inhaled (m^3/day)
SL = concentration of chemical in soil (µg/g)
RF_{inh} = relative inhalation bioavailability (1; unitless)
SIDL = background dust level in indoor air (g/m^3)
SID = number of summer days spent indoors (days/year)
BW = receptor body weight (kg)
DPY = days per year (365 days/year)

$$EXP_{SIAI} = 1.4E\text{-}06 = \frac{15.8 \times 1 \times 100\% \times 2.1 \times 10^{-5} \times 106.46}{70.7 \times 365}$$

Inhalation Exposure from Dust on Outdoor Winter Days

It was assumed that 10% of the summer outside dust level was available during the winter months.

Contribution from Outside Airborne Dust:

$$EXP_{WIAO} = \frac{AI \times SL \times RF_{inh} \times WODL \times PWS \times WOD}{BW \times DPY}$$

Where:

EXP_{WIAO} = winter inhalation exposure from outside airborne dust (µg/kg/day)
AI = amount of air inhaled (m^3/day)
SL = concentration of chemical in soil (µg/g)
RF_{inh} = relative inhalation bioavailability (1; unitless)

WODL = background dust level in outside air (g/m^3)
PWS = percentage of winter soil available (10%)
WOD = number of winter days spent outside per year (days/years)
BW = receptor body weight (kg)
DPY = days per year (365 days/year)

$$EXP_{WIAO} = 9.8E\text{-}08 = \frac{15.8 \times 1 \times 100\% \times 2.1 \times 10^{-5} \times 10\% \times 76.04}{70.7 \times 365}$$

Contribution from Indoor Airborne Dust on Winter Days:

$$EXP_{WIAI} = \frac{AI \times SL \times RF_{inh} \times WIDL \times PWS \times WID}{BW \times DPY}$$

Where:

EXP_{WIAI} = winter inhalation exposure to chemical from indoor airborne dust (µg/kg/day)
AI = amount of air inhaled (m^3/day)
SL = concentration of chemical in soil (µg/g)
RF_{inh} = relative inhalation bioavailability (1; unitless)
WIDL = background dust level in indoor air (g/m^3)
PWS = percentage of winter soil available (10%)
WID = number of winter days spent indoors (days/year)
BW = receptor body weight (kg)
DPY = days per year (365 days/year)

$$EXP_{WIAI} = 9.8E\text{-}08 = \frac{15.8 \times 1 \times 100\% \times 2.1 \times 10^{-5} \times 10\% \times 76.04}{70.7 \times 365}$$

Total Exposure (inhalation of vapour and dusts):

$$EXP_{INH} = EXP_{SIAO} + EXP_{SIAI} + EXP_{WIAO} + EXP_{WAIA} + Air_{Total}$$

Where:

EXP_{INH} = total inhalation exposure (µg/kg/day)
EXP_{SIAO} = summer inhalation exposure to chemical from outside airborne dust (µg/kg/day)
EXP_{SIAI} = summer inhalation exposure to chemical from indoor airborne dust (µg/kg/day)
EXP_{WIAO} = winter inhalation exposure to chemical from outside airborne dust (µg/kg/day)
EXP_{WAIA} = winter inhalation exposure to chemical from indoor airborne dust (µg/kg/day)
Air_{Total} = total inhalation exposure from chemical as vapour in air (µg/kg/day)

EXP_{INH} = 3E-06 =1.4E-06 +1.4E-06 + 9.8E-08 +9.8E-08

C4.2.2 Ingestion of Soil/Dusts

The following provides the equations used to calculate exposures *via* ingestion of soil/dust:

Incidental Outdoor Soil Ingestion during Summer Months

Contribution from Outside Soil:

$$EXP_{SGAO} = \frac{AO \times SL \times RF_{oral} \times SOD}{BW \times DPY}$$

Where:

EXP_{SGAO}	=	exposure from incidental ingestion of outside soil during summer (µg/kg/day)
AO	=	amount of dust ingested (g/day)
SL	=	concentration of chemical in soil (µg/g)
RF_{oral}	=	relative oral bioavailability (1; unitless)
SOD	=	total number of days spent on the site during the summer (days/year)
BW	=	receptor body weight (kg)
DPY	=	averaging time (365 days)

$$EXP_{SGAO} = 8E\text{-}05 = \frac{0.02 \times 1 \times 1 \times 106.46}{70.7 \times 365}$$

Incidental Indoor Dust Ingestion during Summer Months

Contribution from Indoor Dust:

$$EXP_{SGAI} = \frac{AO \times SL \times FR_{out} \times RF_{oral} \times SOD}{BW \times DPY}$$

Where:

EXP_{SGAI}	=	exposure from incidental ingestion of indoor dust during summer (µg/kg/day)
AO	=	amount of soil/dust ingested (g/day)
SL	=	concentration of chemical in soil (µg/g)
RF_{oral}	=	relative oral bioavailability (1; unitless)
FR_{out}	=	fraction of dust originating from outdoor soil sources (Assumed 100%)
SOD	=	total number of days spent on the site during the summer (days/year)
BW	=	receptor body weight (kg)
DPY	=	averaging time (365 days)

$$EXP_{SGAI} = 8E\text{-}05 = \frac{0.02 \times 1 \times 100\% \times 100\% \times 106.46}{70.9 \times 365}$$

Incidental Outdoor Soil Ingestion during Winter Months

Contribution from Outside Soil:

$$EXP_{WGAO} = \frac{AO \times SL \times WDF \times F_{oral} \times WOD}{BW \times DPY}$$

Where:

EXP_{WGAO}	=	exposure from incidental ingestion soil in winter (µg/kg/day)
AO	=	amount of dust ingested (g/day)
SL	=	concentration of chemical in soil (µg/g)
RF_{oral}	=	relative oral bioavailability (1; unitless)
WOD	=	total number of days spent on the site during the winter (days/year)
WDF	=	winter soil/dust covering factor (0.10)
BW	=	receptor body weight (kg)
DPY	=	averaging time (365 days)

$$EXP_{WGAO} = 6E\text{-}06 = \frac{0.02 \times 1 \times 0.10 \times 100\% \times 76.04}{70.7 \times 365}$$

Incidental Indoor Dust Ingestion during Winter Months

Contribution from Indoor Dust:

$$EXP_{WGAI} = \frac{AO \times SL \times WDF \times RF_{oral} \times WOD}{BW \times DPY}$$

Where:

EXP_{WGAI}	=	exposure from incidental ingestion of indoor dust during winter (µg/kg/day)
AO	=	amount of soil/dust ingested (g/day)
SL	=	concentration of chemical in dust (µg/g)
RF_{oral}	=	relative oral bioavailability (1; unitless)
WOD	=	total number of days spent on the site (indoors and outdoors) during the winter months (days/year)
WDF	=	winter dust covering factor (10%)
BW	=	receptor body weight (kg)
DPY	=	averaging time (365 days)

$$EXP_{WGAI} = 6E\text{-}06 = \frac{0.02 \times 1 \times 10\% \times 100\% \times 76.04}{70.7 \times 365}$$

Total Exposure via Incidental Ingestion:

$$EXP_{ING} = EXP_{SGAO} + EXP_{WGAO} + EXP_{SGAI} + EXP_{WGAI}$$

Where:

EXP_{ING}	=	total oral exposure from incidental ingestion of indoor soil/dust µg/kg/day)
EXP_{SGAO}	=	oral exposure from incidental ingestion of summer outside dust/soil (µg/kg/day)
EXP_{WGAO}	=	oral exposure from incidental ingestion of outside dust/soil in winter (µg/kg/day)
EXP_{SGAI}	=	oral exposure from incidental ingestion of inside dust during the summer (µg/kg/day)
EXP_{WGAI}	=	oral exposure from incidental ingestion of inside dust during winter (µg/kg/day)

$$EXP_{ING} = 1.7E\text{-}04 = 8E\text{-}05 + 8E\text{-}05 + 6E\text{-}06 + 6E\text{-}06$$

C4.2.3 Dermal Contact with Soil/Dust

Dermal Exposure from Soil/Dust on Outdoor Summer Days

Contribution from Outside Soil/Dust:

$$EXP_{SDAO} = \frac{\left[\left(AS_s \times DAF_B\right) + \left(AH \times DAF_H\right)\right] \times SL \times AF_{Dermal} \times SOD}{BW \times DPY}$$

Where:

EXP_{SDAO}	=	dermal exposure to chemical from contact with outside soil/dust in summer (µg/kg/day)
AS_s	=	area of exposed skin when outside (m^2)
DAF_B	=	soil/dust adherence factor (g/m^2)
AH	=	area of exposed hands (m^2)
DAF_H	=	soil adherence factor hands only (g/m^2/event)
SL	=	concentration of chemical in soil (µg/g)
AF_{Dermal}	=	relative dermal bioavailability (unitless)
SOD	=	number of summer days spent outdoors (days/year)
BW	=	receptor body weight (kg)
DPY	=	days per year (365 days/year)

$$EXP_{SDAO} = 5E\text{-}04 = \frac{[((0.419+0.083)\times 0.1)+(0.083\times 1)]\times 1\times 100\%\times 106.46}{70.7\times 365}$$

Contributions from Indoor Soil/Dust:

$$EXP_{SDPI} = \frac{[(AS_s \times DAF_B)+(AH \times DAF_H)]\times SL\times 0.7\times AF_{Dermal}\times SID}{BW\times DPY}$$

Where:

EXP_{SDPI}	=	dermal exposure to chemical from contact with indoor soil/dust in summer (µg/kg/day)
AS_s	=	area of exposed skin when outside (m^2)
DAF_B	=	soil/dust adherence factor (g/m^2)
AH	=	area of exposed hands (m^2)
DAF_H	=	soil adherence factor hands only (g/m^2/event)
SL	=	concentration of chemical in soil (µg/g)
AF_{Dermal}	=	relative dermal bioavailability (unitless)
SID	=	number of days spent indoors on site (days/year)
BW	=	receptor body weight (kg)
DPY	=	days per year (365 days/year)
0.70	=	fraction of dust originating from outdoor soil sources (U.S. EPA 1994a)

$$EXP_{SDPI} = 5E\text{-}04 = \frac{[((0.419+0.083)\times 0.1)+(0.083\times 1)]\times 1\times 100\%\times 100\%\times 106.46}{70.7\times 365}$$

Dermal Exposure from Soil/Dust on Outdoor Winter Days

Contribution from Outside Soil/Dust:

$$EXP_{WDAO} = \frac{[(AS_w \times DAF_B)+(AH \times DAF_H)]\times SL\times PWS\times AF_{Dermal}\times WOD}{BW\times DPY}$$

Where:

EXP_{WDAO}	=	dermal exposure to chemical from contact with outside soil/dust in winter (µg/kg/day)
AS_w	=	area of exposed skin when indoors (m^2)
DAF_B	=	soil/dust adherence factor (g/m^2)
AH	=	area of exposed hands (m^2)
DAF_H	=	soil adherence factor hands only (g/m^2/event)
SL	=	concentration of chemical in soil (µg/g)
PWS	=	percentage of winter soil available (10%)

AF_{Dermal} = relative dermal bioavailability (unitless)
WOD = number of winter days spent outdoors (days/year)
BW = receptor body weight (kg)
DPY = days per year (365 days/year)

$$EXP_{WDAO} = 2E\text{-}05 = \frac{\left[\left((0.168-0.083)\times 0.1\right)+\left(0.083\times 1\right)\right]\times 1\times 10\%\times 50\%\times 76.04}{70.7\times 365}$$

Contribution from Indoor Soil/Dust:

$$EXP_{WDPI} = \frac{\left[\left(AS_w \times DAF_B\right)+\left(AH \times DAF_H\right)\right]\times SL \times PWS \times 0.7 \times AF_{Dermal} \times WID}{BW \times DPY}$$

Where:

EXP_{WDPI} = dermal exposure to chemical from contact with indoor soil/dust in winter (µg/kg/day)
AS_w = area of exposed skin when indoors (m^2)
DAF_B = soil/dust adherence factor (g/m^2)
AH = area of exposed hands (m^2)
DAF_H = soil adherence factor hands only (g/m^2 event)
SL = concentration of chemical in soil (µg/g)
PWS = percentage of winter soil available (10%)
0.70 = fraction of dust originating from outdoor soil sources (U.S. EPA 1994a)
AF_{dermal} = fraction of chemical absorbed by receptor by dermal contact with soil/dust (unitless)
WID = number of days spent indoors on site (days/year)
BW = receptor body weight (kg)
DPY = days per year (365 days/year)

$$EXP_{WDPI} = 4E\text{-}05 = \frac{\left[\left((0.168+0.083)\times 0.1\right)+\left(0.083\times 1\right)\right]\times 1\times 0.10\times 1\times 1\times 76.04}{70.7\times 365}$$

Total Exposure (dermal)

$$EXP_{DERM} = EXP_{SDAO} + EXP_{SDPI} + EXP_{WDAO} + EXP_{WDPI}$$

Where:

EXP_{DERM} = total dermal exposure to chemical from contact with outside/dust (µg/kg/day)
EXP_{SDAO} = dermal exposure to chemical from contact with summer outside soil/dust (µg/kg/day)
EXP_{SDPI} = dermal exposure to chemical from contact with summer indoor soil/dust (µg/kg/day)

EXP_{WDAO} = dermal exposure to chemical from contact with winter outside soil/dust (µg/kg/day)

EXP_{WDPI} = dermal exposure to chemical from contact with winter indoor soil/dust (µg/kg/day)

EXP_{DERM} =1E-03 = 5E-04 + 5E-04 +2E-05 + 4E-05

C5.0 RISK CHARACTERIZATION

C5.1 Human Risk Characterization

Total exposure was calculated by summing the individual exposures from each media (air, soil, game and vegetation) for all relevant exposure pathways on a chemical and receptor basis. Exposure ratios (ERs) for threshold effect chemicals and ERs for carcinogens (representing incremental lifetime cancer risks (ILCRs) were estimated using the equations provided below and the calculated exposure estimates.

Both non-cancer and cancer risks were estimated and presented for appropriate oral, dermal and inhalation exposures.

C5.2 Calculating Risks for Non-Carcinogens

Oral risks were estimated based on the following equation.

$$ER = \frac{E_{oral} \times (Adjusted\ by\ relative\ Bioavailability)}{EL_{ORAL}}$$

Where:

ER = exposure ratio (unitless)

E_{Oral} = total daily dermal and oral exposure from all pathways (µg/kg/day)

EL_{Oral} = chemical-specific oral exposure limit (µg/kg/day)

$$ER_{oral} = 1.3E\text{-}02 = \frac{0.046 \times 100\%}{3.5}$$

Inhalation risks were calculated based on the following equation.

$$ER = \frac{EI_{Inhalation} \times (Adjusted\ by\ relative\ Bioavailability)}{EL_{Inhalation}}$$

Where:

ER = exposure ratio (unitless)

$EI_{Inhalation}$ = total daily inhalation exposure from all pathways (µg/kg/day)

$EL_{Inhalation}$ = chemical-specific inhalation exposure limit (µg/kg/day)

$$ER_{inh} = 4.5E\text{-}03 = \frac{5\times10^{-4}\times100\%}{0.11}$$

Dermal risks were estimated based on the following equation.

$$ER = \frac{E_{DERMAL}\times(RAF)}{EL_{ORAL}}$$

Where:

ER = exposure ratio (unitless)

E_{Dermal} = total daily dermal exposure from all pathways (µg/kg/day)

RAF = relative absorption factor (0.01 / 0.5 = 0.02 or 2%)

EL_{Oral} = chemical-specific oral exposure limit (µg/kg/day)

$$ER_{dermal} = 6E\text{-}06 = \frac{1\times10^{-3}\times2\%}{3.5}$$

Total exposure ratio values for all assessed pathways were calculated based on the following equation.

$$ER_{tot} = ER_{oral} + ER_{der} + ER_{inh}$$

$$ER_{tot} = 1.8E\text{-}02 = 1.3E\text{-}02 + 6E\text{-}06 + 4.5E\text{-}03$$

Calculating Risks for Carcinogens

Carcinogenic risks from oral and dermal exposures were calculated based on the following equation.

$$ILCR = EXP_{Oral+Dermal}\times AMT\times q_1^*$$

Where:

ILCR = incremental lifetime cancer risk

$EXP_{Oral+Dermal}$ = total daily exposure *via* oral and dermal pathways (µg/kg/day)

q_1^* = chemical-specific cancer slope factor for oral (µg/kg bw/day)$^{-1}$

AMT = receptor specific amortization factor (years exposed / life expectancy (80 years)

Carcinogenic risks from inhalation exposures were calculated based on the following equation.

$$ILCR = EXP_{inhal} \times AMT \times q_1^*$$

Where:

ILCR = incremental lifetime cancer risk

EXP_{inhal} = total daily exposure *via* inhalation (µg/kg/day)

q_1^* = chemical-specific cancer slope factor for inhalation (µg/kg bw/day)$^{-1}$

AMT = receptor specific amortization factor (years exposed / life expectancy (70 years)

C6.0 MODIFICATIONS OF EXPOSURE ESTIMATES BASED ON RELATIVE BIOAVAILABILITY

One of the most important factors in determining exposure of target tissues to chemicals is bioavailability, or the proportion of a chemical dose entering the blood stream (*i.e.*, absorbed dose) following administration *via* a particular route (*i.e.*, oral, inhalation or dermal). Systemic absorption of chemicals can differ according to whether the dose was received *via* the dermal, oral or the inhalation route. Also, the systemic absorption will differ depending on whether the exposure occurs in water, in soil, in food, *etc*.

It is inappropriate to convert exposure estimates to absorbed doses if toxicity values (from recognized agencies) are based on administered doses. However, if an exposure estimate is adjusted for bioavailability and is expressed as an absorbed dose, then it must be compared to an exposure limit that is based on an absorbed dose, not administered dose. Since most exposure limits are based on administered doses, it may not always be appropriate to consider absolute bioavailability (fraction or percentage of an external dose which reaches the systemic circulation) during the assessment of exposure. Therefore relative bioavailability can be determined by comparing the extent of absorption among several routes of exposure, forms of the same chemical, or exposure medium (food, soil, or water).

As a specific example, it is often necessary to consider route-to-route extrapolation when an exposure limit is not available for the exposure route of concern and no other data (such as pharmacokinetics) are available. It is common to assess the risks posed by dermal absorption of a chemical based on the exposure limit established for oral exposure. The systemic dose *via* dermal absorption is scaled to the 'equivalent' oral dose by correcting for the bioavailability of dermally-applied chemical relative to an orally-administered dose.

Toxicity information used to derive exposure limits is usually based on the administered dose, the absorbed dose or the internal dose. Incorporating bioavailability is dependant on which form the chemical was introduced to the test organism or toxicity study. For the most part, toxicity studies are based on the chemical given orally in food or water. In addition, these studies will use a form of chemical that is highly bioavailable to promote the most efficient toxic effect to the test organism at a given concentration. For example, in studies involving metal toxicity, the compound is often administered as a very soluble salt in water or food. Differences in the adsorption of chemicals between laboratory organisms and wildlife as well as between different mediums of exposure will invariably exist. The relative absorption factor (RAF) is the variable used to incorporate bioavailability information to exposure assessment (Menzie *et al*. 2000).

The RAF is used to adjust the absorption of a chemical from an exposure medium to that of the absorption of the chemical used in the toxicity study. The following equation was used to calculate the RAF:

$$RAF = \frac{BA_M}{BA_{EL}}$$

Where:

RAF = relative adsorption factor (unitless)
BAM = absorption of the chemical form in the exposure medium (%)
BAEL = absorption of the chemical form in the study medium (%)

An RAF can be less than or greater than one. An RAF of one does not indicate that the bioavailability is 100%, but the estimated bioavailability for the chemical in the exposure medium is the same as that used in the toxicity study for developing the toxicity reference value (TRV). In circumstances where the bioavailability is unknown for a particular medium, a risk assessment will default to a RAF of one. In this case, there is no adjustment of the exposure route relative to the toxicity study, a conservative assumption. Table C-6 provides the bioavailability adjustments that were applied in the HHRA.

Table C-6 Bioavailability (BA) adjustments (%)

Chemical	Type	Inhalation (BA)	Oral (BA)	Dermal (BA)
PAHs				
Anthracene	Route	100	31	13
	Study	100	31	13
Benz(a)anthracene	Route	100	31	13
	Study	100	31	13
Benzo(a)pyrene	Route	100	31	13
	Study	100	31	13
Benzo(e)pyrene	Route	100	31	13

Chemical	Type	Inhalation (BA)	Oral (BA)	Dermal (BA)
	Study	100	31	13
Benzo(b)fluoranthene	Route	100	31	13
	Study	100	31	13
Benzo(g,h,i)fluoranthene	Route	100	31	13
	Study	100	31	13
Benzo(g,h,i)perylene	Route	100	31	13
	Study	100	31	13
Benzo(k)fluoranthene	Route	100	31	13
	Study	100	31	13
Chrysene	Route	100	31	13
	Study	100	31	13
Dibenz(a,h)anthracene	Route	100	31	13
	Study	100	31	13
Fluoranthene	Route	100	31	13
	Study	100	31	13
Indeno(1,2,3-cd)pyrene	Route	100	31	13
	Study	100	31	13
Phenanthrene	Route	100	31	13
	Study	100	31	13
Pyrene	Route	100	31	13
	Study	100	31	13
Metals				
Aluminium	Route	100	10	0.1
	Study	100	10	10
Antimony	Route	100	2	0.1
	Study	100	2	2
Arsenic	Route	100	41	3
	Study	100	41	41
Barium	Route	100	7	0.1
	Study	100	7	7
Cadmium	Route	100	1	0.1
	Study	100	1	1
Chromium (Total)	Route	100	0.5	0.1
	Study	100	0.5	0.5
Chromium VI	Route	100	2	0.1
	Study	100	2	2
Copper	Route	100	79	3
	Study	100	79	79
Lead	Route	100	50	1
	Study	100	50	50
Manganese	Route	100	4	0.1
	Study	100	4	4
Mercury	Route	100	7	0.1

Chemical	Type	Inhalation (BA)	Oral (BA)	Dermal (BA)
	Study	100	7	7
Molybdenum	Route	100	38	0.1
	Study	100	38	38
Nickel	Route	100	27	0.1
	Study	100	27	27
Selenium	Route	100	9	0.06
	Study	100	9	9
Silver	Route	100	18	0.1
	Study	100	18	18
Total cyanide	Route	100	100	100
	Study	100	100	100
Zinc	Route	100	20	0.1
	Study	100	20	20

C7.0 CANCER RISKS FOR RECEPTORS EXPOSED TO CHEMICALS FROM THE SITE FOR THEIR ENTIRE LIFETIME

It should be noted that for chemicals that act as direct, genotoxic carcinogens (*i.e.*, directly induce self-propagated lesions), the dose of the chemicals associated with a specified level of risk (one in a 100,000 for this assessment) of the lifetime probability of cancer (*i.e.*, expressed as the RsD) increases with the duration of exposure. The methodology used in estimating the RsD for such chemicals assumes that the exposure occurs over the lifetime of a human receptor (*i.e.*, 70 years for typical humans), hence each life stage exposure estimate was adjusted by the appropriate amortization factor.

The level of risk for the composite receptor was calculated by adding the adjusted exposure ratio (ER) values calculated for each individual life stage (adjusted for duration of exposure) in order to estimate the lifetime cancer risk. The compilation of all five individual life stages (infant, 0.5/80; toddler, 4.5/80; child, 7/80; youth, 8/80; adult, 60/80) results in a risk estimate for the composite or lifetime (80/80) receptor.

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Appendix D
Terrestrial Ecological Risk Assessment (TERA) Exposure Model for High Lake Mine

Exposure and Meat Concentrations

Table D-1 Summary of Exposure Point Concentrations Used in HHRA and TERA

	Soil [mg/kg]		Soil Criteria [mg/kg]		Plant [mg/kg ww]		Prey [mg/kg ww]		Lichen [mg/kg ww]		Water [mg/L]		Whole Fish [mg/kg ww]		Fish Muscle [mg/kg ww]		Invertebrate [mg/kg ww]	
Chemical	Baseline	Project	Plant	Invertebrate	Baseline	Project	Baseline	Project	Baseline	Project	Baseline	Project	Baseline	Project	Baseline	Project	Baseline	Project
Acenaphthene	0.00E+00	4.35E-08	NA	NA	0.00E+00	5.13E-08	0.00E+00	1.53E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.29E-09
Acenaphthylene	5.80E-01	4.69E-09	NA	NA	7.60E-02	1.78E-08	2.04E-01	1.65E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-02	5.70E-10
Aluminum	3.19E+04	0.00E+00	NA	NA	2.35E+01	0.00E+00	1.05E+01	0.00E+00	4.27E+02	0.00E+00	2.26E-02	4.74E-06	3.74E+01	7.84E-03	7.84E+00	1.64E-03	0.00E+00	0.00E+00
Anthracene	0.00E+00	1.02E-06	NA	NA	0.00E+00	3.52E-07	0.00E+00	3.59E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-07
Antimony	2.05E-01	0.00E+00	NA	7.80E+01	2.50E-02	0.00E+00	1.90E-02	0.00E+00	2.25E-02	0.00E+00	5.00E-05	4.62E-04	1.22E-02	1.13E-01	1.94E-02	1.79E-01	0.00E+00	0.00E+00
Arsenic	1.99E+01	7.79E-03	1.80E+01	NA	4.12E-02	3.76E-03	2.87E-02	1.12E-05	9.80E-01	3.83E-04	1.60E-04	8.99E-06	1.46E-01	8.20E-03	2.05E-02	1.15E-03	5.78E-01	2.27E-03
Barium	1.12E+02	0.00E+00	NA	3.30E+02	6.70E+00	0.00E+00	1.11E+00	0.00E+00	1.48E+01	0.00E+00	0.00E+00	5.14E-04	0.00E+00	7.54E-02	0.00E+00	7.49E-02	2.86E+00	0.00E+00
Benz(a)anthracene	8.75E-03	3.49E-05	NA	NA	1.15E-03	1.37E-04	3.08E-03	1.23E-05	4.50E-03	1.80E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.56E-04	1.82E-06
Benzo(a)pyrene	8.75E-03	4.10E-10	NA	NA	1.15E-03	5.38E-05	3.08E-03	1.44E-10	4.50E-03	2.11E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-03	4.98E-11
Benzo(b)fluoranthene	8.75E-03	1.35E-09	NA	NA	1.15E-03	7.09E-06	3.08E-03	4.74E-10	4.50E-03	6.92E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-03	1.64E-10
Benzo(e)pyrene	0.00E+00	4.64E-06	NA	NA	0.00E+00	3.09E-05	0.00E+00	1.63E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.64E-07
Benzo(g,h,i)fluoranthene	0.00E+00	5.74E-15	NA	NA	0.00E+00	3.93E-09	0.00E+00	2.02E-15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.98E-16
Benzo(g,h,i)perylene	0.00E+00	1.54E-09	NA	NA	0.00E+00	1.06E-03	0.00E+00	5.43E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-10
Benzo(k)fluoranthene	8.75E-03	3.52E-10	NA	NA	1.15E-03	5.69E-05	3.08E-03	1.24E-10	4.50E-03	1.81E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-03	4.90E-11
Cadmium	9.00E-01	2.25E-02	3.20E+01	1.40E+02	1.16E-02	1.11E-02	1.93E-02	4.83E-04	2.98E-01	7.46E-03	7.40E-05	7.83E-06	1.05E+00	1.11E-01	1.69E-02	1.79E-03	2.21E+00	1.18E-01
Chromium	5.24E+01	8.46E-02	NA	NA	1.81E+00	4.36E-02	2.18E-01	3.52E-04	3.49E+00	5.64E-03	2.50E-04	1.13E-04	1.25E-01	5.66E-02	1.00E-01	4.53E-02	4.65E+00	7.51E-03
Chromium VI	5.24E+00	8.46E-03	NA	NA	1.81E-01	4.36E-03	2.18E-02	3.52E-05	3.49E-01	5.64E-04	2.50E-05	1.13E-05	1.25E-02	5.66E-03	1.00E-02	4.53E-03	1.67E+00	2.70E-03
Chrysene	0.00E+00	9.70E-10	NA	NA	0.00E+00	5.36E-05	0.00E+00	3.41E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.74E-11
Copper	1.10E+02	3.36E+00	NA	NA	1.92E+00	1.67E+00	1.40E+00	4.30E-02	6.21E+00	1.90E-01	2.10E-03	2.56E-06	2.14E+01	2.60E-02	4.12E-01	5.01E-04	5.35E+00	2.13E+00
Dibenzo(a,h)anthracene	8.75E-03	1.47E-09	NA	NA	1.15E-03	2.35E-03	3.08E-03	5.16E-10	4.50E-03	7.54E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-03	1.78E-10
Fluoranthene	0.00E+00	4.99E-10	NA	NA	0.00E+00	2.16E-05	0.00E+00	1.76E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.07E-11
Fluorene	0.00E+00	8.78E-07	NA	NA	0.00E+00	1.50E-06	0.00E+00	3.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-07
Indeno(1,2,3-cd)pyrene	8.75E-03	2.26E-09	NA	NA	1.15E-03	7.95E-05	3.08E-03	7.97E-10	4.50E-03	1.16E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-03	3.15E-10
Lead	1.60E+01	1.10E-01	1.20E+02	1.70E+03	6.24E-02	5.36E-02	7.15E-02	4.95E-04	1.82E+00	1.26E-02	5.00E-05	6.21E-08	2.59E-01	3.21E-04	4.78E-01	5.94E-04	2.18E+00	3.94E-02
Manganese	5.59E+03	3.05E-01	NA	NA	1.45E+02	1.55E-01	2.79E+00	1.52E-04	2.14E+02	1.17E-02	0.00E+00	5.68E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.64E+01	5.75E-02
Mercury	1.11E-01	8.30E-04	NA	NA	7.91E-03	4.59E-04	1.52E-02	1.13E-04	6.48E-02	4.85E-04	2.50E-05	0.00E+00	2.70E-02	0.00E+00	2.82E-02	0.00E+00	1.13E-01	6.34E-02
Mercury Methyl	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E-05	0.00E+00	5.12E-01	0.00E+00	5.36E-01	0.00E+00	0.00E+00	0.00E+00
Molybdenum	2.05E+00	0.00E+00	NA	NA	4.62E-01	0.00E+00	5.25E-02	0.00E+00	3.65E-02	0.00E+00	5.00E-05	9.66E-05	1.53E-01	2.97E-01	5.00E-03	9.66E-03	6.03E-01	0.00E+00
Naphthalene	1.00E-02	8.93E-08	NA	NA	1.15E-03	1.27E-07	3.20E-03	2.86E-08	4.50E-03	4.02E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-03	1.09E-08
Nickel	3.53E+01	4.43E-02	3.80E+01	2.80E+02	1.05E+00	2.27E-02	2.71E-01	3.40E-04	6.15E+00	7.74E-03	1.06E-03	0.00E+00	2.28E-01	0.00E+00	9.96E-02	0.00E+00	1.22E+00	1.54E-03
Phenanthrene	3.25E-02	2.11E-09	NA	NA	1.12E-03	1.49E-05	3.22E-03	2.09E-10	4.50E-03	2.93E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.95E-03	2.57E-10
Pyrene	8.75E-03	6.09E-10	NA	NA	1.15E-03	1.74E-05	3.08E-03	2.14E-10	4.50E-03	3.13E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-03	7.41E-11
Selenium	7.20E-01	4.48E-02	NA	NA	2.32E-02	2.30E-02	7.14E-02	4.45E-03	1.17E-01	7.31E-03	5.00E-04	1.59E-04	1.98E+00	6.29E-01	7.70E-01	2.44E-01	2.11E-01	2.76E-02
Silver	5.00E-01	0.00E+00	5.60E+02	NA	1.15E-02	0.00E+00	4.96E-02	0.00E+00	4.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.56E-01	0.00E+00
Total Cyanide	0.00E+00	0.00E+00	NA	NA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.88E-05	0.00E+00	6.50E-05	0.00E+00	6.45E-05	0.00E+00	0.00E+00
Zinc	1.87E+02	4.87E+00	NA	NA	1.12E+01	2.64E+00	8.38E+00	2.18E-01	5.92E+01	1.54E+00	2.05E-02	2.44E-06	4.93E+01	5.86E-03	2.38E+01	2.83E-03	1.38E+02	4.17E+01

Apportioned 5% inorganic and 95% organic mercury

Soil criteria for plants and invertebrates derived from US EPA Eco-SSLs

Table D-2 Summary of Risk Quotient (RQ) Values

	Baseline							
Chemical	Arctic_hare	Caribou	Fox	Peregrine_falcon	Ptarmigan	Shrew	Vole	Wolverine
Acenaphthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aluminum	1.6E-01	2.5E-01	1.2E-01	2.4E-02	2.0E-01	3.3E-01	9.4E-01	7.3E-02
Anthracene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Antimony	6.4E-02	1.4E-02	2.7E-02	0.0E+00	0.0E+00	1.6E-01	3.8E-01	3.7E-02
Arsenic	4.9E-02	1.6E-02	2.1E-02	2.9E-03	9.2E-02	4.2E-01	3.2E-01	2.1E-02
Barium	2.2E-02	6.4E-03	4.7E-03	1.2E-02	1.4E-01	7.2E-02	1.3E-01	5.1E-03
Benz(a)anthracene	1.7E-03	7.3E-04	2.1E-03	7.0E-01	4.7E-01	9.7E-03	1.1E-02	2.9E-03
Benzo(a)pyrene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Benzo(b)fluoranthene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Benzo(e)pyrene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(g,h,i)fluoranthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(g,h,i)perylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Benzo(k)fluoranthene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Cadmium	4.7E-03	4.6E-03	2.1E-02	3.0E-03	3.5E-02	**1.4E+00**	9.5E-02	1.3E-02
Chromium	1.5E-01	3.8E-02	3.7E-02	1.9E-02	3.7E-01	**1.2E+00**	9.4E-01	3.5E-02
Chromium VI	6.3E-03	1.6E-03	2.4E-03	5.0E-03	1.1E-01	1.5E-01	4.5E-02	1.5E-03
Chrysene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Copper	4.2E-02	1.1E-02	2.6E-02	6.8E-03	3.3E-02	3.3E-01	2.7E-01	3.2E-02
Dibenzo(a,h)anthracene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Fluoranthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Fluorene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Indeno(1,2,3-cd)pyrene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Lead	9.5E-03	5.2E-03	6.5E-03	1.0E-02	1.4E-01	2.5E-01	7.0E-02	4.9E-03
Manganese	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury	1.3E-03	8.6E-04	4.3E-03	1.1E-03	2.0E-03	5.7E-02	1.1E-02	5.1E-03
Mercury Methyl	6.7E-05	4.9E-05	8.5E-02	2.4E-04	2.8E-04	1.3E-04	1.1E-04	1.1E-01
Molybdenum	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	1.3E-01	5.6E-02	4.3E-02	9.2E-03	1.1E-01	6.5E-01	8.0E-01	0.0E+00
Phenanthrene	2.2E-03	8.0E-04	2.5E-03	7.4E-01	7.0E-01	2.8E-02	1.5E-02	0.0E+00
Pyrene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	0.0E+00
Selenium	6.2E-03	2.5E-03	2.1E-02	3.3E-02	3.5E-02	1.6E-01	4.6E-02	0.0E+00
Silver	4.4E-04	1.4E-04	9.9E-04	5.6E-03	8.4E-03	5.4E-02	5.4E-03	0.0E+00
Total cyanide	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Zinc	1.8E-02	8.7E-03	1.6E-02	1.5E-02	6.0E-02	6.7E-01	1.4E-01	0.0E+00
Total PAH	1.4E-02	5.9E-03	1.8E-02	**5.7E+00**	**4.1E+00**	1.1E-01	9.2E-02	1.8E-02

Table D-2 Summary of Risk Quotient (RQ) Values

	Project							
Chemical	Arctic_hare	Caribou	Fox	Peregrine_falcon	Ptarmigan	Shrew	Vole	Wolverine
Acenaphthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aluminum	2.1E-08	1.5E-08	2.1E-06	2.9E-09	3.4E-09	4.2E-08	3.5E-08	2.7E-06
Anthracene	7.0E-07	1.1E-07	3.1E-07	0.0E+00	0.0E+00	2.6E-06	4.3E-06	4.5E-07
Antimony	6.7E-04	4.9E-04	1.0E-02	0.0E+00	0.0E+00	1.3E-03	1.1E-03	1.3E-02
Arsenic	6.5E-04	1.0E-04	1.3E-04	1.4E-06	6.4E-04	2.3E-03	3.9E-03	1.6E-04
Barium	8.5E-07	6.2E-07	8.2E-06	1.5E-06	1.8E-06	1.7E-06	1.4E-06	1.1E-05
Benz(a)anthracene	1.9E-04	3.3E-05	2.0E-05	2.8E-03	3.2E-02	3.3E-04	1.1E-03	2.7E-05
Benzo(a)pyrene	7.1E-05	1.2E-05	3.7E-06	3.3E-08	1.1E-02	1.1E-04	4.1E-04	4.9E-06
Benzo(b)fluoranthene	9.3E-06	1.6E-06	4.8E-07	1.1E-07	1.5E-03	1.4E-05	5.4E-05	6.5E-07
Benzo(e)pyrene	4.2E-05	6.9E-06	3.4E-06	3.7E-04	6.8E-03	7.1E-05	2.4E-04	4.7E-06
Benzo(g,h,i)fluoranthene	5.2E-09	8.6E-10	2.7E-10	4.6E-13	8.1E-07	7.9E-09	3.0E-08	3.6E-10
Benzo(g,h,i)perylene	1.4E-03	2.3E-04	7.2E-05	1.2E-07	2.2E-01	2.1E-03	8.1E-03	9.6E-05
Benzo(k)fluoranthene	7.5E-05	1.2E-05	3.9E-06	2.8E-08	1.2E-02	1.1E-04	4.4E-04	5.2E-06
Cadmium	2.6E-03	5.0E-04	1.7E-03	7.5E-05	4.1E-03	7.7E-02	1.9E-02	1.4E-03
Chromium	3.2E-03	5.3E-04	5.1E-04	3.3E-05	6.0E-03	7.9E-03	1.9E-02	6.6E-04
Chromium VI	1.4E-04	2.2E-05	2.3E-05	8.7E-06	1.6E-03	5.0E-04	8.2E-04	2.8E-05
Chrysene	7.1E-05	1.2E-05	3.7E-06	7.8E-08	1.1E-02	1.1E-04	4.1E-04	4.9E-06
Copper	2.5E-02	4.0E-03	3.8E-03	2.1E-04	1.4E-02	1.3E-01	1.5E-01	4.1E-03
Dibenzo(a,h)anthracene	3.1E-03	5.2E-04	1.6E-04	1.2E-07	4.9E-01	4.7E-03	1.8E-02	2.1E-04
Fluoranthene	2.8E-05	4.7E-06	1.5E-06	4.0E-08	4.5E-03	4.4E-05	1.7E-04	2.0E-06
Fluorene	2.2E-06	3.6E-07	3.5E-07	7.1E-05	3.8E-04	4.7E-06	1.3E-05	4.9E-07
Indeno(1,2,3-cd)pyrene	1.0E-04	1.7E-05	5.4E-06	1.8E-07	1.6E-02	1.6E-04	6.1E-04	7.3E-06
Lead	2.0E-03	3.4E-04	2.8E-04	6.9E-05	1.3E-02	8.1E-03	1.2E-02	3.3E-04
Manganese	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury	7.9E-05	1.7E-05	2.5E-04	8.0E-06	3.3E-04	3.0E-02	1.9E-03	2.2E-05
Mercury Methyl	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Molybdenum	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	2.4E-03	4.1E-04	3.0E-04	1.2E-05	1.3E-03	5.2E-03	1.4E-02	0.0E+00
Phenanthrene	2.0E-05	3.3E-06	1.0E-06	4.8E-08	3.1E-03	3.0E-05	1.1E-04	0.0E+00
Pyrene	2.3E-05	3.8E-06	1.2E-06	4.9E-08	3.6E-03	3.5E-05	1.3E-04	0.0E+00
Selenium	5.4E-03	9.4E-04	5.3E-03	2.1E-03	1.8E-02	2.9E-02	3.3E-02	0.0E+00
Silver	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total cyanide	3.2E-07	2.3E-07	3.3E-07	1.4E-04	1.6E-04	6.4E-07	5.3E-07	0.0E+00
Zinc	4.4E-03	8.4E-04	2.1E-03	3.8E-04	1.2E-02	2.0E-01	3.5E-02	0.0E+00
Total PAH	5.1E-03	8.6E-04	2.8E-04	3.3E-03	8.1E-01	7.9E-03	3.0E-02	3.7E-04

Table D-2 Summary of Risk Quotient (RQ) Values

	Baseline + Project							
Chemical	Arctic_hare	Caribou	Fox	Peregrine_falcon	Ptarmigan	Shrew	Vole	Wolverine
Acenaphthene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acenaphthylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Aluminum	1.6E-01	2.5E-01	1.2E-01	2.4E-02	2.0E-01	3.3E-01	9.4E-01	7.3E-02
Anthracene	7.0E-07	1.1E-07	3.1E-07	0.0E+00	0.0E+00	2.6E-06	4.3E-06	4.5E-07
Antimony	6.4E-02	1.5E-02	3.7E-02	0.0E+00	0.0E+00	1.6E-01	3.8E-01	5.1E-02
Arsenic	5.0E-02	1.6E-02	2.1E-02	2.9E-03	9.3E-02	4.3E-01	3.2E-01	2.1E-02
Barium	2.2E-02	6.4E-03	4.7E-03	1.2E-02	1.4E-01	7.2E-02	1.3E-01	5.1E-03
Benz(a)anthracene	1.9E-03	7.7E-04	2.2E-03	7.1E-01	5.0E-01	1.0E-02	1.2E-02	3.0E-03
Benzo(a)pyrene	1.8E-03	7.5E-04	2.2E-03	7.0E-01	4.9E-01	1.3E-02	1.1E-02	3.0E-03
Benzo(b)fluoranthene	1.7E-03	7.3E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	2.9E-03
Benzo(e)pyrene	4.2E-05	6.9E-06	3.4E-06	3.7E-04	6.8E-03	7.1E-05	2.4E-04	4.7E-06
Benzo(g,h,i)fluoranthene	5.2E-09	8.6E-10	2.7E-10	4.6E-13	8.1E-07	7.9E-09	3.0E-08	3.6E-10
Benzo(g,h,i)perylene	1.4E-03	2.3E-04	7.2E-05	1.2E-07	2.2E-01	2.1E-03	8.1E-03	9.6E-05
Benzo(k)fluoranthene	1.8E-03	7.5E-04	2.2E-03	7.0E-01	5.0E-01	1.3E-02	1.1E-02	3.0E-03
Cadmium	7.2E-03	5.1E-03	2.3E-02	3.1E-03	3.9E-02	**1.4E+00**	1.1E-01	1.4E-02
Chromium	1.5E-01	3.8E-02	3.8E-02	1.9E-02	3.7E-01	**1.3E+00**	9.6E-01	3.6E-02
Chromium VI	6.5E-03	1.6E-03	2.4E-03	5.0E-03	1.2E-01	1.5E-01	4.6E-02	1.5E-03
Chrysene	7.1E-05	1.2E-05	3.7E-06	7.8E-08	1.1E-02	1.1E-04	4.1E-04	4.9E-06
Copper	6.7E-02	1.5E-02	3.0E-02	7.0E-03	4.7E-02	4.7E-01	4.2E-01	3.6E-02
Dibenzo(a,h)anthracene	4.8E-03	1.2E-03	2.3E-03	7.0E-01	9.7E-01	1.7E-02	2.9E-02	3.2E-03
Fluoranthene	2.8E-05	4.7E-06	1.5E-06	4.0E-08	4.5E-03	4.4E-05	1.7E-04	2.0E-06
Fluorene	2.2E-06	3.6E-07	3.5E-07	7.1E-05	3.8E-04	4.7E-06	1.3E-05	4.9E-07
Indeno(1,2,3-cd)pyrene	1.8E-03	7.5E-04	2.2E-03	7.0E-01	5.0E-01	1.3E-02	1.2E-02	3.0E-03
Lead	1.2E-02	5.5E-03	6.8E-03	1.0E-02	1.6E-01	2.6E-01	8.3E-02	5.3E-03
Manganese	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Mercury	1.4E-03	8.7E-04	4.6E-03	1.1E-03	2.3E-03	8.7E-02	1.2E-02	5.1E-03
Mercury Methyl	6.7E-05	4.9E-05	8.5E-02	2.4E-04	2.8E-04	1.3E-04	1.1E-04	1.1E-01
Molybdenum	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Naphthalene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nickel	1.3E-01	5.7E-02	4.3E-02	9.3E-03	1.1E-01	6.6E-01	8.1E-01	0.0E+00
Phenanthrene	2.2E-03	8.0E-04	2.5E-03	7.4E-01	7.0E-01	2.8E-02	1.5E-02	0.0E+00
Pyrene	1.7E-03	7.4E-04	2.2E-03	7.0E-01	4.8E-01	1.3E-02	1.1E-02	0.0E+00
Selenium	1.2E-02	3.5E-03	2.6E-02	3.5E-02	5.3E-02	1.9E-01	7.8E-02	0.0E+00
Silver	4.4E-04	1.4E-04	9.9E-04	5.6E-03	8.4E-03	5.4E-02	5.4E-03	0.0E+00
Total cyanide	3.2E-07	2.3E-07	3.3E-07	1.4E-04	1.6E-04	6.4E-07	5.3E-07	0.0E+00
Zinc	2.3E-02	9.5E-03	1.8E-02	1.5E-02	7.2E-02	8.7E-01	1.8E-01	0.0E+00
Total PAH	1.9E-02	6.8E-03	1.8E-02	**5.7E+00**	**4.9E+00**	1.2E-01	1.2E-01	1.8E-02

Table D-3 Summary of Tissue Concentrations Used in the Human Health Risk Assessment Model [mg/kg ww]

Receptor	Chemical	Baseline	Project
Max of Game	Aluminum	4.86E+00	4.04E-07
Max of Game	Anthracene	0.00E+00	6.97E-08
Max of Game	Antimony	3.76E-03	3.94E-05
Max of Game	Arsenic	5.11E-02	6.74E-04
Max of Game	Barium	1.14E+00	4.38E-05
Max of Game	Benz(a)anthracene	1.71E-04	1.88E-05
Max of Game	Benzo(a)pyrene	1.71E-04	7.08E-06
Max of Game	Benzo(b)fluoranthene	1.71E-04	9.33E-07
Max of Game	Benzo(e)pyrene	0.00E+00	4.17E-06
Max of Game	Benzo(g,h,i)fluoranthene	0.00E+00	5.17E-10
Max of Game	Benzo(g,h,i)perylene	0.00E+00	1.39E-04
Max of Game	Benzo(k)fluoranthene	1.71E-04	7.49E-06
Max of Game	Cadmium	3.60E-03	1.98E-03
Max of Game	Chromium	3.58E-01	7.69E-03
Max of Game	Chromium VI	3.58E-02	7.69E-04
Max of Game	Chrysene	0.00E+00	7.05E-06
Max of Game	Copper	5.04E-01	2.97E-01
Max of Game	Dibenzo(a,h)anthracene	1.71E-04	3.10E-04
Max of Game	Fluoranthene	0.00E+00	2.84E-06
Max of Game	Indeno(1,2,3-cd)pyrene	1.71E-04	1.05E-05
Max of Game	Lead	4.48E-02	9.58E-03
Max of Game	Manganese	1.91E+01	2.74E-02
Max of Game	Mercury	1.30E-03	7.94E-05
Max of Game	Mercury Methyl	0.00E+00	0.00E+00
Max of Game	Molybdenum	6.55E-02	8.23E-06
Max of Game	Nickel	2.20E-01	4.00E-03
Max of Game	Benzo(a)pyrene	1.71E-04	7.08E-06
Max of Game	Phenanthrene	2.22E-04	1.96E-06
Max of Game	Pyrene	1.71E-04	2.29E-06
Max of Game	Selenium	4.74E-03	4.07E-03
Max of Game	Silver	2.66E-03	0.00E+00
Max of Game	Total Cyanide	0.00E+00	7.56E-06
Max of Game	Zinc	1.90E+00	4.59E-01
Arctic_hare	Acenaphthene	0.00E+00	7.75E-09
Arctic_hare	Acenaphthylene	1.13E-02	2.45E-09
Arctic_hare	Aluminum	3.09E+00	4.04E-07
Arctic_hare	Anthracene	0.00E+00	6.97E-08
Arctic_hare	Antimony	3.76E-03	3.94E-05
Arctic_hare	Arsenic	5.11E-02	6.74E-04
Arctic_hare	Barium	1.14E+00	4.38E-05
Arctic_hare	Benz(a)anthracene	1.71E-04	1.88E-05
Arctic_hare	Benzo(a)pyrene	1.71E-04	7.08E-06
Arctic_hare	Benzo(b)fluoranthene	1.71E-04	9.33E-07
Arctic_hare	Benzo(e)pyrene	0.00E+00	4.17E-06
Arctic_hare	Benzo(g,h,i)fluoranthene	0.00E+00	5.17E-10
Arctic_hare	Benzo(g,h,i)perylene	0.00E+00	1.39E-04
Arctic_hare	Benzo(k)fluoranthene	1.71E-04	7.49E-06
Arctic_hare	Cadmium	3.60E-03	1.98E-03
Arctic_hare	Chromium	3.58E-01	7.69E-03
Arctic_hare	Chromium VI	3.58E-02	7.69E-04
Arctic_hare	Chrysene	0.00E+00	7.05E-06
Arctic_hare	Copper	5.04E-01	2.97E-01
Arctic_hare	Dibenzo(a,h)anthracene	1.71E-04	3.10E-04
Arctic_hare	Fluoranthene	0.00E+00	2.84E-06
Arctic_hare	Fluorene	0.00E+00	2.18E-07
Arctic_hare	Indeno(1,2,3-cd)pyrene	1.71E-04	1.05E-05
Arctic_hare	Lead	4.48E-02	9.58E-03
Arctic_hare	Manganese	1.91E+01	2.74E-02
Arctic_hare	Mercury	1.30E-03	7.94E-05
Arctic_hare	Mercury Methyl	2.13E-06	0.00E+00
Arctic_hare	Molybdenum	6.55E-02	8.23E-06
Arctic_hare	Naphthalene	1.74E-04	1.87E-08
Arctic_hare	Nickel	2.20E-01	4.00E-03
Arctic_hare	Phenanthrene	2.22E-04	1.96E-06
Arctic_hare	Pyrene	1.71E-04	2.29E-06
Arctic_hare	Selenium	4.74E-03	4.07E-03

Table D-3 Summary of Tissue Concentrations Used in the Human Health Risk Assessment Model [mg/kg ww]

Receptor	Chemical	Baseline	Project
Arctic_hare	Silver	2.66E-03	0.00E+00
Arctic_hare	Total Cyanide	0.00E+00	7.56E-06
Arctic_hare	Zinc	1.90E+00	4.59E-01
Caribou	Acenaphthene	0.00E+00	1.25E-09
Caribou	Acenaphthylene	1.83E-03	4.04E-10
Caribou	Aluminum	4.86E+00	2.96E-07
Caribou	Anthracene	0.00E+00	1.06E-08
Caribou	Antimony	8.38E-04	2.89E-05
Caribou	Arsenic	1.65E-02	1.09E-04
Caribou	Barium	3.29E-01	3.21E-05
Caribou	Benz(a)anthracene	7.33E-05	3.28E-06
Caribou	Benzo(a)pyrene	7.33E-05	1.18E-06
Caribou	Benzo(b)fluoranthene	7.33E-05	1.56E-07
Caribou	Benzo(e)pyrene	0.00E+00	6.91E-07
Caribou	Benzo(g,h,i)fluoranthene	0.00E+00	8.63E-11
Caribou	Benzo(g,h,i)perylene	0.00E+00	2.32E-05
Caribou	Benzo(k)fluoranthene	7.33E-05	1.25E-06
Caribou	Cadmium	3.54E-03	3.84E-04
Caribou	Chromium	9.00E-02	1.26E-03
Caribou	Chromium VI	9.00E-03	1.26E-04
Caribou	Chrysene	0.00E+00	1.18E-06
Caribou	Copper	1.36E-01	4.82E-02
Caribou	Dibenzo(a,h)anthracene	7.33E-05	5.17E-05
Caribou	Fluoranthene	0.00E+00	4.73E-07
Caribou	Fluorene	0.00E+00	3.55E-08
Caribou	Indeno(1,2,3-cd)pyrene	7.33E-05	1.75E-06
Caribou	Lead	2.44E-02	1.62E-03
Caribou	Manganese	5.37E+00	4.39E-03
Caribou	Mercury	8.65E-04	1.74E-05
Caribou	Mercury Methyl	1.56E-06	0.00E+00
Caribou	Molybdenum	1.11E-02	6.03E-06
Caribou	Naphthalene	7.38E-05	3.44E-09
Caribou	Nickel	9.57E-02	7.02E-04
Caribou	Phenanthrene	7.96E-05	3.28E-07
Caribou	Pyrene	7.33E-05	3.82E-07
Caribou	Selenium	1.94E-03	7.17E-04
Caribou	Silver	8.51E-04	0.00E+00
Caribou	Total Cyanide	0.00E+00	5.55E-06
Caribou	Zinc	9.01E-01	8.74E-02
Fox	Acenaphthene	0.00E+00	1.58E-09
Fox	Acenaphthylene	1.33E-02	2.54E-10
Fox	Aluminum	2.33E+00	3.98E-05
Fox	Anthracene	0.00E+00	3.12E-08
Fox	Antimony	1.58E-03	6.05E-04
Fox	Arsenic	2.14E-02	1.30E-04
Fox	Barium	2.45E-01	4.23E-04
Fox	Benz(a)anthracene	2.13E-04	1.97E-06
Fox	Benzo(a)pyrene	2.16E-04	3.67E-07
Fox	Benzo(b)fluoranthene	2.16E-04	4.84E-08
Fox	Benzo(e)pyrene	0.00E+00	3.42E-07
Fox	Benzo(g,h,i)fluoranthene	0.00E+00	2.68E-11
Fox	Benzo(g,h,i)perylene	0.00E+00	7.20E-06
Fox	Benzo(k)fluoranthene	2.16E-04	3.88E-07
Fox	Cadmium	1.62E-02	1.27E-03
Fox	Chromium	8.95E-02	1.23E-03
Fox	Chromium VI	1.34E-02	1.30E-04
Fox	Chrysene	0.00E+00	3.66E-07
Fox	Copper	3.17E-01	4.52E-02
Fox	Dibenzo(a,h)anthracene	2.16E-04	1.61E-05
Fox	Fluoranthene	0.00E+00	1.47E-07
Fox	Fluorene	0.00E+00	3.50E-08
Fox	Indeno(1,2,3-cd)pyrene	2.16E-04	5.43E-07
Fox	Lead	3.05E-02	1.33E-03
Fox	Manganese	2.01E+00	3.38E-03
Fox	Mercury	4.36E-03	2.50E-04
Fox	Mercury Methyl	2.71E-03	0.00E+00

Table D-3 Summary of Tissue Concentrations Used in the Human Health Risk Assessment Model [mg/kg ww]

Receptor	Chemical	Baseline	Project
Fox	Molybdenum	1.08E-02	1.50E-03
Fox	Naphthalene	2.24E-04	3.34E-09
Fox	Nickel	7.23E-02	5.04E-04
Fox	Phenanthrene	2.51E-04	1.02E-07
Fox	Pyrene	2.16E-04	1.19E-07
Fox	Selenium	1.60E-02	4.02E-03
Fox	Silver	5.93E-03	0.00E+00
Fox	Total Cyanide	0.00E+00	7.99E-06
Fox	Zinc	1.65E+00	2.22E-01
Peregrine_falcon	Acenaphthene	0.00E+00	3.51E-09
Peregrine_falcon	Acenaphthylene	4.67E-02	3.78E-10
Peregrine_falcon	Aluminum	2.41E+00	2.89E-07
Peregrine_falcon	Anthracene	0.00E+00	8.22E-08
Peregrine_falcon	Antimony	4.36E-03	2.81E-05
Peregrine_falcon	Arsenic	6.57E-03	3.11E-06
Peregrine_falcon	Barium	2.54E-01	3.13E-05
Peregrine_falcon	Benz(a)anthracene	7.05E-04	2.81E-06
Peregrine_falcon	Benzo(a)pyrene	7.05E-04	3.30E-11
Peregrine_falcon	Benzo(b)fluoranthene	7.05E-04	1.08E-10
Peregrine_falcon	Benzo(e)pyrene	0.00E+00	3.74E-07
Peregrine_falcon	Benzo(g,h,i)fluoranthene	0.00E+00	4.63E-16
Peregrine_falcon	Benzo(g,h,i)perylene	0.00E+00	1.24E-10
Peregrine_falcon	Benzo(k)fluoranthene	7.05E-04	2.84E-11
Peregrine_falcon	Cadmium	4.42E-03	1.11E-04
Peregrine_falcon	Chromium	4.99E-02	8.74E-05
Peregrine_falcon	Chromium VI	4.99E-03	8.74E-06
Peregrine_falcon	Chrysene	0.00E+00	7.81E-11
Peregrine_falcon	Copper	3.21E-01	9.83E-03
Peregrine_falcon	Dibenzo(a,h)anthracene	7.05E-04	1.18E-10
Peregrine_falcon	Fluoranthene	0.00E+00	4.02E-11
Peregrine_falcon	Fluorene	0.00E+00	7.07E-08
Peregrine_falcon	Indeno(1,2,3-cd)pyrene	7.05E-04	1.82E-10
Peregrine_falcon	Lead	1.64E-02	1.13E-04
Peregrine_falcon	Manganese	6.39E-01	3.52E-05
Peregrine_falcon	Mercury	3.47E-03	2.60E-05
Peregrine_falcon	Mercury Methyl	1.52E-06	0.00E+00
Peregrine_falcon	Molybdenum	1.20E-02	5.88E-06
Peregrine_falcon	Naphthalene	7.32E-04	6.54E-09
Peregrine_falcon	Nickel	6.20E-02	7.79E-05
Peregrine_falcon	Phenanthrene	7.38E-04	4.79E-11
Peregrine_falcon	Pyrene	7.05E-04	4.91E-11
Peregrine_falcon	Selenium	1.64E-02	1.03E-03
Peregrine_falcon	Silver	1.13E-02	0.00E+00
Peregrine_falcon	Total Cyanide	0.00E+00	5.41E-06
Peregrine_falcon	Zinc	1.92E+00	5.00E-02
Ptarmigan	Acenaphthene	0.00E+00	1.41E-08
Ptarmigan	Acenaphthylene	2.12E-02	4.06E-09
Ptarmigan	Aluminum	2.01E+01	3.36E-07
Ptarmigan	Anthracene	0.00E+00	1.54E-07
Ptarmigan	Antimony	7.58E-03	3.27E-05
Ptarmigan	Arsenic	2.07E-01	1.43E-03
Ptarmigan	Barium	2.83E+00	3.64E-05
Ptarmigan	Benz(a)anthracene	4.73E-04	3.17E-05
Ptarmigan	Benzo(a)pyrene	4.81E-04	1.11E-05
Ptarmigan	Benzo(b)fluoranthene	4.81E-04	1.47E-06
Ptarmigan	Benzo(e)pyrene	0.00E+00	6.77E-06
Ptarmigan	Benzo(g,h,i)fluoranthene	0.00E+00	8.15E-10
Ptarmigan	Benzo(g,h,i)perylene	0.00E+00	2.19E-04
Ptarmigan	Benzo(k)fluoranthene	4.83E-04	1.18E-05
Ptarmigan	Cadmium	5.08E-02	5.96E-03
Ptarmigan	Chromium	9.72E-01	1.60E-02
Ptarmigan	Chromium VI	1.14E-01	1.62E-03
Ptarmigan	Chrysene	0.00E+00	1.11E-05
Ptarmigan	Copper	1.55E+00	6.45E-01
Ptarmigan	Dibenzo(a,h)anthracene	4.81E-04	4.87E-04
Ptarmigan	Fluoranthene	0.00E+00	4.46E-06

Table D-3 Summary of Tissue Concentrations Used in the Human Health Risk Assessment Model [mg/kg ww]

Receptor	Chemical	Baseline	Project
Ptarmigan	Fluorene	0.00E+00	3.82E-07
Ptarmigan	Indeno(1,2,3-cd)pyrene	4.83E-04	1.65E-05
Ptarmigan	Lead	2.33E-01	2.07E-02
Ptarmigan	Manganese	3.84E+01	5.71E-02
Ptarmigan	Mercury	6.39E-03	1.06E-03
Ptarmigan	Mercury Methyl	1.77E-06	0.00E+00
Ptarmigan	Molybdenum	1.21E-01	6.84E-06
Ptarmigan	Naphthalene	4.94E-04	3.48E-08
Ptarmigan	Nickel	7.30E-01	8.45E-03
Ptarmigan	Phenanthrene	7.02E-04	3.09E-06
Ptarmigan	Pyrene	4.81E-04	3.61E-06
Ptarmigan	Selenium	1.76E-02	8.92E-03
Ptarmigan	Silver	1.70E-02	0.00E+00
Ptarmigan	Total Cyanide	0.00E+00	6.29E-06
Ptarmigan	Zinc	7.81E+00	1.56E+00
Shrew	Acenaphthene	0.00E+00	1.85E-08
Shrew	Acenaphthylene	8.31E-02	4.47E-09
Shrew	Aluminum	6.28E+00	8.15E-07
Shrew	Anthracene	0.00E+00	2.62E-07
Shrew	Antimony	9.45E-03	7.95E-05
Shrew	Arsenic	4.41E-01	2.44E-03
Shrew	Barium	3.74E+00	8.84E-05
Shrew	Benz(a)anthracene	9.68E-04	3.30E-05
Shrew	Benzo(a)pyrene	1.25E-03	1.09E-05
Shrew	Benzo(b)fluoranthene	1.25E-03	1.43E-06
Shrew	Benzo(e)pyrene	0.00E+00	7.10E-06
Shrew	Benzo(g,h,i)fluoranthene	0.00E+00	7.94E-10
Shrew	Benzo(g,h,i)perylene	0.00E+00	2.13E-04
Shrew	Benzo(k)fluoranthene	1.33E-03	1.15E-05
Shrew	Cadmium	1.05E+00	5.95E-02
Shrew	Chromium	3.00E+00	1.90E-02
Shrew	Chromium VI	8.67E-01	2.82E-03
Shrew	Chrysene	0.00E+00	1.08E-05
Shrew	Copper	3.97E+00	1.61E+00
Shrew	Dibenzo(a,h)anthracene	1.25E-03	4.75E-04
Shrew	Fluoranthene	0.00E+00	4.35E-06
Shrew	Fluorene	0.00E+00	4.68E-07
Shrew	Indeno(1,2,3-cd)pyrene	1.33E-03	1.61E-05
Shrew	Lead	1.17E+00	3.81E-02
Shrew	Manganese	5.16E+01	8.22E-02
Shrew	Mercury	5.79E-02	3.00E-02
Shrew	Mercury Methyl	4.30E-06	0.00E+00
Shrew	Molybdenum	4.01E-01	1.66E-05
Shrew	Naphthalene	1.35E-03	4.18E-08
Shrew	Nickel	1.11E+00	8.81E-03
Shrew	Phenanthrene	2.82E-03	3.01E-06
Shrew	Pyrene	1.25E-03	3.51E-06
Shrew	Selenium	1.21E-01	2.19E-02
Shrew	Silver	3.23E-01	0.00E+00
Shrew	Total Cyanide	0.00E+00	1.53E-05
Shrew	Zinc	7.00E+01	2.06E+01
Vole	Acenaphthene	0.00E+00	4.61E-08
Vole	Acenaphthylene	7.30E-02	1.44E-08
Vole	Aluminum	1.82E+01	6.84E-07
Vole	Anthracene	0.00E+00	4.29E-07
Vole	Antimony	2.26E-02	6.67E-05
Vole	Arsenic	3.33E-01	4.06E-03
Vole	Barium	6.84E+00	7.43E-05
Vole	Benz(a)anthracene	1.09E-03	1.10E-04
Vole	Benzo(a)pyrene	1.10E-03	4.12E-05
Vole	Benzo(b)fluoranthene	1.10E-03	5.44E-06
Vole	Benzo(e)pyrene	0.00E+00	2.44E-05
Vole	Benzo(g,h,i)fluoranthene	0.00E+00	3.02E-09
Vole	Benzo(g,h,i)perylene	0.00E+00	8.09E-04
Vole	Benzo(k)fluoranthene	1.11E-03	4.36E-05
Vole	Cadmium	7.30E-02	1.45E-02

Table D-3 Summary of Tissue Concentrations Used in the Human Health Risk Assessment Model [mg/kg ww]

Receptor	Chemical	Baseline	Project
Vole	Chromium	2.25E+00	4.59E-02
Vole	Chromium VI	2.53E-01	4.63E-03
Vole	Chrysene	0.00E+00	4.11E-05
Vole	Copper	3.21E+00	1.82E+00
Vole	Dibenzo(a,h)anthracene	1.10E-03	1.80E-03
Vole	Fluoranthene	0.00E+00	1.65E-05
Vole	Fluorene	0.00E+00	1.29E-06
Vole	Indeno(1,2,3-cd)pyrene	1.11E-03	6.10E-05
Vole	Lead	3.30E-01	5.80E-02
Vole	Manganese	1.13E+02	1.64E-01
Vole	Mercury	1.06E-02	1.93E-03
Vole	Mercury Methyl	3.61E-06	0.00E+00
Vole	Molybdenum	3.99E-01	1.39E-05
Vole	Naphthalene	1.13E-03	1.11E-07
Vole	Nickel	1.35E+00	2.38E-02
Vole	Phenanthrene	1.49E-03	1.14E-05
Vole	Pyrene	1.10E-03	1.33E-05
Vole	Selenium	3.48E-02	2.49E-02
Vole	Silver	3.23E-02	0.00E+00
Vole	Total Cyanide	0.00E+00	1.28E-05
Vole	Zinc	1.46E+01	3.69E+00
Wolverine	Acenaphthene	0.00E+00	2.24E-09
Wolverine	Acenaphthylene	1.95E-02	3.53E-10
Wolverine	Aluminum	1.41E+00	5.29E-05
Wolverine	Anthracene	0.00E+00	4.47E-08
Wolverine	Antimony	2.20E-03	7.92E-04
Wolverine	Arsenic	2.20E-02	1.62E-04
Wolverine	Barium	2.62E-01	5.46E-04
Wolverine	Benz(a)anthracene	2.95E-04	2.67E-06
Wolverine	Benzo(a)pyrene	2.95E-04	4.90E-07
Wolverine	Benzo(b)fluoranthene	2.95E-04	6.47E-08
Wolverine	Benzo(e)pyrene	0.00E+00	4.70E-07
Wolverine	Benzo(g,h,i)fluoranthene	0.00E+00	3.59E-11
Wolverine	Benzo(g,h,i)perylene	0.00E+00	9.62E-06
Wolverine	Benzo(k)fluoranthene	2.95E-04	5.19E-07
Wolverine	Cadmium	9.69E-03	1.09E-03
Wolverine	Chromium	8.43E-02	1.58E-03
Wolverine	Chromium VI	8.43E-03	1.58E-04
Wolverine	Chrysene	0.00E+00	4.89E-07
Wolverine	Copper	3.86E-01	4.97E-02
Wolverine	Dibenzo(a,h)anthracene	2.95E-04	2.15E-05
Wolverine	Fluoranthene	0.00E+00	1.97E-07
Wolverine	Fluorene	0.00E+00	4.94E-08
Wolverine	Indeno(1,2,3-cd)pyrene	2.95E-04	7.25E-07
Wolverine	Lead	2.32E-02	1.54E-03
Wolverine	Manganese	1.58E+00	4.20E-03
Wolverine	Mercury	5.15E-03	2.19E-05
Wolverine	Mercury Methyl	3.62E-03	0.00E+00
Wolverine	Molybdenum	1.18E-02	1.99E-03
Wolverine	Naphthalene	3.06E-04	4.53E-09
Wolverine	Nickel	6.74E-02	6.39E-04
Wolverine	Phenanthrene	3.29E-04	1.36E-07
Wolverine	Pyrene	2.95E-04	1.59E-07
Wolverine	Selenium	2.06E-02	5.24E-03
Wolverine	Silver	5.00E-03	0.00E+00
Wolverine	Total Cyanide	0.00E+00	7.42E-06
Wolverine	Zinc	1.35E+00	8.78E-02

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

											Dietary Concentrations							EDI						
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg ww
Baseline	Max	Arctic_hare	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	1.33E-03	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-02	5.10E-02	1.38E-05
Baseline	Max	Arctic_hare	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	3.09E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-03	3.09E+00	1.39E+01	2.08E-02
Baseline	Max	Arctic_hare	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	4.70E-04	3.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-06	3.76E-03	1.69E-02	1.69E-05
Baseline	Max	Arctic_hare	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	4.56E-02	5.42E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-05	5.11E-02	2.30E-01	4.60E-04
Baseline	Max	Arctic_hare	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	2.57E-01	8.81E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E+00	5.12E+00	7.68E-04
Baseline	Max	Arctic_hare	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	3.07E-07
Baseline	Max	Arctic_hare	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	2.89E-07
Baseline	Max	Arctic_hare	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	2.78E-07
Baseline	Max	Arctic_hare	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	2.81E-07
Baseline	Max	Arctic_hare	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	2.06E-03	1.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.30E-06	3.60E-03	1.62E-02	1.94E-06
Baseline	Max	Arctic_hare	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	1.20E-01	2.38E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-05	3.58E-01	1.61E+00	8.86E-03
Baseline	Max	Arctic_hare	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	1.20E-02	2.38E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-06	3.58E-02	1.61E-01	8.86E-04
Baseline	Max	Arctic_hare	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	2.51E-01	2.52E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-04	5.04E-01	2.27E+00	2.27E-02
Baseline	Max	Arctic_hare	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	2.38E-07
Baseline	Max	Arctic_hare	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	2.26E-07
Baseline	Max	Arctic_hare	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	3.66E-02	8.21E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-06	4.48E-02	2.02E-01	6.05E-05
Baseline	Max	Arctic_hare	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	1.91E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E+01	8.60E+01	3.44E-02
Baseline	Max	Arctic_hare	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	2.55E-04	1.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-06	1.30E-03	5.84E-03	3.05E-05
Baseline	Max	Arctic_hare	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-06	2.13E-06	9.58E-06	5.00E-08
Baseline	Max	Arctic_hare	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	4.70E-03	6.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-06	6.55E-02	2.95E-01	1.77E-03
Baseline	Max	Arctic_hare	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	2.29E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E-04	7.84E-04	1.16E-07
Baseline	Max	Arctic_hare	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	8.08E-02	1.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.03E-05	2.20E-01	9.88E-01	5.93E-03
Baseline	Max	Arctic_hare	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	7.45E-05	1.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-04	9.99E-04	3.38E-07
Baseline	Max	Arctic_hare	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.01E-05	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-04	7.70E-04	2.96E-07
Baseline	Max	Arctic_hare	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	1.65E-03	3.05E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-05	4.74E-03	2.13E-02	4.84E-05
Baseline	Max	Arctic_hare	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	1.15E-03	1.51E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.66E-03	1.20E-02	3.59E-05
Baseline	Max	Arctic_hare	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Arctic_hare	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	4.29E-01	1.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03	1.90E+00	8.56E+00	7.70E-04
Baseline	Max	Caribou	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	1.65E-04	1.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-03	1.83E-01	4.98E-05
Baseline	Max	Caribou	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	5.15E-01	0.00E+00	4.34E+00	0.00E+00	0.00E+00	1.41E-03	4.86E+00	4.86E+02	7.29E-01
Baseline	Max	Caribou	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	5.82E-05	5.48E-04	0.00E+00	2.29E-04	0.00E+00	0.00E+00	3.12E-06	8.38E-04	8.38E-02	8.38E-05
Baseline	Max	Caribou	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	5.65E-03	9.04E-04	0.00E+00	9.95E-03	0.00E+00	0.00E+00	9.99E-06	1.65E-02	1.65E+00	3.30E-03
Baseline	Max	Caribou	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	3.18E-02	1.47E-01	0.00E+00	1.50E-01	0.00E+00	0.00E+00	0.00E+00	3.29E-01	3.29E+01	4.94E-03
Baseline	Max	Caribou	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.93E-06
Baseline	Max	Caribou	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.75E-06
Baseline	Max	Caribou	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.65E-06
Baseline	Max	Caribou	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.67E-06
Baseline	Max	Caribou	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	2.55E-04	2.54E-04	0.00E+00	3.03E-03	0.00E+00	0.00E+00	4.62E-06	3.54E-03	3.54E-01	4.25E-05
Baseline	Max	Caribou	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	1.49E-02	3.97E-02	0.00E+00	3.55E-02	0.00E+00	0.00E+00	1.56E-05	9.00E-02	9.00E+00	4.95E-02
Baseline	Max	Caribou	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	1.49E-03	3.97E-03	0.00E+00	3.55E-03	0.00E+00	0.00E+00	1.56E-06	9.00E-03	9.00E-01	4.95E-03
Baseline	Max	Caribou	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	3.11E-02	4.20E-02	0.00E+00	6.31E-02	0.00E+00	0.00E+00	1.31E-04	1.36E-01	1.36E+01	1.36E-01
Baseline	Max	Caribou	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.27E-06
Baseline	Max	Caribou	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.16E-06
Baseline	Max	Caribou	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	4.53E-03	1.37E-03	0.00E+00	1.85E-02	0.00E+00	0.00E+00	3.12E-06	2.44E-02	2.44E+00	7.32E-04
Baseline	Max	Caribou	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	3.19E+00	0.00E+00	2.18E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+00	5.37E+02	2.15E-01
Baseline	Max	Caribou	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	3.15E-05	1.74E-04	0.00E+00	6.58E-04	0.00E+00	0.00E+00	1.56E-06	8.65E-04	8.65E-02	4.52E-04
Baseline	Max	Caribou	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-06	1.56E-06	1.56E-04	8.15E-07
Baseline	Max	Caribou	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	5.82E-04	1.01E-02	0.00E+00	3.71E-04	0.00E+00	0.00E+00	3.12E-06	1.11E-02	1.11E+00	6.66E-03
Baseline	Max	Caribou	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	2.84E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.38E-05	7.38E-03	1.10E-06
Baseline	Max	Caribou	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	1.00E-02	2.31E-02	0.00E+00	6.25E-02	0.00E+00	0.00E+00	6.62E-05	9.57E-02	9.57E+00	5.74E-02
Baseline	Max	Caribou	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	9.22E-06	2.46E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.96E-05	7.96E-03	2.69E-06
Baseline	Max	Caribou	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	2.48E-06	2.52E-05	0.00E+00	4.57E-05	0.00E+00	0.00E+00	0.00E+00	7.33E-05	7.33E-03	2.82E-06
Baseline	Max	Caribou	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	2.04E-04	5.09E-04	0.00E+00	1.19E-03	0.00E+00	0.00E+00	3.12E-05	1.94E-03	1.94E-01	4.38E-04
Baseline	Max	Caribou	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	1.42E-04	2.52E-04

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

											Dietary Concentrations						EDI							
Scenario	Site	Receptor	Chemical	Soil mg/kg	Surface Soil mg/kg	Surface Water mg/L	Air mg/m3	Plant Deposition mg/kg dw	Plant Air mg/kg dw	Plant Aboveground mg/kg dw	Plant Total mg/kg dw	Prey Terrestrial mg/kg dw	Lichen Terrestrial mg/kg dw	Fish Aquatic mg/kg dw	Terr_Invert Terrestrial mg/kg dw	Soil EDI mg/kg/day	Plant EDI mg/kg/day	Prey EDI mg/kg/day	Lichen EDI mg/kg/day	Fish EDI mg/kg/day	Terr_Invert EDI mg/kg/day	Water EDI mg/kg/day	Total EDI mg/kg/day	Total EDI mg/day	Tissue Concentration mg/kg ww
Baseline	Max	Caribou	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Caribou	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	5.31E-02	2.45E-01	0.00E+00	6.02E-01	0.00E+00	0.00E+00	1.28E-03	9.01E-01	9.01E+01	8.11E-03
Baseline	Max	Fox	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	3.91E-04	5.19E-04	1.22E-02	0.00E+00	0.00E+00	2.59E-04	0.00E+00	1.33E-02	5.26E-02	1.43E-05
Baseline	Max	Fox	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	1.60E-01	6.27E-01	1.35E+00	1.88E-01	0.00E+00	1.95E-03	2.33E+00	9.17E+00	1.37E-02
Baseline	Max	Fox	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	1.38E-04	1.71E-04	1.13E-03	7.11E-05	6.12E-05	0.00E+00	4.32E-06	1.58E-03	6.23E-03	6.23E-06
Baseline	Max	Fox	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	1.34E-02	2.81E-04	1.71E-03	3.09E-03	7.32E-04	2.13E-03	1.38E-05	2.14E-02	8.43E-02	1.69E-04
Baseline	Max	Fox	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	7.56E-02	4.57E-02	6.63E-02	4.68E-02	0.00E+00	1.05E-02	0.00E+00	2.45E-01	9.65E-01	1.45E-04
Baseline	Max	Fox	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	1.68E-06	0.00E+00	2.13E-04	8.41E-04	3.36E-07
Baseline	Max	Fox	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	3.91E-06	0.00E+00	2.16E-04	8.49E-04	3.19E-07
Baseline	Max	Fox	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	3.91E-06	0.00E+00	2.16E-04	8.49E-04	3.07E-07
Baseline	Max	Fox	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	4.47E-06	0.00E+00	2.16E-04	8.52E-04	3.11E-07
Baseline	Max	Fox	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	6.08E-04	7.91E-05	1.15E-03	9.41E-04	5.27E-03	8.12E-03	6.39E-06	1.62E-02	6.37E-02	7.65E-06
Baseline	Max	Fox	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	3.54E-02	1.23E-02	1.30E-02	1.10E-02	6.27E-04	1.71E-02	2.16E-05	8.95E-02	3.52E-01	1.94E-03
Baseline	Max	Fox	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	3.54E-03	1.23E-03	1.30E-03	1.10E-03	6.27E-05	6.14E-03	2.16E-06	1.34E-02	5.27E-02	2.90E-04
Baseline	Max	Fox	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	7.40E-02	1.31E-02	8.37E-02	1.96E-02	1.07E-01	1.97E-02	1.81E-04	3.17E-01	1.25E+00	1.25E-02
Baseline	Max	Fox	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	3.91E-06	0.00E+00	2.16E-04	8.49E-04	2.63E-07
Baseline	Max	Fox	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	4.47E-06	0.00E+00	2.16E-04	8.52E-04	2.50E-07
Baseline	Max	Fox	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	1.08E-02	4.26E-04	4.26E-03	5.76E-03	1.30E-03	8.02E-03	4.32E-06	3.05E-02	1.20E-01	3.61E-05
Baseline	Max	Fox	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	9.92E-01	1.67E-01	6.77E-01	0.00E+00	1.71E-01	0.00E+00	2.01E+00	7.90E+00	3.16E-03
Baseline	Max	Fox	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	7.49E-05	5.40E-05	9.05E-04	2.05E-04	2.71E-03	4.15E-04	2.16E-06	4.36E-03	1.72E-02	8.97E-05
Baseline	Max	Fox	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-03	0.00E+00	2.16E-06	2.71E-03	1.07E-02	5.57E-05
Baseline	Max	Fox	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	1.38E-03	3.15E-03	3.13E-03	1.15E-04	7.70E-04	2.22E-03	4.32E-06	1.08E-02	4.25E-02	2.55E-04
Baseline	Max	Fox	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	6.75E-06	7.85E-06	1.91E-04	1.42E-05	0.00E+00	4.47E-06	0.00E+00	2.24E-04	8.83E-04	1.31E-07
Baseline	Max	Fox	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	2.38E-02	7.19E-03	1.62E-02	1.94E-02	1.14E-03	4.50E-03	9.15E-05	7.23E-02	2.85E-01	1.71E-03
Baseline	Max	Fox	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	2.19E-05	7.65E-06	1.92E-04	1.42E-05	0.00E+00	1.45E-05	0.00E+00	2.51E-04	9.88E-04	3.34E-07
Baseline	Max	Fox	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	5.91E-06	7.83E-06	1.84E-04	1.42E-05	0.00E+00	3.91E-06	0.00E+00	2.16E-04	8.49E-04	3.27E-07
Baseline	Max	Fox	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	4.86E-04	1.58E-04	4.26E-03	3.70E-04	9.95E-03	7.78E-04	4.32E-05	1.60E-02	6.32E-02	1.43E-04
Baseline	Max	Fox	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	3.38E-04	7.85E-05	2.96E-03	1.42E-04	0.00E+00	2.41E-03	0.00E+00	5.93E-03	2.34E-02	7.01E-05
Baseline	Max	Fox	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Fox	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	1.26E-01	7.63E-02	5.00E-01	1.87E-01	2.47E-01	5.07E-01	1.77E-03	1.65E+00	6.49E+00	5.84E-04
Baseline	Max	Peregrine_falcon	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	0.00E+00	0.00E+00	4.67E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.67E-02	4.25E-02	8.50E-06
Baseline	Max	Peregrine_falcon	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	0.00E+00	2.40E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-03	2.41E+00	2.19E+00	3.28E-03
Baseline	Max	Peregrine_falcon	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	0.00E+00	0.00E+00	4.35E-03	0.00E+00	0.00E+00	0.00E+00	3.04E-06	4.36E-03	3.96E-03	3.96E-06
Baseline	Max	Peregrine_falcon	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	0.00E+00	0.00E+00	6.56E-03	0.00E+00	0.00E+00	0.00E+00	9.74E-06	6.57E-03	5.98E-03	1.20E-05
Baseline	Max	Peregrine_falcon	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	0.00E+00	0.00E+00	2.54E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.54E-01	2.31E-01	3.47E-05
Baseline	Max	Peregrine_falcon	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.89E-07
Baseline	Max	Peregrine_falcon	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.77E-07
Baseline	Max	Peregrine_falcon	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.71E-07
Baseline	Max	Peregrine_falcon	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.72E-07
Baseline	Max	Peregrine_falcon	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	0.00E+00	0.00E+00	4.41E-03	0.00E+00	0.00E+00	0.00E+00	4.50E-06	4.42E-03	4.02E-03	4.27E-04
Baseline	Max	Peregrine_falcon	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	0.00E+00	0.00E+00	4.98E-02	0.00E+00	0.00E+00	0.00E+00	1.52E-05	4.99E-02	4.54E-02	2.50E-04
Baseline	Max	Peregrine_falcon	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	0.00E+00	0.00E+00	4.98E-03	0.00E+00	0.00E+00	0.00E+00	1.52E-06	4.99E-03	4.54E-03	2.50E-05
Baseline	Max	Peregrine_falcon	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	0.00E+00	0.00E+00	3.21E-01	0.00E+00	0.00E+00	0.00E+00	1.28E-04	3.21E-01	2.92E-01	2.92E-03
Baseline	Max	Peregrine_falcon	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.46E-07
Baseline	Max	Peregrine_falcon	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.39E-07
Baseline	Max	Peregrine_falcon	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	0.00E+00	0.00E+00	1.63E-02	0.00E+00	0.00E+00	0.00E+00	3.04E-06	1.64E-02	1.49E-02	4.46E-06
Baseline	Max	Peregrine_falcon	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	0.00E+00	6.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E-01	5.81E-01	2.32E-04
Baseline	Max	Peregrine_falcon	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	0.00E+00	0.00E+00	3.47E-03	0.00E+00	0.00E+00	0.00E+00	1.52E-06	3.47E-03	3.16E-03	7.55E-05
Baseline	Max	Peregrine_falcon	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-06	1.52E-06	1.38E-06	3.31E-08
Baseline	Max	Peregrine_falcon	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	0.00E+00	0.00E+00	1.20E-02	0.00E+00	0.00E+00	0.00E+00	3.04E-06	1.20E-02	1.09E-02	6.56E-05
Baseline	Max	Peregrine_falcon	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	0.00E+00	0.00E+00	7.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.32E-04	6.66E-04	7.29E-08
Baseline	Max	Peregrine_falcon	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	0.00E+00	0.00E+00

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

										Dietary Concentrations								EDI						
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg/kg ww
Baseline	Max	Peregrine_falcon	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	0.00E+00	0.00E+00	7.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.38E-04	6.71E-04	1.67E-07
Baseline	Max	Peregrine_falcon	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	0.00E+00	0.00E+00	7.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-04	6.41E-04	1.82E-07
Baseline	Max	Peregrine_falcon	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	0.00E+00	0.00E+00	1.63E-02	0.00E+00	0.00E+00	0.00E+00	3.04E-05	1.64E-02	1.49E-02	1.68E-02
Baseline	Max	Peregrine_falcon	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	0.00E+00	0.00E+00	1.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-02	1.03E-02	3.10E-05
Baseline	Max	Peregrine_falcon	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Peregrine_falcon	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	0.00E+00	0.00E+00	1.92E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-03	1.92E+00	1.75E+00	1.53E-02
Baseline	Max	Ptarmigan	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	4.52E-03	1.57E-02	0.00E+00	0.00E+00	0.00E+00	9.80E-04	0.00E+00	2.12E-02	1.22E-02	2.44E-06
Baseline	Max	Ptarmigan	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	4.86E+00	0.00E+00	1.53E+01	0.00E+00	0.00E+00	1.60E-03	2.01E+01	1.16E+01	1.74E-02
Baseline	Max	Ptarmigan	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	1.60E-03	5.18E-03	0.00E+00	8.04E-04	0.00E+00	0.00E+00	3.54E-06	7.58E-03	4.36E-03	4.36E-06
Baseline	Max	Ptarmigan	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	1.55E-01	8.53E-03	0.00E+00	3.50E-02	0.00E+00	8.04E-03	1.13E-05	2.07E-01	1.19E-01	2.38E-04
Baseline	Max	Ptarmigan	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	8.73E-01	1.39E+00	0.00E+00	5.30E-01	0.00E+00	3.97E-02	0.00E+00	2.83E+00	1.63E+00	2.44E-04
Baseline	Max	Ptarmigan	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	6.34E-06	0.00E+00	4.73E-04	2.72E-04	8.00E-08
Baseline	Max	Ptarmigan	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.48E-05	0.00E+00	4.81E-04	2.77E-04	7.66E-08
Baseline	Max	Ptarmigan	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.48E-05	0.00E+00	4.81E-04	2.77E-04	7.38E-08
Baseline	Max	Ptarmigan	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.69E-05	0.00E+00	4.83E-04	2.78E-04	7.47E-08
Baseline	Max	Ptarmigan	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	7.02E-03	2.40E-03	0.00E+00	1.07E-02	0.00E+00	3.07E-02	5.24E-06	5.08E-02	2.92E-02	3.10E-03
Baseline	Max	Ptarmigan	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	4.08E-01	3.74E-01	0.00E+00	1.25E-01	0.00E+00	6.46E-02	1.77E-05	9.72E-01	5.59E-01	3.07E-03
Baseline	Max	Ptarmigan	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	4.08E-02	3.74E-02	0.00E+00	1.25E-02	0.00E+00	2.32E-02	1.77E-06	1.14E-01	6.55E-02	3.60E-04
Baseline	Max	Ptarmigan	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	8.55E-01	3.97E-01	0.00E+00	2.22E-01	0.00E+00	7.44E-02	1.49E-04	1.55E+00	8.90E-01	8.90E-03
Baseline	Max	Ptarmigan	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.48E-05	0.00E+00	4.81E-04	2.77E-04	6.32E-08
Baseline	Max	Ptarmigan	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.69E-05	0.00E+00	4.83E-04	2.78E-04	6.02E-08
Baseline	Max	Ptarmigan	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	1.24E-01	1.29E-02	0.00E+00	6.52E-02	0.00E+00	3.03E-02	3.54E-06	2.33E-01	1.34E-01	4.01E-05
Baseline	Max	Ptarmigan	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	3.01E+01	0.00E+00	7.66E+00	0.00E+00	6.46E-01	0.00E+00	3.84E+01	2.21E+01	8.83E-03
Baseline	Max	Ptarmigan	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	8.65E-04	1.64E-03	0.00E+00	2.32E-03	0.00E+00	1.57E-03	1.77E-06	6.39E-03	3.68E-03	8.79E-05
Baseline	Max	Ptarmigan	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-06	1.77E-06	1.02E-06	2.43E-08
Baseline	Max	Ptarmigan	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	1.60E-02	9.57E-02	0.00E+00	1.31E-03	0.00E+00	8.38E-03	3.54E-06	1.21E-01	6.98E-02	4.19E-04
Baseline	Max	Ptarmigan	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	7.80E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.69E-05	0.00E+00	4.94E-04	2.84E-04	3.11E-08
Baseline	Max	Ptarmigan	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	2.75E-01	2.18E-01	0.00E+00	2.20E-01	0.00E+00	1.70E-02	7.51E-05	7.30E-01	4.20E-01	2.52E-03
Baseline	Max	Ptarmigan	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	2.53E-04	2.32E-04	0.00E+00	1.61E-04	0.00E+00	5.49E-05	0.00E+00	7.02E-04	4.03E-04	1.00E-07
Baseline	Max	Ptarmigan	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.82E-05	2.38E-04	0.00E+00	1.61E-04	0.00E+00	1.48E-05	0.00E+00	4.81E-04	2.77E-04	7.84E-08
Baseline	Max	Ptarmigan	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	5.61E-03	4.80E-03	0.00E+00	4.19E-03	0.00E+00	2.94E-03	3.54E-05	1.76E-02	1.01E-02	1.14E-02
Baseline	Max	Ptarmigan	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	3.90E-03	2.38E-03	0.00E+00	1.61E-03	0.00E+00	9.13E-03	0.00E+00	1.70E-02	9.78E-03	2.93E-05
Baseline	Max	Ptarmigan	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Ptarmigan	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	1.46E+00	2.32E+00	0.00E+00	2.12E+00	0.00E+00	1.92E+00	1.45E-03	7.81E+00	4.49E+00	3.93E-02
Baseline	Max	Shrew	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	4.53E-03	1.53E-02	3.00E-02	0.00E+00	0.00E+00	3.32E-02	0.00E+00	8.31E-02	3.32E-04	9.02E-08
Baseline	Max	Shrew	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	4.73E+00	1.54E+00	0.00E+00	0.00E+00	0.00E+00	3.89E-03	6.28E+00	2.51E-02	3.77E-05
Baseline	Max	Shrew	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	1.60E-03	5.04E-03	2.80E-03	0.00E+00	0.00E+00	0.00E+00	8.60E-06	9.45E-03	3.78E-05	3.78E-08
Baseline	Max	Shrew	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	1.55E-01	8.31E-03	4.21E-03	0.00E+00	0.00E+00	2.73E-01	2.75E-05	4.41E-01	1.76E-03	3.52E-06
Baseline	Max	Shrew	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	8.75E-01	1.35E+00	1.63E-01	0.00E+00	0.00E+00	1.35E+00	0.00E+00	3.74E+00	1.49E-02	2.24E-06
Baseline	Max	Shrew	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	2.15E-04	0.00E+00	9.68E-04	3.87E-06	1.55E-09
Baseline	Max	Shrew	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	5.01E-04	0.00E+00	1.25E-03	5.02E-06	1.88E-09
Baseline	Max	Shrew	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	5.01E-04	0.00E+00	1.25E-03	5.02E-06	1.82E-09
Baseline	Max	Shrew	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	5.73E-04	0.00E+00	1.33E-03	5.30E-06	1.93E-09
Baseline	Max	Shrew	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	7.03E-03	2.34E-03	2.84E-03	0.00E+00	0.00E+00	1.04E+00	1.27E-05	1.05E+00	4.21E-03	5.05E-07
Baseline	Max	Shrew	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	4.09E-01	3.65E-01	3.20E-02	0.00E+00	0.00E+00	2.19E+00	4.30E-05	3.00E+00	1.20E-02	6.59E-05
Baseline	Max	Shrew	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	4.09E-02	3.65E-02	3.20E-03	0.00E+00	0.00E+00	7.87E-01	4.30E-06	8.67E-01	3.47E-03	1.91E-05
Baseline	Max	Shrew	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	8.56E-01	3.87E-01	2.06E-01	0.00E+00	0.00E+00	2.52E+00	3.61E-04	3.97E+00	1.59E-02	1.59E-04
Baseline	Max	Shrew	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	5.01E-04	0.00E+00	1.25E-03	5.02E-06	1.55E-09
Baseline	Max	Shrew	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	5.73E-04	0.00E+00	1.33E-03	5.30E-06	1.56E-09
Baseline	Max	Shrew	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	1.25E-01	1.26E-02	1.05E-02	0.00E+00	0.00E+00	1.03E+00	8.60E-06	1.17E+00	4.70E-03	1.41E-06
Baseline	Max	Shrew	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	2.93E+01	4.10E-01	0.00E+00	0.00E+00	2.19E+01	0.00E+00	5.16E+01	2.06E-01	8.26E-05
Baseline	Max	Shrew	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

											Dietary Concentrations							EDI						
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg/kg ww
Baseline	Max	Shrew	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.30E-06	4.30E-06	1.72E-08	8.98E-11
Baseline	Max	Shrew	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	1.60E-02	9.33E-02	7.71E-03	0.00E+00	0.00E+00	2.84E-01	8.60E-06	4.01E-01	1.60E-03	9.63E-06
Baseline	Max	Shrew	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	7.81E-05	2.32E-04	4.70E-04	0.00E+00	0.00E+00	5.73E-04	0.00E+00	1.35E-03	5.41E-06	8.04E-10
Baseline	Max	Shrew	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	2.75E-01	2.13E-01	3.98E-02	0.00E+00	0.00E+00	5.77E-01	1.82E-04	1.11E+00	4.42E-03	2.65E-05
Baseline	Max	Shrew	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	2.54E-04	2.26E-04	4.74E-04	0.00E+00	0.00E+00	1.86E-03	0.00E+00	2.82E-03	1.13E-05	3.81E-09
Baseline	Max	Shrew	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	6.83E-05	2.32E-04	4.53E-04	0.00E+00	0.00E+00	5.01E-04	0.00E+00	1.25E-03	5.02E-06	1.93E-09
Baseline	Max	Shrew	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	5.62E-03	4.68E-03	1.05E-02	0.00E+00	0.00E+00	9.97E-02	8.60E-05	1.21E-01	4.82E-04	1.09E-06
Baseline	Max	Shrew	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	3.90E-03	2.32E-03	7.29E-03	0.00E+00	0.00E+00	3.09E-01	0.00E+00	3.23E-01	1.29E-03	3.87E-06
Baseline	Max	Shrew	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Shrew	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	1.46E+00	2.26E+00	1.23E+00	0.00E+00	0.00E+00	6.50E+01	3.53E-03	7.00E+01	2.80E-01	2.52E-05
Baseline	Max	Vole	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	8.37E-03	5.83E-02	4.75E-03	0.00E+00	0.00E+00	1.62E-03	0.00E+00	7.30E-02	1.68E-03	4.56E-07
Baseline	Max	Vole	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	1.80E+01	2.44E-01	0.00E+00	0.00E+00	0.00E+00	3.26E-03	1.82E+01	4.19E-01	6.29E-04
Baseline	Max	Vole	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	2.96E-03	1.92E-02	4.43E-04	0.00E+00	0.00E+00	0.00E+00	7.22E-06	2.26E-02	5.19E-04	5.19E-07
Baseline	Max	Vole	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	2.87E-01	3.16E-02	6.67E-04	0.00E+00	0.00E+00	1.33E-02	2.31E-05	3.33E-01	7.66E-03	1.53E-05
Baseline	Max	Vole	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	1.62E+00	5.14E+00	2.59E-02	0.00E+00	0.00E+00	6.56E-02	0.00E+00	6.84E+00	1.57E-01	2.36E-05
Baseline	Max	Vole	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	1.05E-05	0.00E+00	1.09E-03	2.50E-05	9.99E-09
Baseline	Max	Vole	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	2.44E-05	0.00E+00	1.10E-03	2.53E-05	9.52E-09
Baseline	Max	Vole	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	2.44E-05	0.00E+00	1.10E-03	2.53E-05	9.17E-09
Baseline	Max	Vole	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	2.79E-05	0.00E+00	1.11E-03	2.54E-05	9.27E-09
Baseline	Max	Vole	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	1.30E-02	8.89E-03	4.49E-04	0.00E+00	0.00E+00	5.07E-02	1.07E-05	7.30E-02	1.68E-03	2.02E-07
Baseline	Max	Vole	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	7.56E-01	1.39E+00	5.07E-03	0.00E+00	0.00E+00	1.07E-01	3.61E-05	2.25E+00	5.18E-02	2.85E-04
Baseline	Max	Vole	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	7.56E-02	1.39E-01	5.07E-04	0.00E+00	0.00E+00	3.83E-02	3.61E-06	2.53E-01	5.82E-03	3.20E-05
Baseline	Max	Vole	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	1.58E+00	1.47E+00	3.26E-02	0.00E+00	0.00E+00	1.23E-01	3.03E-04	3.21E+00	7.38E-02	7.38E-04
Baseline	Max	Vole	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	2.44E-05	0.00E+00	1.10E-03	2.53E-05	7.85E-09
Baseline	Max	Vole	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	2.79E-05	0.00E+00	1.11E-03	2.54E-05	7.47E-09
Baseline	Max	Vole	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	2.30E-01	4.78E-02	1.66E-03	0.00E+00	0.00E+00	5.00E-02	7.22E-06	3.30E-01	7.59E-03	2.28E-06
Baseline	Max	Vole	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	1.11E+02	6.49E-02	0.00E+00	0.00E+00	1.07E+00	0.00E+00	1.13E+02	2.59E+00	1.04E-03
Baseline	Max	Vole	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	1.60E-03	6.07E-03	3.53E-04	0.00E+00	0.00E+00	2.59E-03	3.61E-06	1.06E-02	2.44E-04	1.27E-06
Baseline	Max	Vole	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.61E-06	3.61E-06	8.30E-08	4.33E-10
Baseline	Max	Vole	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	2.96E-02	3.54E-01	1.22E-03	0.00E+00	0.00E+00	1.38E-02	7.22E-06	3.99E-01	9.18E-03	5.51E-05
Baseline	Max	Vole	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	1.44E-04	8.82E-04	7.45E-05	0.00E+00	0.00E+00	2.79E-05	0.00E+00	1.13E-03	2.60E-05	3.85E-09
Baseline	Max	Vole	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	5.09E-01	8.08E-01	6.30E-03	0.00E+00	0.00E+00	2.81E-02	1.53E-04	1.35E+00	3.11E-02	1.87E-04
Baseline	Max	Vole	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	4.69E-04	8.60E-04	7.50E-05	0.00E+00	0.00E+00	9.07E-05	0.00E+00	1.49E-03	3.44E-05	1.16E-08
Baseline	Max	Vole	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	1.26E-04	8.80E-04	7.17E-05	0.00E+00	0.00E+00	2.44E-05	0.00E+00	1.10E-03	2.53E-05	9.74E-09
Baseline	Max	Vole	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	1.04E-02	1.78E-02	1.66E-03	0.00E+00	0.00E+00	4.85E-03	7.22E-05	3.48E-02	8.00E-04	1.81E-06
Baseline	Max	Vole	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	7.22E-03	8.82E-03	1.15E-03	0.00E+00	0.00E+00	1.51E-02	0.00E+00	3.23E-02	7.42E-04	2.23E-06
Baseline	Max	Vole	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Vole	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	2.70E+00	8.57E+00	1.95E-01	0.00E+00	0.00E+00	3.17E+00	2.96E-03	1.46E+01	3.37E-01	3.03E-05
Baseline	Max	Wolverine	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Acenaphthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Acenaphthylene	5.80E-01	5.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-01	3.30E-01	6.38E-01	0.00E+00	0.00E+00	2.43E-01	5.26E-04	6.93E-04	1.83E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-02	1.95E-01	5.30E-05
Baseline	Max	Wolverine	Aluminum	3.19E+04	0.00E+00	2.26E-02	0.00E+00	0.00E+00	0.00E+00	1.02E+02	1.02E+02	3.28E+01	4.75E+02	1.61E+02	0.00E+00	0.00E+00	2.14E-01	9.42E-01	0.00E+00	2.51E-01	0.00E+00	1.78E-03	1.41E+00	1.41E+01	2.11E-02
Baseline	Max	Wolverine	Anthracene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Antimony	2.05E-01	2.05E-01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	1.09E-01	1.09E-01	5.94E-02	2.50E-02	5.27E-02	0.00E+00	1.86E-04	2.28E-04	1.71E-03	0.00E+00	8.17E-05	0.00E+00	3.93E-06	2.20E-03	2.20E-02	2.20E-05
Baseline	Max	Wolverine	Arsenic	1.99E+01	1.99E+01	1.60E-04	0.00E+00	0.00E+00	0.00E+00	1.79E-01	1.79E-01	8.95E-02	1.09E+00	6.30E-01	1.99E+00	1.80E-02	3.76E-04	2.57E-03	0.00E+00	9.78E-04	0.00E+00	1.26E-05	2.20E-02	2.20E-01	4.40E-04
Baseline	Max	Wolverine	Barium	1.12E+02	1.12E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+01	2.91E+01	3.47E+00	1.65E+01	0.00E+00	9.86E+00	1.02E-01	6.11E-02	9.96E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-01	2.62E+00	3.93E-04
Baseline	Max	Wolverine	Benz(a)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	1.57E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	1.18E-06
Baseline	Max	Wolverine	Benzo(a)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	1.11E-06
Baseline	Max	Wolverine	Benzo(b)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	1.07E-06
Baseline	Max	Wolverine	Benzo(e)pyrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Benzo(g,h,i)fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Benzo(g,h,i)perylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Benzo(k)fluoranthene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	1.07E-06
Baseline	Max	Wolverine	Cadmium	9.00E-01	9.00E-01	7.40E-05	0.00E+00	0.00E+00	0.00E+00	5.04E-02	5.04E-02	6.03E-02	3.31E-01	4.53E+00	7.62E+00	8.16E-04	1.06E-04	1.73E-03	0.00E+00	7.04E-03	0.00E+00	5.82E-06	9.69E-03	9.69E-02	1.16E-05
Baseline	Max	Wolverine	Chromium	5.24E+01	5.24E+01	2.50E-04	0.00E+00	0.00E+00	0.00E+00	7.86E+00	7.86E+00	6.81E-01	3.88E+00	5.39E-01	1.60E+01	4.75E-02	1.65E-02	1.95E-02	0.00E+00	8.38E-04	0.00E+00	1.97E-05	8.43E-02	8.43E-01	4.64E-03
Baseline	Max	Wolverine	Chromium VI	5.24E+00	5.24E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	7.86E-01	7.86E-01	6.81E-02	3.88E-01	5.39E-02	5.76E+00	4.75E-03	1.65E-03	1.95E-03	0.00E+00	8.38E-05	0.00E+00	1.97E-06	8.43E-03	8.43E-02	4.64E-04
Baseline	Max	Wolverine	Chrysene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Copper	1.10E+02	1.10E+02	2.10E-03	0.00E+00	0.00E+00	0.00E+00	8.33E+00	8.33E+00	4.38E+00	6.90E+00	9.22E+01	1.84E+01	9.94E-02	1.75E-02	1.26E-01	0.00E+00	1.43E-01	0.00E+00	1.65E-04	3.86E-01	3.86E+00	3.86E-02
Baseline	Max	Wolverine	Dibenzo(a,h)anthracene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	9.12E-07
Baseline	Max	Wolverine	Fluoranthene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Fluorene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

											Dietary Concentrations							EDI						
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg/kg ww
Baseline	Max	Wolverine	Indeno(1,2,3-cd)pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	4.19E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	8.66E-07
Baseline	Max	Wolverine	Lead	1.60E+01	1.60E+01	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.71E-01	2.71E-01	2.23E-01	2.03E+00	1.12E+00	7.52E+00	1.45E-02	5.69E-04	6.41E-03	0.00E+00	1.73E-03	0.00E+00	3.93E-06	2.32E-02	2.32E-01	6.95E-05
Baseline	Max	Wolverine	Manganese	5.59E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.32E+02	6.32E+02	8.72E+00	2.38E+02	0.00E+00	1.60E+02	0.00E+00	1.32E+00	2.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E+00	1.58E+01	6.30E-03
Baseline	Max	Wolverine	Mercury	1.11E-01	1.11E-01	2.50E-05	0.00E+00	0.00E+00	0.00E+00	3.44E-02	3.44E-02	4.74E-02	7.20E-02	2.33E+00	3.89E-01	1.01E-04	7.22E-05	1.36E-03	0.00E+00	3.61E-03	0.00E+00	1.97E-06	5.15E-03	5.15E-02	2.69E-04
Baseline	Max	Wolverine	Mercury Methyl	0.00E+00	0.00E+00	2.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.61E-03	0.00E+00	1.97E-06	3.62E-03	3.62E-02	1.89E-04
Baseline	Max	Wolverine	Molybdenum	2.05E+00	2.05E+00	5.00E-05	0.00E+00	0.00E+00	0.00E+00	2.01E+00	2.01E+00	1.64E-01	4.06E-02	6.62E-01	2.08E+00	1.86E-03	4.21E-03	4.70E-03	0.00E+00	1.03E-03	0.00E+00	3.93E-06	1.18E-02	1.18E-01	7.09E-04
Baseline	Max	Wolverine	Naphthalene	1.00E-02	1.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-03	1.00E-02	5.00E-03	0.00E+00	4.19E-03	9.07E-06	1.05E-05	2.87E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.06E-04	3.06E-03	4.55E-07
Baseline	Max	Wolverine	Nickel	3.53E+01	3.53E+01	1.06E-03	0.00E+00	0.00E+00	0.00E+00	4.58E+00	4.58E+00	8.46E-01	6.84E+00	9.84E-01	4.22E+00	3.20E-02	9.61E-03	2.43E-02	0.00E+00	1.53E-03	0.00E+00	8.34E-05	6.74E-02	6.74E-01	4.05E-03
Baseline	Max	Wolverine	Phenanthrene	3.25E-02	3.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-03	4.88E-03	1.01E-02	5.00E-03	0.00E+00	1.36E-02	2.95E-05	1.02E-05	2.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.29E-04	3.29E-03	1.11E-06
Baseline	Max	Wolverine	Pyrene	8.75E-03	8.75E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.99E-03	4.99E-03	9.62E-03	5.00E-03	0.00E+00	3.67E-03	7.93E-06	1.05E-05	2.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.95E-04	2.95E-03	1.13E-06
Baseline	Max	Wolverine	Selenium	7.20E-01	7.20E-01	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.01E-01	1.01E-01	2.23E-01	1.30E-01	8.56E+00	7.29E-01	6.53E-04	2.11E-04	6.40E-03	0.00E+00	1.33E-02	0.00E+00	3.93E-05	2.06E-02	2.06E-01	4.67E-04
Baseline	Max	Wolverine	Silver	5.00E-01	5.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	5.00E-02	1.55E-01	5.00E-02	0.00E+00	2.26E+00	4.53E-04	1.05E-04	4.45E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-03	5.00E-02	1.50E-04
Baseline	Max	Wolverine	Total Cyanide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Baseline	Max	Wolverine	Zinc	1.87E+02	1.87E+02	2.05E-02	0.00E+00	0.00E+00	0.00E+00	4.86E+01	4.86E+01	2.62E+01	6.58E+01	2.13E+02	4.76E+02	1.70E-01	1.02E-01	7.51E-01	0.00E+00	3.30E-01	0.00E+00	1.61E-03	1.35E+00	1.35E+01	1.22E-03
Project	Max	Arctic_hare	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	9.98E-10	6.75E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E-09	3.49E-08	8.48E-12
Project	Max	Arctic_hare	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	1.08E-10	2.34E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-09	1.10E-08	2.99E-12
Project	Max	Arctic_hare	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.04E-07	4.04E-07	1.82E-06	2.73E-09
Project	Max	Arctic_hare	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	2.34E-08	4.63E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.97E-08	3.14E-07	1.06E-10
Project	Max	Arctic_hare	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.94E-05	3.94E-05	1.77E-04	1.77E-07
Project	Max	Arctic_hare	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	1.79E-04	4.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.65E-07	6.74E-04	3.03E-03	6.07E-06
Project	Max	Arctic_hare	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.38E-05	4.38E-05	1.97E-04	2.96E-08
Project	Max	Arctic_hare	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	8.01E-07	1.80E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E-05	8.45E-05	3.37E-08
Project	Max	Arctic_hare	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	9.39E-12	7.08E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.08E-06	3.18E-05	1.20E-08
Project	Max	Arctic_hare	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	3.09E-11	9.33E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.33E-07	4.20E-06	1.52E-09
Project	Max	Arctic_hare	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	1.06E-07	4.06E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.17E-06	1.88E-05	6.10E-09
Project	Max	Arctic_hare	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	1.32E-16	5.17E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.17E-10	2.33E-09	5.31E-13
Project	Max	Arctic_hare	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	3.53E-11	1.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-04	6.25E-04	1.42E-07
Project	Max	Arctic_hare	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	8.08E-12	7.49E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.49E-06	3.37E-05	1.23E-08
Project	Max	Arctic_hare	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	5.16E-04	1.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.67E-07	1.98E-03	8.91E-03	1.07E-06
Project	Max	Arctic_hare	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	1.94E-03	5.74E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.64E-06	7.69E-03	3.46E-02	1.90E-04
Project	Max	Arctic_hare	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	1.94E-04	5.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.64E-07	7.69E-04	3.46E-03	1.90E-05
Project	Max	Arctic_hare	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	2.22E-11	7.05E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-06	3.17E-05	1.27E-08
Project	Max	Arctic_hare	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	7.70E-02	2.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-07	2.97E-01	1.34E+00	1.34E-02
Project	Max	Arctic_hare	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	3.36E-11	3.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-04	1.39E-03	4.32E-07
Project	Max	Arctic_hare	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	1.14E-11	2.84E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-06	1.28E-05	5.01E-09
Project	Max	Arctic_hare	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	2.01E-08	1.98E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-07	9.82E-07	2.87E-10
Project	Max	Arctic_hare	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	5.19E-11	1.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-05	4.71E-05	1.38E-08
Project	Max	Arctic_hare	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	2.53E-03	7.05E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.29E-09	9.58E-03	4.31E-02	1.29E-05
Project	Max	Arctic_hare	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	7.00E-03	2.04E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.83E-07	2.74E-02	1.23E-01	4.93E-05
Project	Max	Arctic_hare	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	1.90E-05	6.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.94E-05	3.57E-04	1.87E-06
Project	Max	Arctic_hare	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Arctic_hare	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.23E-06	8.23E-06	3.70E-05	2.22E-07
Project	Max	Arctic_hare	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	2.05E-09	1.67E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-08	8.42E-08	1.25E-11
Project	Max	Arctic_hare	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	1.02E-03	2.98E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.00E-03	1.80E-02	1.08E-04
Project	Max	Arctic_hare	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	4.84E-11	1.96E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-06	8.84E-06	2.99E-09
Project	Max	Arctic_hare	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	1.40E-11	2.29E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E-06	1.03E-05	3.96E-09
Project	Max	Arctic_hare	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	1.03E-03	3.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-05	4.07E-03	1.83E-02	4.15E-05
Project	Max	Arctic_hare	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Arctic_hare	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.56E-06	7.56E-06	3.40E-05	3.09E-10
Project	Max	Arctic_hare	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	1.12E-01	3.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-07	4.59E-01	2.06E+00	1.86E-04
Project	Max	Caribou	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	1.24E-10	1.13E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-09	1.25E-07	3.04E-11
Project	Max	Caribou	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	1.33E-11	3.90E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.04E-10	4.04E-08	1.10E-11
Project	Max	Caribou	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-07	2.96E-07	2.96E-05	4.44E-08
Project	Max	Caribou	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	2.90E-09	7.73E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-08	1.06E-06	3.59E-10
Project	Max	Caribou	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.89E-05	2.89E-05	2.89E-03	2.89E-06
Project	Max	Caribou	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	2.21E-05	8.26E-05	0.00E+00	0.00E+00	3.89E-06	0.00E+00	5.61E-07	1.09E-04	1.09E-02	2.18E-05
Project	Max	Caribou	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.21E-05	3.21E-05	3.21E-03	4.82E-07
Project	Max	Caribou	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	9.92E-08	3.00E-06	0.00E+00	0.00E+00	1.82E-07	0.00E+00	0.00E+00	3.28E-06	3.28E-04	1.31E-07
Project	Max	Caribou	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	1.16E-12	1.18E-06	0.00E+00	0.00E+00	2.14E-12	0.00E+00	0.00E+00	1.18E-06	1.18E-04	4.43E-08
Project	Max	Caribou	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	3.82E-12	1.56E-07	0.00E+00	7.03E-12	0.00E+00	0.00E+00	0.00E+00	1.56E-07	1.56E-05	5.63E-09
Project	Max	Caribou	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	1.32E-08	6.78E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.91E-07	6.91E-05	2.25E-08
Project	Max	Caribou	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	1.63E-17	8.63E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.63E-11	8.63E-09	1.97E-12
Project	Max	Caribou	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	4.37E-12	2.32E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.32E-05	2.32E-03	5.28E-07
Project	Max	Caribou	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	1.00E-12	1.25E-06	0.00E+00	1.84E-12	0.00E+00	0.00E+00	0.00E+00	1.25E-06	1.25E-04	4.56E-08
Project	Max	Caribou	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	6.39E-05	2.44E-04	0.00E+00	0.00E+00	7.57E-05	0.00E+00	0.00E+00	4.89E-07	3.84E-04	4.61E-06
Project	Max	Caribou	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	2.40E-04	9.58E-04	0.00E+00	0.00E+00	5.73E-05	0.00E+00	0.00E+00	7.07E-06	1.26E-03	1.26E-01	6.94E-04
Project	Max	Caribou	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	2.40E-05	9.58E-05	0.00E+00	0.00E+00	5.73E-06	0.00E+00	0.00E+00	7.07E-07	1.26E-04	1.26E-02	6.94E-05
Project	Max	Caribou	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	2.75E-12	1.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-06	1.18E-04	4.70E-08
Project	Max	Caribou	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	9.52E-03	3.67E-02	0.00E+00	0.00E+00	1.93E-03	0.00E+00	0.00E+00	1.60E-07	4.82E-02	4.82E+00	4.82E-02

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

											Dietary Concentrations						EDI						
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg/kg ww
Project	Max	Caribou	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	4.16E-12	5.17E-05	0.00E+00	7.65E-12	0.00E+00	0.00E+00	0.00E+00	5.17E-05	5.17E-03	1.60E-06
Project	Max	Caribou	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	1.42E-12	4.73E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.73E-07	4.73E-05	1.86E-08
Project	Max	Caribou	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	2.49E-09	3.30E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.55E-08	3.55E-06	1.04E-09
Project	Max	Caribou	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	6.42E-12	1.75E-06	0.00E+00	1.18E-11	0.00E+00	0.00E+00	0.00E+00	1.75E-06	1.75E-04	5.13E-08
Project	Max	Caribou	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	3.14E-04	1.18E-03	0.00E+00	1.28E-04	0.00E+00	0.00E+00	3.88E-09	1.62E-03	1.62E-01	4.85E-05
Project	Max	Caribou	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	8.67E-04	3.40E-03	0.00E+00	1.19E-04	0.00E+00	0.00E+00	3.55E-07	4.39E-03	4.39E-01	1.75E-04
Project	Max	Caribou	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	2.36E-06	1.01E-05	0.00E+00	4.93E-06	0.00E+00	0.00E+00	0.00E+00	1.74E-05	1.74E-03	9.06E-06
Project	Max	Caribou	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Caribou	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.03E-06	6.03E-06	6.03E-04	3.62E-06
Project	Max	Caribou	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	2.53E-10	2.78E-09	0.00E+00	4.08E-10	0.00E+00	0.00E+00	0.00E+00	3.44E-09	3.44E-07	5.11E-11
Project	Max	Caribou	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	1.26E-04	4.97E-04	0.00E+00	7.86E-05	0.00E+00	0.00E+00	0.00E+00	7.02E-04	7.02E-02	4.21E-04
Project	Max	Caribou	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	5.99E-12	3.28E-07	0.00E+00	2.97E-12	0.00E+00	0.00E+00	0.00E+00	3.28E-07	3.28E-05	1.11E-08
Project	Max	Caribou	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	1.73E-12	3.82E-07	0.00E+00	3.18E-12	0.00E+00	0.00E+00	0.00E+00	3.82E-07	3.82E-05	1.47E-08
Project	Max	Caribou	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	1.27E-04	5.05E-04	0.00E+00	7.42E-05	0.00E+00	0.00E+00	9.91E-06	7.17E-04	7.17E-02	1.62E-04
Project	Max	Caribou	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Caribou	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.55E-06	5.55E-06	5.55E-04	5.03E-09
Project	Max	Caribou	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	1.38E-02	5.79E-02	0.00E+00	1.57E-02	0.00E+00	0.00E+00	1.52E-07	8.74E-02	8.74E+00	7.86E-04
Project	Max	Fox	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	2.94E-10	3.50E-10	9.14E-10	0.00E+00	0.00E+00	1.95E-11	0.00E+00	1.58E-09	6.22E-09	1.51E-12
Project	Max	Fox	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	3.17E-11	1.21E-10	9.85E-11	0.00E+00	0.00E+00	2.10E-12	0.00E+00	2.54E-10	9.99E-10	2.71E-13
Project	Max	Fox	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-05	0.00E+00	4.09E-07	3.98E-05	1.57E-04	2.35E-07
Project	Max	Fox	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	6.89E-09	2.40E-09	2.14E-08	0.00E+00	0.00E+00	4.56E-10	0.00E+00	3.12E-08	1.23E-07	4.15E-11
Project	Max	Fox	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.65E-04	0.00E+00	3.99E-05	6.05E-04	2.39E-03	2.39E-06
Project	Max	Fox	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	5.26E-05	2.57E-05	6.69E-07	1.21E-06	4.11E-05	8.36E-06	7.76E-07	1.30E-04	5.14E-04	1.03E-06
Project	Max	Fox	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.78E-04	0.00E+00	4.44E-05	4.23E-04	1.67E-03	2.50E-07
Project	Max	Fox	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	2.36E-07	9.32E-07	7.34E-07	5.67E-08	0.00E+00	6.70E-09	0.00E+00	1.97E-06	7.74E-06	3.09E-09
Project	Max	Fox	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	2.77E-12	3.67E-07	8.60E-12	6.65E-13	0.00E+00	1.83E-13	0.00E+00	3.67E-07	1.45E-06	5.43E-10
Project	Max	Fox	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	9.09E-12	4.84E-08	2.83E-11	2.18E-12	0.00E+00	6.02E-13	0.00E+00	4.84E-08	1.91E-07	6.91E-11
Project	Max	Fox	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	3.13E-08	2.11E-07	9.75E-08	0.00E+00	0.00E+00	2.08E-09	0.00E+00	3.42E-07	1.35E-06	4.37E-10
Project	Max	Fox	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	3.88E-17	2.68E-11	1.21E-16	0.00E+00	0.00E+00	2.57E-18	0.00E+00	2.68E-11	1.06E-10	2.41E-14
Project	Max	Fox	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	1.04E-11	7.20E-06	3.24E-11	0.00E+00	0.00E+00	6.89E-13	0.00E+00	7.20E-06	2.84E-05	6.47E-09
Project	Max	Fox	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	2.38E-12	3.88E-07	7.40E-12	5.72E-13	0.00E+00	1.80E-13	0.00E+00	3.88E-07	1.53E-06	5.58E-10
Project	Max	Fox	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	1.52E-04	7.59E-05	2.88E-05	2.36E-05	5.57E-04	4.33E-04	6.76E-07	1.27E-03	5.01E-03	6.01E-07
Project	Max	Fox	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	5.71E-04	2.98E-04	2.10E-05	1.78E-05	2.84E-04	2.76E-05	9.77E-06	1.23E-03	4.84E-03	2.66E-05
Project	Max	Fox	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	5.71E-05	2.98E-05	2.10E-06	1.78E-06	2.84E-05	9.92E-06	9.77E-07	1.30E-04	5.13E-04	2.82E-06
Project	Max	Fox	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	6.55E-12	3.66E-07	2.04E-11	0.00E+00	0.00E+00	2.48E-13	0.00E+00	3.66E-07	1.44E-06	5.75E-10
Project	Max	Fox	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	2.27E-02	1.14E-02	2.56E-03	6.01E-04	1.30E-04	7.84E-03	2.21E-07	4.52E-02	1.78E-01	1.78E-03
Project	Max	Fox	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	9.90E-12	1.61E-05	3.08E-11	2.38E-12	0.00E+00	6.56E-13	0.00E+00	1.61E-05	6.33E-05	1.96E-08
Project	Max	Fox	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	3.37E-12	1.47E-07	1.05E-11	0.00E+00	0.00E+00	2.23E-13	0.00E+00	1.47E-07	5.80E-07	2.27E-10
Project	Max	Fox	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	5.93E-09	1.03E-08	1.84E-08	0.00E+00	0.00E+00	3.93E-10	0.00E+00	3.50E-08	1.38E-07	4.04E-11
Project	Max	Fox	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	1.53E-11	5.43E-07	4.75E-11	3.67E-12	0.00E+00	1.16E-12	0.00E+00	5.43E-07	2.14E-06	6.29E-10
Project	Max	Fox	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	7.46E-04	3.66E-04	2.95E-05	3.99E-05	1.61E-06	1.45E-04	5.36E-09	1.33E-03	5.23E-03	1.57E-06
Project	Max	Fox	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	2.06E-03	1.06E-03	9.10E-06	3.70E-05	0.00E+00	2.12E-04	4.90E-07	3.38E-03	1.33E-02	5.32E-06
Project	Max	Fox	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	5.61E-06	3.13E-06	6.77E-06	1.53E-06	0.00E+00	2.33E-04	0.00E+00	2.50E-04	9.85E-04	5.14E-06
Project	Max	Fox	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Fox	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03	0.00E+00	8.34E-06	1.50E-03	5.89E-03	3.54E-05
Project	Max	Fox	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	6.03E-10	8.64E-10	1.70E-09	1.27E-10	0.00E+00	3.99E-11	0.00E+00	3.34E-09	1.32E-08	1.95E-12
Project	Max	Fox	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	2.99E-04	1.55E-04	2.03E-05	2.44E-05	0.00E+00	5.66E-06	0.00E+00	5.04E-04	1.99E-03	1.19E-05
Project	Max	Fox	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	1.43E-11	1.02E-07	1.25E-11	9.24E-13	0.00E+00	9.44E-13	0.00E+00	1.02E-07	4.02E-07	1.36E-10
Project	Max	Fox	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	4.11E-12	1.19E-07	1.28E-11	9.89E-13	0.00E+00	2.72E-13	0.00E+00	1.19E-07	4.68E-07	1.80E-10
Project	Max	Fox	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	3.03E-04	1.57E-04	2.65E-04	2.31E-05	3.16E-03	1.02E-04	1.37E-05	4.02E-03	1.58E-02	3.59E-05
Project	Max	Fox	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Fox	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-07	0.00E+00	7.67E-06	7.99E-06	3.15E-05	2.85E-10
Project	Max	Fox	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	3.29E-02	1.80E-02	1.30E-02	4.88E-03	2.94E-05	1.53E-01	2.10E-07	2.22E-01	8.76E-01	7.88E-05
Project	Max	Peregrine_falcon	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	0.00E+00	0.00E+00	3.51E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.51E-09	3.19E-09	5.72E-13
Project	Max	Peregrine_falcon	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	0.00E+00	0.00E+00	3.78E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.78E-10	3.44E-10	6.88E-14
Project	Max	Peregrine_falcon	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.89E-07	2.89E-07	2.63E-07	3.94E-10
Project	Max	Peregrine_falcon	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	0.00E+00	0.00E+00	8.22E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.22E-08	7.48E-08	1.86E-11
Project	Max	Peregrine_falcon	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-05	2.81E-05	2.56E-05	2.56E-08
Project	Max	Peregrine_falcon	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	0.00E+00	0.00E+00	2.56E-06	0.00E+00	0.00E+00	0.00E+00	5.47E-07	3.11E-06	2.83E-06	5.66E-09
Project	Max	Peregrine_falcon	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-05	3.13E-05	2.85E-05	4.27E-09
Project	Max	Peregrine_falcon	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	0.00E+00	0.00E+00	2.81E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-06	2.56E-06	7.53E-10
Project	Max	Peregrine_falcon	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	0.00E+00	0.00E+00	3.30E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.30E-11	3.00E-11	8.31E-15
Project	Max	Peregrine_falcon	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	0.00E+00	0.00E+00	1.08E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-10	9.87E-11	2.63E-14
Project	Max	Peregrine_falcon	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	0.00E+00	0.00E+00	3.74E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.74E-07	3.40E-07	8.14E-11
Project	Max	Peregrine_falcon	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	0.00E+00	0.00E+00	4.63E-16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.63E-16	4.21E-16	7.07E-20
Project	Max	Peregrine_falcon	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	0.00E+00	0.00E+00	1.24E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-10	1.13E-10	1.90E-14
Project	Max	Peregrine_falcon	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	0.00E+00	0.00E+00	2.84E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-11	2.58E-11	6.94E-15
Project	Max	Peregrine_falcon	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	0.00E+00	0.00E+00	1.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.77E-07	1.11E-04	1.01E-04	1.07E-05
Project	Max	Peregrine_falcon	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	0.00E+00	0.00E+00	8.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.89E-06	8.74E-05	7.96E-05	4.38E-07
Project	Max	Peregrine_falcon	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	0.00E+00	0.00E+00	8.05E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.89E-07	8.74E-06	7.96E-06	4.38E-08

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

										Dietary Concentrations						EDI								
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg ww
Project	Max	Peregrine_falcon	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	0.00E+00	0.00E+00	7.81E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.81E-11	7.11E-11	2.09E-14
Project	Max	Peregrine_falcon	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	0.00E+00	0.00E+00	9.83E-03	0.00E+00	0.00E+00	0.00E+00	1.56E-07	9.83E-03	8.94E-03	8.94E-05
Project	Max	Peregrine_falcon	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	0.00E+00	0.00E+00	1.18E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-10	1.07E-10	2.45E-14
Project	Max	Peregrine_falcon	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	0.00E+00	0.00E+00	4.02E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.02E-11	3.66E-11	1.06E-14
Project	Max	Peregrine_falcon	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	0.00E+00	0.00E+00	7.07E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.07E-08	6.43E-08	1.39E-11
Project	Max	Peregrine_falcon	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	0.00E+00	0.00E+00	1.82E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-10	1.66E-10	3.59E-14
Project	Max	Peregrine_falcon	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	0.00E+00	0.00E+00	1.13E-04	0.00E+00	0.00E+00	0.00E+00	3.78E-09	1.13E-04	1.03E-04	3.09E-08
Project	Max	Peregrine_falcon	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	0.00E+00	0.00E+00	3.49E-05	0.00E+00	0.00E+00	0.00E+00	3.46E-07	3.52E-05	3.21E-05	1.28E-08
Project	Max	Peregrine_falcon	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	0.00E+00	0.00E+00	2.60E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	2.36E-05	5.65E-07
Project	Max	Peregrine_falcon	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Peregrine_falcon	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.88E-06	5.88E-06	5.35E-06	3.21E-08
Project	Max	Peregrine_falcon	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	0.00E+00	0.00E+00	6.54E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.54E-09	5.95E-09	6.51E-13
Project	Max	Peregrine_falcon	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	0.00E+00	0.00E+00	7.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.79E-05	7.09E-05	4.25E-07
Project	Max	Peregrine_falcon	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	0.00E+00	0.00E+00	4.79E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.79E-11	4.36E-11	1.09E-14
Project	Max	Peregrine_falcon	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	0.00E+00	0.00E+00	4.91E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.91E-11	4.47E-11	1.26E-14
Project	Max	Peregrine_falcon	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	0.00E+00	0.00E+00	1.02E-03	0.00E+00	0.00E+00	0.00E+00	9.65E-06	1.03E-03	9.35E-04	1.06E-03
Project	Max	Peregrine_falcon	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Peregrine_falcon	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.41E-06	5.41E-06	4.92E-06	3.29E-11
Project	Max	Peregrine_falcon	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	0.00E+00	0.00E+00	5.00E-02	0.00E+00	0.00E+00	0.00E+00	1.48E-07	5.00E-02	4.55E-02	3.98E-04
Project	Max	Ptarmigan	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	3.39E-09	1.06E-08	0.00E+00	0.00E+00	0.00E+00	7.36E-11	0.00E+00	1.41E-08	8.10E-09	1.45E-12
Project	Max	Ptarmigan	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	3.66E-10	3.68E-09	0.00E+00	0.00E+00	0.00E+00	7.93E-12	0.00E+00	4.06E-09	2.33E-09	4.67E-13
Project	Max	Ptarmigan	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.36E-07	3.36E-07	1.93E-07	2.90E-10
Project	Max	Ptarmigan	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	7.96E-08	7.29E-08	0.00E+00	0.00E+00	0.00E+00	1.73E-09	0.00E+00	1.54E-07	8.87E-08	2.21E-11
Project	Max	Ptarmigan	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.27E-05	3.27E-05	1.88E-05	1.88E-08
Project	Max	Ptarmigan	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	6.07E-04	7.79E-04	0.00E+00	1.37E-05	0.00E+00	3.16E-05	6.36E-07	1.43E-03	8.23E-04	1.65E-06
Project	Max	Ptarmigan	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.64E-05	3.64E-05	2.09E-05	3.14E-09
Project	Max	Ptarmigan	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	2.72E-06	2.83E-05	0.00E+00	6.42E-07	0.00E+00	2.53E-08	0.00E+00	3.17E-05	1.82E-05	5.36E-09
Project	Max	Ptarmigan	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	3.19E-11	1.11E-05	0.00E+00	7.52E-12	0.00E+00	6.92E-13	0.00E+00	1.11E-05	6.40E-06	1.77E-09
Project	Max	Ptarmigan	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	1.05E-10	1.47E-06	0.00E+00	2.47E-11	0.00E+00	2.28E-12	0.00E+00	1.47E-06	8.45E-07	2.25E-10
Project	Max	Ptarmigan	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	3.62E-07	6.40E-06	0.00E+00	0.00E+00	0.00E+00	7.84E-09	0.00E+00	6.77E-06	3.89E-06	9.32E-10
Project	Max	Ptarmigan	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	4.48E-16	8.15E-10	0.00E+00	0.00E+00	0.00E+00	9.71E-18	0.00E+00	8.15E-10	4.68E-10	7.87E-14
Project	Max	Ptarmigan	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	1.20E-10	2.19E-04	0.00E+00	0.00E+00	0.00E+00	2.61E-12	0.00E+00	2.19E-04	1.26E-04	2.11E-08
Project	Max	Ptarmigan	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	2.75E-11	1.18E-05	0.00E+00	6.47E-12	0.00E+00	6.81E-13	0.00E+00	1.18E-05	6.78E-06	1.82E-09
Project	Max	Ptarmigan	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	1.76E-03	2.30E-03	0.00E+00	2.66E-04	0.00E+00	1.64E-03	5.55E-07	5.96E-03	3.43E-03	3.64E-04
Project	Max	Ptarmigan	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	6.60E-03	9.04E-03	0.00E+00	2.02E-04	0.00E+00	1.04E-04	8.01E-06	1.60E-02	9.17E-03	5.04E-05
Project	Max	Ptarmigan	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	6.60E-04	9.04E-04	0.00E+00	2.02E-05	0.00E+00	3.75E-05	8.01E-07	1.62E-03	9.33E-04	5.13E-06
Project	Max	Ptarmigan	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	7.56E-11	1.11E-05	0.00E+00	0.00E+00	0.00E+00	9.37E-13	0.00E+00	1.11E-05	6.38E-06	1.88E-09
Project	Max	Ptarmigan	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	2.62E-01	3.47E-01	0.00E+00	6.80E-03	0.00E+00	2.96E-02	1.81E-07	6.45E-01	3.71E-01	3.71E-03
Project	Max	Ptarmigan	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	1.14E-10	4.87E-04	0.00E+00	2.69E-11	0.00E+00	2.48E-12	0.00E+00	4.87E-04	2.80E-04	6.40E-08
Project	Max	Ptarmigan	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	3.89E-11	4.46E-06	0.00E+00	0.00E+00	0.00E+00	8.44E-13	0.00E+00	4.46E-06	2.57E-06	7.42E-10
Project	Max	Ptarmigan	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	6.85E-08	3.12E-07	0.00E+00	0.00E+00	0.00E+00	1.48E-09	0.00E+00	3.82E-07	2.19E-07	4.73E-11
Project	Max	Ptarmigan	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	1.76E-10	1.65E-05	0.00E+00	4.16E-11	0.00E+00	4.37E-12	0.00E+00	1.65E-05	9.47E-06	2.05E-09
Project	Max	Ptarmigan	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	8.61E-03	1.11E-02	0.00E+00	4.51E-04	0.00E+00	5.48E-04	4.40E-09	2.07E-02	1.19E-02	3.57E-06
Project	Max	Ptarmigan	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	2.38E-02	3.21E-02	0.00E+00	4.18E-04	0.00E+00	7.99E-04	4.02E-07	5.71E-02	3.28E-02	1.31E-05
Project	Max	Ptarmigan	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	6.48E-05	9.50E-05	0.00E+00	1.73E-05	0.00E+00	8.81E-04	0.00E+00	1.06E-03	6.08E-04	1.45E-05
Project	Max	Ptarmigan	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Ptarmigan	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.84E-06	6.84E-06	3.93E-06	2.36E-08
Project	Max	Ptarmigan	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	6.96E-09	2.62E-08	0.00E+00	1.44E-09	0.00E+00	1.51E-10	0.00E+00	3.48E-08	2.00E-08	2.19E-12
Project	Max	Ptarmigan	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	3.46E-03	4.69E-03	0.00E+00	2.77E-04	0.00E+00	2.14E-05	0.00E+00	8.45E-03	4.86E-03	2.91E-05
Project	Max	Ptarmigan	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	1.65E-10	3.09E-06	0.00E+00	1.05E-11	0.00E+00	3.57E-12	0.00E+00	3.09E-06	1.78E-06	4.43E-10
Project	Max	Ptarmigan	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	4.75E-11	3.61E-06	0.00E+00	1.12E-11	0.00E+00	1.03E-12	0.00E+00	3.61E-06	2.07E-06	5.87E-10
Project	Max	Ptarmigan	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	3.50E-03	4.77E-03	0.00E+00	2.61E-04	0.00E+00	3.84E-04	1.12E-05	8.92E-03	5.13E-03	5.80E-03
Project	Max	Ptarmigan	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Ptarmigan	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.29E-06	6.29E-06	3.62E-06	2.42E-11
Project	Max	Ptarmigan	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	3.80E-01	5.46E-01	0.00E+00	5.52E-02	0.00E+00	5.80E-01	1.73E-07	1.56E+00	8.98E-01	7.85E-03
Project	Max	Shrew	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	3.40E-09	1.04E-08	2.25E-09	0.00E+00	0.00E+00	2.49E-09	0.00E+00	1.85E-08	7.40E-11	1.80E-14
Project	Max	Shrew	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	3.66E-10	3.59E-09	2.43E-10	0.00E+00	0.00E+00	2.69E-10	0.00E+00	4.47E-09	1.79E-11	4.85E-15
Project	Max	Shrew	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.15E-07	8.15E-07	3.26E-09	4.89E-12
Project	Max	Shrew	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	7.97E-08	7.11E-08	5.28E-08	0.00E+00	0.00E+00	5.85E-08	0.00E+00	2.62E-07	1.05E-09	3.54E-13
Project	Max	Shrew	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.95E-05	7.95E-05	3.18E-07	3.18E-10
Project	Max	Shrew	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	6.08E-04	7.59E-04	1.65E-06	0.00E+00	0.00E+00	1.07E-03	1.55E-06	2.44E-03	9.77E-06	1.95E-08
Project	Max	Shrew	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.84E-05	8.84E-05	3.54E-07	5.31E-11
Project	Max	Shrew	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	2.73E-06	2.76E-05	1.81E-06	0.00E+00	0.00E+00	8.58E-07	0.00E+00	3.30E-05	1.32E-07	5.26E-11
Project	Max	Shrew	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	3.20E-11	1.09E-05	2.12E-11	0.00E+00	0.00E+00	2.35E-11	0.00E+00	1.09E-05	4.34E-08	1.63E-11
Project	Max	Shrew	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	1.05E-10	1.43E-06	6.97E-11	0.00E+00	0.00E+00	7.71E-11	0.00E+00	1.43E-06	5.73E-09	2.07E-12
Project	Max	Shrew	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	3.62E-07	6.23E-06	2.40E-07	0.00E+00	0.00E+00	2.66E-07	0.00E+00	7.10E-06	2.84E-08	9.23E-12
Project	Max	Shrew	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	4.49E-16	7.94E-10	2.97E-16	0.00E+00	0.00E+00	3.29E-16	0.00E+00	7.94E-10	3.17E-12	7.24E-16
Project	Max	Shrew	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	1.20E-10	2.13E-04	7.97E-11	0.00E+00	0.00E+00	8.83E-11	0.00E+00	2.13E-04	8.52E-07	1.94E-10
Project	Max	Shrew	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	2.75E-11	1.15E-05	1.82E-11	0.00E+00	0.00E+00	2.31E-11	0.00E+00	1.15E-05	4.59E-08	1.68E-11
Project	Max	Shrew	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	1.76E-03	2.24E-03	7.10E-05	0.00E+00	0.00E+00	5.55E-02

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

										Dietary Concentrations								EDI					
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg ww
Project	Max	Shrew	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	6.61E-03	8.81E-03	5.18E-05	0.00E+00	0.00E+00	3.54E-03	1.95E-05	1.90E-02	7.61E-05	4.19E-07
Project	Max	Shrew	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	6.61E-04	8.81E-04	5.18E-06	0.00E+00	0.00E+00	1.27E-03	1.95E-06	2.82E-03	1.13E-05	6.20E-08
Project	Max	Shrew	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	7.57E-11	1.08E-05	5.02E-11	0.00E+00	0.00E+00	3.18E-11	0.00E+00	1.08E-05	4.33E-08	1.73E-11
Project	Max	Shrew	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	2.62E-01	3.38E-01	6.32E-03	0.00E+00	0.00E+00	1.00E+00	4.40E-07	1.61E+00	6.44E-03	6.44E-05
Project	Max	Shrew	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	1.15E-10	4.75E-04	7.59E-11	0.00E+00	0.00E+00	8.41E-11	0.00E+00	4.75E-04	1.90E-06	5.88E-10
Project	Max	Shrew	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	3.90E-11	4.35E-06	2.58E-11	0.00E+00	0.00E+00	2.86E-11	0.00E+00	4.35E-06	1.74E-08	6.83E-12
Project	Max	Shrew	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	6.86E-08	3.04E-07	4.54E-08	0.00E+00	0.00E+00	5.03E-08	0.00E+00	4.68E-07	1.87E-09	5.48E-13
Project	Max	Shrew	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	1.77E-10	1.60E-05	1.17E-10	0.00E+00	0.00E+00	1.48E-10	0.00E+00	1.61E-05	6.42E-08	1.89E-11
Project	Max	Shrew	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	8.63E-03	1.08E-02	7.28E-05	0.00E+00	0.00E+00	1.86E-02	1.07E-08	3.81E-02	1.52E-04	4.57E-08
Project	Max	Shrew	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	2.39E-02	3.13E-02	2.24E-05	0.00E+00	0.00E+00	2.71E-02	9.76E-07	8.22E-02	3.29E-04	1.32E-07
Project	Max	Shrew	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	6.49E-05	9.26E-05	1.67E-05	0.00E+00	0.00E+00	2.99E-02	0.00E+00	3.00E-02	1.20E-04	6.27E-07
Project	Max	Shrew	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Shrew	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-05	1.66E-05	6.64E-08	3.99E-10
Project	Max	Shrew	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	6.97E-09	2.56E-08	4.20E-09	0.00E+00	0.00E+00	5.12E-09	0.00E+00	4.18E-08	1.67E-10	2.48E-14
Project	Max	Shrew	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	3.46E-03	4.57E-03	5.00E-05	0.00E+00	0.00E+00	7.26E-04	0.00E+00	8.81E-03	3.52E-05	2.11E-07
Project	Max	Shrew	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	1.65E-10	3.01E-06	3.08E-11	0.00E+00	0.00E+00	1.21E-10	0.00E+00	3.01E-06	1.21E-08	4.08E-12
Project	Max	Shrew	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	4.76E-11	3.51E-06	3.15E-11	0.00E+00	0.00E+00	3.49E-11	0.00E+00	3.51E-06	1.41E-08	5.40E-12
Project	Max	Shrew	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	3.50E-03	4.65E-03	6.54E-04	0.00E+00	0.00E+00	1.30E-02	2.73E-05	2.19E-02	8.74E-05	1.98E-07
Project	Max	Shrew	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Shrew	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-05	1.53E-05	6.11E-08	5.54E-13
Project	Max	Shrew	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	3.81E-01	5.32E-01	3.21E-02	0.00E+00	0.00E+00	1.97E+01	4.19E-07	2.06E+01	8.24E-02	7.42E-06
Project	Max	Vole	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	6.29E-09	3.93E-08	3.57E-10	0.00E+00	0.00E+00	1.21E-10	0.00E+00	4.61E-08	1.06E-09	2.58E-13
Project	Max	Vole	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	6.77E-10	1.36E-08	3.84E-11	0.00E+00	0.00E+00	1.31E-11	0.00E+00	1.44E-08	3.30E-10	8.97E-14
Project	Max	Vole	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.84E-07	6.84E-07	1.57E-08	2.36E-11
Project	Max	Vole	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	1.47E-07	2.70E-07	8.36E-09	0.00E+00	0.00E+00	2.85E-09	0.00E+00	4.29E-07	9.86E-09	3.33E-12
Project	Max	Vole	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.67E-05	6.67E-05	1.53E-06	1.53E-09
Project	Max	Vole	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	1.12E-03	2.88E-03	2.61E-07	0.00E+00	0.00E+00	5.22E-05	1.30E-06	4.06E-03	9.34E-05	1.87E-07
Project	Max	Vole	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.43E-05	7.43E-05	1.71E-06	2.56E-10
Project	Max	Vole	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	5.05E-06	1.05E-04	2.86E-07	0.00E+00	0.00E+00	4.18E-08	0.00E+00	1.10E-04	2.53E-06	1.01E-09
Project	Max	Vole	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	5.92E-11	4.12E-05	3.35E-12	0.00E+00	0.00E+00	1.14E-12	0.00E+00	4.12E-05	9.48E-07	3.56E-10
Project	Max	Vole	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	1.94E-10	5.44E-06	1.10E-11	0.00E+00	0.00E+00	3.76E-12	0.00E+00	5.44E-06	1.25E-07	4.53E-11
Project	Max	Vole	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	6.70E-07	2.37E-05	3.80E-08	0.00E+00	0.00E+00	1.30E-08	0.00E+00	2.44E-05	5.61E-07	1.82E-10
Project	Max	Vole	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	8.30E-16	3.02E-09	4.70E-17	0.00E+00	0.00E+00	1.60E-17	0.00E+00	3.02E-09	6.93E-11	1.58E-14
Project	Max	Vole	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	2.23E-10	8.09E-04	1.26E-11	0.00E+00	0.00E+00	4.30E-12	0.00E+00	8.09E-04	1.86E-05	4.24E-09
Project	Max	Vole	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	5.09E-11	4.36E-05	2.89E-12	0.00E+00	0.00E+00	1.12E-12	0.00E+00	4.36E-05	1.00E-06	3.66E-10
Project	Max	Vole	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	3.25E-03	8.53E-03	1.12E-05	0.00E+00	0.00E+00	2.70E-03	1.13E-06	1.45E-02	3.33E-04	4.00E-08
Project	Max	Vole	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	1.22E-02	3.35E-02	8.19E-06	0.00E+00	0.00E+00	1.72E-04	1.63E-05	4.59E-02	1.06E-03	5.80E-06
Project	Max	Vole	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	1.22E-03	3.35E-03	8.19E-07	0.00E+00	0.00E+00	6.19E-05	1.63E-06	4.63E-03	1.07E-04	5.86E-07
Project	Max	Vole	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	1.40E-10	4.11E-05	7.94E-12	0.00E+00	0.00E+00	1.55E-12	0.00E+00	4.11E-05	9.45E-07	3.77E-10
Project	Max	Vole	Cobalt	#VALUE!	#VALUE!	#N/A	#N/A	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#N/A	#VALUE!	#VALUE!	#VALUE!
Project	Max	Vole	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	4.85E-01	1.28E+00	1.00E-03	0.00E+00	0.00E+00	4.89E-02	3.69E-07	1.82E+00	4.18E-02	4.18E-04
Project	Max	Vole	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	2.12E-10	1.80E-03	1.20E-11	0.00E+00	0.00E+00	4.09E-12	0.00E+00	1.80E-03	4.15E-05	1.29E-08
Project	Max	Vole	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	7.21E-11	1.65E-05	4.09E-12	0.00E+00	0.00E+00	1.39E-12	0.00E+00	1.65E-05	3.80E-07	1.49E-10
Project	Max	Vole	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	1.27E-07	1.15E-06	7.19E-09	0.00E+00	0.00E+00	2.45E-09	0.00E+00	1.29E-06	2.97E-08	8.68E-12
Project	Max	Vole	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	3.27E-10	6.10E-05	1.85E-11	0.00E+00	0.00E+00	7.22E-12	0.00E+00	6.10E-05	1.40E-06	4.12E-10
Project	Max	Vole	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	1.60E-02	4.11E-02	1.15E-05	0.00E+00	0.00E+00	9.05E-04	8.97E-09	5.80E-02	1.33E-03	4.00E-07
Project	Max	Vole	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	4.41E-02	1.19E-01	3.55E-06	0.00E+00	0.00E+00	1.32E-03	8.19E-07	1.64E-01	3.78E-03	1.51E-06
Project	Max	Vole	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	1.20E-04	3.52E-04	2.64E-06	0.00E+00	0.00E+00	1.45E-03	0.00E+00	1.93E-03	4.44E-05	2.32E-07
Project	Max	Vole	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Vole	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-05	1.39E-05	3.21E-07	1.92E-09
Project	Max	Vole	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	1.29E-08	9.71E-08	6.65E-10	0.00E+00	0.00E+00	2.49E-10	0.00E+00	1.11E-07	2.55E-09	3.79E-13
Project	Max	Vole	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	6.40E-03	1.74E-02	7.92E-06	0.00E+00	0.00E+00	3.53E-05	0.00E+00	2.38E-02	5.48E-04	3.29E-06
Project	Max	Vole	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	3.05E-10	1.14E-05	4.87E-12	0.00E+00	0.00E+00	5.89E-12	0.00E+00	1.14E-05	2.63E-07	8.90E-11
Project	Max	Vole	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	8.80E-11	1.33E-05	4.99E-12	0.00E+00	0.00E+00	1.70E-12	0.00E+00	1.33E-05	3.07E-07	1.18E-10
Project	Max	Vole	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	6.48E-03	1.76E-02	1.04E-04	0.00E+00	0.00E+00	6.34E-04	2.29E-05	2.49E-02	5.72E-04	1.30E-06
Project	Max	Vole	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Vole	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-05	1.28E-05	2.95E-07	2.67E-12
Project	Max	Vole	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	7.04E-01	2.02E+00	5.08E-03	0.00E+00	0.00E+00	9.57E-01	3.52E-07	3.69E+00	8.48E-02	7.63E-06
Project	Max	Wolverine	Acenaphthene	4.35E-08	4.35E-07	0.00E+00	4.95E-05	0.00E+00	1.98E-07	2.48E-08	2.23E-07	4.79E-08	0.00E+00	0.00E+00	1.83E-08	3.95E-10	4.68E-10	1.37E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.24E-09	2.24E-08	5.44E-12
Project	Max	Wolverine	Acenaphthylene	4.69E-09	4.69E-08	0.00E+00	1.11E-04	0.00E+00	7.47E-08	2.67E-09	7.73E-08	5.16E-09	0.00E+00	0.00E+00	1.97E-09	4.25E-11	1.62E-10	1.48E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.53E-10	3.53E-09	9.57E-13
Project	Max	Wolverine	Aluminum	0.00E+00	0.00E+00	4.74E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.39E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E-05	0.00E+00	3.73E-07	5.29E-05	5.29E-04	7.94E-07
Project	Max	Wolverine	Anthracene	1.02E-06	1.02E-05	0.00E+00	2.21E-05	0.00E+00	9.49E-07	5.82E-07	1.53E-06	1.12E-06	0.00E+00	0.00E+00	4.28E-07	9.25E-09	3.21E-09	3.22E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.47E-08	4.47E-07	1.51E-10
Project	Max	Wolverine	Antimony	0.00E+00	0.00E+00	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.55E-04	0.00E+00	3.63E-05	7.92E-04	7.92E-03	7.92E-06
Project	Max	Wolverine	Arsenic	7.79E-03	7.79E-02	8.99E-06	1.56E-04	1.63E-02	0.00E+00	7.01E-05	1.64E-02	3.50E-05	4.26E-04	3.54E-02	7.84E-03	7.06E-05	3.43E-05	1.01E-06	0.00E+00	5.49E-05	0.00E+00	7.07E-07	1.62E-04	1.62E-03	3.23E-06
Project	Max	Wolverine	Barium	0.00E+00	0.00E+00	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.05E-04	0.00E+00	4.04E-05	5.46E-04	5.46E-03	8.19E-07
Project	Max	Wolverine	Benz(a)anthracene	3.49E-05	3.49E-04	0.00E+00	1.56E-05	4.57E-04	1.17E-04	1.99E-05	5.94E-04	3.84E-05	2.00E-05	0.00E+00	6.28E-06	3.17E-07	1.25E-06	1.10E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.67E-06	2.67E-05	1.06E-08
Project	Max	Wolverine	Benzo(a)pyrene	4.10E-10	4.10E-09	0.00E+00	3.39E-06	1.35E-04	9.86E-05	2.33E-10	2.34E-04	4.51E-10	2.34E-10	0.00E+00	1.72E-10	3.71E-12	4.90E-07	1.29E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.90E-07	4.90E-06	1.84E-09
Project	Max	Wolverine	Benzo(b)fluoranthene	1.35E-09	1.35E-08	0.00E+00	1.03E-05	1.74E-05	1.35E-05	7.67E-10	3.08E-05	1.48E-09	7.69E-10	0.00E+00	5.64E-10	1.22E-11	6.47E-08	4.25E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.47E-08	6.47E-07	2.34E-10
Project	Max	Wolverine	Benzo(e)pyrene	4.64E-06	4.64E-05	0.00E+00	1.12E-06	4.47E-05	8.70E-05	2.65E-06	1.34E-04	5.10E-06	0.00E+00	0.00E+00	1.95E-06	4.21E-08	2.82E-07	1.46E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.70E-07	4.70E-06	1.53E-09
Project	Max	Wolverine	Benzo(g,h,i)fluoranthene	5.74E-15	5.74E-14	0.00E+00	2.91E-11	1.54E-09	1.56E-08	3.27E-15	1.71E-08	6.32E-15	0.00E+00	0.00E+00	2.41E-15	5.21E-17	3.59E-11	1.81E-16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.59E-11	3.59E-10	8.17E-14

Table D-4 Summary of predicted exposures and meat concentrations for each receptor, scenario, location and chemical

											Dietary Concentrations							EDI						
				Soil	Surface Soil	Surface Water	Air	Plant Deposition	Plant Air	Plant Aboveground	Plant Total	Prey Terrestrial	Lichen Terrestrial	Fish Aquatic	Terr_Invert Terrestrial	Soil EDI	Plant EDI	Prey EDI	Lichen EDI	Fish EDI	Terr_Invert EDI	Water EDI	Total EDI	Total EDI	Tissue Concentration
Scenario	Site	Receptor	Chemical	mg/kg	mg/kg	mg/L	mg/m3	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg dw	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/kg/day	mg/day	mg/kg ww
Project	Max	Wolverine	Benzo(g,h,i)perylene	1.54E-09	1.54E-08	0.00E+00	7.82E-06	4.13E-04	4.17E-03	8.78E-10	4.59E-03	1.70E-09	0.00E+00	0.00E+00	6.46E-10	1.40E-11	9.62E-06	4.86E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.62E-06	9.62E-05	2.19E-08
Project	Max	Wolverine	Benzo(k)fluoranthene	3.52E-10	3.52E-09	0.00E+00	2.85E-06	1.17E-04	1.31E-04	2.01E-10	2.47E-04	3.88E-10	2.01E-10	0.00E+00	1.69E-10	3.19E-12	5.19E-07	1.11E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.19E-07	5.19E-06	1.89E-09
Project	Max	Wolverine	Cadmium	2.25E-02	2.25E-01	7.83E-06	4.50E-04	4.71E-02	0.00E+00	1.26E-03	4.84E-02	1.51E-03	8.29E-03	4.80E-01	4.06E-01	2.04E-04	1.01E-04	4.33E-05	0.00E+00	7.45E-04	0.00E+00	6.16E-07	1.09E-03	1.09E-02	1.31E-06
Project	Max	Wolverine	Chromium	8.46E-02	8.46E-01	1.13E-04	1.69E-03	1.77E-01	0.00E+00	1.27E-02	1.90E-01	1.10E-03	6.27E-03	2.44E-01	2.59E-02	7.67E-04	3.98E-04	3.16E-05	0.00E+00	3.79E-04	0.00E+00	8.90E-06	1.58E-03	1.58E-02	8.72E-05
Project	Max	Wolverine	Chromium VI	8.46E-03	8.46E-02	1.13E-05	1.69E-04	1.77E-02	0.00E+00	1.27E-03	1.90E-02	1.10E-04	6.27E-04	2.44E-02	9.30E-03	7.67E-05	3.98E-05	3.16E-06	0.00E+00	3.79E-05	0.00E+00	8.90E-07	1.58E-04	1.58E-03	8.72E-06
Project	Max	Wolverine	Chrysene	9.70E-10	9.70E-09	0.00E+00	1.55E-05	2.27E-04	6.39E-06	5.53E-10	2.33E-04	1.07E-09	0.00E+00	0.00E+00	2.32E-10	8.79E-12	4.89E-07	3.06E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.89E-07	4.89E-06	1.95E-09
Project	Max	Wolverine	Copper	3.36E+00	3.36E+01	2.56E-06	6.71E-02	7.02E+00	0.00E+00	2.55E-01	7.28E+00	1.34E-01	2.11E-01	1.12E-01	7.35E+00	3.04E-02	1.53E-02	3.85E-03	0.00E+00	1.74E-04	0.00E+00	2.01E-07	4.97E-02	4.97E-01	4.97E-03
Project	Max	Wolverine	Dibenzo(a,h)anthracene	1.47E-09	1.47E-08	0.00E+00	6.57E-06	3.47E-04	9.88E-03	8.36E-10	1.02E-02	1.61E-09	8.37E-10	0.00E+00	6.15E-10	1.33E-11	2.15E-05	4.63E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.15E-05	2.15E-04	6.65E-08
Project	Max	Wolverine	Fluoranthene	4.99E-10	4.99E-09	0.00E+00	8.15E-05	4.58E-05	4.79E-05	2.85E-10	9.37E-05	5.49E-10	0.00E+00	0.00E+00	2.09E-10	4.53E-12	1.97E-07	1.58E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-07	1.97E-06	7.71E-10
Project	Max	Wolverine	Fluorene	8.78E-07	8.78E-06	0.00E+00	2.89E-04	0.00E+00	6.04E-06	5.00E-07	6.54E-06	9.66E-07	0.00E+00	0.00E+00	3.68E-07	7.96E-09	1.37E-08	2.77E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-08	4.94E-07	1.45E-10
Project	Max	Wolverine	Indeno(1,2,3-cd)pyrene	2.26E-09	2.26E-08	0.00E+00	5.90E-06	3.28E-04	1.77E-05	1.29E-09	3.46E-04	2.49E-09	1.29E-09	0.00E+00	1.08E-09	2.05E-11	7.25E-07	7.14E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.25E-07	7.25E-06	2.13E-09
Project	Max	Wolverine	Lead	1.10E-01	1.10E+00	6.21E-08	2.21E-03	2.31E-01	0.00E+00	1.88E-03	2.33E-01	1.55E-03	1.40E-02	1.39E-03	1.36E-01	1.00E-03	4.89E-04	4.44E-05	0.00E+00	2.15E-06	0.00E+00	4.89E-09	1.54E-03	1.54E-02	4.61E-06
Project	Max	Wolverine	Manganese	3.05E-01	3.05E+00	5.68E-06	6.11E-03	6.39E-01	0.00E+00	3.45E-02	6.73E-01	4.76E-04	1.30E-02	0.00E+00	1.98E-01	2.77E-03	1.41E-03	1.37E-05	0.00E+00	0.00E+00	0.00E+00	4.46E-07	4.20E-03	4.20E-02	1.68E-05
Project	Max	Wolverine	Mercury	8.30E-04	8.30E-03	0.00E+00	1.66E-05	1.74E-03	0.00E+00	2.57E-04	1.99E-03	3.55E-04	5.39E-04	0.00E+00	2.18E-01	7.53E-06	4.18E-06	1.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-05	2.19E-04	1.14E-06
Project	Max	Wolverine	Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Wolverine	Molybdenum	0.00E+00	0.00E+00	9.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-03	0.00E+00	7.60E-06	1.99E-03	1.99E-02	1.20E-04
Project	Max	Wolverine	Naphthalene	8.93E-08	8.93E-07	0.00E+00	1.65E-03	0.00E+00	5.06E-07	4.46E-08	5.51E-07	8.93E-08	4.46E-08	0.00E+00	3.74E-08	8.09E-10	1.15E-09	2.56E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.53E-09	4.53E-08	6.72E-12
Project	Max	Wolverine	Nickel	4.43E-02	4.43E-01	0.00E+00	8.86E-04	9.27E-02	0.00E+00	5.76E-03	9.85E-02	1.06E-03	8.60E-03	0.00E+00	5.31E-03	4.02E-04	2.07E-04	3.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E-04	6.39E-03	3.83E-05
Project	Max	Wolverine	Phenanthrene	2.11E-09	2.11E-08	0.00E+00	5.35E-04	0.00E+00	6.49E-05	3.17E-10	6.49E-05	6.55E-10	3.25E-10	0.00E+00	8.85E-10	1.91E-11	1.36E-07	1.88E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-07	1.36E-06	4.60E-10
Project	Max	Wolverine	Pyrene	6.09E-10	6.09E-09	0.00E+00	6.15E-05	3.45E-05	4.12E-05	3.47E-10	7.57E-05	6.70E-10	3.48E-10	0.00E+00	2.55E-10	5.52E-12	1.59E-07	1.92E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-07	1.59E-06	6.10E-10
Project	Max	Wolverine	Selenium	4.48E-02	4.48E-01	1.59E-04	8.97E-04	9.38E-02	0.00E+00	6.28E-03	1.00E-01	1.39E-02	8.12E-03	2.72E+00	9.53E-02	4.07E-04	2.10E-04	3.99E-04	0.00E+00	4.22E-03	0.00E+00	1.25E-05	5.24E-03	5.24E-02	1.19E-04
Project	Max	Wolverine	Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Project	Max	Wolverine	Total Cyanide	0.00E+00	0.00E+00	8.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.36E-07	0.00E+00	6.98E-06	7.42E-06	7.42E-05	6.73E-10
Project	Max	Wolverine	Zinc	4.87E+00	4.87E+01	2.44E-06	9.75E-02	1.02E+01	0.00E+00	1.27E+00	1.15E+01	6.82E-01	1.72E+00	2.53E-02	1.44E+02	4.42E-02	2.40E-02	1.96E-02	0.00E+00	3.93E-05	0.00E+00	1.92E-07	8.78E-02	8.78E-01	7.91E-05

Table D-5 Summary of Exposure Equations Used in the TERA

Eq.	Variable	Parameter	Formulas / Values	Units	Data Reference
1	Soil Deposition (Cs)	Cs	Cs = (Ds * (1 - Exp(-Kt * t))) / Kt	mg/kg	Calculated soil concentration that results from the deposition over time
		Where:			
		Ds	(Dpd + Dwp) / (Z * BD)	mg/kg of soil/year	Deposition to soil
		Dpd	(ConcAir * (1 - Fv) * Vd * 31536000) + (ConcAir * Fv * Vd * 31536000)	mg/m2/year	Calculation of the dry deposition rates for the chemical
		Dwp	(ConcAir * (1 - Fv) * Vw * 31536000) + (ConcAir * Fv * Vw * 31536000)	mg/m2/year	Calculation of the wet deposition rates for the chemical
		BD	1500	kg/m3	Bulk density
		t	14	years	Deposition
		Kt	Kv + Ks		Sum of abiotic/biotic degradation with calculated loss due to volatilization
		Kv	0.693 / (Half life / 365)		
		Half_life	1.58E-08 * ((Koc * S) / VP)	years	
		S	Solubility	mg/L	Table B-19
		Vd, Vw	Depostion velocity	m/s	Table B-16
		Vp	Vapour pressure	mmHg	Table B-20
		Z	Soil Depth	meters	
		Fv	Fraction of Chemical in Vapour Phase	%	Table B-15
2	Surface Water Concentrations		Measured and Predicted Exposure Point Concentrations	mg/L	Raw data
3	Air Concentrations		Measured and Predicted Exposure Point Concentrations	mg/m3	Raw data
4	Plant Deposition (Pd)		Pd = ((Dpd + (0.6 * Dwp)) * Rp * (1 - Exp(-Kp * Tp))) / (Yp * Kp)	mg/kg dw	Calculation of the plant concentration (mg/kg dry weight) from atmospehric deposition
		Where:			
		Y	2.88	unitless	Empirical Constant
		Yp	0.24	kg DW/m2	Yield
		Kp	18	yr-1	Plant surface loss coefficient
		Tp	0.12	years	Period of exposure - years
		Rp	0.5	unitless	Edible portion of plant
		Dpd	(ConcAir * (1 - Fv) * Vd * 31536000)	mg/m2/year	particulate dry deposition rates
		Dwp	(ConcAir * (1 - Fv) * Vw * 31536000)	mg/m2/year	particulate wet deposition rates
		Soil	0.2	meters	
		Surface Soil	0.02	meters	

Table D-5 Summary of Exposure Equations Used in the TERA

Eq.	Variable	Parameter	Formulas / Values	Units	Data Reference
5	Plant Air Concentration (Pv)		Pv = (ConcAir * (Bv / RF) * Fv * VGag) / Pa		Calculation of the estimated plant concentration (mg/kg) for air to plant transfer
		Where:			
		Bv	(1.19 * Bvol) / ((1 - WC) * Pforage)		Mass based air to plant bio transfer factor
		RF	Metals = 1, PAHs/VOCs = 100		Reduction factor
		Fv	Fraction of Chemical in Vapour Phase	%	Table B-15
		Vgag	1		Browse
		Pa	1200	g/m3	Density of air
		Bvol	10 ^ ((1.065 * (Log(Kow) / Log(10)) - (Log(H / (R * t)) / Log(10)) - 1.654))	Unitless	Volumetric air to plant bio transfer factor
		Pforage	770	g/L	Density of forage McCrady and Maggard 1993
		t	2.88	Kelvin	Ambient Temperature
		R	8.20E-05	atm-m3/mol-K	Ideal gas constant
6	Plant Above Ground	Reg	Exp(Constant + slope * Ln(Conc))	mg/kg dw	Table B-23
		Ufv	Conc * BCF	mg/kg dw	Table B-23
7	Plant Total	Plant	[Plant Dep] + [Plant Air] + [Plant Aboveground]	mg/kg dw	Table B-4
8	Prey Terrestrial	Reg	Exp(Constant + slope * Ln(Conc))	mg/kg dw	Table B-23
		Ufv	Conc * BCF		Table B-23
9	Fish Aquatic	Reg	Exp(Constant + slope * Ln(Conc))	mg/kg dw	Table B-23
		Ufv	Conc * BCF		Table B-23
10	Terrestrial Invertebrate	Reg	Exp(Constant + slope * Ln(Conc))	mg/kg dw	Table B-23
		Ufv	Conc * BCF		Table B-23
11	Soil EDI	EDI	[Soil] * (Exposure variable (SIR / BW))	mg/kg/day	Table B-8
12	Plant EDI	EDI	[Plant] * Diet * (NMFR / ME)	mg/kg/day	Tables B-9, B-10, B-11
13	Prey EDI	EDI	[Prey] * Diet * (NMFR / ME)	mg/kg/day	Tables B-9, B-10, B-11
14	Fish EDI	EDI	[Fish] * Diet * (NMFR / ME)	mg/kg/day	Tables B-9, B-10, B-11
15	Terrestrial Invert EDI	EDI	[Terr Invert] * Diet * (NMFR / ME)	mg/kg/day	Tables B-9, B-10, B-11
16	Water EDI	EDI	[Surface Water] * (Exposure variable (WIR / BW))	mg/kg/day	Table B-8
17	Total EDI	EDI	[Soil] + [Plant] + [Prey]+ [Fish]+ [Terrestrial Invert]+ [Water]	mg/kg/day	
18	Total EDI	EDI	Total EDI * Exposure Variable (BW)	mg/day	Table B-8
19	Tissue Concentration		Total EDI * BioTransfer Factors	mg/kg ww	Table B-24

Exposure Limits

Table D-6 Wildlife Oral TRVs

Wildlife Receptor	Chemical	Abbreviation	TRV [mg/kg/day]	Reference / Comment
Arctic_hare	Acenaphthene	Arctic_hare_Acenaphthene	NA	
Arctic_hare	Acenaphthylene	Arctic_hare_Acenaphthylene	NA	
Arctic_hare	Aluminum	Arctic_hare_Aluminum	19.3	LOAEL; US EPA 1999
Arctic_hare	Anthracene	Arctic_hare_Anthracene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Antimony	Arctic_hare_Antimony	0.059	Eco-SSL (US EPA 2003)
Arctic_hare	Arsenic	Arctic_hare_Arsenic	1.04	Eco-SSL (US EPA 2003)
Arctic_hare	Barium	Arctic_hare_Barium	51.8	Eco-SSL (US EPA 2003)
Arctic_hare	Benz(a)anthracene	Arctic_hare_Benz(a)anthracene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Benzo(a)pyrene	Arctic_hare_Benzo(a)pyrene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Benzo(b)fluoranther	Arctic_hare_Benzo(b)fluoranthene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Benzo(e)pyrene	Arctic_hare_Benzo(e)pyrene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Benzo(g,h,i)fluorant	Arctic_hare_Benzo(g,h,i)fluoranthene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Benzo(g,h,i)perylen	Arctic_hare_Benzo(g,h,i)perylene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Benzo(k)fluoranther	Arctic_hare_Benzo(k)fluoranthene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Cadmium	Arctic_hare_Cadmium	0.77	Eco-SSL (US EPA 2003)
Arctic_hare	Chromium	Arctic_hare_Chromium	2.4	Eco-SSL (US EPA 2003)
Arctic_hare	Chromium VI	Arctic_hare_Chromium VI	5.66	Eco-SSL (US EPA 2003)
Arctic_hare	Chrysene	Arctic_hare_Chrysene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Copper	Arctic_hare_Copper	12	NOAEL; US EPA 1999
Arctic_hare	Dibenzo(a,h)anthra	Arctic_hare_Dibenzo(a,h)anthracene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Fluoranthene	Arctic_hare_Fluoranthene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Fluorene	Arctic_hare_Fluorene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Indeno(1,2,3-cd)pyr	Arctic_hare_Indeno(1,2,3-cd)pyrene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Lead	Arctic_hare_Lead	4.7	Eco-SSL (US EPA 2003)
Arctic_hare	Manganese	Arctic_hare_Manganese	NA	
Arctic_hare	Mercury	Arctic_hare_Mercury	1.01	NOAEL; US EPA 1999
Arctic_hare	Mercury Methyl	Arctic_hare_Mercury Methyl	0.032	NOAEL; US EPA 1999
Arctic_hare	Molybdenum	Arctic_hare_Molybdenum	NA	
Arctic_hare	Naphthalene	Arctic_hare_Naphthalene	NA	
Arctic_hare	Nickel	Arctic_hare_Nickel	1.7	Eco-SSL (US EPA 2003)
Arctic_hare	Phenanthrene	Arctic_hare_Phenanthrene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Pyrene	Arctic_hare_Pyrene	0.1	US EPA 1999; Total HMW PAH
Arctic_hare	Selenium	Arctic_hare_Selenium	0.76	LOAEL; US EPA 1999
Arctic_hare	Silver	Arctic_hare_Silver	6.02	Eco-SSL (US EPA 2003)
Arctic_hare	Total Cyanide	Arctic_hare_Total Cyanide	24	NOAEL; US EPA (1999)
Arctic_hare	Zinc	Arctic_hare_Zinc	104	NOAEL; US EPA 1999
Caribou	Acenaphthene	Caribou_Acenaphthene	NA	
Caribou	Acenaphthylene	Caribou_Acenaphthylene	NA	
Caribou	Aluminum	Caribou_Aluminum	19.3	LOAEL; US EPA 1999
Caribou	Anthracene	Caribou_Anthracene	0.1	US EPA 1999; Total HMW PAH
Caribou	Antimony	Caribou_Antimony	0.059	Eco-SSL (US EPA 2003)
Caribou	Arsenic	Caribou_Arsenic	1.04	Eco-SSL (US EPA 2003)
Caribou	Barium	Caribou_Barium	51.8	Eco-SSL (US EPA 2003)
Caribou	Benz(a)anthracene	Caribou_Benz(a)anthracene	0.1	US EPA 1999; Total HMW PAH
Caribou	Benzo(a)pyrene	Caribou_Benzo(a)pyrene	0.1	US EPA 1999; Total HMW PAH
Caribou	Benzo(b)fluoranther	Caribou_Benzo(b)fluoranthene	0.1	US EPA 1999; Total HMW PAH
Caribou	Benzo(e)pyrene	Caribou_Benzo(e)pyrene	0.1	US EPA 1999; Total HMW PAH
Caribou	Benzo(g,h,i)fluorant	Caribou_Benzo(g,h,i)fluoranthene	0.1	US EPA 1999; Total HMW PAH
Caribou	Benzo(g,h,i)perylen	Caribou_Benzo(g,h,i)perylene	0.1	US EPA 1999; Total HMW PAH
Caribou	Benzo(k)fluoranther	Caribou_Benzo(k)fluoranthene	0.1	US EPA 1999; Total HMW PAH
Caribou	Cadmium	Caribou_Cadmium	0.77	Eco-SSL (US EPA 2003)
Caribou	Chromium	Caribou_Chromium	2.4	Eco-SSL (US EPA 2003)
Caribou	Chromium VI	Caribou_Chromium VI	5.66	Eco-SSL (US EPA 2003)
Caribou	Chrysene	Caribou_Chrysene	0.1	US EPA 1999; Total HMW PAH
Caribou	Copper	Caribou_Copper	12	NOAEL; US EPA 1999
Caribou	Dibenzo(a,h)anthra	Caribou_Dibenzo(a,h)anthracene	0.1	US EPA 1999; Total HMW PAH
Caribou	Fluoranthene	Caribou_Fluoranthene	0.1	US EPA 1999; Total HMW PAH
Caribou	Fluorene	Caribou_Fluorene	0.1	US EPA 1999; Total HMW PAH
Caribou	Indeno(1,2,3-cd)pyr	Caribou_Indeno(1,2,3-cd)pyrene	0.1	US EPA 1999; Total HMW PAH
Caribou	Lead	Caribou_Lead	4.7	Eco-SSL (US EPA 2003)
Caribou	Manganese	Caribou_Manganese	NA	

Exposure Variables

Table D-7 Estimation of Average Metabolizable Energy

Receptor	**Percent Soil in Diet**
wolverine	2.8%

NFMR		**Percent Sediment in Diet**
1.34E+02	kcal/kg/day	#N/A
1.34E+03	kcal/day	
1.34E+06	cal/day	

BW	
1.00E+01	kg

Estimation of Average Metabolizable Energy				**EPA Method**	**CEI Method**
		GE	AE	MEavg	FIR
Diet	Portion	[kcal/kg-DW]	[%]	kcal/kg-DW	kg/day
Fish	5%	4900	88%	2.16.E+02	1.55E-02
Terr_Invert	0%	5400	87%	0.00.E+00	0.00E+00
Lichen	0%	4300	41%	0.00.E+00	0.00E+00
Plant	5%	4200	76%	1.60.E+02	2.10E-02
Prey	90%	5000	84%	3.78.E+03	2.87E-01
	100%		**Sum**	**4.16E+03**	**3.23E-01**
			Estimation of Total Ingestion Rate [kg-food / day]	3.22E-01	3.23E-01
			Soil Ingestion Rate [kg-soil / day]	9.02E-03	9.05E-03
			Sediment Ingestion Rate [kg-sediment / day]	#N/A	#N/A
			Estimation of Total Ingestion Rate [kg-food / kg-BW day]	3.22E-02	3.23E-02

Table D-8. Receptor Exposure Variables

Receptor	Variable	Abbreviation	Value	Units	Reference/Comments
Arctic_hare	BW	BW_Arctic_hare	4.50E+00	kg-WW	Usher (2000)
Caribou	BW	BW_Caribou	1.00E+02	kg-WW	Adult females range from 80 to 120 kg; Used mid value (ADFG 1999)
Fox	BW	BW_Fox	3.94E+00	kg-WW	Adult female fall body weight (EPA 1993)
Peregrine_falcon	BW	BW_Peregrine_falcon	9.10E-01	kg-WW	Adult female (HWW 2007)
Ptarmigan	BW	BW_Ptarmigan	5.75E-01	kg-WW	Several species range from 350 to 800 grams; Used mid-value (HWW 2007)
Shrew	BW	BW_Shrew	4.00E-03	kg-WW	Range of 2 to 6 grams for masked shrew; used mid-value (Pattie & Fisher 1999)
Vole	BW	BW_Vole	2.30E-02	kg-WW	Site-specific data from Gartner Lee
Wolverine	BW	BW_Wolverine	1.00E+01	kg-WW	Adult female weight ranges from 8 to 12 kg (HWW 2007)
Arctic_hare	SIR	SIR_Arctic_hare	1.03E-02	kg/day	Calculated
Caribou	SIR	SIR_Caribou	2.84E-02	kg/day	Calculated
Fox	SIR	SIR_Fox	2.66E-03	kg/day	Calculated
Arctic_hare	SIR_Percent	SIR_Percent_Arctic_hare	6.3%	% of Diet	Suter et al. 2000; used jackrabbit
Caribou	SIR_Percent	SIR_Percent_Caribou	2.0%	% of Diet	Used detection limit; Assumed similar to other herbivores like white-tailed deer, mule deer, elk and moose which are <2% (Beyer et al. 1994)
Fox	SIR_Percent	SIR_Percent_Fox	2.8%	% of Diet	Beyer et al. 1994
Peregrine_falcon	SIR_Percent	SIR_Percent_Peregrine_falcon	0.0%	% of Diet	Predatory diet limits soil ingestion; Assumed zero
Ptarmigan	SIR_Percent	SIR_Percent_Ptarmigan	9.3%	% of Diet	Assumed similar to wild turkey (Beyer et al. 1994
Shrew	SIR_Percent	SIR_Percent_Shrew	2.4%	% of Diet	Used max between other herbivores like white-footed mouse and meadow vole (Beyer et al. 1994)
Vole	SIR_Percent	SIR_Percent_Vole	13.0%	% of Diet	Assumed similar to another insectivore like short-tailed shrew (Suter et al. 2000)
Wolverine	SIR_Percent	SIR_Percent_Wolverine	2.8%	% of Diet	Assumed similar to another carnivore like fox
Peregrine_falcon	SIR	SIR_Peregrine_falcon	0.00E+00	kg/day	Calculated
Ptarmigan	SIR	SIR_Ptarmigan	4.48E-03	kg/day	Calculated
Shrew	SIR	SIR_Shrew	3.12E-05	kg/day	Calculated
Vole	SIR	SIR_Vole	3.32E-04	kg/day	Calculated
Wolverine	SIR	SIR_Wolverine	9.07E-03	kg/day	Calculated
Arctic_hare	WIR	WIR_Arctic_hare	3.83E-01	L/day	Allometric equation 3-17; US EPA 1993
Caribou	WIR	WIR_Caribou	6.25E+00	L/day	Allometric equation 3-17; US EPA 1993
Fox	WIR	WIR_Fox	3.40E-01	L/day	Allometric equation 3-17; US EPA 1993
Peregrine_falcon	WIR	WIR_Peregrine_falcon	5.54E-02	L/day	Allometric equation 3-15 (US EPA 1993)
Ptarmigan	WIR	WIR_Ptarmigan	4.07E-02	L/day	Allometric equation 3-15 (US EPA 1993)
Shrew	WIR	WIR_Shrew	6.88E-04	L/day	Allometric equation 3-17; US EPA 1993
Vole	WIR	WIR_Vole	3.32E-03	L/day	Allometric equation 3-17; US EPA 1993
Wolverine	WIR	WIR_Wolverine	7.86E-01	L/day	Allometric equation 3-17; US EPA 1993

Table D-9 Receptor Dietary Composition [Media % of Diet]

Receptor	Media	Abbreviation	Value
Arctic_hare	Fish	Arctic_hare_Fish	0.0%
Arctic_hare	Terr_Invert	Arctic_hare_Terr_Invert	0.0%
Arctic_hare	Lichen	Arctic_hare_Lichen	0.0%
Arctic_hare	Plant	Arctic_hare_Plant	100.0%
Arctic_hare	Prey	Arctic_hare_Prey	0.0%
Caribou	Fish	Caribou_Fish	0.0%
Caribou	Terr_Invert	Caribou_Terr_Invert	0.0%
Caribou	Lichen	Caribou_Lichen	50.0%
Caribou	Plant	Caribou_Plant	50.0%
Caribou	Prey	Caribou_Prey	0.0%
Fox	Fish	Fox_Fish	5.0%
Fox	Terr_Invert	Fox_Terr_Invert	5.0%
Fox	Lichen	Fox_Lichen	5.0%
Fox	Plant	Fox_Plant	5.0%
Fox	Prey	Fox_Prey	80.0%
Peregrine_falcon	Fish	Peregrine_falcon_Fish	0.0%
Peregrine_falcon	Terr_Invert	Peregrine_falcon_Terr_Invert	0.0%
Peregrine_falcon	Lichen	Peregrine_falcon_Lichen	0.0%
Peregrine_falcon	Plant	Peregrine_falcon_Plant	0.0%
Peregrine_falcon	Prey	Peregrine_falcon_Prey	100.0%
Ptarmigan	Fish	Ptarmigan_Fish	0.0%
Ptarmigan	Terr_Invert	Ptarmigan_Terr_Invert	10.0%
Ptarmigan	Lichen	Ptarmigan_Lichen	30.0%
Ptarmigan	Plant	Ptarmigan_Plant	60.0%
Ptarmigan	Prey	Ptarmigan_Prey	0.0%
Shrew	Fish	Shrew_Fish	0.0%
Shrew	Terr_Invert	Shrew_Terr_Invert	65.0%
Shrew	Lichen	Shrew_Lichen	0.0%
Shrew	Plant	Shrew_Plant	15.0%
Shrew	Prey	Shrew_Prey	20.0%
Vole	Fish	Vole_Fish	0.0%
Vole	Terr_Invert	Vole_Terr_Invert	5.0%
Vole	Lichen	Vole_Lichen	0.0%
Vole	Plant	Vole_Plant	90.0%
Vole	Prey	Vole_Prey	5.0%
Wolverine	Fish	Wolverine_Fish	5.0%
Wolverine	Terr_Invert	Wolverine_Terr_Invert	0.0%
Wolverine	Lichen	Wolverine_Lichen	0.0%
Wolverine	Plant	Wolverine_Plant	5.0%
Wolverine	Prey	Wolverine_Prey	90.0%

Table D-10 Normalized to Body Weight Free-living (Field) Metabolic Rate (NFMR)

Receptor	NFMR [kcal/kg bw/day] [A]	FMR [kcal/day] [B]	Body Weight [grams]	a	b	Reference/Comments
Arctic_hare	9.66E+01	4.35E+02	4.50E+03	7.94E+00	6.46E-01	Used equation for herbivores (Nagy et al. 1999)
Caribou	3.22E+01	3.22E+03	1.00E+05	7.94E+00	6.46E-01	Used equation for herbivores (Nagy et al. 1999)
Fox	1.00E+02	3.95E+02	3.94E+03	6.03E+00	6.78E-01	Used equation for omnivores (Nagy et al. 1999)
Peregrine_falcon	2.86E+02	2.60E+02	9.10E+02	1.05E+01	6.81E-01	Used equation for all birds (Nagy et al. 1999)
Ptarmigan	1.57E+02	9.01E+01	5.75E+02	8.51E-01	9.59E-01	Used equation for galliformes (Nagy et al. 1999)
Shrew	9.88E+02	3.95E+00	4.00E+00	6.98E+00	6.22E-01	Used equation for insectivores (Nagy et al. 1999)
Vole	6.25E+02	1.44E+01	2.30E+01	7.94E+00	6.46E-01	Used equation for insectivores (Nagy et al. 1999)
Wolverine	1.34E+02	1.34E+03	1.00E+04	2.23E+00	8.50E-01	Used equation for carnivores (Nagy et al. 1999)

A) NFMR = Normalized Free Metabolic Rate = FMR / BW; Where BW is in kg

B) FMR = Free Metabolic Rate [kcal/day] = (a x BW^{b}) / 4.184 Kj/calorie; Where BW is in grams

Table D-11 Metabolizable Energy (ME) of Dietary Items [kcal/kg] [A]

Receptor	Dietary Item	Abbreviation	Value
Arctic_hare	Plant	Arctic_hare_Plant	3192
Arctic_hare	Prey	Arctic_hare_Prey	4200
Arctic_hare	Fish	Arctic_hare_Fish	4312
Arctic_hare	Terr_Invert	Arctic_hare_Terr_Invert	4698
Arctic_hare	Lichen	Arctic_hare_Lichen	1763
Caribou	Plant	Caribou_Plant	3192
Caribou	Prey	Caribou_Prey	4200
Caribou	Fish	Caribou_Fish	4312
Caribou	Terr_Invert	Caribou_Terr_Invert	4698
Caribou	Lichen	Caribou_Lichen	1763
Fox	Plant	Fox_Plant	3192
Fox	Prey	Fox_Prey	4200
Fox	Fish	Fox_Fish	4312
Fox	Terr_Invert	Fox_Terr_Invert	4698
Fox	Lichen	Fox_Lichen	1763
Peregrine_falcon	Plant	Peregrine_falcon_Plant	1974
Peregrine_falcon	Prey	Peregrine_falcon_Prey	3900
Peregrine_falcon	Fish	Peregrine_falcon_Fish	4312
Peregrine_falcon	Terr_Invert	Peregrine_falcon_Terr_Invert	3888
Peregrine_falcon	Lichen	Peregrine_falcon_Lichen	1462
Ptarmigan	Plant	Ptarmigan_Plant	1974
Ptarmigan	Prey	Ptarmigan_Prey	3900
Ptarmigan	Fish	Ptarmigan_Fish	4312
Ptarmigan	Terr_Invert	Ptarmigan_Terr_Invert	3888
Ptarmigan	Lichen	Ptarmigan_Lichen	1462
Shrew	Plant	Shrew_Plant	3192
Shrew	Prey	Shrew_Prey	4200
Shrew	Fish	Shrew_Fish	4312
Shrew	Terr_Invert	Shrew_Terr_Invert	4698
Shrew	Lichen	Shrew_Lichen	1763
Vole	Plant	Vole_Plant	3192
Vole	Prey	Vole_Prey	4200
Vole	Fish	Vole_Fish	4312
Vole	Terr_Invert	Vole_Terr_Invert	4698
Vole	Lichen	Vole_Lichen	1763
Wolverine	Plant	Wolverine_Plant	3192
Wolverine	Prey	Wolverine_Prey	4200
Wolverine	Fish	Wolverine_Fish	4312
Wolverine	Terr_Invert	Wolverine_Terr_Invert	4698
Wolverine	Lichen	Wolverine_Lichen	1763

A) US EPA 1993; Equation 4-17

Table D-12 Gross Energy (GE) of Dietary Items [kcal/kg dw] [A]

Receptor	Dietary Item	Abbreviation	Value	Reference/Comments
Arctic_hare	Fish	Arctic_hare_Fish	4900	Bony fishes
Arctic_hare	Terr_Invert	Arctic_hare_Terr_Invert	5400	Grasshoppers and crickets
Arctic_hare	Lichen	Arctic_hare_Lichen	4300	Stems and branches
Arctic_hare	Plant	Arctic_hare_Plant	4200	Young moncot grasses
Arctic_hare	Prey	Arctic_hare_Prey	5000	Mice, voles and rabbits
Caribou	Fish	Caribou_Fish	4900	Bony fishes
Caribou	Terr_Invert	Caribou_Terr_Invert	5400	Grasshoppers and crickets
Caribou	Lichen	Caribou_Lichen	4300	Stems and branches
Caribou	Plant	Caribou_Plant	4200	Young moncot grasses
Caribou	Prey	Caribou_Prey	5000	Mice, voles and rabbits
Fox	Fish	Fox_Fish	4900	Bony fishes
Fox	Terr_Invert	Fox_Terr_Invert	5400	Grasshoppers and crickets
Fox	Lichen	Fox_Lichen	4300	Stems and branches
Fox	Plant	Fox_Plant	4200	Young moncot grasses
Fox	Prey	Fox_Prey	5000	Mice, voles and rabbits
Peregrine_falcon	Fish	Peregrine_falcon_Fish	4900	Bony fishes
Peregrine_falcon	Terr_Invert	Peregrine_falcon_Terr_Invert	5400	Grasshoppers and crickets
Peregrine_falcon	Lichen	Peregrine_falcon_Lichen	4300	Stems and branches
Peregrine_falcon	Plant	Peregrine_falcon_Plant	4200	Young moncot grasses
Peregrine_falcon	Prey	Peregrine_falcon_Prey	5000	Mice, voles and rabbits
Ptarmigan	Fish	Ptarmigan_Fish	4900	Bony fishes
Ptarmigan	Terr_Invert	Ptarmigan_Terr_Invert	5400	Grasshoppers and crickets
Ptarmigan	Lichen	Ptarmigan_Lichen	4300	Stems and branches
Ptarmigan	Plant	Ptarmigan_Plant	4200	Young moncot grasses
Ptarmigan	Prey	Ptarmigan_Prey	5000	Mice, voles and rabbits
Shrew	Fish	Shrew_Fish	4900	Bony fishes
Shrew	Terr_Invert	Shrew_Terr_Invert	5400	Grasshoppers and crickets
Shrew	Lichen	Shrew_Lichen	4300	Stems and branches
Shrew	Plant	Shrew_Plant	4200	Young moncot grasses
Shrew	Prey	Shrew_Prey	5000	Mice, voles and rabbits
Vole	Fish	Vole_Fish	4900	Bony fishes
Vole	Terr_Invert	Vole_Terr_Invert	5400	Grasshoppers and crickets
Vole	Lichen	Vole_Lichen	4300	Stems and branches
Vole	Plant	Vole_Plant	4200	Young moncot grasses
Vole	Prey	Vole_Prey	5000	Mice, voles and rabbits
Wolverine	Fish	Wolverine_Fish	4900	Bony fishes
Wolverine	Terr_Invert	Wolverine_Terr_Invert	5400	Grasshoppers and crickets
Wolverine	Lichen	Wolverine_Lichen	4300	Stems and branches
Wolverine	Plant	Wolverine_Plant	4200	Young moncot grasses
Wolverine	Prey	Wolverine_Prey	5000	Mice, voles and rabbits

A) US EPA 1993; Tables 4-1 & 4-2

Table D-13 Assimilation Efficiency (AE) of Dietary Items [Percent% Efficiency] [A]

Receptor	Dietary Item	Abbreviation	Value	Reference/Comments
Arctic_hare	Fish	Arctic_hare_Fish	88%	Mammals eating fish
Arctic_hare	Terr_Invert	Arctic_hare_Terr_Invert	87%	Insects
Arctic_hare	Lichen	Arctic_hare_Lichen	41%	Assumed similar to mature grasses
Arctic_hare	Plant	Arctic_hare_Plant	76%	Herbivory
Arctic_hare	Prey	Arctic_hare_Prey	84%	Small birds and mammals
Caribou	Fish	Caribou_Fish	88%	Mammals eating fish
Caribou	Terr_Invert	Caribou_Terr_Invert	87%	Insects
Caribou	Lichen	Caribou_Lichen	41%	Assumed similar to mature grasses
Caribou	Plant	Caribou_Plant	76%	Herbivory
Caribou	Prey	Caribou_Prey	84%	Small birds and mammals
Fox	Fish	Fox_Fish	88%	Mammals eating fish
Fox	Terr_Invert	Fox_Terr_Invert	87%	Insects
Fox	Lichen	Fox_Lichen	41%	Assumed similar to mature grasses
Fox	Plant	Fox_Plant	76%	Herbivory
Fox	Prey	Fox_Prey	84%	Small birds and mammals
Peregrine_falcon	Fish	Peregrine_falcon_Fish	88%	Mammals eating fish
Peregrine_falcon	Terr_Invert	Peregrine_falcon_Terr_Invert	72%	Terrestrial insects
Peregrine_falcon	Lichen	Peregrine_falcon_Lichen	34%	Stems, twigs, pine needles
Peregrine_falcon	Plant	Peregrine_falcon_Plant	47%	Grasses and leaves
Peregrine_falcon	Prey	Peregrine_falcon_Prey	78%	Birds and small mammals
Ptarmigan	Fish	Ptarmigan_Fish	88%	Mammals eating fish
Ptarmigan	Terr_Invert	Ptarmigan_Terr_Invert	72%	Terrestrial insects
Ptarmigan	Lichen	Ptarmigan_Lichen	34%	Stems, twigs, pine needles
Ptarmigan	Plant	Ptarmigan_Plant	47%	Grasses and leaves
Ptarmigan	Prey	Ptarmigan_Prey	78%	Birds and small mammals
Shrew	Fish	Shrew_Fish	88%	Mammals eating fish
Shrew	Terr_Invert	Shrew_Terr_Invert	87%	Insects
Shrew	Lichen	Shrew_Lichen	41%	Assumed similar to mature grasses
Shrew	Plant	Shrew_Plant	76%	Herbivory
Shrew	Prey	Shrew_Prey	84%	Small birds and mammals
Vole	Fish	Vole_Fish	88%	Mammals eating fish
Vole	Terr_Invert	Vole_Terr_Invert	87%	Insects
Vole	Lichen	Vole_Lichen	41%	Assumed similar to mature grasses
Vole	Plant	Vole_Plant	76%	Herbivory
Vole	Prey	Vole_Prey	84%	Small birds and mammals
Wolverine	Fish	Wolverine_Fish	88%	Mammals eating fish
Wolverine	Terr_Invert	Wolverine_Terr_Invert	87%	Insects
Wolverine	Lichen	Wolverine_Lichen	41%	Assumed similar to mature grasses
Wolverine	Plant	Wolverine_Plant	76%	Herbivory
Wolverine	Prey	Wolverine_Prey	84%	Small birds and mammals

A) US EPA 1993; Table 4-3

Physical and Chemical Properties

Table D-14 Chemical Kow Values

Chemical	Value	Reference/Comment
Acenaphthene	7943	US EPA OSW 2005
Acenaphthylene	11749	Mackay et al 1992
Aluminum	NA	
Anthracene	31623	US EPA OSW 2005
Antimony	NA	
Arsenic	NA	
Barium	NA	
Benz(a)anthracene	501187	US EPA OSW 2005
Benzo(a)pyrene	1000000	US EPA OSW 2005
Benzo(b)fluoranthene	1330454	US EPA OSW 2005
Benzo(e)pyrene	2511886	Mackay et al 1992
Benzo(g,h,i)fluoranthene	10000000	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	10000000	Mackay et al 1992
Benzo(k)fluoranthene	1258925	US EPA OSW 2005
Cadmium	NA	
Chromium	NA	
Chromium VI	NA	
Chrysene	501187	
Copper	NA	
Dibenzo(a,h)anthracene	3162278	US EPA OSW 2005
Fluoranthene	100000	US EPA OSW 2005
Fluorene	15845	US EPA OSW 2005
Indeno(1,2,3-cd)pyrene	3981072	US EPA OSW 2005
Lead	NA	
Manganese	NA	
Mercury	NA	
Mercury Methyl	NA	
Molybdenum	NA	
Naphthalene	1995	US EPA OSW 2005
Nickel	NA	
Phenanthrene	31623	US EPA OSW 2005
Pyrene	79433	US EPA OSW 2005
Selenium	NA	
Silver	NA	
Total Cyanide	0.204	US EPA OSW 2005
Zinc	NA	

Table D-15 Fraction of Chemical in Vapour Phase [%]

Chemical	Value	Reference/Comment
Acenaphthene	100%	US EPA OSW 2005
Acenaphthylene	100%	Assume = acenaphthene
Aluminum	0%	
Anthracene	100%	US EPA OSW 2005
Antimony	0%	
Arsenic	0%	
Barium	0%	
Benz(a)anthracene	48%	US EPA OSW 2005
Benzo(a)pyrene	29%	US EPA OSW 2005
Benzo(b)fluoranthene	97%	US EPA OSW 2005
Benzo(e)pyrene	29%	Assumed = benzo(a)pyrene
Benzo(g,h,i)fluoranthene	6%	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	6%	Assumed = dibenzo(a,h)anthracene
Benzo(k)fluoranthene	27%	US EPA OSW 2005
Cadmium	0%	
Chromium	0%	
Chromium VI	0%	
Chrysene	74%	US EPA OSW 2005
Copper	0%	
Dibenzo(a,h)anthracene	6%	
Fluoranthene	99%	US EPA OSW 2005
Fluorene	100%	US EPA OSW 2005
Indeno(1,2,3-cd)pyrene	1%	US EPA OSW 2005
Lead	0%	
Manganese	0%	
Mercury	0%	
Mercury Methyl	0%	
Molybdenum	0%	
Naphthalene	100%	US EPA OSW 2005
Nickel	0%	
Phenanthrene	100%	US EPA OSW 2005
Pyrene	99%	US EPA OSW 2005
Selenium	0%	
Silver	0%	
Total Cyanide	100%	Assumed due to high vapour pressure
Zinc	0%	

Table D-16 Deposition Velocity [m/s]

Chemical	Wet Deposition Velocity	Dry Deposition Velocity	Reference (Wet)	Reference (Dry)
Acenaphthene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Acenaphthylene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Aluminum	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Anthracene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Antimony	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Arsenic	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Barium	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Benz(a)anthracene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Benzo(a)pyrene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Benzo(b)fluoranthene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Benzo(e)pyrene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Benzo(g,h,i)fluoranthene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Benzo(g,h,i)perylene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Benzo(k)fluoranthene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Cadmium	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Chromium	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Chromium VI	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Chrysene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Copper	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Dibenzo(a,h)anthracene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Fluoranthene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Fluorene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Indeno(1,2,3-cd)pyrene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Lead	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Manganese	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Mercury	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Mercury Methyl	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Molybdenum	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Naphthalene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Nickel	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Phenanthrene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Pyrene	4.0E-03	1.5E-02	Mackay 1991	Extrapolation from Wesley and Hicks 2000
Selenium	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Silver	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Total Cyanide	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005
Zinc	4.0E-03	3.0E-02	Mackay 1991	US EPA OSW 2005

Table D-17 Henry's Constant [atm m^3 / mol]

Chemical	Value	H [Pa m^3/mol]	H' [Unitless]	Reference/Comment
Acenaphthene	1.60E-04	1.62E+01	6.56E-03	US EPA OSW 2005
Acenaphthylene	1.45E-03	1.47E+02	5.95E-02	Mackay et al 1992
Aluminum	0.00E+00	0.00E+00	0.00E+00	Assumed
Anthracene	6.50E-05	6.59E+00	2.67E-03	US EPA OSW 2005
Antimony	0.00E+00	0.00E+00	0.00E+00	Assumed
Arsenic	0.00E+00	0.00E+00	0.00E+00	Assumed
Barium	0.00E+00	0.00E+00	0.00E+00	Assumed
Benz(a)anthracene	3.40E-06	3.45E-01	1.39E-04	US EPA OSW 2005
Benzo(a)pyrene	1.10E-06	1.11E-01	4.51E-05	US EPA OSW 2005
Benzo(b)fluoranthene	1.11E-04	1.12E+01	4.55E-03	US EPA OSW 2005
Benzo(e)pyrene	1.10E-06	1.11E-01	4.51E-05	Assumed = benzo(a)pyrene
Benzo(g,h,i)fluoranthene	1.44E-07	1.46E-02	5.91E-06	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	1.44E-07	1.46E-02	5.91E-06	US EPA OSW 2005
Benzo(k)fluoranthene	8.30E-07	8.41E-02	3.40E-05	US EPA OSW 2005
Cadmium	0.00E+00	0.00E+00	0.00E+00	Assumed
Chromium	0.00E+00	0.00E+00	0.00E+00	Assumed
Chromium VI	0.00E+00	0.00E+00	0.00E+00	Assumed
Chrysene	9.50E-05	9.63E+00	3.90E-03	US EPA OSW 2005
Copper	0.00E+00	0.00E+00	0.00E+00	Assumed
Dibenzo(a,h)anthracene	1.50E-08	1.52E-03	6.15E-07	US EPA OSW 2005
Fluoranthene	1.60E-05	1.62E+00	6.56E-04	US EPA OSW 2005
Fluorene	6.40E-05	6.48E+00	2.62E-03	US EPA OSW 2005
Indeno(1,2,3-cd)pyrene	1.60E-06	1.62E-01	6.56E-05	US EPA OSW 2005
Lead	0.00E+00	0.00E+00	0.00E+00	Assumed
Manganese	0.00E+00	0.00E+00	0.00E+00	Assumed
Mercury	0.00E+00	0.00E+00	0.00E+00	Assumed
Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	Assumed
Molybdenum	0.00E+00	0.00E+00	0.00E+00	Assumed
Naphthalene	4.80E-04	4.86E+01	1.97E-02	US EPA OSW 2005
Nickel	0.00E+00	0.00E+00	0.00E+00	Assumed
Phenanthrene	2.30E-05	2.33E+00	9.43E-04	US EPA OSW 2005
Pyrene	1.10E-05	1.11E+00	4.51E-04	US EPA OSW 2005
Selenium	0.00E+00	0.00E+00	0.00E+00	Assumed
Silver	0.00E+00	0.00E+00	0.00E+00	Assumed
Total Cyanide	2.40E-02	2.43E+03	9.84E-01	US EPA OSW 2005
Zinc	0.00E+00	0.00E+00	0.00E+00	Assumed

Table D-18 Chemical Groups

Chemical	Group
Acenaphthene	VOC
Acenaphthylene	VOC
Aluminum	Metal
Anthracene	PAH
Antimony	Metal
Arsenic	Metal
Barium	Metal
Benz(a)anthracene	PAH
Benzo(a)pyrene	PAH
Benzo(b)fluoranthene	PAH
Benzo(e)pyrene	PAH
Benzo(g,h,i)fluoranthene	PAH
Benzo(g,h,i)perylene	PAH
Benzo(k)fluoranthene	PAH
Cadmium	Metal
Chromium	Metal
Chromium VI	Metal
Chrysene	PAH
Copper	Metal
Dibenzo(a,h)anthracene	PAH
Fluoranthene	PAH
Fluorene	PAH
Indeno(1,2,3-cd)pyrene	PAH
Lead	Metal
Manganese	Metal
Mercury	Metal
Mercury Methyl	Metal
Molybdenum	Metal
Naphthalene	PAH
Nickel	Metal
Phenanthrene	PAH
Pyrene	PAH
Selenium	Metal
Silver	Metal
Total Cyanide	Metal
Zinc	Metal

Table D-19 Solubility [mg/L] or [ppm]

Chemical	Value	S [kg/m3]	Reference/Comment
Acenaphthene	3.60E+00	1.45E-07	US EPA OSW 2005
Acenaphthylene	3.90E+00	1.45E-07	Mackay et al 1992
Aluminum	NA		
Anthracene	4.30E-02	1.45E-07	US EPA OSW 2005
Antimony	NA		
Arsenic	NA		
Barium	NA		
Benz(a)anthracene	9.40E-03	1.45E-07	US EPA OSW 2005
Benzo(a)pyrene	5.50E-09	1.45E-07	US EPA OSW 2005
Benzo(b)fluoranthene	5.00E-07	1.45E-07	US EPA OSW 2005
Benzo(e)pyrene	3.50E-03	1.45E-07	Mackay et al 1992
Benzo(g,h,i)fluoranthene	9.98E-11	1.45E-07	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	9.98E-11	1.45E-07	US EPA OSW 2005
Benzo(k)fluoranthene	2.00E-09	1.45E-07	US EPA OSW 2005
Cadmium	NA		
Chromium	NA		
Chromium VI	NA		
Chrysene	6.20E-09	1.45E-07	US EPA OSW 2005
Copper	NA		
Dibenzo(a,h)anthracene	1.00E-10	1.45E-07	US EPA OSW 2005
Fluoranthene	7.83E-06	1.45E-07	US EPA OSW 2005
Fluorene	2.00E+00		
Indeno(1,2,3-cd)pyrene	1.00E-10	1.45E-07	US EPA OSW 2005
Lead	NA		
Manganese	NA		
Mercury	NA		
Mercury Methyl	NA		
Molybdenum	NA		
Naphthalene	3.10E+01	1.45E-07	US EPA OSW 2005
Nickel	NA		
Phenanthrene	1.10E-04	1.45E-07	US EPA OSW 2005
Pyrene	4.60E-06	1.45E-07	US EPA OSW 2005
Selenium	NA		
Silver	NA		
Total Cyanide	9.54E+04	1.45E-07	US EPA OSW 2005
Zinc	NA		

Table D-20 Vapour Pressure [mmHg]

Chemical	Value	VP[atm]	VP[Pa]	VP[kPa]	Reference/Comment
Acenaphthene	2.50E-03	3.29E-06	3.33E-01	3.33E-04	US EPA OSW 2005
Acenaphthylene	2.90E-02	3.82E-05	3.87E+00	3.87E-03	Mackay et al 1992
Aluminum	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Anthracene	2.70E-06	3.55E-09	3.60E-04	3.60E-07	US EPA OSW 2005
Antimony	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Barium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Benz(a)anthracene	1.10E-07	1.45E-10	1.47E-05	1.47E-08	US EPA OSW 2005
Benzo(a)pyrene	5.50E-09	7.24E-12	7.34E-07	7.34E-10	US EPA OSW 2005
Benzo(b)fluoranthene	5.00E-07	6.58E-10	6.67E-05	6.67E-08	US EPA OSW 2005
Benzo(e)pyrene	5.55E-09	7.30E-12	7.40E-07	7.40E-10	Mackay et al 1992
Benzo(g,h,i)fluoranthene	9.98E-11	1.31E-13	1.33E-08	1.33E-11	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	9.98E-11	1.31E-13	1.33E-08	1.33E-11	US EPA OSW 2005
Benzo(k)fluoranthene	2.00E-09	2.63E-12	2.66E-07	2.66E-10	US EPA OSW 2005
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Chromium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Chromium VI	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Chrysene	6.20E-09	8.16E-12	8.27E-07	8.27E-10	US EPA OSW 2005
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Dibenzo(a,h)anthracene	1.00E-10	1.32E-13	1.34E-08	1.34E-11	US EPA OSW 2005
Fluoranthene	7.83E-06	1.03E-08	1.04E-03	1.04E-06	US EPA OSW 2005
Fluorene	6.30E-04	8.29E-07	8.40E-02	8.40E-05	US EPA OSW 2005
Indeno(1,2,3-cd)pyrene	1.00E-10	1.32E-13	1.34E-08	1.34E-11	US EPA OSW 2005
Lead	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Mercury	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Mercury Methyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Molybdenum	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Naphthalene	8.51E-02	1.12E-04	1.13E+01	1.13E-02	US EPA OSW 2005
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Phenanthrene	1.10E-04	1.45E-07	1.47E-02	1.47E-05	US EPA OSW 2005
Pyrene	4.60E-06	6.05E-09	6.13E-04	6.13E-07	US EPA OSW 2005
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Silver	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed
Total Cyanide	3.65E+02	4.80E-01	4.86E+04	4.86E+01	US EPA OSW 2005
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Assumed

Table D-21 Chemical Koc Values [(mg/g) / (mg/mL)] or [L/kg]

Chemical	Value	Reference/Comment
Acenaphthene	4.90E+03	US EPA OSW 2005
Acenaphthylene	2.51E+03	Mackay et al 1992
Aluminum	NA	Assumed
Anthracene	2.35E+04	US EPA OSW 2005
Antimony	NA	Assumed
Arsenic	NA	Assumed
Barium	NA	Assumed
Benz(a)anthracene	3.58E+05	US EPA OSW 2005
Benzo(a)pyrene	9.69E+05	US EPA OSW 2005
Benzo(b)fluoranthene	1.05E+06	US EPA OSW 2005
Benzo(e)pyrene	1.58E+07	Mackay et al 1992
Benzo(g,h,i)fluoranthene	1.58E+06	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	1.58E+06	Mackay et al 1992
Benzo(k)fluoranthene	9.92E+05	US EPA OSW 2005
Cadmium	NA	Assumed
Chromium	NA	Assumed
Chromium VI	NA	Assumed
Chrysene	5.01E+05	Assumed
Copper	NA	Assumed
Dibenzo(a,h)anthracene	1.79E+06	US EPA OSW 2005
Fluoranthene	4.91E+04	US EPA OSW 2005
Fluorene	7.71E+03	US EPA OSW 2005
Indeno(1,2,3-cd)pyrene	3.08E+06	US EPA OSW 2005
Lead	NA	Assumed
Manganese	NA	Assumed
Mercury	NA	Assumed
Mercury Methyl	NA	Assumed
Molybdenum	NA	Assumed
Naphthalene	1.19E+03	US EPA OSW 2005
Nickel	NA	Assumed
Phenanthrene	3.16E+04	US EPA OSW 2005
Pyrene	7.94E+04	US EPA OSW 2005
Selenium	NA	Assumed
Silver	NA	Assumed
Total Cyanide	NA	Assumed
Zinc	NA	Assumed

Table D-22 Abiotic & Biotic Degradation Rate [years^{-1}]

Chemical	Value	Half-life [Days]	Reference/Comment
Acenaphthene	2.78E+00	9.10E+01	US EPA OSW 2005
Acenaphthylene	5.06E+00	5.00E+01	Mackay et al 1992
Aluminum	0.00E+00	0.00E+00	Assumed
Anthracene	5.50E-01	4.60E+02	US EPA OSW 2005
Antimony	0.00E+00	0.00E+00	Assumed
Arsenic	0.00E+00	0.00E+00	Assumed
Barium	0.00E+00	0.00E+00	Assumed
Benz(a)anthracene	3.70E-01	6.84E+02	US EPA OSW 2005
Benzo(a)pyrene	4.80E-01	5.27E+02	US EPA OSW 2005
Benzo(b)fluoranthene	4.10E-01	6.17E+02	US EPA OSW 2005
Benzo(e)pyrene	4.80E-01	5.27E+02	Assumed = benzo(a)pyrene
Benzo(g,h,i)fluoranthene	3.89E-01	6.50E+02	Assumed = benzo(ghi)perylene
Benzo(g,h,i)perylene	3.89E-01	6.50E+02	Mackay et al 1992
Benzo(k)fluoranthene	1.20E-01	2.11E+03	US EPA OSW 2005
Cadmium	0.00E+00	0.00E+00	Assumed
Chromium	0.00E+00	0.00E+00	Assumed
Chromium VI	0.00E+00	0.00E+00	Assumed
Chrysene	2.50E-01	1.01E+03	Assumed
Copper	0.00E+00	0.00E+00	Assumed
Dibenzo(a,h)anthracene	2.70E-01	9.37E+02	US EPA OSW 2005
Fluoranthene	5.70E-01	4.44E+02	US EPA OSW 2005
Fluorene	4.22E+00	6.00E+01	US EPA OSW 2005
Indeno(1,2,3-cd)pyrene	3.50E-01	7.23E+02	US EPA OSW 2005
Lead	0.00E+00	0.00E+00	Assumed
Manganese	0.00E+00	0.00E+00	Assumed
Mercury	0.00E+00	0.00E+00	Assumed
Mercury Methyl	0.00E+00	0.00E+00	Assumed
Molybdenum	0.00E+00	0.00E+00	Assumed
Naphthalene	5.27E+00	4.80E+01	US EPA OSW 2005
Nickel	0.00E+00	0.00E+00	Assumed
Phenanthrene	1.26E+00	2.01E+02	US EPA OSW 2005
Pyrene	1.30E-01	1.95E+03	US EPA OSW 2005
Selenium	0.00E+00	0.00E+00	Assumed
Silver	0.00E+00	0.00E+00	Assumed
Total Cyanide	0.00E+00	0.00E+00	Assumed
Zinc	0.00E+00	0.00E+00	Assumed

Fate and Transport Variables

Table D-23 Literature and Site-specific Derived Regression Models and Bio-Concentration Factors [Dry Weight Basis]

			Regression Variables		BCF			
Media	Chemical	Abbreviation	Constant	Slope	Value	Model	Units	Reference/Comment
Fish	Acenaphthene	Fish_Acenaphthene			2.01E+02	BCF	L/kg	US EPA 2005
Fish	Acenaphthylene	Fish_Acenaphthylene			0.00E+00	BCF	L/kg	
Fish	Aluminum	Fish_Aluminum			7.14E+03	BCF	L/kg	Site-specific
Fish	Anthracene	Fish_Anthracene			5.82E+02	BCF	L/kg	US EPA 2005
Fish	Antimony	Fish_Antimony			1.05E+03	BCF	L/kg	Site-specific
Fish	Arsenic	Fish_Arsenic			3.94E+03	BCF	L/kg	Site-specific
Fish	Barium	Fish_Barium			6.33E+02	BCF	L/kg	US EPA 2005
Fish	Benz(a)anthracene	Fish_Benz(a)anthracene			4.89E+03	BCF	L/kg	US EPA 2005
Fish	Benzo(a)pyrene	Fish_Benzo(a)pyrene			8.32E+03	BCF	L/kg	US EPA 2005
Fish	Benzo(b)fluoranthene	Fish_Benzo(b)fluoranthene			1.04E+04	BCF	L/kg	US EPA 2005
Fish	Benzo(e)pyrene	Fish_Benzo(e)pyrene			0.00E+00	BCF	L/kg	
Fish	Benzo(g,h,i)fluoranthene	Fish_Benzo(g,h,i)fluoranthene			0.00E+00	BCF	L/kg	
Fish	Benzo(g,h,i)perylene	Fish_Benzo(g,h,i)perylene			0.00E+00	BCF	L/kg	
Fish	Benzo(k)fluoranthene	Fish_Benzo(k)fluoranthene			9.93E+03	BCF	L/kg	US EPA 2005
Fish	Cadmium	Fish_Cadmium			6.13E+04	BCF	L/kg	Site-specific
Fish	Chromium	Fish_Chromium			2.16E+03	BCF	L/kg	Site-specific
Fish	Chromium VI	Fish_Chromium VI			2.16E+03	BCF	L/kg	Assumed = chromium
Fish	Chrysene	Fish_Chrysene			4.89E+03	BCF	L/kg	US EPA 2005
Fish	Copper	Fish_Copper			4.39E+04	BCF	L/kg	Site-specific
Fish	Dibenzo(a,h)anthracene	Fish_Dibenzo(a,h)anthracene			2.02E+04	BCF	L/kg	US EPA 2005
Fish	Fluoranthene	Fish_Fluoranthene			1.41E+03	BCF	L/kg	US EPA 2005
Fish	Fluorene	Fish_Fluorene			3.42E+02	BCF	L/kg	US EPA 2005
Fish	Indeno(1,2,3-cd)pyrene	Fish_Indeno(1,2,3-cd)pyrene			2.41E+04	BCF	L/kg	US EPA 2005
Fish	Lead	Fish_Lead			2.23E+04	BCF	L/kg	Site-specific
Fish	Manganese	Fish_Manganese			0.00E+00	BCF	L/kg	
Fish	Mercury	Fish_Mercury			9.31E+04	BCF	L/kg	Site-specific
Fish	Mercury Methyl	Fish_Mercury Methyl			9.31E+04	BCF	L/kg	Site-specific
Fish	Molybdenum	Fish_Molybdenum			1.32E+04	BCF	L/kg	Site-specific
Fish	Naphthalene	Fish_Naphthalene			6.93E+01	BCF	L/kg	US EPA 2005
Fish	Nickel	Fish_Nickel			9.28E+02	BCF	L/kg	Site-specific
Fish	Phenanthrene	Fish_Phenanthrene			5.82E+02	BCF	L/kg	US EPA 2005
Fish	Pyrene	Fish_Pyrene			1.18E+03	BCF	L/kg	US EPA 2005
Fish	Selenium	Fish_Selenium			1.71E+04	BCF	L/kg	Site-specific
Fish	Silver	Fish_Silver			8.77E+01	BCF	L/kg	US EPA 2005
Fish	Total Cyanide	Fish_Total Cyanide			3.16E+00	BCF	L/kg	US EPA 2005
Fish	Zinc	Fish_Zinc			1.04E+04	BCF	L/kg	Site-specific
Fish Muscle	Acenaphthene	Fish Muscle_Acenaphthene			2.01E+02	BCF	L/kg	US EPA 2005
Fish Muscle	Acenaphthylene	Fish Muscle_Acenaphthylene			0.00E+00	BCF	L/kg	
Fish Muscle	Aluminum	Fish Muscle_Aluminum			1.51E+03	BCF	L/kg	Site-specific
Fish Muscle	Anthracene	Fish Muscle_Anthracene			5.82E+02	BCF	L/kg	US EPA 2005
Fish Muscle	Antimony	Fish Muscle_Antimony			1.69E+03	BCF	L/kg	Site-specific
Fish Muscle	Arsenic	Fish Muscle_Arsenic			5.57E+02	BCF	L/kg	Site-specific
Fish Muscle	Barium	Fish Muscle_Barium			6.33E+02	BCF	L/kg	US EPA 2005
Fish Muscle	Benz(a)anthracene	Fish Muscle_Benz(a)anthracene			4.89E+03	BCF	L/kg	US EPA 2005
Fish Muscle	Benzo(a)pyrene	Fish Muscle_Benzo(a)pyrene			8.32E+03	BCF	L/kg	US EPA 2005
Fish Muscle	Benzo(b)fluoranthene	Fish Muscle_Benzo(b)fluoranthene			1.04E+04	BCF	L/kg	US EPA 2005
Fish Muscle	Benzo(e)pyrene	Fish Muscle_Benzo(e)pyrene			0.00E+00	BCF	L/kg	
Fish Muscle	Benzo(g,h,i)fluoranthene	Fish Muscle_Benzo(g,h,i)fluoranthene			0.00E+00	BCF	L/kg	
Fish Muscle	Benzo(g,h,i)perylene	Fish Muscle_Benzo(g,h,i)perylene			0.00E+00	BCF	L/kg	
Fish Muscle	Benzo(k)fluoranthene	Fish Muscle_Benzo(k)fluoranthene			9.93E+03	BCF	L/kg	US EPA 2005
Fish Muscle	Cadmium	Fish Muscle_Cadmium			9.96E+02	BCF	L/kg	Site-specific
Fish Muscle	Chromium	Fish Muscle_Chromium			1.74E+03	BCF	L/kg	Site-specific
Fish Muscle	Chromium VI	Fish Muscle_Chromium VI			1.74E+03	BCF	L/kg	Assumed = chromium
Fish Muscle	Chrysene	Fish Muscle_Chrysene			4.89E+03	BCF	L/kg	US EPA 2005
Fish Muscle	Copper	Fish Muscle_Copper			8.52E+02	BCF	L/kg	Site-specific
Fish Muscle	Dibenzo(a,h)anthracene	Fish Muscle_Dibenzo(a,h)anthracene			2.02E+04	BCF	L/kg	US EPA 2005
Fish Muscle	Fluoranthene	Fish Muscle_Fluoranthene			1.41E+03	BCF	L/kg	US EPA 2005
Fish Muscle	Fluorene	Fish Muscle_Fluorene			3.42E+02	BCF	L/kg	US EPA 2005
Fish Muscle	Indeno(1,2,3-cd)pyrene	Fish Muscle_Indeno(1,2,3-cd)pyrene			2.41E+04	BCF	L/kg	US EPA 2005
Fish Muscle	Lead	Fish Muscle_Lead			4.15E+04	BCF	L/kg	Site-specific
Fish Muscle	Manganese	Fish Muscle_Manganese			0.00E+00	BCF	L/kg	
Fish Muscle	Mercury	Fish Muscle_Mercury			9.81E+04	BCF	L/kg	Site-specific
Fish Muscle	Mercury Methyl	Fish Muscle_Mercury Methyl			9.81E+04	BCF	L/kg	Site-specific
Fish Muscle	Molybdenum	Fish Muscle_Molybdenum			4.35E+02	BCF	L/kg	Site-specific
Fish Muscle	Naphthalene	Fish Muscle_Naphthalene			6.93E+01	BCF	L/kg	US EPA 2005
Fish Muscle	Nickel	Fish Muscle_Nickel			4.09E+02	BCF	L/kg	Site-specific
Fish Muscle	Phenanthrene	Fish Muscle_Phenanthrene			5.82E+02	BCF	L/kg	US EPA 2005
Fish Muscle	Pyrene	Fish Muscle_Pyrene			1.18E+03	BCF	L/kg	US EPA 2005
Fish Muscle	Selenium	Fish Muscle_Selenium			6.70E+03	BCF	L/kg	Site-specific
Fish Muscle	Silver	Fish Muscle_Silver			8.77E+01	BCF	L/kg	US EPA 2005
Fish Muscle	Total Cyanide	Fish Muscle_Total Cyanide			3.16E+00	BCF	L/kg	US EPA 2005
Fish Muscle	Zinc	Fish Muscle_Zinc			5.06E+03	BCF	L/kg	Site-specific
Lichen	Acenaphthene	Lichen_Acenaphthene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Acenaphthylene	Lichen_Acenaphthylene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Aluminum	Lichen_Aluminum			1.49E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Anthracene	Lichen_Anthracene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Antimony	Lichen_Antimony			1.22E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Arsenic	Lichen_Arsenic			5.47E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Barium	Lichen_Barium			1.47E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Benz(a)anthracene	Lichen_Benz(a)anthracene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Benzo(a)pyrene	Lichen_Benzo(a)pyrene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Benzo(b)fluoranthene	Lichen_Benzo(b)fluoranthene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Benzo(e)pyrene	Lichen_Benzo(e)pyrene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Benzo(g,h,i)fluoranthene	Lichen_Benzo(g,h,i)fluoranthene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Benzo(g,h,i)perylene	Lichen_Benzo(g,h,i)perylene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Benzo(k)fluoranthene	Lichen_Benzo(k)fluoranthene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Cadmium	Lichen_Cadmium			3.68E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Chromium	Lichen_Chromium			7.41E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Chromium VI	Lichen_Chromium VI			7.41E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Chrysene	Lichen_Chrysene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Copper	Lichen_Copper			6.30E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Dibenzo(a,h)anthracene	Lichen_Dibenzo(a,h)anthracene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Fluoranthene	Lichen_Fluoranthene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Fluorene	Lichen_Fluorene			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Indeno(1,2,3-cd)pyrene	Lichen_Indeno(1,2,3-cd)pyrene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific

Table D-23 Literature and Site-specific Derived Regression Models and Bio-Concentration Factors [Dry Weight Basis]

			Regression Variables		BCF			
Media	Chemical	Abbreviation	Constant	Slope	Value	Model	Units	Reference/Comment
Lichen	Lead	Lichen_Lead			1.27E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Manganese	Lichen_Manganese			4.26E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Mercury	Lichen_Mercury			6.49E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Mercury Methyl	Lichen_Mercury Methyl				BCF	g COPC / kg dw) / (mg COPC / kg s	NA
Lichen	Molybdenum	Lichen_Molybdenum			1.98E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Naphthalene	Lichen_Naphthalene			5.00E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Nickel	Lichen_Nickel			1.94E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Phenanthrene	Lichen_Phenanthrene			1.54E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Pyrene	Lichen_Pyrene			5.71E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Selenium	Lichen_Selenium			1.81E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Silver	Lichen_Silver			1.00E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Lichen	Total Cyanide	Lichen_Total Cyanide			0.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg soil)]	
Lichen	Zinc	Lichen_Zinc			3.52E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Plant	Acenaphthene	Plant_Acenaphthene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Acenaphthylene	Plant_Acenaphthylene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Aluminum	Plant_Aluminum			3.20E-03	BCF	g COPC / kg dw) / (mg COPC / kg s	BJC 1998b
Plant	Anthracene	Plant_Anthracene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Antimony	Plant_Antimony			5.30E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Arsenic	Plant_Arsenic			9.00E-03	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Barium	Plant_Barium			2.60E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Benz(a)anthracene	Plant_Benz(a)anthracene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Benzo(a)pyrene	Plant_Benzo(a)pyrene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Benzo(b)fluoranthene	Plant_Benzo(b)fluoranthene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Benzo(e)pyrene	Plant_Benzo(e)pyrene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Benzo(g,h,i)fluoranthene	Plant_Benzo(g,h,i)fluoranthene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Benzo(g,h,i)perylene	Plant_Benzo(g,h,i)perylene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Benzo(k)fluoranthene	Plant_Benzo(k)fluoranthene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Cadmium	Plant_Cadmium			5.60E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Chromium	Plant_Chromium			1.50E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Chromium VI	Plant_Chromium VI			1.50E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = chromium
Plant	Chrysene	Plant_Chrysene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Copper	Plant_Copper			7.60E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Dibenzo(a,h)anthracene	Plant_Dibenzo(a,h)anthracene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Fluoranthene	Plant_Fluoranthene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Fluorene	Plant_Fluorene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Plant	Indeno(1,2,3-cd)pyrene	Plant_Indeno(1,2,3-cd)pyrene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Lead	Plant_Lead			1.70E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Manganese	Plant_Manganese			1.13E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	BJC 1998b
Plant	Mercury	Plant_Mercury			3.10E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Mercury Methyl	Plant_Mercury Methyl				BCF	g COPC / kg dw) / (mg COPC / kg s	NA
Plant	Molybdenum	Plant_Molybdenum			9.80E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Naphthalene	Plant_Naphthalene			5.00E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Nickel	Plant_Nickel			1.30E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Phenanthrene	Plant_Phenanthrene			1.50E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Pyrene	Plant_Pyrene			5.70E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Selenium	Plant_Selenium			1.40E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Silver	Plant_Silver			1.00E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Plant	Total Cyanide	Plant_Total Cyanide			8.38E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	US EPA 2005
Plant	Zinc	Plant_Zinc			2.60E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific sedge
Prey	Acenaphthene	Prey_Acenaphthene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Acenaphthylene	Prey_Acenaphthylene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Aluminum	Prey_Aluminum			1.03E-03	BCF	COPC / kg dw) / (mg COPC / kg dw	Site-specific; based on predicted s
Prey	Anthracene	Prey_Anthracene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Antimony	Prey_Antimony			2.90E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Arsenic	Prey_Arsenic			4.50E-03	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Barium	Prey_Barium			3.10E-02	BCF	COPC / kg dw) / (mg COPC / kg dw	Site-specific
Prey	Benz(a)anthracene	Prey_Benz(a)anthracene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Benzo(a)pyrene	Prey_Benzo(a)pyrene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Benzo(b)fluoranthene	Prey_Benzo(b)fluoranthene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Benzo(e)pyrene	Prey_Benzo(e)pyrene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Benzo(g,h,i)fluoranthene	Prey_Benzo(g,h,i)fluoranthene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Benzo(g,h,i)perylene	Prey_Benzo(g,h,i)perylene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Benzo(k)fluoranthene	Prey_Benzo(k)fluoranthene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Cadmium	Prey_Cadmium			6.70E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Chromium	Prey_Chromium			1.30E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Chromium VI	Prey_Chromium VI			1.30E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = chromium
Prey	Chrysene	Prey_Chrysene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Copper	Prey_Copper			4.00E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Dibenzo(a,h)anthracene	Prey_Dibenzo(a,h)anthracene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Fluoranthene	Prey_Fluoranthene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Fluorene	Prey_Fluorene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Indeno(1,2,3-cd)pyrene	Prey_Indeno(1,2,3-cd)pyrene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Assumed = benzo(a)pyrene
Prey	Lead	Prey_Lead			1.40E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific; based on predicted s
Prey	Manganese	Prey_Manganese			1.56E-03	BCF	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998a
Prey	Mercury	Prey_Mercury			4.27E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Mercury Methyl	Prey_Mercury Methyl				BCF	g COPC / kg dw) / (mg COPC / kg s	NA
Prey	Molybdenum	Prey_Molybdenum			8.00E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Naphthalene	Prey_Naphthalene			1.00E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Nickel	Prey_Nickel			2.40E-02	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Phenanthrene	Prey_Phenanthrene			3.10E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Pyrene	Prey_Pyrene			1.10E+00	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Selenium	Prey_Selenium			3.10E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Silver	Prey_Silver			3.10E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Prey	Total Cyanide	Prey_Total Cyanide				BCF	g COPC / kg dw) / (mg COPC / kg s	NA
Prey	Zinc	Prey_Zinc			1.40E-01	BCF	g COPC / kg dw) / (mg COPC / kg s	Site-specific
Terr_Invert	Acenaphthene	Terr_Invert_Acenaphthene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Acenaphthylene	Terr_Invert_Acenaphthylene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Aluminum	Terr_Invert_Aluminum						Data unavailable (US EPA 2005)
Terr_Invert	Anthracene	Terr_Invert_Anthracene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Antimony	Terr_Invert_Antimony						
Terr_Invert	Arsenic	Terr_Invert_Arsenic	-1.42E+00	7.06E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Barium	Terr_Invert_Barium			8.80E-02	BCF	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Benz(a)anthracene	Terr_Invert_Benz(a)anthracene			1.80E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Benzo(a)pyrene	Terr_Invert_Benzo(a)pyrene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Benzo(b)fluoranthene	Terr_Invert_Benzo(b)fluoranthene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999

Table D-23 Literature and Site-specific Derived Regression Models and Bio-Concentration Factors [Dry Weight Basis]

			Regression Variables		BCF			
Media	**Chemical**	**Abbreviation**	**Constant**	**Slope**	**Value**	**Model**	**Units**	**Reference/Comment**
Terr_Invert	Benzo(e)pyrene	Terr_Invert_Benzo(e)pyrene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Benzo(g,h,i)fluoranthene	Terr_Invert_Benzo(g,h,i)fluoranthene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Benzo(g,h,i)perylene	Terr_Invert_Benzo(g,h,i)perylene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Benzo(k)fluoranthene	Terr_Invert_Benzo(k)fluoranthene			4.79E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Cadmium	Terr_Invert_Cadmium	2.11E+00	7.95E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Chromium	Terr_Invert_Chromium			3.06E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA Eco-SSL (2005)
Terr_Invert	Chromium VI	Terr_Invert_Chromium VI			1.10E+00	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = chromium
Terr_Invert	Chrysene	Terr_Invert_Chrysene			2.40E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Copper	Terr_Invert_Copper	1.68E+00	2.64E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Dibenzo(a,h)anthracene	Terr_Invert_Dibenzo(a,h)anthracene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Fluoranthene	Terr_Invert_Fluoranthene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Fluorene	Terr_Invert_Fluorene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Indeno(1,2,3-cd)pyrene	Terr_Invert_Indeno(1,2,3-cd)pyrene			4.79E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Lead	Terr_Invert_Lead	-2.18E-01	8.07E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Manganese	Terr_Invert_Manganese	-8.09E-01	6.82E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Mercury	Terr_Invert_Mercury	-6.84E-01	1.18E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Mercury Methyl	Terr_Invert_Mercury Methyl				Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	NA
Terr_Invert	Molybdenum	Terr_Invert_Molybdenum			1.01E+00	BCF	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Naphthalene	Terr_Invert_Naphthalene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Nickel	Terr_Invert_Nickel			1.20E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Phenanthrene	Terr_Invert_Phenanthrene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Pyrene	Terr_Invert_Pyrene			4.19E-01	BCF	COPC / kg dw) / (mg COPC / kg dw	Assumed = benzo(a)pyrene
Terr_Invert	Selenium	Terr_Invert_Selenium	-7.50E-02	7.33E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b (w/o outlier)
Terr_Invert	Silver	Terr_Invert_Silver			4.53E+00	BCF	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b
Terr_Invert	Total Cyanide	Terr_Invert_Total Cyanide			6.71E+00	BCF	COPC / kg dw) / (mg COPC / kg dw	US EPA 1999
Terr_Invert	Zinc	Terr_Invert_Zinc	4.45E+00	3.28E-01		Ln_Normal	COPC / kg dw) / (mg COPC / kg dw	Sample et al. 1998b

Table D-24 Bio-Transfer Factors [days/kg FW]

Receptor	Chemical	Abbreviation	Value	Reference/Comment
Arctic_hare	Acenaphthene	Acenaphthene_Arctic_hare	2.43E-04	Calculated (US EPA 2005)
Caribou	Acenaphthene	Acenaphthene_Caribou	2.43E-04	Calculated (US EPA 2005)
Fox	Acenaphthene	Acenaphthene_Fox	2.43E-04	Calculated (US EPA 2005)
Peregrine_falcon	Acenaphthene	Acenaphthene_Peregrine_falcon	1.79E-04	Calculated (US EPA 2005)
Ptarmigan	Acenaphthene	Acenaphthene_Ptarmigan	1.79E-04	Calculated (US EPA 2005)
Shrew	Acenaphthene	Acenaphthene_Shrew	2.43E-04	Calculated (US EPA 2005)
Vole	Acenaphthene	Acenaphthene_Vole	2.43E-04	Calculated (US EPA 2005)
Wolverine	Acenaphthene	Acenaphthene_Wolverine	2.43E-04	Calculated (US EPA 2005)
Arctic_hare	Acenaphthylene	Acenaphthylene_Arctic_hare	2.71E-04	Calculated (US EPA 2005)
Caribou	Acenaphthylene	Acenaphthylene_Caribou	2.71E-04	Calculated (US EPA 2005)
Fox	Acenaphthylene	Acenaphthylene_Fox	2.71E-04	Calculated (US EPA 2005)
Peregrine_falcon	Acenaphthylene	Acenaphthylene_Peregrine_falcon	2.00E-04	Calculated (US EPA 2005)
Ptarmigan	Acenaphthylene	Acenaphthylene_Ptarmigan	2.00E-04	Calculated (US EPA 2005)
Shrew	Acenaphthylene	Acenaphthylene_Shrew	2.71E-04	Calculated (US EPA 2005)
Vole	Acenaphthylene	Acenaphthylene_Vole	2.71E-04	Calculated (US EPA 2005)
Wolverine	Acenaphthylene	Acenaphthylene_Wolverine	2.71E-04	Calculated (US EPA 2005)
Arctic_hare	Aluminum	Aluminum_Arctic_hare	1.50E-03	Baes et al. 1984
Caribou	Aluminum	Aluminum_Caribou	1.50E-03	Baes et al. 1984
Fox	Aluminum	Aluminum_Fox	1.50E-03	Baes et al. 1984
Peregrine_falcon	Aluminum	Aluminum_Peregrine_falcon	1.50E-03	Baes et al. 1984
Ptarmigan	Aluminum	Aluminum_Ptarmigan	1.50E-03	Baes et al. 1984
Shrew	Aluminum	Aluminum_Shrew	1.50E-03	Baes et al. 1984
Vole	Aluminum	Aluminum_Vole	1.50E-03	Baes et al. 1984
Wolverine	Aluminum	Aluminum_Wolverine	1.50E-03	Baes et al. 1984
Arctic_hare	Anthracene	Anthracene_Arctic_hare	3.38E-04	Calculated (US EPA 2005)
Caribou	Anthracene	Anthracene_Caribou	3.38E-04	Calculated (US EPA 2005)
Fox	Anthracene	Anthracene_Fox	3.38E-04	Calculated (US EPA 2005)
Peregrine_falcon	Anthracene	Anthracene_Peregrine_falcon	2.49E-04	Calculated (US EPA 2005)
Ptarmigan	Anthracene	Anthracene_Ptarmigan	2.49E-04	Calculated (US EPA 2005)
Shrew	Anthracene	Anthracene_Shrew	3.38E-04	Calculated (US EPA 2005)
Vole	Anthracene	Anthracene_Vole	3.38E-04	Calculated (US EPA 2005)
Wolverine	Anthracene	Anthracene_Wolverine	3.38E-04	Calculated (US EPA 2005)
Arctic_hare	Antimony	Antimony_Arctic_hare	1.00E-03	US EPA 2005
Caribou	Antimony	Antimony_Caribou	1.00E-03	US EPA 2005
Fox	Antimony	Antimony_Fox	1.00E-03	US EPA 2005
Peregrine_falcon	Antimony	Antimony_Peregrine_falcon	1.00E-03	US EPA 2005
Ptarmigan	Antimony	Antimony_Ptarmigan	1.00E-03	US EPA 2005
Shrew	Antimony	Antimony_Shrew	1.00E-03	US EPA 2005
Vole	Antimony	Antimony_Vole	1.00E-03	US EPA 2005
Wolverine	Antimony	Antimony_Wolverine	1.00E-03	US EPA 2005
Arctic_hare	Arsenic	Arsenic_Arctic_hare	2.00E-03	US EPA 2005
Caribou	Arsenic	Arsenic_Caribou	2.00E-03	US EPA 2005
Fox	Arsenic	Arsenic_Fox	2.00E-03	US EPA 2005
Peregrine_falcon	Arsenic	Arsenic_Peregrine_falcon	2.00E-03	US EPA 2005
Ptarmigan	Arsenic	Arsenic_Ptarmigan	2.00E-03	US EPA 2005
Shrew	Arsenic	Arsenic_Shrew	2.00E-03	US EPA 2005
Vole	Arsenic	Arsenic_Vole	2.00E-03	US EPA 2005
Wolverine	Arsenic	Arsenic_Wolverine	2.00E-03	US EPA 2005
Arctic_hare	Barium	Barium_Arctic_hare	1.50E-04	US EPA 2005
Caribou	Barium	Barium_Caribou	1.50E-04	US EPA 2005
Fox	Barium	Barium_Fox	1.50E-04	US EPA 2005
Peregrine_falcon	Barium	Barium_Peregrine_falcon	1.50E-04	US EPA 2005
Ptarmigan	Barium	Barium_Ptarmigan	1.50E-04	US EPA 2005
Shrew	Barium	Barium_Shrew	1.50E-04	US EPA 2005
Vole	Barium	Barium_Vole	1.50E-04	US EPA 2005
Wolverine	Barium	Barium_Wolverine	1.50E-04	US EPA 2005
Arctic_hare	Benz(a)anthracene	Benz(a)anthracene_Arctic_hare	3.99E-04	Calculated (US EPA 2005)
Caribou	Benz(a)anthracene	Benz(a)anthracene_Caribou	3.99E-04	Calculated (US EPA 2005)
Fox	Benz(a)anthracene	Benz(a)anthracene_Fox	3.99E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benz(a)anthracene	Benz(a)anthracene_Peregrine_falcon	2.94E-04	Calculated (US EPA 2005)
Ptarmigan	Benz(a)anthracene	Benz(a)anthracene_Ptarmigan	2.94E-04	Calculated (US EPA 2005)
Shrew	Benz(a)anthracene	Benz(a)anthracene_Shrew	3.99E-04	Calculated (US EPA 2005)
Vole	Benz(a)anthracene	Benz(a)anthracene_Vole	3.99E-04	Calculated (US EPA 2005)
Wolverine	Benz(a)anthracene	Benz(a)anthracene_Wolverine	3.99E-04	Calculated (US EPA 2005)
Arctic_hare	Benzo(a)pyrene	Benzo(a)pyrene_Arctic_hare	3.76E-04	Calculated (US EPA 2005)
Caribou	Benzo(a)pyrene	Benzo(a)pyrene_Caribou	3.76E-04	Calculated (US EPA 2005)
Fox	Benzo(a)pyrene	Benzo(a)pyrene_Fox	3.76E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benzo(a)pyrene	Benzo(a)pyrene_Peregrine_falcon	2.77E-04	Calculated (US EPA 2005)
Ptarmigan	Benzo(a)pyrene	Benzo(a)pyrene_Ptarmigan	2.77E-04	Calculated (US EPA 2005)
Shrew	Benzo(a)pyrene	Benzo(a)pyrene_Shrew	3.76E-04	Calculated (US EPA 2005)
Vole	Benzo(a)pyrene	Benzo(a)pyrene_Vole	3.76E-04	Calculated (US EPA 2005)
Wolverine	Benzo(a)pyrene	Benzo(a)pyrene_Wolverine	3.76E-04	Calculated (US EPA 2005)
Arctic_hare	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Arctic_hare	3.62E-04	Calculated (US EPA 2005)
Caribou	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Caribou	3.62E-04	Calculated (US EPA 2005)

Table D-24 Bio-Transfer Factors [days/kg FW]

Receptor	Chemical	Abbreviation	Value	Reference/Comment
Fox	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Fox	3.62E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Peregrine_falcor	2.67E-04	Calculated (US EPA 2005)
Ptarmigan	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Ptarmigan	2.67E-04	Calculated (US EPA 2005)
Shrew	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Shrew	3.62E-04	Calculated (US EPA 2005)
Vole	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Vole	3.62E-04	Calculated (US EPA 2005)
Wolverine	Benzo(b)fluoranthene	Benzo(b)fluoranthene_Wolverine	3.62E-04	Calculated (US EPA 2005)
Arctic_hare	Benzo(e)pyrene	Benzo(e)pyrene_Arctic_hare	3.25E-04	Calculated (US EPA 2005)
Caribou	Benzo(e)pyrene	Benzo(e)pyrene_Caribou	3.25E-04	Calculated (US EPA 2005)
Fox	Benzo(e)pyrene	Benzo(e)pyrene_Fox	3.25E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benzo(e)pyrene	Benzo(e)pyrene_Peregrine_falcon	2.39E-04	Calculated (US EPA 2005)
Ptarmigan	Benzo(e)pyrene	Benzo(e)pyrene_Ptarmigan	2.39E-04	Calculated (US EPA 2005)
Shrew	Benzo(e)pyrene	Benzo(e)pyrene_Shrew	3.25E-04	Calculated (US EPA 2005)
Vole	Benzo(e)pyrene	Benzo(e)pyrene_Vole	3.25E-04	Calculated (US EPA 2005)
Wolverine	Benzo(e)pyrene	Benzo(e)pyrene_Wolverine	3.25E-04	Calculated (US EPA 2005)
Arctic_hare	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Arctic_hare	2.28E-04	Calculated (US EPA 2005)
Caribou	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Caribou	2.28E-04	Calculated (US EPA 2005)
Fox	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Fox	2.28E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Peregrine_fal	1.68E-04	Calculated (US EPA 2005)
Ptarmigan	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Ptarmigan	1.68E-04	Calculated (US EPA 2005)
Shrew	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Shrew	2.28E-04	Calculated (US EPA 2005)
Vole	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Vole	2.28E-04	Calculated (US EPA 2005)
Wolverine	Benzo(g,h,i)fluoranthene	Benzo(g,h,i)fluoranthene_Wolverine	2.28E-04	Calculated (US EPA 2005)
Arctic_hare	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Arctic_hare	2.28E-04	Calculated (US EPA 2005)
Caribou	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Caribou	2.28E-04	Calculated (US EPA 2005)
Fox	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Fox	2.28E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Peregrine_falcon	1.68E-04	Calculated (US EPA 2005)
Ptarmigan	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Ptarmigan	1.68E-04	Calculated (US EPA 2005)
Shrew	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Shrew	2.28E-04	Calculated (US EPA 2005)
Vole	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Vole	2.28E-04	Calculated (US EPA 2005)
Wolverine	Benzo(g,h,i)perylene	Benzo(g,h,i)perylene_Wolverine	2.28E-04	Calculated (US EPA 2005)
Arctic_hare	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Arctic_hare	3.65E-04	Calculated (US EPA 2005)
Caribou	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Caribou	3.65E-04	Calculated (US EPA 2005)
Fox	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Fox	3.65E-04	Calculated (US EPA 2005)
Peregrine_falcon	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Peregrine_falcor	2.69E-04	Calculated (US EPA 2005)
Ptarmigan	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Ptarmigan	2.69E-04	Calculated (US EPA 2005)
Shrew	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Shrew	3.65E-04	Calculated (US EPA 2005)
Vole	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Vole	3.65E-04	Calculated (US EPA 2005)
Wolverine	Benzo(k)fluoranthene	Benzo(k)fluoranthene_Wolverine	3.65E-04	Calculated (US EPA 2005)
Arctic_hare	Cadmium	Cadmium_Arctic_hare	1.20E-04	US EPA 2005
Caribou	Cadmium	Cadmium_Caribou	1.20E-04	US EPA 2005
Fox	Cadmium	Cadmium_Fox	1.20E-04	US EPA 2005
Peregrine_falcon	Cadmium	Cadmium_Peregrine_falcon	1.06E-01	US EPA 2005
Ptarmigan	Cadmium	Cadmium_Ptarmigan	1.06E-01	US EPA 2005
Shrew	Cadmium	Cadmium_Shrew	1.20E-04	US EPA 2005
Vole	Cadmium	Cadmium_Vole	1.20E-04	US EPA 2005
Wolverine	Cadmium	Cadmium_Wolverine	1.20E-04	US EPA 2005
Arctic_hare	Chromium VI	Chromium VI_Arctic_hare	5.50E-03	Assumed = chromium
Caribou	Chromium VI	Chromium VI_Caribou	5.50E-03	Assumed = chromium
Fox	Chromium VI	Chromium VI_Fox	5.50E-03	Assumed = chromium
Peregrine_falcon	Chromium VI	Chromium VI_Peregrine_falcon	5.50E-03	Assumed = chromium
Ptarmigan	Chromium VI	Chromium VI_Ptarmigan	5.50E-03	Assumed = chromium
Shrew	Chromium VI	Chromium VI_Shrew	5.50E-03	Assumed = chromium
Vole	Chromium VI	Chromium VI_Vole	5.50E-03	Assumed = chromium
Wolverine	Chromium VI	Chromium VI_Wolverine	5.50E-03	Assumed = chromium
Arctic_hare	Chromium	Chromium_Arctic_hare	5.50E-03	US EPA 2005
Caribou	Chromium	Chromium_Caribou	5.50E-03	US EPA 2005
Fox	Chromium	Chromium_Fox	5.50E-03	US EPA 2005
Peregrine_falcon	Chromium	Chromium_Peregrine_falcon	5.50E-03	US EPA 2005
Ptarmigan	Chromium	Chromium_Ptarmigan	5.50E-03	US EPA 2005
Shrew	Chromium	Chromium_Shrew	5.50E-03	US EPA 2005
Vole	Chromium	Chromium_Vole	5.50E-03	US EPA 2005
Wolverine	Chromium	Chromium_Wolverine	5.50E-03	US EPA 2005
Arctic_hare	Chrysene	Chrysene_Arctic_hare	3.99E-04	Calculated (US EPA 2005)
Caribou	Chrysene	Chrysene_Caribou	3.99E-04	Calculated (US EPA 2005)
Fox	Chrysene	Chrysene_Fox	3.99E-04	Calculated (US EPA 2005)
Peregrine_falcon	Chrysene	Chrysene_Peregrine_falcon	2.94E-04	Calculated (US EPA 2005)
Ptarmigan	Chrysene	Chrysene_Ptarmigan	2.94E-04	Calculated (US EPA 2005)
Shrew	Chrysene	Chrysene_Shrew	3.99E-04	Calculated (US EPA 2005)
Vole	Chrysene	Chrysene_Vole	3.99E-04	Calculated (US EPA 2005)
Wolverine	Chrysene	Chrysene_Wolverine	3.99E-04	Calculated (US EPA 2005)
Arctic_hare	Copper	Copper_Arctic_hare	1.00E-02	Baes et al. 1984
Caribou	Copper	Copper_Caribou	1.00E-02	Baes et al. 1984
Fox	Copper	Copper_Fox	1.00E-02	Baes et al. 1984
Peregrine_falcon	Copper	Copper_Peregrine_falcon	1.00E-02	Baes et al. 1984

Table D-24 Bio-Transfer Factors [days/kg FW]

Receptor	Chemical	Abbreviation	Value	Reference/Comment
Ptarmigan	Copper	Copper_Ptarmigan	1.00E-02	Baes et al. 1984
Shrew	Copper	Copper_Shrew	1.00E-02	Baes et al. 1984
Vole	Copper	Copper_Vole	1.00E-02	Baes et al. 1984
Wolverine	Copper	Copper_Wolverine	1.00E-02	Baes et al. 1984
Arctic_hare	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Arctic_hare	3.10E-04	Calculated (US EPA 2005)
Caribou	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Caribou	3.10E-04	Calculated (US EPA 2005)
Fox	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Fox	3.10E-04	Calculated (US EPA 2005)
Peregrine_falcon	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Peregrine_fal	2.28E-04	Calculated (US EPA 2005)
Ptarmigan	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Ptarmigan	2.28E-04	Calculated (US EPA 2005)
Shrew	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Shrew	3.10E-04	Calculated (US EPA 2005)
Vole	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Vole	3.10E-04	Calculated (US EPA 2005)
Wolverine	Dibenzo(a,h)anthracene	Dibenzo(a,h)anthracene_Wolverine	3.10E-04	Calculated (US EPA 2005)
Arctic_hare	Fluoranthene	Fluoranthene_Arctic_hare	3.92E-04	Calculated (US EPA 2005)
Caribou	Fluoranthene	Fluoranthene_Caribou	3.92E-04	Calculated (US EPA 2005)
Fox	Fluoranthene	Fluoranthene_Fox	3.92E-04	Calculated (US EPA 2005)
Peregrine_falcon	Fluoranthene	Fluoranthene_Peregrine_falcon	2.89E-04	Calculated (US EPA 2005)
Ptarmigan	Fluoranthene	Fluoranthene_Ptarmigan	2.89E-04	Calculated (US EPA 2005)
Shrew	Fluoranthene	Fluoranthene_Shrew	3.92E-04	Calculated (US EPA 2005)
Vole	Fluoranthene	Fluoranthene_Vole	3.92E-04	Calculated (US EPA 2005)
Wolverine	Fluoranthene	Fluoranthene_Wolverine	3.92E-04	Calculated (US EPA 2005)
Arctic_hare	Fluorene	Fluorene_Arctic_hare	2.93E-04	Calculated (US EPA 2005)
Caribou	Fluorene	Fluorene_Caribou	2.93E-04	Calculated (US EPA 2005)
Fox	Fluorene	Fluorene_Fox	2.93E-04	Calculated (US EPA 2005)
Peregrine_falcon	Fluorene	Fluorene_Peregrine_falcon	2.16E-04	Calculated (US EPA 2005)
Ptarmigan	Fluorene	Fluorene_Ptarmigan	2.16E-04	Calculated (US EPA 2005)
Shrew	Fluorene	Fluorene_Shrew	2.93E-04	Calculated (US EPA 2005)
Vole	Fluorene	Fluorene_Vole	2.93E-04	Calculated (US EPA 2005)
Wolverine	Fluorene	Fluorene_Wolverine	2.93E-04	Calculated (US EPA 2005)
Arctic_hare	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Arctic_hare	2.94E-04	Calculated (US EPA 2005)
Caribou	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Caribou	2.94E-04	Calculated (US EPA 2005)
Fox	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Fox	2.94E-04	Calculated (US EPA 2005)
Peregrine_falcon	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Peregrine_falc	2.17E-04	Calculated (US EPA 2005)
Ptarmigan	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Ptarmigan	2.17E-04	Calculated (US EPA 2005)
Shrew	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Shrew	2.94E-04	Calculated (US EPA 2005)
Vole	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Vole	2.94E-04	Calculated (US EPA 2005)
Wolverine	Indeno(1,2,3-cd)pyrene	Indeno(1,2,3-cd)pyrene_Wolverine	2.94E-04	Calculated (US EPA 2005)
Arctic_hare	Lead	Lead_Arctic_hare	3.00E-04	US EPA 2005
Caribou	Lead	Lead_Caribou	3.00E-04	US EPA 2005
Fox	Lead	Lead_Fox	3.00E-04	US EPA 2005
Peregrine_falcon	Lead	Lead_Peregrine_falcon	3.00E-04	US EPA 2005
Ptarmigan	Lead	Lead_Ptarmigan	3.00E-04	US EPA 2005
Shrew	Lead	Lead_Shrew	3.00E-04	US EPA 2005
Vole	Lead	Lead_Vole	3.00E-04	US EPA 2005
Wolverine	Lead	Lead_Wolverine	3.00E-04	US EPA 2005
Arctic_hare	Manganese	Manganese_Arctic_hare	4.00E-04	Baes et al. 1984
Caribou	Manganese	Manganese_Caribou	4.00E-04	Baes et al. 1984
Fox	Manganese	Manganese_Fox	4.00E-04	Baes et al. 1984
Peregrine_falcon	Manganese	Manganese_Peregrine_falcon	4.00E-04	Baes et al. 1984
Ptarmigan	Manganese	Manganese_Ptarmigan	4.00E-04	Baes et al. 1984
Shrew	Manganese	Manganese_Shrew	4.00E-04	Baes et al. 1984
Vole	Manganese	Manganese_Vole	4.00E-04	Baes et al. 1984
Wolverine	Manganese	Manganese_Wolverine	4.00E-04	Baes et al. 1984
Arctic_hare	Mercury Methyl	Mercury Methyl_Arctic_hare	5.22E-03	Assumed = mercury
Caribou	Mercury Methyl	Mercury Methyl_Caribou	5.22E-03	Assumed = mercury
Fox	Mercury Methyl	Mercury Methyl_Fox	5.22E-03	Assumed = mercury
Peregrine_falcon	Mercury Methyl	Mercury Methyl_Peregrine_falcon	2.39E-02	Assumed = mercury
Ptarmigan	Mercury Methyl	Mercury Methyl_Ptarmigan	2.39E-02	Assumed = mercury
Shrew	Mercury Methyl	Mercury Methyl_Shrew	5.22E-03	Assumed = mercury
Vole	Mercury Methyl	Mercury Methyl_Vole	5.22E-03	Assumed = mercury
Wolverine	Mercury Methyl	Mercury Methyl_Wolverine	5.22E-03	Assumed = mercury
Arctic_hare	Mercury	Mercury_Arctic_hare	5.22E-03	US EPA 2005
Caribou	Mercury	Mercury_Caribou	5.22E-03	US EPA 2005
Fox	Mercury	Mercury_Fox	5.22E-03	US EPA 2005
Peregrine_falcon	Mercury	Mercury_Peregrine_falcon	2.39E-02	US EPA 2005
Ptarmigan	Mercury	Mercury_Ptarmigan	2.39E-02	US EPA 2005
Shrew	Mercury	Mercury_Shrew	5.22E-03	US EPA 2005
Vole	Mercury	Mercury_Vole	5.22E-03	US EPA 2005
Wolverine	Mercury	Mercury_Wolverine	5.22E-03	US EPA 2005
Arctic_hare	Molybdenum	Molybdenum_Arctic_hare	6.00E-03	Baes et al. 1984
Caribou	Molybdenum	Molybdenum_Caribou	6.00E-03	Baes et al. 1984
Fox	Molybdenum	Molybdenum_Fox	6.00E-03	Baes et al. 1984
Peregrine_falcon	Molybdenum	Molybdenum_Peregrine_falcon	6.00E-03	Baes et al. 1984
Ptarmigan	Molybdenum	Molybdenum_Ptarmigan	6.00E-03	Baes et al. 1984
Shrew	Molybdenum	Molybdenum_Shrew	6.00E-03	Baes et al. 1984

Table D-24 Bio-Transfer Factors [days/kg FW]

Receptor	Chemical	Abbreviation	Value	Reference/Comment
Vole	Molybdenum	Molybdenum_Vole	6.00E-03	Baes et al. 1984
Wolverine	Molybdenum	Molybdenum_Wolverine	6.00E-03	Baes et al. 1984
Arctic_hare	Naphthalene	Naphthalene_Arctic_hare	1.48E-04	Calculated (US EPA 2005)
Caribou	Naphthalene	Naphthalene_Caribou	1.48E-04	Calculated (US EPA 2005)
Fox	Naphthalene	Naphthalene_Fox	1.48E-04	Calculated (US EPA 2005)
Peregrine_falcon	Naphthalene	Naphthalene_Peregrine_falcon	1.09E-04	Calculated (US EPA 2005)
Ptarmigan	Naphthalene	Naphthalene_Ptarmigan	1.09E-04	Calculated (US EPA 2005)
Shrew	Naphthalene	Naphthalene_Shrew	1.48E-04	Calculated (US EPA 2005)
Vole	Naphthalene	Naphthalene_Vole	1.48E-04	Calculated (US EPA 2005)
Wolverine	Naphthalene	Naphthalene_Wolverine	1.48E-04	Calculated (US EPA 2005)
Arctic_hare	Nickel	Nickel_Arctic_hare	6.00E-03	US EPA 2005
Caribou	Nickel	Nickel_Caribou	6.00E-03	US EPA 2005
Fox	Nickel	Nickel_Fox	6.00E-03	US EPA 2005
Peregrine_falcon	Nickel	Nickel_Peregrine_falcon	6.00E-03	US EPA 2005
Ptarmigan	Nickel	Nickel_Ptarmigan	6.00E-03	US EPA 2005
Shrew	Nickel	Nickel_Shrew	6.00E-03	US EPA 2005
Vole	Nickel	Nickel_Vole	6.00E-03	US EPA 2005
Wolverine	Nickel	Nickel_Wolverine	6.00E-03	US EPA 2005
Arctic_hare	Phenanthrene	Phenanthrene_Arctic_hare	3.38E-04	Calculated (US EPA 2005)
Caribou	Phenanthrene	Phenanthrene_Caribou	3.38E-04	Calculated (US EPA 2005)
Fox	Phenanthrene	Phenanthrene_Fox	3.38E-04	Calculated (US EPA 2005)
Peregrine_falcon	Phenanthrene	Phenanthrene_Peregrine_falcon	2.49E-04	Calculated (US EPA 2005)
Ptarmigan	Phenanthrene	Phenanthrene_Ptarmigan	2.49E-04	Calculated (US EPA 2005)
Shrew	Phenanthrene	Phenanthrene_Shrew	3.38E-04	Calculated (US EPA 2005)
Vole	Phenanthrene	Phenanthrene_Vole	3.38E-04	Calculated (US EPA 2005)
Wolverine	Phenanthrene	Phenanthrene_Wolverine	3.38E-04	Calculated (US EPA 2005)
Arctic_hare	Pyrene	Pyrene_Arctic_hare	3.84E-04	Calculated (US EPA 2005)
Caribou	Pyrene	Pyrene_Caribou	3.84E-04	Calculated (US EPA 2005)
Fox	Pyrene	Pyrene_Fox	3.84E-04	Calculated (US EPA 2005)
Peregrine_falcon	Pyrene	Pyrene_Peregrine_falcon	2.83E-04	Calculated (US EPA 2005)
Ptarmigan	Pyrene	Pyrene_Ptarmigan	2.83E-04	Calculated (US EPA 2005)
Shrew	Pyrene	Pyrene_Shrew	3.84E-04	Calculated (US EPA 2005)
Vole	Pyrene	Pyrene_Vole	3.84E-04	Calculated (US EPA 2005)
Wolverine	Pyrene	Pyrene_Wolverine	3.84E-04	Calculated (US EPA 2005)
Arctic_hare	Selenium	Selenium_Arctic_hare	2.27E-03	US EPA 2005
Caribou	Selenium	Selenium_Caribou	2.27E-03	US EPA 2005
Fox	Selenium	Selenium_Fox	2.27E-03	US EPA 2005
Peregrine_falcon	Selenium	Selenium_Peregrine_falcon	1.13E+00	US EPA 2005
Ptarmigan	Selenium	Selenium_Ptarmigan	1.13E+00	US EPA 2005
Shrew	Selenium	Selenium_Shrew	2.27E-03	US EPA 2005
Vole	Selenium	Selenium_Vole	2.27E-03	US EPA 2005
Wolverine	Selenium	Selenium_Wolverine	2.27E-03	US EPA 2005
Arctic_hare	Silver	Silver_Arctic_hare	3.00E-03	US EPA 2005
Caribou	Silver	Silver_Caribou	3.00E-03	US EPA 2005
Fox	Silver	Silver_Fox	3.00E-03	US EPA 2005
Peregrine_falcon	Silver	Silver_Peregrine_falcon	3.00E-03	US EPA 2005
Ptarmigan	Silver	Silver_Ptarmigan	3.00E-03	US EPA 2005
Shrew	Silver	Silver_Shrew	3.00E-03	US EPA 2005
Vole	Silver	Silver_Vole	3.00E-03	US EPA 2005
Wolverine	Silver	Silver_Wolverine	3.00E-03	US EPA 2005
Arctic_hare	Total Cyanide	Total Cyanide_Arctic_hare	9.07E-06	US EPA 2005
Caribou	Total Cyanide	Total Cyanide_Caribou	9.07E-06	US EPA 2005
Fox	Total Cyanide	Total Cyanide_Fox	9.07E-06	US EPA 2005
Peregrine_falcon	Total Cyanide	Total Cyanide_Peregrine_falcon	6.68E-06	US EPA 2005
Ptarmigan	Total Cyanide	Total Cyanide_Ptarmigan	6.68E-06	US EPA 2005
Shrew	Total Cyanide	Total Cyanide_Shrew	9.07E-06	US EPA 2005
Vole	Total Cyanide	Total Cyanide_Vole	9.07E-06	US EPA 2005
Wolverine	Total Cyanide	Total Cyanide_Wolverine	9.07E-06	US EPA 2005
Arctic_hare	Zinc	Zinc_Arctic_hare	9.00E-05	US EPA 2005
Caribou	Zinc	Zinc_Caribou	9.00E-05	US EPA 2005
Fox	Zinc	Zinc_Fox	9.00E-05	US EPA 2005
Peregrine_falcon	Zinc	Zinc_Peregrine_falcon	8.75E-03	US EPA 2005
Ptarmigan	Zinc	Zinc_Ptarmigan	8.75E-03	US EPA 2005
Shrew	Zinc	Zinc_Shrew	9.00E-05	US EPA 2005
Vole	Zinc	Zinc_Vole	9.00E-05	US EPA 2005
Wolverine	Zinc	Zinc_Wolverine	9.00E-05	US EPA 2005

Organics = log(BTF) [day/kg FW] = {-0.099 x Log(Kow)^2 + 1.07 x LOG(Kow) - 3.56} x Fat Content of Tissue x Metabolism Factor

Table D-25 Metabolism Factor [Unitless]

Chemical	Value	Reference/Comment
Acenaphthene	0.01	Hofelt et al 2001
Acenaphthylene	0.01	Hofelt et al 2001
Aluminum	1	No adjustment
Anthracene	0.01	Hofelt et al 2001
Antimony	1	No adjustment
Arsenic	1	No adjustment
Barium	1	No adjustment
Benz(a)anthracene	0.01	Hofelt et al 2001
Benzo(a)pyrene	0.01	Hofelt et al 2001
Benzo(b)fluoranthene	0.01	Hofelt et al 2001
Benzo(e)pyrene	0.01	Hofelt et al 2001
Benzo(g,h,i)fluoranthene	0.01	Hofelt et al 2001
Benzo(g,h,i)perylene	0.01	Hofelt et al 2001
Benzo(k)fluoranthene	0.01	Hofelt et al 2001
Cadmium	1	No adjustment
Chromium	1	No adjustment
Chromium VI	1	No adjustment
Chrysene	0.01	Hofelt et al 2001
Copper	1	No adjustment
Dibenzo(a,h)anthracene	0.01	Hofelt et al 2001
Fluoranthene	0.01	Hofelt et al 2001
Fluorene	0.01	Hofelt et al 2001
Indeno(1,2,3-cd)pyrene	0.01	Hofelt et al 2001
Lead	1	No adjustment
Manganese	1	No adjustment
Mercury	1	No adjustment
Mercury Methyl	1	No adjustment
Molybdenum	1	No adjustment
Naphthalene	0.01	Hofelt et al 2001
Nickel	1	No adjustment
Phenanthrene	0.01	Hofelt et al 2001
Pyrene	0.01	Hofelt et al 2001
Selenium	1	No adjustment
Silver	1	No adjustment
Total Cyanide	1	No adjustment
Zinc	1	No adjustment

Table D-26 Fat content

Receptor	Value	Reference/Comment
Arctic_hare	19%	US EPA 2005;Assumed equal to beef
Caribou	19%	US EPA 2005;Assumed equal to beef
Fox	19%	US EPA 2005;Assumed equal to beef
Peregrine_falcon	14%	US EPA 2005;Assumed equal to chicken
Ptarmigan	14%	US EPA 2005;Assumed equal to chicken
Shrew	19%	US EPA 2005;Assumed equal to beef
Vole	19%	US EPA 2005;Assumed equal to beef
Wolverine	19%	US EPA 2005;Assumed equal to beef

Table D-27 Percent Water Content of Wildlife Foods [%]

Media	Value	Reference/Comment
Berries	77%	Suter et al. 2000
Fish	77%	Site-specific for liver and muscle
Fish Muscle	77%	Site-specific for muscle
Lichen	10%	Used mature dry grass; Suter et al. 2000
Mussel	82%	Suter et al. 2000
Plant	77%	Suter et al. 2000
Prey	68%	Suter et al. 2000
Terr_Invert	71%	Suter et al. 2000

Table D-28 Measured and Predicted Exposure Point Concentrations for the Ecological Risk Assessment

Scenario	Site	Chemical	Media	Abbreviation	Value	Units	Reference/Comment
Baseline	Max	Acenaphthene	Air	Baseline_Max_Acenaphthene_Air	0.00E+00	ug/m3	
Baseline	Max	Acenaphthene	Soil	Baseline_Max_Acenaphthene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Acenaphthene	Surface Soil	Baseline_Max_Acenaphthene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Acenaphthene	Surface Water	Baseline_Max_Acenaphthene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Acenaphthylene	Air	Baseline_Max_Acenaphthylene_Air	0.00E+00	ug/m3	
Baseline	Max	Acenaphthylene	Soil	Baseline_Max_Acenaphthylene_Soil	5.80E-01	mg/kg	Not analyzed
Baseline	Max	Acenaphthylene	Surface Soil	Baseline_Max_Acenaphthylene_Surface Soil	5.80E-01	mg/kg	Not analyzed
Baseline	Max	Acenaphthylene	Surface Water	Baseline_Max_Acenaphthylene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Aluminum	Air	Baseline_Max_Aluminum_Air	0.00E+00	ug/m3	
Baseline	Max	Aluminum	Soil	Baseline_Max_Aluminum_Soil	3.19E+04	mg/kg	Not analyzed; Calculated soil with plant BCF value
Baseline	Max	Aluminum	Surface Soil	Baseline_Max_Aluminum_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Aluminum	Surface Water	Baseline_Max_Aluminum_Surface Water	2.26E-02	mg/L	Measured median value
Baseline	Max	Anthracene	Air	Baseline_Max_Anthracene_Air	0.00E+00	ug/m3	
Baseline	Max	Anthracene	Soil	Baseline_Max_Anthracene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Anthracene	Surface Soil	Baseline_Max_Anthracene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Anthracene	Surface Water	Baseline_Max_Anthracene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Antimony	Air	Baseline_Max_Antimony_Air	0.00E+00	ug/m3	
Baseline	Max	Antimony	Soil	Baseline_Max_Antimony_Soil	2.05E-01	mg/kg	2/20 detected at 0.2 ppm
Baseline	Max	Antimony	Surface Soil	Baseline_Max_Antimony_Surface Soil	2.05E-01	mg/kg	2/20 detected at 0.2 ppm
Baseline	Max	Antimony	Surface Water	Baseline_Max_Antimony_Surface Water	5.00E-05	mg/L	Measured median value
Baseline	Max	Arsenic	Air	Baseline_Max_Arsenic_Air	0.00E+00	ug/m3	
Baseline	Max	Arsenic	Soil	Baseline_Max_Arsenic_Soil	1.99E+01	mg/kg	95th percentile
Baseline	Max	Arsenic	Surface Soil	Baseline_Max_Arsenic_Surface Soil	1.99E+01	mg/kg	95th percentile
Baseline	Max	Arsenic	Surface Water	Baseline_Max_Arsenic_Surface Water	1.60E-04	mg/L	Measured median value
Baseline	Max	Barium	Air	Baseline_Max_Barium_Air	0.00E+00	ug/m3	
Baseline	Max	Barium	Soil	Baseline_Max_Barium_Soil	1.12E+02	mg/kg	95th percentile
Baseline	Max	Barium	Surface Soil	Baseline_Max_Barium_Surface Soil	1.12E+02	mg/kg	95th percentile
Baseline	Max	Barium	Surface Water	Baseline_Max_Barium_Surface Water	0.00E+00	mg/L	
Baseline	Max	Benz(a)anthracene	Air	Baseline_Max_Benz(a)anthracene_Air	0.00E+00	ug/m3	
Baseline	Max	Benz(a)anthracene	Soil	Baseline_Max_Benz(a)anthracene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benz(a)anthracene	Surface Soil	Baseline_Max_Benz(a)anthracene_Surface Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benz(a)anthracene	Surface Water	Baseline_Max_Benz(a)anthracene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Benzo(a)pyrene	Air	Baseline_Max_Benzo(a)pyrene_Air	0.00E+00	ug/m3	
Baseline	Max	Benzo(a)pyrene	Soil	Baseline_Max_Benzo(a)pyrene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benzo(a)pyrene	Surface Soil	Baseline_Max_Benzo(a)pyrene_Surface Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benzo(a)pyrene	Surface Water	Baseline_Max_Benzo(a)pyrene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Benzo(b)fluoranthene	Air	Baseline_Max_Benzo(b)fluoranthene_Air	0.00E+00	ug/m3	
Baseline	Max	Benzo(b)fluoranthene	Soil	Baseline_Max_Benzo(b)fluoranthene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benzo(b)fluoranthene	Surface Soil	Baseline_Max_Benzo(b)fluoranthene_Surface Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benzo(b)fluoranthene	Surface Water	Baseline_Max_Benzo(b)fluoranthene_Surface Wat	0.00E+00	mg/L	
Baseline	Max	Benzo(e)pyrene	Air	Baseline_Max_Benzo(e)pyrene_Air	0.00E+00	ug/m3	
Baseline	Max	Benzo(e)pyrene	Soil	Baseline_Max_Benzo(e)pyrene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Benzo(e)pyrene	Surface Soil	Baseline_Max_Benzo(e)pyrene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Benzo(e)pyrene	Surface Water	Baseline_Max_Benzo(e)pyrene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Benzo(g,h,i)fluoranthene	Air	Baseline_Max_Benzo(g,h,i)fluoranthene_Air	0.00E+00	ug/m3	
Baseline	Max	Benzo(g,h,i)fluoranthene	Soil	Baseline_Max_Benzo(g,h,i)fluoranthene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Benzo(g,h,i)fluoranthene	Surface Soil	Baseline_Max_Benzo(g,h,i)fluoranthene_Surface S	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Benzo(g,h,i)fluoranthene	Surface Water	Baseline_Max_Benzo(g,h,i)fluoranthene_Surface W	0.00E+00	mg/L	
Baseline	Max	Benzo(g,h,i)perylene	Air	Baseline_Max_Benzo(g,h,i)perylene_Air	0.00E+00	ug/m3	
Baseline	Max	Benzo(g,h,i)perylene	Soil	Baseline_Max_Benzo(g,h,i)perylene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Benzo(g,h,i)perylene	Surface Soil	Baseline_Max_Benzo(g,h,i)perylene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Benzo(g,h,i)perylene	Surface Water	Baseline_Max_Benzo(g,h,i)perylene_Surface Wate	0.00E+00	mg/L	
Baseline	Max	Benzo(k)fluoranthene	Air	Baseline_Max_Benzo(k)fluoranthene_Air	0.00E+00	ug/m3	
Baseline	Max	Benzo(k)fluoranthene	Soil	Baseline_Max_Benzo(k)fluoranthene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benzo(k)fluoranthene	Surface Soil	Baseline_Max_Benzo(k)fluoranthene_Surface Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Benzo(k)fluoranthene	Surface Water	Baseline_Max_Benzo(k)fluoranthene_Surface Wat	0.00E+00	mg/L	
Baseline	Max	Cadmium	Air	Baseline_Max_Cadmium_Air	0.00E+00	ug/m3	
Baseline	Max	Cadmium	Soil	Baseline_Max_Cadmium_Soil	9.00E-01	mg/kg	95th percentile; most samples non-detect

Table D-28 Measured and Predicted Exposure Point Concentrations for the Ecological Risk Assessment

Scenario	Site	Chemical	Media	Abbreviation	Value	Units	Reference/Comment
Baseline	Max	Cadmium	Surface Soil	Baseline_Max_Cadmium_Surface Soil	9.00E-01	mg/kg	95th percentile; most samples non-detect
Baseline	Max	Cadmium	Surface Water	Baseline_Max_Cadmium_Surface Water	7.40E-05	mg/L	Measured median value
Baseline	Max	Chromium VI	Air	Baseline_Max_Chromium VI_Air	0.00E+00	ug/m3	
Baseline	Max	Chromium VI	Soil	Baseline_Max_Chromium VI_Soil	5.24E+00	mg/kg	10% of chromium
Baseline	Max	Chromium VI	Surface Soil	Baseline_Max_Chromium VI_Surface Soil	5.24E+00	mg/kg	10% of chromium
Baseline	Max	Chromium VI	Surface Water	Baseline_Max_Chromium VI_Surface Water	2.50E-05	mg/L	10% of chromium
Baseline	Max	Chromium	Air	Baseline_Max_Chromium_Air	0.00E+00	ug/m3	
Baseline	Max	Chromium	Soil	Baseline_Max_Chromium_Soil	5.24E+01	mg/kg	95th percentile
Baseline	Max	Chromium	Surface Soil	Baseline_Max_Chromium_Surface Soil	5.24E+01	mg/kg	95th percentile
Baseline	Max	Chromium	Surface Water	Baseline_Max_Chromium_Surface Water	2.50E-04	mg/L	Measured median value
Baseline	Max	Chrysene	Air	Baseline_Max_Chrysene_Air	0.00E+00	ug/m3	
Baseline	Max	Chrysene	Soil	Baseline_Max_Chrysene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Chrysene	Surface Soil	Baseline_Max_Chrysene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Chrysene	Surface Water	Baseline_Max_Chrysene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Copper	Air	Baseline_Max_Copper_Air	0.00E+00	ug/m3	
Baseline	Max	Copper	Soil	Baseline_Max_Copper_Soil	1.10E+02	mg/kg	95th percentile
Baseline	Max	Copper	Surface Soil	Baseline_Max_Copper_Surface Soil	1.10E+02	mg/kg	95th percentile
Baseline	Max	Copper	Surface Water	Baseline_Max_Copper_Surface Water	2.10E-03	mg/L	Measured median value
Baseline	Max	Dibenzo(a,h)anthracene	Air	Baseline_Max_Dibenzo(a,h)anthracene_Air	0.00E+00	ug/m3	
Baseline	Max	Dibenzo(a,h)anthracene	Soil	Baseline_Max_Dibenzo(a,h)anthracene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Dibenzo(a,h)anthracene	Surface Soil	Baseline_Max_Dibenzo(a,h)anthracene_Surface S	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Dibenzo(a,h)anthracene	Surface Water	Baseline_Max_Dibenzo(a,h)anthracene_Surface W	0.00E+00	mg/L	
Baseline	Max	Fluoranthene	Air	Baseline_Max_Fluoranthene_Air	0.00E+00	ug/m3	
Baseline	Max	Fluoranthene	Soil	Baseline_Max_Fluoranthene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Fluoranthene	Surface Soil	Baseline_Max_Fluoranthene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Fluoranthene	Surface Water	Baseline_Max_Fluoranthene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Fluorene	Air	Baseline_Max_Fluorene_Air	0.00E+00	ug/m3	
Baseline	Max	Fluorene	Soil	Baseline_Max_Fluorene_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Fluorene	Surface Soil	Baseline_Max_Fluorene_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Fluorene	Surface Water	Baseline_Max_Fluorene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Indeno(1,2,3-cd)pyrene	Air	Baseline_Max_Indeno(1,2,3-cd)pyrene_Air	0.00E+00	ug/m3	
Baseline	Max	Indeno(1,2,3-cd)pyrene	Soil	Baseline_Max_Indeno(1,2,3-cd)pyrene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Indeno(1,2,3-cd)pyrene	Surface Soil	Baseline_Max_Indeno(1,2,3-cd)pyrene_Surface So	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Indeno(1,2,3-cd)pyrene	Surface Water	Baseline_Max_Indeno(1,2,3-cd)pyrene_Surface Wa	0.00E+00	mg/L	
Baseline	Max	Lead	Air	Baseline_Max_Lead_Air	0.00E+00	ug/m3	
Baseline	Max	Lead	Soil	Baseline_Max_Lead_Soil	1.60E+01	mg/kg	95th percentile
Baseline	Max	Lead	Surface Soil	Baseline_Max_Lead_Surface Soil	1.60E+01	mg/kg	95th percentile
Baseline	Max	Lead	Surface Water	Baseline_Max_Lead_Surface Water	5.00E-05	mg/L	Measured median value
Baseline	Max	Manganese	Air	Baseline_Max_Manganese_Air	0.00E+00	ug/m3	
Baseline	Max	Manganese	Soil	Baseline_Max_Manganese_Soil	5.59E+03	mg/kg	Not analyzed; Calculated soil with plant BCF value
Baseline	Max	Manganese	Surface Soil	Baseline_Max_Manganese_Surface Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Manganese	Surface Water	Baseline_Max_Manganese_Surface Water	0.00E+00	mg/L	
Baseline	Max	Mercury Methyl	Air	Baseline_Max_Mercury Methyl_Air	0.00E+00	ug/m3	
Baseline	Max	Mercury Methyl	Soil	Baseline_Max_Mercury Methyl_Soil	0.00E+00	mg/kg	Aquatic concern
Baseline	Max	Mercury Methyl	Surface Soil	Baseline_Max_Mercury Methyl_Surface Soil	0.00E+00	mg/kg	Aquatic concern
Baseline	Max	Mercury Methyl	Surface Water	Baseline_Max_Mercury Methyl_Surface Water	2.50E-05	mg/L	Assumed = mercury
Baseline	Max	Mercury	Air	Baseline_Max_Mercury_Air	0.00E+00	ug/m3	
Baseline	Max	Mercury	Soil	Baseline_Max_Mercury_Soil	1.11E-01	mg/kg	95th percentile
Baseline	Max	Mercury	Surface Soil	Baseline_Max_Mercury_Surface Soil	1.11E-01	mg/kg	95th percentile
Baseline	Max	Mercury	Surface Water	Baseline_Max_Mercury_Surface Water	2.50E-05	mg/L	Measured median value
Baseline	Max	Molybdenum	Air	Baseline_Max_Molybdenum_Air	0.00E+00	ug/m3	
Baseline	Max	Molybdenum	Soil	Baseline_Max_Molybdenum_Soil	2.05E+00	mg/kg	95th percentile
Baseline	Max	Molybdenum	Surface Soil	Baseline_Max_Molybdenum_Surface Soil	2.05E+00	mg/kg	95th percentile
Baseline	Max	Molybdenum	Surface Water	Baseline_Max_Molybdenum_Surface Water	5.00E-05	mg/L	Measured median value
Baseline	Max	Naphthalene	Air	Baseline_Max_Naphthalene_Air	0.00E+00	ug/m3	
Baseline	Max	Naphthalene	Soil	Baseline_Max_Naphthalene_Soil	1.00E-02	mg/kg	1/6 detected at 0.01 to 0.02 ppm
Baseline	Max	Naphthalene	Surface Soil	Baseline_Max_Naphthalene_Surface Soil	1.00E-02	mg/kg	1/6 detected at 0.01 to 0.02 ppm
Baseline	Max	Naphthalene	Surface Water	Baseline_Max_Naphthalene_Surface Water	0.00E+00	mg/L	

Table D-28 Measured and Predicted Exposure Point Concentrations for the Ecological Risk Assessment

Scenario	Site	Chemical	Media	Abbreviation	Value	Units	Reference/Comment
Baseline	Max	Nickel	Air	Baseline_Max_Nickel_Air	0.00E+00	ug/m3	
Baseline	Max	Nickel	Soil	Baseline_Max_Nickel_Soil	3.53E+01	mg/kg	95th percentile
Baseline	Max	Nickel	Surface Soil	Baseline_Max_Nickel_Surface Soil	3.53E+01	mg/kg	95th percentile
Baseline	Max	Nickel	Surface Water	Baseline_Max_Nickel_Surface Water	1.06E-03	mg/L	Measured median value
Baseline	Max	Phenanthrene	Air	Baseline_Max_Phenanthrene_Air	0.00E+00	ug/m3	
Baseline	Max	Phenanthrene	Soil	Baseline_Max_Phenanthrene_Soil	3.25E-02	mg/kg	2/6 detected at 0.01 to 0.02 ppm
Baseline	Max	Phenanthrene	Surface Soil	Baseline_Max_Phenanthrene_Surface Soil	3.25E-02	mg/kg	2/6 detected at 0.01 to 0.02 ppm
Baseline	Max	Phenanthrene	Surface Water	Baseline_Max_Phenanthrene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Pyrene	Air	Baseline_Max_Pyrene_Air	0.00E+00	ug/m3	
Baseline	Max	Pyrene	Soil	Baseline_Max_Pyrene_Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Pyrene	Surface Soil	Baseline_Max_Pyrene_Surface Soil	8.75E-03	mg/kg	All non-detect at 0.01 to 0.02 ppm
Baseline	Max	Pyrene	Surface Water	Baseline_Max_Pyrene_Surface Water	0.00E+00	mg/L	
Baseline	Max	Selenium	Air	Baseline_Max_Selenium_Air	0.00E+00	ug/m3	
Baseline	Max	Selenium	Soil	Baseline_Max_Selenium_Soil	7.20E-01	mg/kg	95th percentile
Baseline	Max	Selenium	Surface Soil	Baseline_Max_Selenium_Surface Soil	7.20E-01	mg/kg	95th percentile
Baseline	Max	Selenium	Surface Water	Baseline_Max_Selenium_Surface Water	5.00E-04	mg/L	Measured median value
Baseline	Max	Silver	Air	Baseline_Max_Silver_Air	0.00E+00	ug/m3	
Baseline	Max	Silver	Soil	Baseline_Max_Silver_Soil	5.00E-01	mg/kg	All non-detect at 1 ppm
Baseline	Max	Silver	Surface Soil	Baseline_Max_Silver_Surface Soil	5.00E-01	mg/kg	All non-detect at 1 ppm
Baseline	Max	Silver	Surface Water	Baseline_Max_Silver_Surface Water	0.00E+00	mg/L	
Baseline	Max	Total Cyanide	Air	Baseline_Max_Total Cyanide_Air	0.00E+00	ug/m3	
Baseline	Max	Total Cyanide	Soil	Baseline_Max_Total Cyanide_Soil	0.00E+00	mg/kg	Not analyzed
Baseline	Max	Total Cyanide	Surface Soil	Baseline_Max_Total Cyanide_Surface Soil	0.00E+00	mg/kg	
Baseline	Max	Total Cyanide	Surface Water	Baseline_Max_Total Cyanide_Surface Water	0.00E+00	mg/L	
Baseline	Max	Zinc	Air	Baseline_Max_Zinc_Air	0.00E+00	ug/m3	
Baseline	Max	Zinc	Soil	Baseline_Max_Zinc_Soil	1.87E+02	mg/kg	95th percentile
Baseline	Max	Zinc	Surface Soil	Baseline_Max_Zinc_Surface Soil	1.87E+02	mg/kg	95th percentile
Baseline	Max	Zinc	Surface Water	Baseline_Max_Zinc_Surface Water	2.05E-02	mg/L	Measured median value
Project	Max	Acenaphthene	Air	Project_Max_Acenaphthene_Air	4.95E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Acenaphthene	Soil	Project_Max_Acenaphthene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Acenaphthene	Surface Soil	Project_Max_Acenaphthene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Acenaphthene	Surface Water	Project_Max_Acenaphthene_Surface Water	0.00E+00	mg/L	
Project	Max	Acenaphthylene	Air	Project_Max_Acenaphthylene_Air	1.11E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Acenaphthylene	Soil	Project_Max_Acenaphthylene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Acenaphthylene	Surface Soil	Project_Max_Acenaphthylene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Acenaphthylene	Surface Water	Project_Max_Acenaphthylene_Surface Water	0.00E+00	mg/L	
Project	Max	Aluminum	Air	Project_Max_Aluminum_Air	0.00E+00	ug/m3	
Project	Max	Aluminum	Soil	Project_Max_Aluminum_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Aluminum	Surface Soil	Project_Max_Aluminum_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Aluminum	Surface Water	Project_Max_Aluminum_Surface Water	4.74E-06	mg/L	Maximum increase over baseline
Project	Max	Anthracene	Air	Project_Max_Anthracene_Air	2.21E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Anthracene	Soil	Project_Max_Anthracene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Anthracene	Surface Soil	Project_Max_Anthracene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Anthracene	Surface Water	Project_Max_Anthracene_Surface Water	0.00E+00	mg/L	
Project	Max	Antimony	Air	Project_Max_Antimony_Air	0.00E+00	ug/m3	
Project	Max	Antimony	Soil	Project_Max_Antimony_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Antimony	Surface Soil	Project_Max_Antimony_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Antimony	Surface Water	Project_Max_Antimony_Surface Water	4.62E-04	mg/L	Maximum increase over baseline
Project	Max	Arsenic	Air	Project_Max_Arsenic_Air	1.56E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Arsenic	Soil	Project_Max_Arsenic_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Arsenic	Surface Soil	Project_Max_Arsenic_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Arsenic	Surface Water	Project_Max_Arsenic_Surface Water	8.99E-06	mg/L	Maximum increase over baseline
Project	Max	Barium	Air	Project_Max_Barium_Air	0.00E+00	ug/m3	
Project	Max	Barium	Soil	Project_Max_Barium_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Barium	Surface Soil	Project_Max_Barium_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Barium	Surface Water	Project_Max_Barium_Surface Water	5.14E-04	mg/L	Maximum increase over baseline
Project	Max	Benz(a)anthracene	Air	Project_Max_Benz(a)anthracene_Air	1.56E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benz(a)anthracene	Soil	Project_Max_Benz(a)anthracene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration

Table D-28 Measured and Predicted Exposure Point Concentrations for the Ecological Risk Assessment

Scenario	Site	Chemical	Media	Abbreviation	Value	Units	Reference/Comment
Project	Max	Benz(a)anthracene	Surface Soil	Project_Max_Benz(a)anthracene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benz(a)anthracene	Surface Water	Project_Max_Benz(a)anthracene_Surface Water	0.00E+00	mg/L	
Project	Max	Benzo(a)pyrene	Air	Project_Max_Benzo(a)pyrene_Air	3.39E-06	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benzo(a)pyrene	Soil	Project_Max_Benzo(a)pyrene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(a)pyrene	Surface Soil	Project_Max_Benzo(a)pyrene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(a)pyrene	Surface Water	Project_Max_Benzo(a)pyrene_Surface Water	0.00E+00	mg/L	
Project	Max	Benzo(b)fluoranthene	Air	Project_Max_Benzo(b)fluoranthene_Air	1.03E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benzo(b)fluoranthene	Soil	Project_Max_Benzo(b)fluoranthene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(b)fluoranthene	Surface Soil	Project_Max_Benzo(b)fluoranthene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(b)fluoranthene	Surface Water	Project_Max_Benzo(b)fluoranthene_Surface Water	0.00E+00	mg/L	
Project	Max	Benzo(e)pyrene	Air	Project_Max_Benzo(e)pyrene_Air	1.12E-06	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benzo(e)pyrene	Soil	Project_Max_Benzo(e)pyrene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(e)pyrene	Surface Soil	Project_Max_Benzo(e)pyrene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(e)pyrene	Surface Water	Project_Max_Benzo(e)pyrene_Surface Water	0.00E+00	mg/L	
Project	Max	Benzo(g,h,i)fluoranthene	Air	Project_Max_Benzo(g,h,i)fluoranthene_Air	2.91E-11	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benzo(g,h,i)fluoranthene	Soil	Project_Max_Benzo(g,h,i)fluoranthene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(g,h,i)fluoranthene	Surface Soil	Project_Max_Benzo(g,h,i)fluoranthene_Surface Soi	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(g,h,i)fluoranthene	Surface Water	Project_Max_Benzo(g,h,i)fluoranthene_Surface Wa	0.00E+00	mg/L	
Project	Max	Benzo(g,h,i)perylene	Air	Project_Max_Benzo(g,h,i)perylene_Air	7.82E-06	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benzo(g,h,i)perylene	Soil	Project_Max_Benzo(g,h,i)perylene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(g,h,i)perylene	Surface Soil	Project_Max_Benzo(g,h,i)perylene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(g,h,i)perylene	Surface Water	Project_Max_Benzo(g,h,i)perylene_Surface Water	0.00E+00	mg/L	
Project	Max	Benzo(k)fluoranthene	Air	Project_Max_Benzo(k)fluoranthene_Air	2.85E-06	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Benzo(k)fluoranthene	Soil	Project_Max_Benzo(k)fluoranthene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(k)fluoranthene	Surface Soil	Project_Max_Benzo(k)fluoranthene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Benzo(k)fluoranthene	Surface Water	Project_Max_Benzo(k)fluoranthene_Surface Water	0.00E+00	mg/L	
Project	Max	Cadmium	Air	Project_Max_Cadmium_Air	4.50E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Cadmium	Soil	Project_Max_Cadmium_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Cadmium	Surface Soil	Project_Max_Cadmium_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Cadmium	Surface Water	Project_Max_Cadmium_Surface Water	7.83E-06	mg/L	Maximum increase over baseline
Project	Max	Chromium VI	Air	Project_Max_Chromium VI_Air	1.69E-04	ug/m3	10% of chromium
Project	Max	Chromium VI	Soil	Project_Max_Chromium VI_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Chromium VI	Surface Soil	Project_Max_Chromium VI_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Chromium VI	Surface Water	Project_Max_Chromium VI_Surface Water	1.13E-05	mg/L	10% of chromium
Project	Max	Chromium	Air	Project_Max_Chromium_Air	1.69E-03	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Chromium	Soil	Project_Max_Chromium_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Chromium	Surface Soil	Project_Max_Chromium_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Chromium	Surface Water	Project_Max_Chromium_Surface Water	1.13E-04	mg/L	Maximum increase over baseline
Project	Max	Chrysene	Air	Project_Max_Chrysene_Air	1.55E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Chrysene	Soil	Project_Max_Chrysene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Chrysene	Surface Soil	Project_Max_Chrysene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Chrysene	Surface Water	Project_Max_Chrysene_Surface Water	0.00E+00	mg/L	
Project	Max	Copper	Air	Project_Max_Copper_Air	6.71E-02	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Copper	Soil	Project_Max_Copper_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Copper	Surface Soil	Project_Max_Copper_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Copper	Surface Water	Project_Max_Copper_Surface Water	2.56E-06	mg/L	Maximum increase over baseline
Project	Max	Dibenzo(a,h)anthracene	Air	Project_Max_Dibenzo(a,h)anthracene_Air	6.57E-06	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Dibenzo(a,h)anthracene	Soil	Project_Max_Dibenzo(a,h)anthracene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Dibenzo(a,h)anthracene	Surface Soil	Project_Max_Dibenzo(a,h)anthracene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Dibenzo(a,h)anthracene	Surface Water	Project_Max_Dibenzo(a,h)anthracene_Surface Wa	0.00E+00	mg/L	
Project	Max	Fluoranthene	Air	Project_Max_Fluoranthene_Air	8.15E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Fluoranthene	Soil	Project_Max_Fluoranthene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Fluoranthene	Surface Soil	Project_Max_Fluoranthene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Fluoranthene	Surface Water	Project_Max_Fluoranthene_Surface Water	0.00E+00	mg/L	
Project	Max	Fluorene	Air	Project_Max_Fluorene_Air	2.89E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Fluorene	Soil	Project_Max_Fluorene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Fluorene	Surface Soil	Project_Max_Fluorene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Fluorene	Surface Water	Project_Max_Fluorene_Surface Water	0.00E+00	mg/L	

Table D-28 Measured and Predicted Exposure Point Concentrations for the Ecological Risk Assessment

Scenario	Site	Chemical	Media	Abbreviation	Value	Units	Reference/Comment
Project	Max	Indeno(1,2,3-cd)pyrene	Air	Project_Max_Indeno(1,2,3-cd)pyrene_Air	5.90E-06	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Indeno(1,2,3-cd)pyrene	Soil	Project_Max_Indeno(1,2,3-cd)pyrene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Indeno(1,2,3-cd)pyrene	Surface Soil	Project_Max_Indeno(1,2,3-cd)pyrene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Indeno(1,2,3-cd)pyrene	Surface Water	Project_Max_Indeno(1,2,3-cd)pyrene_Surface Wat	0.00E+00	mg/L	
Project	Max	Lead	Air	Project_Max_Lead_Air	2.21E-03	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Lead	Soil	Project_Max_Lead_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Lead	Surface Soil	Project_Max_Lead_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Lead	Surface Water	Project_Max_Lead_Surface Water	6.21E-08	mg/L	Maximum increase over baseline
Project	Max	Manganese	Air	Project_Max_Manganese_Air	6.11E-03	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Manganese	Soil	Project_Max_Manganese_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Manganese	Surface Soil	Project_Max_Manganese_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Manganese	Surface Water	Project_Max_Manganese_Surface Water	5.68E-06	mg/L	Maximum increase over baseline
Project	Max	Mercury Methyl	Air	Project_Max_Mercury Methyl_Air	0.00E+00	ug/m3	Aquatic concern
Project	Max	Mercury Methyl	Soil	Project_Max_Mercury Methyl_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Mercury Methyl	Surface Soil	Project_Max_Mercury Methyl_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Mercury Methyl	Surface Water	Project_Max_Mercury Methyl_Surface Water	0.00E+00	mg/L	
Project	Max	Mercury	Air	Project_Max_Mercury_Air	1.66E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Mercury	Soil	Project_Max_Mercury_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Mercury	Surface Soil	Project_Max_Mercury_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Mercury	Surface Water	Project_Max_Mercury_Surface Water	0.00E+00	mg/L	
Project	Max	Molybdenum	Air	Project_Max_Molybdenum_Air	0.00E+00	ug/m3	
Project	Max	Molybdenum	Soil	Project_Max_Molybdenum_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Molybdenum	Surface Soil	Project_Max_Molybdenum_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Molybdenum	Surface Water	Project_Max_Molybdenum_Surface Water	9.66E-05	mg/L	Maximum increase over baseline
Project	Max	Naphthalene	Air	Project_Max_Naphthalene_Air	1.65E-03	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Naphthalene	Soil	Project_Max_Naphthalene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Naphthalene	Surface Soil	Project_Max_Naphthalene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Naphthalene	Surface Water	Project_Max_Naphthalene_Surface Water	0.00E+00	mg/L	
Project	Max	Nickel	Air	Project_Max_Nickel_Air	8.86E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Nickel	Soil	Project_Max_Nickel_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Nickel	Surface Soil	Project_Max_Nickel_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Nickel	Surface Water	Project_Max_Nickel_Surface Water	0.00E+00	mg/L	Maximum increase over baseline
Project	Max	Phenanthrene	Air	Project_Max_Phenanthrene_Air	5.35E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Phenanthrene	Soil	Project_Max_Phenanthrene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Phenanthrene	Surface Soil	Project_Max_Phenanthrene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Phenanthrene	Surface Water	Project_Max_Phenanthrene_Surface Water	0.00E+00	mg/L	
Project	Max	Pyrene	Air	Project_Max_Pyrene_Air	6.15E-05	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Pyrene	Soil	Project_Max_Pyrene_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Pyrene	Surface Soil	Project_Max_Pyrene_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Pyrene	Surface Water	Project_Max_Pyrene_Surface Water	0.00E+00	mg/L	
Project	Max	Selenium	Air	Project_Max_Selenium_Air	8.97E-04	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Selenium	Soil	Project_Max_Selenium_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Selenium	Surface Soil	Project_Max_Selenium_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Selenium	Surface Water	Project_Max_Selenium_Surface Water	1.59E-04	mg/L	Maximum increase over baseline
Project	Max	Silver	Air	Project_Max_Silver_Air	0.00E+00	ug/m3	
Project	Max	Silver	Soil	Project_Max_Silver_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Silver	Surface Soil	Project_Max_Silver_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Silver	Surface Water	Project_Max_Silver_Surface Water	0.00E+00	mg/L	Maximum increase over baseline
Project	Max	Total Cyanide	Air	Project_Max_Total Cyanide_Air	0.00E+00	ug/m3	
Project	Max	Total Cyanide	Soil	Project_Max_Total Cyanide_Soil	0.00E+00	mg/kg	
Project	Max	Total Cyanide	Surface Soil	Project_Max_Total Cyanide_Surface Soil	0.00E+00	mg/kg	
Project	Max	Total Cyanide	Surface Water	Project_Max_Total Cyanide_Surface Water	8.88E-05	mg/L	Maximum increase over baseline
Project	Max	Zinc	Air	Project_Max_Zinc_Air	9.75E-02	ug/m3	Annual average taken from 12 receptor locations around mine
Project	Max	Zinc	Soil	Project_Max_Zinc_Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Zinc	Surface Soil	Project_Max_Zinc_Surface Soil	0.00E+00	mg/kg	ERA model predicts future soil concentration
Project	Max	Zinc	Surface Water	Project_Max_Zinc_Surface Water	2.44E-06	mg/L	Maximum increase over baseline

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