Copper Fox Metals Inc.

Schaft Creek Project: Tahltan (Country) Foods Baseline Assessment, 2009 Update




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SCHAFT CREEK PROJECT:

Tahltan (Country) Foods Baseline Assessment, 2009 Update

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Executive Summary

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In April 2008, Rescan™ Tahltan Environmental Consultants (Rescan) completed a baseline report (the Report) entitled *Schaft Creek Tahltan (Country) Foods Baseline Assessment* (Rescan 2008). The results of the country food baseline assessment indicated no unacceptable risks to country food harvesters who consume moose, grouse, snowshoe hare, rainbow trout, blueberry, and soapberry. However, the results for blueberry and soapberry were based on a limited sample size. There was uncertainty whether the measured metal concentrations in a small sample size were reflective of the conditions throughout the entire proposed road route and mine site. Therefore, additional blueberry and soapberry samples were collected in August 2008 and measured for metal concentrations. This report presents an updated country foods baseline assessment, which incorporates the additional berry data with the data included in the 2008 report.

The updated assessment for blueberries and soapberries indicates no unacceptable risks to human receptors. Based on these results, country food harvesters currently consume country foods at the rates that are within the recommended maximum weekly intakes (RMWIs). Thus, people may safely continue to eat these foods at the rates and frequencies to which they are accustomed.

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RTEC Keepers of the Land

SCHAFT CREEK PROJECT: TAHLTAN (COUNTRY) FOODS BASELINE ASSESSMENT, 2009 UPDATE

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Acronyms and Abbreviations

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BW	body weight
COPC	contaminant of potential concern
EA	environmental assessment
EDI	estimated daily intake
ER	exposure ratio
F	fraction of daily consumption
ILCR	incremental lifetime cancer risk
IR	ingestion rate
the Project	the Schaft Creek Project
RTEC	Rescan™ Tahltan Environmental Consultants
RMWI	recommended maximum weekly intake
TDI	tolerable daily intake

1. Introduction

1. Introduction

1.1 BACKGROUND

Rescan Tahltan Environmental Consultants (RTEC) completed the Schaft Creek Tahltan (Country) Foods Baseline Assessment for the Schaft Creek Project (the Project) in April 2008 which assessed the baseline exposure of metals to people who consume country foods (country food harvesters). Country food harvesters in the Project area include: members of the Tahltan First Nation, other First Nation groups, and non-First Nations. These country foods harvesters were the human receptors evaluated in this study.

Metals were the focus of the assessment because the Project is a base metals mine and base metals also occur naturally in environment. The twelve metals included in the assessment were: aluminum, antimony, arsenic, chromium, copper, lead, mercury, molybdenum, nickel, selenium, vanadium, and zinc.

The original assessment identified no unacceptable risks to country food harvesters who consume moose, snowshoe hare, grouse, rainbow trout, blueberry and soapberry from the Project area. However, the original assessment of blueberry and soapberry was based on a limited sample size. Thus, it was uncertain whether the metal concentrations detected in the small sample size were representative of the entire Project area. Therefore, in August 2008, additional blueberry and soapberry samples were collected for metals analysis.

This report presents an update to the blueberry and soapberry components of 2008 Schaft Creek Tahltan (Country) Foods Baseline Assessment and includes values for the following:

- The metal concentrations in blueberry and soapberry from 2007 and 2008 berry samples.
- Updated values of the metal Estimated Daily Intake (EDI) to toddler and adult country food harvesters.
- Updated values of the Exposure Ratio (ER) to toddler and adult country food harvesters.
- Updated values of the recommended maximum weekly number of servings of blueberry and soapberry for toddler and adult country food harvesters.

1.2 OBJECTIVES

This report presents an updated assessment of the Schaft Creek Tahltan (Country) Foods Baseline Assessment for blueberries and soapberries. This includes updated values for the Recommended Maximum Weekly Intakes (RMWIs) of blueberries and soapberries, following Health Canada's Guidance on Health Impact Assessments (Health Canada, 2004a).

The baseline assessment will be used to predict potential effects of the Project on country foods as part of the EA Application. The concentration of metals in country foods are directly related to concentrations in the surrounding environment (i.e., soil, water and vegetation). Therefore, the country foods effects assessment will evaluate the potential for mine related increases of metals concentrations in soil, water and vegetation and the potential for subsequent increases of metals in country foods. The EA Application will also evaluate how the potential changes in tissue concentrations (if any) may affect the RMWIs presented in this baseline report.

2. Methodology

2. Methodology

The methodology for the assessment was based on Health Canada's *Canadian Handbook on Health Impact Assessment*, Chapter 8: Food Issues in Environment Impact Assessment (Health Canada, 2004a).

The country foods assessment was divided into the following five stages:

1. **Problem Formulation**: The conceptual model for conducting the country foods assessment was developed. This included the identification of the country foods, contaminants of potential concern (COPCs) and human receptors.
2. **Exposure Assessment**: The extent to which human receptors might be exposed to the COPCs was assessed. This included identifying the receptor specific characteristics (i.e., consumption amounts and consumption frequencies) and calculating the estimated daily intakes (EDI).
3. **Toxicity Assessment**: The tolerable daily intakes (TDIs)—levels of daily exposure that can be taken into the body without appreciable health risk—were identified.
4. **Risk Characterization**: The exposure and effects assessments were integrated to produce quantitative risk estimates and Recommended Maximum Weekly Intake (RMWIs).
5. **Uncertainty Analysis**: The assumptions made throughout the assessment and their effects on the conclusions were evaluated.

This update report only provides updated values for blueberry and soapberry in the Exposure Assessment and Risk Characterization stages. Details methodology for all stages was presented in the Schaft Creek Tahltan (Country) Foods Baseline Assessment in April 2008.

3. Problem Formulation

3. Problem Formulation

The purpose of the problem formulation stage was to create a conceptual model for the country foods assessment. This entailed identifying the country foods, contaminants of potential concern (COPCs), and human receptors to evaluate. The problem formulation stage is not described in this report because it was discussed in the Schaft Creek Tahltan (Country) Foods Baseline Assessment in April 2008. The updated sampling data for blueberry and soapberry does not change the results of the problem formulation presented in Rescan 2008.

4. Exposure Assessment

4. Exposure Assessment

4.1 INTRODUCTION

The amount of metals that people would be exposed to from the consumption of blueberry and soapberry was determined for the ingestion pathway. The amount of exposure depends on:

- the concentration of metals in plants (blueberry and soapberry) resulting from their uptake of metals in soil and water
- human receptor characteristics (i.e., body weight, consumption amount and frequency).

These parameters are included in exposure estimate equations to determine the estimated daily intake (EDI) of each metal through the consumption of blueberry and soapberry.

4.2 BERRY TISSUE METAL CONCENTRATIONS

During the 2008 field work program, four blueberry samples and four soapberry samples were collected and analyzed for total metal concentrations. These samples were collected in addition to four blueberry and four soapberry samples that were collected during the 2007 field work program. Appendix 1 presents the entire berry data set.

Table 4.2-1 presents the maximum concentration of metals that were measured in berries collected in 2007 and 2008. The maximum concentrations were used to calculate risk estimates because the sample size is too low to calculate the 95% upper confidence limit of the mean.

Table 4.2-1. Metal Concentrations in Blueberry and Soapberry (mg/kg wet weight)

	Blueberry Maximum Concentration		Soapberry Maximum Concentration	
Metals	**2007 (N=4)**	**2008 (N=4)**	**2007 (N=4)**	**2008 (N=4)**
Aluminum	6.2	4.6	6.0	2.4
Antimony	0.005	0.005	0.005	0.005
Arsenic	0.005	0.005	0.005	0.005
Chromium	0.05	0.91	0.05	0.16
Copper	1.160	0.777	0.020	1.120
Lead	0.01	0.01	0.025	0.01
Mercury	0.005	0.0005	0.005	0.0005
Molybdenum	0.54	0.365	0.35	0.393
Nickel	0.14	0.57	0.89	1.44
Selenium	0.1	0.1	0.1	0.1
Vanadium	0.05	0.05	0.05	0.05
Zinc	1.93	2.22	3.25	2.86

4.3 HUMAN RECEPTOR CHARACTERISTICS

Receptor characteristics were based on guidance provided by Health Canada (2004b), and Jin (2006, unpublished data). The meal frequency and serving size of each country food was assumed to accurately represent the consumption pattern of people who consume the most of each country food. Data from were based on adult serving size and consumption frequency. It was assumed that a

toddler would eat the country foods at the same frequency as adults. The assumed toddler serving sizes were calculated as 43% of the adult serving size as per Richardson (1997). It is anticipated that this assumption overestimates the actual toddler serving sizes. The receptor characteristics assumed are presented in Table 4.3-1.

Table 4.3-1. Human Receptor Characteristics

Parameter	Toddler (0.5 to 4 years old)	Adult (over 18 years old)	Data Source
Body weight (kg)	16.5	70.7	Health Canada, 2004b
Serving size (kg)	0.092	0.213	
Blueberry (berry)	0.094	0.219	Jin, 2006
Soapberry (berry)	0.120	0.280	Jin, 2006
Frequency of consumption (days per year)			
Blueberry (berry)	104	104	Jin, 2006
Soapberry (berry)	156	156	Jin, 2006

4.4 ESTIMATED DAILY INTAKE

The following equation was used to estimate the exposure from country foods ingestion:

$$EDI_{food} = \frac{IR \times C_{food} \times F}{BW}$$

Where:

EDI_{food} = estimated daily intake of country food (in mg metal/kg body weight/day)
IR = the ingestion rate (in kg/day)
C_{food} = metal concentrations in food (in mg/kg)
F = fraction of the year consuming country food (unitless)
BW = receptor body weight (in kg)

The EDI of each metal for adult and toddler receptors are presented in Tables 4.4-1. For this assessment, it was conservatively assumed that 100% of the country foods consumed were collected from the Project area, and that each of the metals evaluated are 100% bioavailable.

Table 4.4-1. Estimated Daily Intake of Metals by Human Receptors (mg/kg body weight/day)

	Blueberry		Soapberry	
Metals	Toddler Max EDI	Adult Max EDI	Toddler Max EDI	Adult Max EDI
Aluminum	1.01×10^{-2}	5.47×10^{-3}	1.87×10^{-2}	1.02×10^{-2}
Antimony	8.13×10^{-6}	4.41×10^{-6}	1.56×10^{-5}	8.46×10^{-6}
Arsenic	8.13×10^{-6}	4.41×10^{-6}	1.56×10^{-5}	8.46×10^{-6}
Chromium	1.48×10^{-3}	8.03×10^{-4}	4.99×10^{-4}	2.71×10^{-4}
Copper	1.89×10^{-3}	1.02×10^{-3}	3.49×10^{-3}	1.90×10^{-3}
Lead	1.63×10^{-5}	8.83×10^{-6}	7.80×10^{-5}	4.23×10^{-5}
Mercury	8.13×10^{-6}	4.41×10^{-6}	1.56×10^{-5}	8.46×10^{-6}

(continued)

Table 4.4-1. Estimated Daily Intake of Metals by Human Receptors (mg/kg body weight/day) (completed)

	Blueberry		Soapberry	
Metals	**Toddler Max EDI**	**Adult Max EDI**	**Toddler Max EDI**	**Adult Max EDI**
Molybdenum	8.78×10^{-4}	4.77×10^{-4}	1.23×10^{-3}	6.65×10^{-4}
Nickel	9.27×10^{-4}	5.03×10^{-4}	4.49×10^{-3}	2.44×10^{-3}
Selenium	1.63×10^{-4}	8.83×10^{-5}	3.12×10^{-4}	1.69×10^{-4}
Vanadium	8.13×10^{-5}	4.41×10^{-5}	1.56×10^{-4}	8.46×10^{-5}
Zinc	3.61×10^{-3}	1.96×10^{-3}	1.01×10^{-2}	5.50×10^{-3}

5. Toxicity Assessment

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5.1 TOXICITY REFERENCE VALUES

The toxicity assessment involved identifying the amount of contaminants of potential concern (COPCs) that can be taken into the body without experiencing adverse health effects to humans. This amount is referred to as the toxicity reference value or tolerable daily intake (TDI). The TDIs identified were derived by Health Canada's Bureau of Chemical Safety, Chemical Health Hazard Division or were adopted by Health Canada from various other regulatory agencies such as the US EPA's Integrated Risk Information Service Database, and the Joint Food and Agriculture Organization/World Health Organization, Expert Committee on Food Additives and Contaminants.

Table 5.1-1 presents a summary of the TDI values for all COPCs. The slope factor is only presented for arsenic because it is the only carcinogenic COPC. Details on the derivation of the TDI values and the arsenic slope factor were presented in Rescan 2008.

Table 5.1-1. Toxicity Reference Values for Metals of Potential Concern

Metal	TDI (mg/kg body weight/day)	Slope Factor (mg/kg body weight/day)$^{-1}$
Aluminum	1.0	N/A
Antimony	0.003	N/A
Arsenic	0.001	1.7
Chromium	1.5	N/A
Copper	0.125	N/A
Lead	0.00357	N/A
Mercury	0.00071	N/A
Molybdenum	0.033	N/A
Nickel	0.025	N/A
Selenium	0.010	N/A
Vanadium	0.015	N/A
Zinc	0.7	N/A

N/A = not applicable.

6. Risk Characterization

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6.1 ESTIMATION OF NON-CARCINOGENIC RISKS

Human health risk estimates were calculated based on the following formula:

$$\text{Exposure Ratio (ER)} = \frac{\text{Estimated Daily Intake (EDI)}}{\text{Tolerable Daily Intake (TDI)}}$$

For non-carcinogenic metals, an exposure ratio (ER) of less than 0.2 represents exposure that does not pose a significant health risk to human receptors (Health Canada, 2004b). Health Canada considers an ER value of 0.2 appropriate because only one exposure pathway is evaluated. ER values greater than 0.2 do not necessarily indicate that adverse health effects will occur, due to the conservatism employed in their estimation (e.g., the toxicity reference values are conservative and protective of human health). Thus, an ER value of greater than 0.2 is not conclusive evidence that a health risk exists. However, it does suggest potential risk that may require a more detailed evaluation.

Tables 6.1-1 presents the updated ER values for blueberry and soapberry based on the maximum metal concentrations from the 2007 and 2008 berry tissue samples. There were no contaminant of potential concern (COPC) ER values that exceeded 0.2. Therefore, COPC exposure from the consumption of blueberry and soapberry from the Project area is not expected to pose any health risk to country food harvesters.

Table 6.1-1. Exposure Ratios for Human Receptors

	Blueberry		Soapberry	
Metals	**Toddler Max ER**	**Adult Max ER**	**Toddler Max ER**	**Adult Max ER**
Aluminum	1.01×10^{-2}	5.47×10^{-3}	1.87×10^{-2}	1.02×10^{-2}
Antimony	2.71×10^{-3}	1.47×10^{-3}	5.20×10^{-3}	2.82×10^{-3}
Arsenic	8.13×10^{-3}	4.41×10^{-5}	1.56×10^{-2}	8.46×10^{-5}
Chromium	9.87×10^{-4}	5.35×10^{-4}	3.33×10^{-4}	1.81×10^{-4}
Copper	1.51×10^{-2}	8.19×10^{-3}	2.79×10^{-2}	1.52×10^{-2}
Lead	4.56×10^{-3}	2.47×10^{-3}	2.18×10^{-2}	1.19×10^{-2}
Mercury	1.15×10^{-2}	6.22×10^{-3}	2.20×10^{-2}	1.19×10^{-2}
Molybdenum	2.66×10^{-2}	1.44×10^{-2}	3.71×10^{-2}	2.02×10^{-2}
Nickel	3.71×10^{-2}	2.01×10^{-2}	1.80×10^{-1}	9.75×10^{-2}
Selenium	1.63×10^{-2}	8.83×10^{-3}	3.12×10^{-2}	1.69×10^{-2}
Vanadium	5.42×10^{-3}	2.94×10^{-3}	1.04×10^{-2}	5.64×10^{-3}
Zinc	5.16×10^{-3}	2.80×10^{-3}	1.45×10^{-2}	7.86×10^{-3}

6.2 ESTIMATION OF CANCER RISKS

Carcinogenic risks were estimated as incremental lifetime cancer risk (ILCR) estimates according to the following formula:

$$\text{ILCR} = \text{Estimated Lifetime Daily Exposure} \times \text{Cancer Potency Factor}$$

Table 6.2-1 presents the ILCR values for human receptors exposed to arsenic from blueberries and soapberries. The updated ILCR values from consuming blueberries or soapberries were unchanged because there was no difference in maximum arsenic concentration from the berry tissue samples between 2007 and 2008. Thus, the data show that all ILCR values were below 1×10^{-5}, the accepted limit for cancer risk in BC. This indicates that people can continue to consume these berries without any additional risk of cancer.

Table 6.2-1. Incremental Lifetime Cancer Risk for Human Receptors Exposed to Arsenic in Country Foods

Country Food	Incremental Lifetime Cancer Risk
Blueberry	7.50×10^{-8}
Soapberry	1.44×10^{-7}

6.3 RECOMMENDED MAXIMUM WEEKLY INTAKES

The recommended maximum weekly intake (RMWI) is the amount of country food that can be consumed per week without any significant risk of human health effect from COPC exposure. The RMWI estimates the weekly country food intake to reach an exposure ratio of 1.0. The RMWI is calculated based on the following formula:

$$RMWI = \frac{TDI \times BW \times 7}{C_{food}}$$

Where:

RMWI = recommended maximum weekly intake of food (kg/week)
TDI = tolerable daily intake (mg/kg body weight/day)
BW = receptor body weight (kg)
7 = days/week
C_{food} = maximum metal concentration in food (mg/kg wet weight)

The lowest RMWI value for a metal represents the recommended maximum amount of food that can be ingested in a week. This amount was converted into numbers of servings per week by dividing the RMWI by the serving size of blueberry and soapberry. Table 6.3-1 presents the recommended maximum servings per week.

Table 6.3-1. Recommended Maximum Servings per Week

Country Food	Human Receptor	Recommended Maximum Servings per Week	Current Servings per Week
Blueberry	Toddler	53.8	1.29
	Adult	99.1	1.29
Soapberry	Toddler	16.7	0.02
	Adult	30.7	0.02

All RMWIs are greater than the reported levels of consumption for all country foods evaluated. This means that the predicted levels of the metals evaluated in the foods harvested from the Project area do not pose a health risk to toddlers or adults that consume them and that the country foods harvesters can continue to consume the country foods at rates and frequencies to which they are accustomed.

7. Uncertainty Analysis

7. Uncertainty Analysis

7.1 INTRODUCTION

The process of evaluating human health risks from exposure to environmental media involves multiple steps. Inherent in each step of the baseline assessment are uncertainties that ultimately affect the final risk estimates. Uncertainties may exist in numerous areas, including the collection of samples used to identify contaminant concentrations, laboratory analysis of samples, and estimation of potential exposures and derivation of toxicity reference values. These uncertainties may result in an over- or underestimation of risk. However, for this assessment, where uncertainties existed, a conservative approach was taken, in order to overestimate rather than underestimate potential risks.

The following uncertainty analysis is a qualitative discussion of the significant sources of uncertainty in this assessment. There may be sources of uncertainty other than those evaluated here; however, their impact on the estimated risks and Recommended Maximum Weekly Intakes (RMWIs) are considered comparatively insignificant.

7.2 CONTAMINANTS OF POTENTIAL CONCERN (COPCS)

The COPCs selected for this assessment were metals. Metals were the focus of this assessment because the Project is a base metals mine and base metals naturally occur in environmental media (i.e., soil, water and plant and animal tissue). Other contaminants (i.e., persistent organic pollutants and radionuclides) have been measured in environmental media under baseline conditions in various areas of northern Canada. However, these contaminants are not associated with base metal mining operations. Therefore, the Project will have no effect on the levels of these contaminants, even if they currently occur at detectable concentrations within the study area. COPCs other than metals that may be associated mine operations but do not occur under baseline conditions will be evaluated as part of the EA for the Project. Subsequently, it is certain that all baseline COPCs that are relevant to the Project have been evaluated.

7.3 BERRY TISSUE CONCENTRATIONS

Although additional blueberry and soapberry samples were collected and analyzed for metals, the total number per species (eight) is still low. Therefore, there is some uncertainty that the levels of metals measured are reflective of the metals concentrations throughout the entire proposed road route and mine site. However, the additional sampling provides additional certainty to blueberry and soapberry metal concentrations, and the use of maximum concentrations may provide additional conservatism.

7.4 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control methodologies were followed during the sampling of the soil, water, and vegetation. All persons collecting the tissue samples were trained on appropriate tissue sampling techniques. This minimized the potential for cross contamination and ensured that the samples sizes were adequate for chemical analyses. Tissue collectors were provided with all of the sterile field supplies and disinfectants required for collecting samples.

All chemistry samples were analysed by ALS Laboratory Group (Environmental Division) in Burnaby, BC. ALS is certified by the Canadian Association of Environmental Analytical Laboratories. Chain of custody forms were completed and transported with all tissue samples sent to ALS.

7.5 LOCATIONS OF COUNTRY FOODS HARVESTED

For most of the country foods assessed, it was assumed that 100% of the food consumed per year came from within the Project area. This is likely an overestimation of actual consumption, as it is improbable that 100% of country foods that are harvested come from within the Project area. This is particularly true, given that the site is primarily only accessible by air.

7.6 COUNTRY FOODS CONSUMPTION AMOUNTS AND FREQUENCY

The consumption amount and frequency data used in this assessment came from interviews called Food Consumption Frequency Questionnaire interviews. This type of interview often leads to overestimations of actual intake (Institute for Risk Research, 1999). Therefore, it is likely that the consumption amounts and frequencies have been overestimated. Such overestimation provides conservatism in the risk evaluation and RMWIs.

This assessment does not consider seasonal differences in the way that food is prepared (it is based on fresh weight and not dried or preserved weight), nor does it consider variability in a person's diet over time.

7.7 TOXICITY REFERENCE VALUES

There is uncertainty associated with estimating toxicity benchmarks by extrapolating potential effects on humans from animal studies in the laboratory. Thus, for human health risk assessments, it is a standard practice to assume that people are more sensitive to the toxic effects of a substance than laboratory animals. Therefore, the toxicity benchmarks for human health are set at much lower levels than the animal benchmarks (typically 100 to 1,000 times lower). This large margin ensures that doses less than the toxicity benchmarks are safe and that minor exceedances of these benchmarks are extremely unlikely to cause adverse health effects.

The tolerable daily intakes (TDIs) are derived for individual contaminants. However, it is recognized that within any food, multiple chemicals may be present and interactions between compounds may result in antagonism, additivity or synergism. As the scientific understanding of the effects of multiple contaminants is still in its infancy, interactions were not evaluated in this assessment.

7.8 DEFINITION OF HEALTH

This country foods assessment is a science-based approach recommended by Health Canada. It should protect human receptors from adverse health effects from exposure to the selected metals. The country foods assessor recognizes that health is more than just physical health. For instance: social, cultural, nutritional, and economic factors also play a role in a person's overall health status. Thus, this science-based assessment does not take into account all aspects of human health.

8. Conclusions

8. Conclusions

The quality of country foods has been estimated prior to development of the Project and thus is reflective of baseline metals levels. It also evaluated current potential health risks associated from the ingestion of baseline metals concentrations in the country foods. This baseline assessment will be used to as a benchmark for predicting potential effects of the Project on country foods as part of the EA Application. Below presents a summary of the findings of the study and presents an overview of how the results of this study will be used to evaluate potential Project related effects on the quality of country foods.

8.1 BASELINE COUNTRY FOODS QUALITY

This report presents the updated assessment of blueberry and soapberry. The updated blueberry and soapberry assessment supports the original assessment which indicates no unacceptable risks to human receptors from both non-carcinogenic and carcinogenic effects. The current blueberry and soapberry consumption rates from food harvesters in the Project area are well below the recommended maximum weekly intakes (RMWIs) that were calculated. Based on the measured berries metal concentration and the current rates of consumption of these foods, country food harvesters can continue to consume blueberry and soapberry at the rates and frequencies they are accustomed to without any health risks.

8.2 FUTURE COUNTRY FOODS QUALITY

This baseline assessment will be used to predict potential effects of the Project on country foods as part of the EA Application. The concentration of contaminants of potential concern (COPCs) in country foods are directly related to the concentrations in the surrounding environment (i.e., in soil, water and vegetation). Therefore, the country foods effects assessment will evaluate the potential for mine related increases of COPC concentrations (particularly metals) in soil, water and vegetation and the potential for subsequent increases in country foods. The EA will also evaluate how the potential changes in tissue concentrations (if any) may affect the recommended weekly intakes presented in this baseline report.

References

References

Health Canada. 2004a. *Canadian Handbook on Health Impact Assessment*. Volume 3: The Multidisciplinary Team, Chapter 8. Ottawa, Ontario.

Health Canada. 2004b. *Federal Contaminated Site Risk Assessment in Canada.* Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA). Ottawa, Ontario.

Institute for Risk Research. 1999. *Country Foods: Benefits and Risks, A Resource Document for Nunavut and Labrador*. Waterloo, Ontario.

Jin A. 2006 [unpublished]. Survey of traditional food and medicine consumption among Tahltan people in Dease Lake, Telegraph Creek and Iskut, BC 2005-2006.

Richardson, G.M. 1997. *Compendium of Canadian Human Exposure Factors for Risk Assessment*. Ottawa: O'Connor Associates Environmental Inc.

Appendix 1

Schaft Creek Project 2008-Metal Concentrations in Berry Tissue Samples (mg/kg wet weight)

Appendix 1
Schaft Creek Project 2008 - Metal Concentrations in Berry Tissue Samples (mg/kg wet weight)

RESULTS OF ANALYSIS								
Sample ID	3-Blueberry	5-Blueberry	8-Blueberry	9-Blueberry	7-Soapberry	4-Soapberry	10-Soapberry	11-Soapberry
Date Sampled	17-Aug-08	18-Aug-08	20-Aug-08	20-Aug-08	19-Aug-08	17-Aug-08	21-Aug-08	26-Aug-08
Time Sampled	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
ALS Sample ID	L676276-3	L676276-5	L676276-7	L676276-8	L676276-6	L676276-4	L676276-9	L676276-10
Matrix	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue	Tissue
Physical Tests								
% Moisture	85.2	88.9	88.8	87.1	78.7	80.6	79.8	78.6
Metals								
Aluminum (Al)-Total	<2.0	<2.0	4.6	4.4	<2.0	<2.0	2.4	2.4
Antimony (Sb)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Arsenic (As)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Barium (Ba)-Total	2.13	0.771	1.42	1.81	0.081	0.532	0.062	0.16
Beryllium (Be)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth (Bi)-Total	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Cadmium (Cd)-Total	0.0067	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Calcium (Ca)-Total	161	168	139	137	263	116	319	171
Chromium (Cr)-Total	0.38	0.91	<0.10	0.79	0.16	0.1	<0.10	<0.10
Cobalt (Co)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Copper (Cu)-Total	0.28	0.777	0.617	0.676	0.595	1.12	0.931	0.718
Iron (Fe)-Total	3.7	6.46	3.04	5.82	5.83	5.73	6.75	5.18
Lead (Pb)-Total	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Lithium (Li)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Magnesium (Mg)-Total	108	85.9	94.8	99.5	112	99.1	138	84.2
Manganese (Mn)-Total	13.5	8.3	13.8	33.5	2.5	3.32	2.24	2.6
Mercury (Hg)-Total	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Molybdenum (Mo)-Total	0.365	0.086	0.135	0.088	0.137	0.277	0.393	0.076
Nickel (Ni)-Total	0.31	0.57	<0.10	0.46	0.2	1.44	0.87	0.36
Phosphorus (P)-Total	117	165	229	203	384	302	468	347
Potassium (K)-Total	932	860	1060	1020	1890	1800	1900	1620
Selenium (Se)-Total	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Sodium (Na)-Total	<20	<20	<20	<20	<20	<20	<20	<20
Strontium (Sr)-Total	1.15	0.085	0.316	0.072	0.472	0.491	0.228	0.195
Thallium (Tl)-Total	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin (Sn)-Total	0.071	<0.050	0.066	0.073	<0.050	<0.050	<0.050	0.103
Titanium (Ti)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	<0.10
Uranium (U)-Total	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Vanadium (V)-Total	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc (Zn)-Total	2.22	1.18	1.27	1.26	2.79	1.57	2.86	1.65