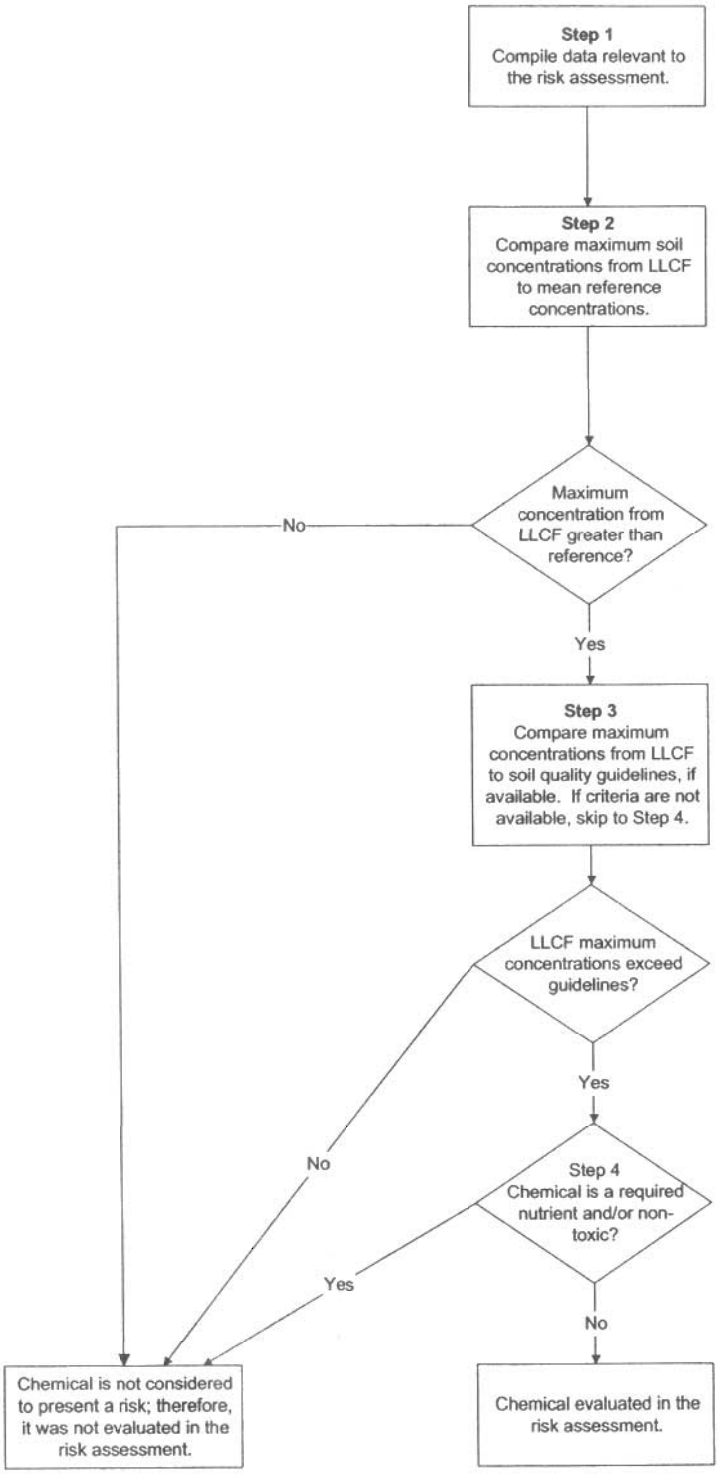
Figure 1
Chemical Screening Process



5.1.2 Identifying Receptors

5.1.2.1 Wildlife Receptors

There are many species of organisms that could be present in the southern arctic environment. However, it is not practical to evaluate all species. Receptors that were selected for the risk assessment: are representative of the local ecosystem; have the greatest potential for exposure, play a key role in the food web; and have sufficient characterization data to facilitate calculations of exposure and health risks. The short-listed receptors are called valued ecosystem components (VECs). VECs are defined as resources or environmental features that include the following:

- are important to human populations (i.e., used as a food source);
- have economic and/or social value (i.e., animal that are trapped for furs, recreational value);
- have intrinsic ecological significance (i.e., endangered species, key species in the food web); and
- serve as a baseline from which the impacts can be evaluated (CCME 1996a).

The VEC selection process is described in detail in Appendix II, Section 4.1.1. The following VEC's were evaluated in the risk assessment:

- muskoxen (*Ovibos moschatus*);
- caribou (*Rangifer tarandus*);
- grizzly bears (*Ursus arctos horribilis*);
- wolverine (*Gulo gulo*);
- wolves (*Canis lupus*);
- hare (*Lepus arcticus*); and
- ptarmigan (*Lagopus lagopus*).

5.1.2.2 Human Receptors

Humans are not expected to be directly exposed to metals in the LLCF by incidental ingestion of processed kimberlite or via drinking processed kimberlite effluent. The only valid pathway for

the human health assessment is via ingestion of caribou meat from caribou that have been exposed to metals from ingestion of processed kimberlite, vegetation and effluent. Therefore, concentrations of metals in caribou meat were estimated (Appendix I).

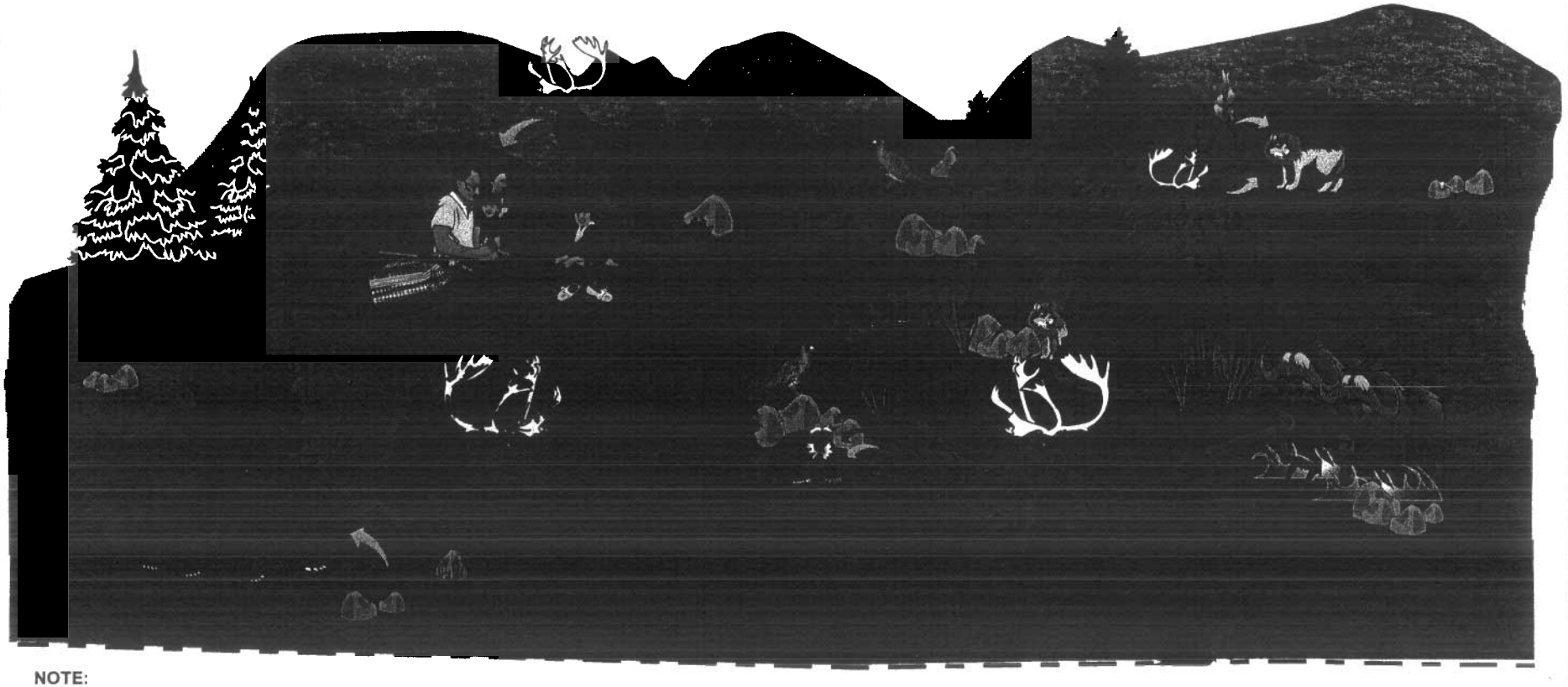
Both a hypothetical adult and toddler were evaluated for exposure to metals via ingestion of caribou meat. Consistent with risk assessment guidance (Health Canada 1994, 1995, 2003), the toddler life phase (i.e., seven months to four years) was chosen as the most susceptible child lifestage for evaluation of non-carcinogenic metals. The toddler phase is the most susceptible childhood phase due to their ratio of body size to ingestion rates compared to other life stages.

5.1.3 Identifying Exposure Pathways

Receptors may be exposed to metals from the LLCF via several pathways. An illustration of exposure pathways is presented in Figure 2. The following pathways were evaluated in the risk assessment:

- ingestion of soil (all VECs);
- ingestion of plants that have taken up metals from the soil (caribou, muskox, hare and ptarmigan);
- ingestion of processed kimberlite effluent (all VECs);
- ingestion of prey (wolves, wolverine, grizzly bears); and
- ingestion of caribou meat (humans).

Direct skin contact was not considered to be a significant exposure pathway for fur- or feather-bearing receptors since fur and feathers provide effective protection of skin. Water and soil on fur or feathers is more likely to be ingested during grooming than absorbed through the skin. Grooming was considered as part of the ingestion pathway. The details of the exposure pathway analysis are presented in Appendix II, Sections 4.1.2 and 5.1.2 for wildlife and humans, respectively.



NOTE:
This figure is for illustrative purposes only. Although it represents the wildlife exposure pathways, clipart was not available for species resident in the study area.

FEEDING ON PREY/MEAT

FEEDING ON PLANTS

INGESTING SOIL

WATER INGESTION

Figure: 2

EXPOSURE PATHWAYS ASSESSED IN THE RISK ASSESSMENT

R:\CAD\2003\1323\03-1323-037\1000\EXPOSURE-PATHWAYS.cdr

5.1.4 Risk Assessment Endpoints

This step involves establishing assessment and measurement endpoints. An assessment endpoint is a general statement describing what is being protected. The measurement endpoint is the method for measuring whether the assessment endpoint is being achieved.

5.1.4.1 Assessment Endpoints

In human health risk assessment, protection of the individual is the assessment endpoint. This means that no one individual person may be exposed to concentrations of metals that may pose a health risk.

The human health assessment endpoint for this risk assessment is:

> *There will be no unacceptable risks to individual children or adults consuming their entire daily meat intake from caribou that have been exposed to metals from the LLCF area.*

In ecological risk assessment, the overall goal is to ensure that the structure and function of the ecosystem is not changed to the point where populations and communities cannot be sustained and where human uses are curtailed. The assessment endpoints may be different depending on the type of species being evaluated. Listed species are typically protected at the individual level. Wolverine and grizzly bears are listed as "sensitive" (COSEWIC 2002). Other wildlife are protected at the population level. Protection of the population means that the population of a species within an area of interest should not be affected; however, a small number of individual animals within the population may be affected.

The assessment endpoints for wildlife receptors for this risk assessment are:

> *There will be no unacceptable risks to the population of caribou, muskoxen, wolves, hare, and ptarmigan that may be exposed to metals from the LLCF.*

Unacceptable risks to populations are defined as sufficient effects on individuals that the viability of the population declines due to increased death rate or decreased birth rate.

> *There will be no unacceptable risks to individual wolverines and grizzly bears that may be exposed to metals from the LLCF.*

Unacceptable risks to individuals are defined as risks of sub-lethal effects (such as slower growth or lower capacity to reproduce).

5.1.4.2 Measurement Endpoints

Human Receptors

The measurement endpoint for humans must be protective to ensure that there will not be unacceptable risks to individual children or adults consuming caribou that may have been exposed to metals from the LLCF. The primary measurement endpoint is the toxicity benchmark or toxicity reference value (TRV). TRVs are safe exposures below which there is minimal risk of adverse health effects. The TRVs used in the human health assessment were obtained from government agencies such as Health Canada (Health Canada 2003; TERA 2003) and the U.S. EPA's Integrated Risk Information Service database (IRIS 2003). The ratio between estimated exposure to individuals and the TRV, called an Exposure Ratio (ER), should be less then the acceptable threshold value, 0.2. This acceptable threshold value is less than 1 to account for exposure to the COCs from other sources.

Wildlife Receptors

For wildlife receptors, two types of measurement endpoints are defined. Primary measurement endpoints assess risks to individual animals, in the same way that risks to individual human receptors are evaluated (as discussed above). However, in most cases for ecological receptors, it is more important to assess risks to the population, rather than to individual animals. In this case, secondary measurement endpoints are defined that evaluate risks to the population. However, if an ecological receptor has special status (i.e., listed as endangered, threatened or sensitive), risks to individual animals are evaluated (this is the case for wolverines and grizzly bears). Primary and secondary measurement endpoints for each of the ecological receptors are described in the sections below.

Primary Measurement Endpoints

In order to meet the assessment endpoint for wildlife ecological receptors, the primary measurement endpoint (or TRV) is the Lowest Observed Adverse Effect Level (LOAEL). As is done in the human health assessment, an ER is calculated for each exposure pathway, by calculating the ratio between estimated exposure and the toxicity benchmark. ERs values from

each exposure pathway are added together to determine the total ER value. The acceptable ER value for risks to individual wildlife receptors is 1, since all of the exposure for wildlife is assumed to be from the LLCF.

Secondary Measurement Endpoints

A secondary measurement endpoint has been defined for species where risks are predicted for individuals. The secondary measurement endpoint is that the number of individuals affected must be less than 20% of the probable population size (Suter et al. 1995). This threshold for effects on populations is based upon an understanding of the natural variability in the factors that control the sustainability of populations (e.g., birth rate and death rate). It is a very conservative benchmark, since the natural variability in birth and death rates is usually much higher than 20%. The number of individuals affected is estimated from the home range size of each of the receptors. Species with small home range sizes (e.g., arctic hare) may have more than one home range overlapping the area. In these cases, the total number of individuals relative to the probable population size is evaluated.

A summary of the assessment and measurement endpoints used in this assessment is presented in Table 1.

Table 1
Summary of Assessment and Measurement Endpoints

Receptor	Assessment Endpoint	Primary Measurement Endpoint	Secondary Measurement Endpoint
Human	No adverse effects to individual children or adults	ER (exposure versus toxicity benchmark) ER<0.2	Not applicable, since humans are evaluated as individuals
Wolverine and grizzly bear	No adverse effects to individual organisms	ER (exposure versus toxicity benchmark) ER<1	Not applicable, since wolverines and grizzly bears are evaluated as individuals
Caribou, muskox, wolves, hare and ptarmigan	No adverse effect on the population	ER (exposure versus toxicity benchmark) ER<1	< 20% of individuals affected relative to probable population size

5.1.5 Estimating Exposure

5.1.5.1 Wildlife Health

The amount of exposure that VECs might receive from the study area was determined for all of the exposure pathways illustrated in Figure 2. The amount of exposure depends on the concentrations in various media (e.g., maximum metal concentrations measured in soil, plant tissue, and water and calculated prey tissue concentrations), the amount of time an animal is in contact with these media and the rates at which the receptors take in food and soil. Some of these factors (e.g., water ingestion rates, food ingestion rates) are available from government agencies (i.e., U.S. EPA) while others required professional judgement (i.e., time in the area). Whenever there was uncertainty and in order to account for the variability in animals' habits, conservative assumptions were used to ensure that exposure would not be underestimated.

5.1.5.2 Human Health

The amount of exposure to metals that people would get from the LLCF was determined for the caribou meat ingestion pathway. The amount of exposure depends on the concentration of metals in caribou meat resulting from caribou ingestion of vegetation, water and soil from the LLCF, meat ingestion rates and the frequency of meat ingestion. Default food ingestion rates for aboriginal people were obtained from Health Canada (2003). It was assumed that people consumed caribou meat 365 days per year from caribou that have spent 6 months per year ingesting vegetation, water and soil from the LLCF.

The assumptions used in the wildlife and human risk assessment are presented in Table 2. These assumptions, together with maximum measured metal concentrations and literature values for parameters such as ingestion rates, were used as input to exposure equations for humans and wildlife. Further details on methods to estimate exposure are presented in Appendix II, Section 4.2 and 5.2 for wildlife and humans, respectively.

Table 2
Conservative Assumptions Used in the Risk Assessment, and the Reasons Why Assumptions Are Conservative

Assumption Used in the Risk Assessment	Reason Why Assumption Is Conservative
Wildlife consume 100% of their food (i.e., vegetation or prey) and water while in the vicinity of the LLCF	Animals will not be confined to the LLCF but rather are free to get drinking water and food from throughout the tundra. The grasses that will be planted in the LLCF are not necessarily preferred vegetation types for wildlife. In addition, there are many sources of water in the vicinity of the LLCF so it is very unlikely that wildlife would consume all of their daily drinking water from the LLCF.
Caribou, grizzly bears, wolves, and wolverines consume 100% of their food, water, and soil from the vicinity of the LLCF for 6 months per year.	The area of the LLCF is approximately 390 ha. This area is much smaller than the typical home range for caribou, grizzly bears, wolves and wolverines. Individual caribou are more likely to spend only a couple of weeks per year getting food from the LLCF on their way to and from calving grounds.
VECs are exposed to maximum concentrations in plants, soil and water.	Animals are not confined to areas with the maximum concentration. While in the vicinity of the LLCF, animals are most likely to be exposed to a range of metals concentrations.
People consume their entire meat intake per year from caribou that have been exposed to metals from the LLCF	It is unlikely that all of the meat that people would consume would be from caribou that have been exposed to maximum concentrations of metals from the LLCF for 6 months per year. The majority of the caribou hunted in the Northwest Territories are unlikely to encounter the LLCF at all.

5.1.6 Determining the Toxicity Benchmark

Toxicity assessment involves identification of the potentially toxic effects of substances, and determination of the amount of a substance that a receptor can be exposed to without experiencing unacceptable effects. The results of the toxicity assessment are expressed as the TRV, or toxicity benchmark. TRVs are safe exposures below which there is minimal risk of adverse health effects.

The TRVs used in the human health assessment were obtained from government agencies such as Health Canada (Health Canada 2003; TERA 2003) and the U.S. EPA's Integrated Risk Information Service Database (IRIS 2003). The majority of toxicity information comes from the results of experiments with laboratory animals. Some additional information on human health effects is also available for some substances where cases of workplace exposures and associated health effects have been documented.

Animal studies provide dose-response information for non-carcinogenic chemicals that can be extrapolated to humans by applying safety factors. In most cases safety factors of 100 to 1,000 are applied to a laboratory derived No-Observed-Adverse-Effect Level (NOAEL; the highest concentration in a toxicity test where no chronic health effects were observed or measured) to account for interspecies extrapolation and protection of the most susceptible in a population (i.e., children and elderly). Therefore, TRVs have large margins of safety to ensure that the toxicity or risk of a substance to people is not underestimated.

TRVs for the wildlife health assessment were obtained from Sample et al. (1996). These TRVs are based on laboratory toxicity studies. Ideally, toxicity test species should be the same species being evaluated in the risk assessment, but this is rarely possible. Usually, laboratory toxicity studies using rats, mice, mallard ducks or other captive species provide dose-response information that can be extrapolated to wildlife. The Lowest-Observed-Adverse-Effect Level (LOAEL) for sublethal effects was selected for each metal, where available. In studies where mortality was the endpoint or where a LOAEL was not identified, the No-Observed-Adverse-Effect Level (NOAEL) was selected. The LOAELs and NOAELs from laboratory studies were extrapolated to TRVs for wildlife species by incorporating differences in physiology between large and small animals (Sample and Arenal 1999).

Further details on determining toxicity benchmarks for this risk assessment are presented in Appendix II, Section 4.3 and 5.3 for wildlife and humans, respectively.

5.1.7 Risk Characterization

Risk estimates were calculated as the exposure ratio (ER), which is a ratio of the estimated exposure of metals from the LLCF to the toxicity benchmarks, as follows:

$$ER = \frac{\text{Estimated Exposure}}{\text{Toxicity Benchmark}}$$

The resulting ER must be interpreted according to the assessment endpoints as described above.

The ER indicates whether the amount of a metal taken in by people or animals is greater than the amount of the metal below which there would be no health effect or no unacceptable risk of

cancer. If the ER is greater than 1, then the amount taken in is greater than the threshold amount for which there are no health effects. This does not mean that there will be health effects but that further consideration is necessary to reduce uncertainty in the risk assessment. If the ER is less than 1, then we can be certain that no health effects or unacceptable risks would occur.

In some cases, it is necessary to reduce the acceptable ER value since other sources of exposure need to be considered. For example, since the earth's crust is made up of metals, they are all around us. They are in the food we eat, the air we breathe and the water we drink. Therefore, the ER calculated from exposure in the study area, must be adjusted to consider exposure from other sources. For this assessment the acceptable risk threshold for the human health risk assessment was an ER of 0.2 because it is assumed that people are exposed to metals from multiple sources.

For wildlife, the acceptable risk threshold is an ER of 1 since the risk assessment conservatively assumed wildlife obtained all of their food, water and soil from the LLCF. No other significant exposure sources would occur while wildlife are in the vicinity of the LLCF.

5.2 How Sure Are We?

5.2.1 Applying Layers of Safety

In this risk assessment, exposures and benchmarks were estimated from available information about how exposure might take place and the potential health effects that could result. There is always uncertainty associated with these estimations, depending on the quality, quantity and variability associated with the available data. When information is uncertain, it is standard practice in a risk assessment to make assumptions that are biased towards safety, so that even if there is uncertainty, human and wildlife health will still be protected. Every effort was made to ensure that assumptions were specific to the LLCF at the EKATI Diamond Mine.

There are several layers of safety applied in this study. For example, maximum concentrations were used in the risk assessment to estimate exposure. This assumption accounts for the potential variability in concentrations in soil, water and vegetation. Conservative assumptions regarding the amount of time that wildlife spent near the LLCF were also applied to the risk assessment. In addition, it was assumed that people ate caribou meat every day (i.e., 365 days per year) from

caribou that were exposed to maximum metals concentrations from the LLCF for 6 months per year.

There is also uncertainty associated with estimating toxicity benchmarks. Extrapolating from animal studies in the laboratory to the possible effects that may result from exposure to metals from the study area is uncertain. To add a layer of safety, 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 benchmark for human health is set at a much lower level than the animal benchmark (typically 100 to 1,000 times lower). This large margin of safety 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.

All of these layers of safety ensure that risks due to exposure to metals from the LLCF has not been underestimated.

5.3 Is It Acceptable?

5.3.1 Acceptability of Guidelines and Toxicity Benchmarks

The guidelines and toxicity benchmarks used in this risk assessment have been determined by regulatory agencies to be acceptable based on a combination of scientific information and public acceptability. Science provides the understanding of the consequences of exposure. Public opinion has determined the level of protection that must be built into the guidelines and toxicity benchmarks.

6. RISK ASSESSMENT RESULTS

6.1 Human Health Risk Assessment Results

All of the ERs are much less than 0.2 for both toddlers and adults (Table 3). ERs were calculated for exposure to metals via consumption of caribou meat from caribou that have been exposed to maximum concentrations of metals in food, water and soil from the LLCF.

Table 3
Human Health ER Values for Exposure to Metals in Caribou Meat

Parameter	ER	
	Toddler	Adult
Chromium	0.0003	0.0003
Cobalt	0.001	0.001
Manganese	0.002	0.001
Molybdenum	0.007	0.005
Nickel	0.03	0.02
Strontium	0.004	0.003

6.2 Wildlife Health Risk Assessment Results

ERs were less than 1 for all VECs and all COCs (Table 4). ERs were calculated for exposure to maximum concentrations metals in food, water and soil from the LLCF. Since all ERs were less than 1, no risks to individual animals are predicted. Since no risks to individuals are predicted, there would be not risks to populations. The very low ERs provide confidence that no effects on wildlife will occur, even when overall exposure to all metals of concern is considered. Most of exposure was due to the soil pathway, followed by the plant ingestion pathway. Water ingestion contributed very little to the overall exposure (Appendix II, Section 4.5).

Table 4
Total ER Values for Wildlife (Individual Animals)

Parameter	Caribou	Grizzly Bear	Muskox	Wolf	Wolverine	Hare	Ptarmigan
Chromium	0.0005	0.0005	0.0009	0.0008	0.0007	0.002	0.0008
Cobalt	0.003	0.003	0.005	0.005	0.004	0.009	0.3
Manganese	0.0004	0.0004	0.0007	0.0002	0.0002	0.001	0.6
Molybdenum	0.3	0.3	0.5	0.1	0.1	0.7	0.004
Nickel	0.008	0.008	0.01	0.01	0.01	0.02	0.03
Strontium	0.002	0.002	0.004	0.002	0.002	0.005	0.003

7. CONCLUSIONS

7.1 Human Health

For the human health risk assessment, for all of the metals evaluated in the assessment, estimated exposure was less than the toxicity benchmarks. Therefore, there is no risk to health due to the ingestion of caribou meat. Conservative assumptions and many layers of safety were used to estimate exposure and to derive toxicity benchmarks. This means that there is a high degree of certainty that risks have not been underestimated and that all members of a family would be safe from exposure to metals from the study area.

7.2 Wildlife Health

There is no increased health risk for wildlife exposed to metals in the LLCF via incidental ingestion of soil, water and food. Since none of the VECs would be at risk from ingesting water, soil and food from the LLCF and since the VECs selected for the risk assessment are representative of different levels of the ecosystem, it is concluded that no other species of wildlife that inhabit the LLCF would be exposed to concentrations of metals that could cause a health risk. Conservative assumptions and many layers of safety were applied to the wildlife health risk assessment. This means that there is a high degree of certainty that risks have not been underestimated and that all wildlife would be safe from exposure to metals from the LLCF.

7.3 What Does This Mean for the Abandonment and Reclamation Plan?

Stabilizing processed kimberlite by revegetating the LLCF as part of BHPBs Abandonment and Reclamation Plan for the EKATI Diamond Mine will not result in human or wildlife health effects due to exposure to metals from processed kimberlite.

8. CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

GOLDER ASSOCIATES LTD.

Report prepared by:

Cindy Robinson, B.Sc., P. Biol.
Toxicologist

Jennifer Douglas, B.Sc.
Environmental Biologist

Report reviewed by:

Stella Swanson, Ph.D., P. Biol.
Principal, Senior Environmental Scientist

9. REFERENCES

ABR Inc. Environmental and Research Services. 2000. EKATI Diamond Mine Reclamation Research Program 2000. Prepared for BHP Diamond Inc.

AENV (Alberta Environment). 2000. Policy for Management of Risks at Contaminated Sites in Alberta. AENV, Edmonton, AB.

BHPB (BHP Billiton Diamonds Inc.). 1998. Interim Abandonment and Restoration Plan. BHP Diamonds Inc., Yellowknife, NWT. pp. 1-93.

CCME (Canadian Council of Ministers of the Environment). 1996a. A Framework for Ecological Risk Assessment: General Guidance. National Contaminated Sites Remediation Program. CCME. Winnipeg, Manitoba. March 1996.

CCME (Canadian Council of Ministers of the Environment). 1996b. A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. CCME-EPC-101E.

CCME (Canadian Council of Ministers of the Environment). 1996c. Guidance Manual for Developing Site-Specific Soil Quality Remediation Objectives for Contaminated Sites in Canada. National Contaminated Sites Remediation Program. CCME. Winnipeg, Manitoba.

CCME (Canadian Council of Ministers of the Environment). 1999. Canadian Environmental Quality Guidelines. Updated 2003. Winnipeg, CCME-1299.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2002. Endangered Species in Canada: 2001 List. Committee on the Status of Endangered Wildlife in Canada, Ottawa, ON.

Health Canada. 1994. Canadian Environmental Protection Act: Human Health Risk Assessment for Priority Substances. Health Canada, Ottawa, ON.

Health Canada. 1995 (unpublished). Human Health Risk Assessment of Chemicals from Contaminated Sites: Volumes I and II. Health Canada, Ottawa ON.

Health Canada. 2003. Federal Contaminated Site Risk Assessment in Canada. Part I: Guidance on Human Health Screening Level Risk Assessment (SLRA). Version 1.1. Health Canada, Ottawa ON.

IRIS (Integrated Research Information System). 2003. U.S. Environmental Protection Agency, Cincinnati, OH. Available on the internet at: http://www.epa.gov/iris/ Accessed October 2003.

Martens and Associates (Harvey Martens and Associates Inc.). 2002. EKATI Diamond Mine Processed Kimberlite Tailings Reclamation Research Program 2002. Prepared for BHP Billiton Diamonds Inc. Yellowknife, NWT.

Martens and Associates (Harvey Martens and Associates Inc.). 2001. EKATI Diamond Mine Processed Kimberlite Tailings Reclamation Research Program 2001. Prepared for BHP Billiton Diamonds Inc. Yellowknife, NWT.

Martens and Associates (Harvey Martens and Associates Inc.). 2000. EKATI Diamond Mine Processed Kimberlite Tailings Reclamation Research Program 2000. Prepared for BHP Billiton Diamonds Inc. Yellowknife, NWT.

Millard, J. of BHP Billiton Diamonds Inc. 2003. Personal Communication with Cindy Robinson of Golder Associates Ltd. on November 13, 2003.

Reid, N. 2001. EKATI Diamond Mine Processed Kimberlite Tailings Vegetation Research. Department of Renewable Resources, University of Alberta, Edmonton, Alberta.

Reid, Neil. 2000. EKATI Diamond Mine Processed Kimberlite Tailings Reclamation. Department of Renewable Resources, University of Alberta, Edmonton, Alberta.

Sample, B.E. and C.A. Arenal. 1999. Allometric Models for Interspecies Extrapolation of Wildlife Toxicity Data. Bull. Environ. Contam. Toxicol.; 62: 653-663.

Sample, B.E., D.M. Opresko and G.W. Suter II. 1996. Toxicological Benchmark for Wildlife: 1996 Revision. ES/ER/TM-86/R3.

Suter, G. W., B.W. Cornaby, C. T. Hadden, R. N. Hull, M. Stack and F. A. Zafran. 1995. An Approach for Balancing Health and Ecological Risks at Hazardous Waste Sites. Risk Analysis; 15(2): 221-231.

TERA (Toxicology Excellence for Risk Assessment). 2003. Available on the internet at: http://www.tera.org/ Accessed October 2003.

U.S. EPA. (United States Environmental Protection Agency). 1998. Guidelines for Ecological Risk Assessment. Washington, D.C. EPA/630/R-95/002F.

APPENDIX I

DATA USED IN RISK ASSESSMENT

TABLE OF CONTENTS

LIST OF TABLES

I DATA USED IN THE RISK ASSESSMENT

I.1 Introduction

BHP Billiton Ltd. (BHPB) has conducted research at the Long Lake Containment Facility (LLCF) to determine metals concentrations in amended processed kimberlite and vegetation. In addition, water quality of processed kimberlite effluent has been measured at BHPB as part of routine water quality monitoring. These data were reviewed and evaluated in the risk assessment and are summarized in this appendix.

The risk assessment required information on metal concentrations in the following parts of the food chain:

- reference soil and reference native plant species;
- soil-amended processed kimberlite (herein referred to as soil), which will be used as the growing material for plants;
- plants grown on the LLCF;
- water in the LLCF, and
- animal tissue (calculated).

I.2 Soil

Soil data were obtained from EKATI Diamond Mine Processed Kimberlite Tailings Reclamation Research Program (Martens and Associates 2002). In this program, soil samples were collected from reference locations and from plots within the LLCF. Three reference locations were identified; a location within the mine site but not impacted by processed kimberlite, at the Arnie Exploration Site and in a wet meadow. Three surface (0 to 15 cm) soil samples were collected at both of the mine site and Arnie Exploration site and one soil sample was collected from the wet meadow. Mean metal concentrations were calculated for each site for the chemical screening process described in Appendix II, Section 3.

Soil amendment plots were established within the LLCF in one of three blocks (BI, BII or BIII). Each block was divided into treatment plots which consisted of the following soil amendments: