Revised Draft Guidelines for the Preparation of an Environmental Impact Statement

for

AREVA Resources Canada Inc's

Kiggavik Project (NIRB File No. 09MN003)

February 2011

Issued by:

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GLOSSARY

This glossary is provided for the Proponent's greater certainty; the onus is on the Proponent to request clarification from the NIRB on any term it feels has not been made clear. This glossary includes terminology and definitions that are specific to Nunavut and the proposed project. Additional glossary terms can be found in the NIRB's *Guide 2: Guide to Terminology and Definitions* (NIRB, 2007).

Please note that, where possible, a reference has been provided for each of the terms below.

Clean waste rock	Refers to mined bedrock with low contaminant levels and no acid generating potential.
Commissioner's Lands	Lands administered by a municipality in Nunavut, or by the Government of Nunavut.
Cumulative impacts or effects	The impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
Ecosystemic	Relating to the complex of a natural community of living organisms and its environment functioning as an ecological unit in nature.
Esker	A long winding ridge of gravel, sand, etc. originally deposited by a meltwater stream running under a glacier (INAC, 2007b).
Fugitive dust	Also referred to as fugitive mist or fugitive vapour. Dust, mist, or vapour containing a toxic pollutant, regulated under federal legislation that is emitted from any source other than through a stack (Tilleman, 2005).
Harvest	The reduction of wildlife into possession, and includes hunting, trapping, fishing, as defined in the *Fisheries Act*, netting, egging, picking, collecting, gathering, spearing, killing, capturing or taking by any means (GC and TFN, 1993).
Ice scour	Geological term for long, narrow ditches in a seabed, created by the collision of fast ice and pack ice and the grounding of icebergs.
Inuit	Aboriginal peoples of northern Canada and Greenland. In the context of Nunavut, for the purpose of these Guidelines, meaning those people to whom NLCA Beneficiary status is ascribed.
Inuit Owned Lands	Means (a) those lands that vest in the DIO [Designated Inuit Organization] as Inuit Owned Lands pursuant to Section 19.3.1 [of the NLCA], and (b) any lands that are vested in, acquired by or re-acquired by the DIO as Inuit Owned Lands from time to time pursuant to the [NLCA], so long as they maintain such status pursuant to the [NLCA] (GC and TFN, 1993).

Inuit Qaujimajatuqangit	Means traditional, current and evolving body of Inuit values, beliefs, experience, perceptions and knowledge regarding the environment, including land, water, wildlife and people, to the extent that people are part of the environment (QIA, 2009). This definition replaces the definition in NIRB's *Guide 2: Guide to Terminology and Definitions* (NIRB, 2007)
Inuit Qaujimaningit	Means (a) Inuit Traditional Knowledge and variations of Inuit Traditional Knowledge; (b) Inuit epistemology relating to: Inuit Societal values (including the legal obligations set out in the NLCA regarding Inuit Participation, Inuit employment and training, etc.); and Inuit knowledge (both contemporary and traditional) (QIA, 2009).
Local Study Area	That area where there exists the reasonable potential for immediate impacts due to project activities, ongoing normal activities, or to possible abnormal operating conditions.
Nunavummiut	Residents of Nunavut.
Nunavut Land Claims Agreement (NLCA)	The "Agreement Between the Inuit of the Settlement Area and her Majesty the Queen in Right of Canada", including its preamble and schedules, and any amendments to that agreement made pursuant to it (Tilleman, 2005).
Potentially affected communities	A community or communities with the potential to be impacted, either positively or negatively, by a proposed project or development. Such communities may be defined physical entities or comprised of dispersed populations in the area of influence of a development or project.
Precautionary principle	Where there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UN, 1972).
Proponent	The organization, company, or department planning to undertake a proposal (Tilleman, 2005).
Radiation	Any form of electromagnetic energy propagated as rays, waves, or streams of energetic particles. Includes any or all of: alpha, beta, gamma, or x-rays, neutrons, and high-energy electrons, protons, or other atomic particles. Does not include sound or radio waves, or visible infrared, or ultraviolet light (Tilleman, 2005).
Radon	A colourless, naturally occurring, radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks (Tilleman, 2005).
Reasonably foreseeable future development	Projects or activities that are currently under regulatory review or that will be submitted for regulatory review in the near future, as determined by the existence of a proposed project description, letter of intent, or any regulatory application filed with an authorizing agency (NIRB, 2007).
Regional Study Area	The area within which there is the potential for indirect or cumulative biophysical and socio-economic effects.

Residual Impacts	Those predicted adverse impacts that remain after mitigating measures have been applied (Tilleman, 2005).
Rock glacier	Boulders and fine material cemented by ice about a meter below the surface.
Rock heave	The movement of rock as a result of freezing and thawing.
Sacred site	A place on the land created or used by Inuit spiritual leaders in the past for religious ceremonies, such as: a platform or formation leading to an "altar"; a hill, mountain, stone, boulder, river, lake, or Inukshuk designated as a sacred site; an offering place where people might plead for good fortune and well-being, often found along the coast, but also inland; a place where an unusual event might have happened, or an event that led to a death or a story of survival; a place known to Elders in legend where a significant story occurred (Ittarnisalirijiit Katimajiit, 1996).
Scoping	A process that pinpoints significant issues requiring study and analysis. This process aims to identify those components of the biophysical and/or socio-economic environment that may be impacted by the project and for which there is public concern (NIRB, 2008).
Special waste	A substance that: (1) is prescribed as a special waste or, (2) is present in circumstances prescribed to be those in which a substance is a special waste (Tilleman, 2005).
Subeconomic mineralized waste	Material or rock that is not economically feasible to mine. Material may contain significant contaminant concentration or acid generating potential and is classified as special waste.
Tailings	Residue of raw material or waste separated out during the processing of crops or mineral ores. Those portions of washed or milled ore that are regarded as too poor to be treated further (Tilleman, 2005).
Talik	Permanently unfrozen ground in regions of permafrost. Usually applies to a layer that lies above the permafrost but below the active layer, often occurs below waterbodies.
Thermal stability	The degree to which something, such as permafrost, has the capacity to remain at the same temperature over time.
Transboundary impacts	Any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity, the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party (UN, 1991).
Valued Ecosystem Components (VECs)	Those aspects of the environment considered to be of vital importance to a particular region or community, including: a) resources that are either legally, politically, publically, or professionally recognized as important, such as parks, land selections, and historical sites; b) resources that have ecological importance; and c) resources that have social importance (NIRB, 2007).

Valued Socio-Economic Components (VSECs)	Those aspects of the socio-economic environment considered to be of vital importance to a particular region or community, including components relating to the local economy, health, demographics, traditional way of life, cultural well-being, social life, archaeological resources, existing services and infrastructure, and community and local government organizations (NIRB, 2007).
Yellowcake	Impure uranium oxide obtained during the processing of uranium ore (Barber, 2004).

LIST OF ACRONYMS

ANFO	- Ammonium Nitrate and Fuel Oil
ARD	- Acid Rock Drainage
ATV	- All Terrain Vehicles
CEA	- Cumulative Effects Assessment
COPC	- Constituents of Potential Concern
DFO	- Department of Fisheries and Oceans Canada
EIS	- Environmental Impact Statement
EMP	- Environmental Management Plan
GHG	- Greenhouse Gas
GN	- Government of Nunavut
HTO	- Hunters' and Trappers' Organization
IIBA	- Inuit Impact and Benefit Agreement
INAC	- Indian and Northern Affairs Canada
IOL	- Inuit Owned Land
IPG	- Institutions of Public Government
IR	- Information Request
KIA	- Kivalliq Inuit Association
LSA	- Local Study Area
MB	- megabyte
ML	- Metal Leaching
MSDS	- Material Safety Data Sheets
NGMP	- Nunavut General Monitoring Program
NIRB	- Nunavut Impact Review Board
NLCA	- Nunavut Land Claims Agreement
NPC	- Nunavut Planning Commission
NSA	- Nunavut Settlement Area
NWB	- Nunavut Water Board
OHF	- Oil Handling Facility
PM	- Particulate Matter
PM_{10}	- Particulate matter of 10 micrometres or less
$PM_{2.5}$	- Particulate matter less than 2.5 micrometres or less
PMP	- Probable Maximum Precipitation
QIA	- Qikiqtani Inuit Association
ROM	- Run-Of-Mine
RSA	- Regional Study Area
SEMC	- Socio-Economic Monitoring Committee

TK	- Traditional Knowledge
TSP	- Total Suspended Particulate
VEC	- Valued Ecosystem Component
VSEC	- Valued Socio-Economic Component

PART I – THE ASSESSMENT

1.0 INTRODUCTION

1.1 OBJECTIVE OF NIRB GUIDELINES

Pursuant to Section 12.5.2 of the *Nunavut Land Claims Agreement* (NLCA):

> *"When a project proposal has been referred to NIRB by the Minister for review, NIRB shall, upon soliciting any advice it considers appropriate, issue guidelines to the Proponent for the preparation of an impact statement. It is the responsibility of the Proponent to prepare an impact statement in accordance with any guidelines issued by NIRB..."* (GC and TFN, 1993)

The present Guidelines are issued for the preparation of an Environmental Impact Statement (EIS) for the Kiggavik project (the Project) proposed by AREVA Resources Canada Inc. (the Proponent). An EIS is a documented evaluation of the project proposal, providing detailed information regarding the proposal's environmental and socio-economic impacts (NIRB, 2006). It includes the identification and development of mitigation measures, which are measures designed to control, reduce or eliminate potentially adverse impacts of an activity or project and enhance positive impacts. It also contains monitoring and reporting methods to verify the accuracy of impact predictions.

1.2 EIS GUIDELINE DEVELOPMENT

The Kiggavik project is subject to the environmental review and related licensing and permitting processes established by the NLCA (GC and TFN, 1993). In correspondence dated March 2, 2010 the Minister of Indian and Northern Affairs Canada (the Minister) referred the Kiggavik project to the Nunavut Impact Review Board (NIRB or Board) for a Review under Part 5 of Article 12 of the NLCA. Pursuant to Section 12.5.1 of the NLCA, the Minister highlighted the following specific issues of concern for NIRB to consider during its review of the Kiggavik project:

- The use of new technology for mine design, and operation and tailings containment. Specifically, the Minister stated that: *"It is essential that these aspects of the Proposal are thoroughly assessed in order to ensure impact predictions to surface and ground water are accurate."*
- The importance of a thorough cumulative effects assessment. The Minister stressed that: "*Cumulative impacts of particular concern include those to caribou, caribou migration and calving grounds, and related socio-economic impacts to Baker Lake and other impacted communities.*"
- Scoping the proposal according to the Board's jurisdictional authority.
- Ensuring the review is conducted in a manner which enables and supports meaningful participation of the public and facilitates thorough public consultation. In particular the

Minister highlighted that: *"The very technical nature of some of the issues that have raised concern may warrant additional community information sessions."* (INAC, 2010).

- The EIS developed in accordance with these Guidelines will serve as the basis for the Board's review of the Kiggavik project and will enable the Board and any interested parties to understand and assess the potential adverse and beneficial biophysical environmental and socio-economic effects associated with development of the Kiggavik project.

The NIRB has developed these EIS Guidelines based on the information contained within the *Kiggavik Project Proposal* (AREVA, 2008) submitted by the Proponent and on the NIRB's public scoping process. The Guidelines establish the nature and scope of the issues that the Proponent must address in the EIS.

The NIRB has also conducted public scoping sessions in the following potentially-affected communities in the Nunavut Settlement Area (NSA): Baker Lake, Repulse Bay, Coral Harbour, Chesterfield Inlet, Arviat, Whale Cove and Rankin Inlet. The objective of these meetings was to allow the NIRB staff to effectively engage the public and interested parties on the proposed scope of the assessment, while soliciting their advice on Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent in its EIS. A *Public Scoping Meeting Summary Report* (NIRB, 2010) was developed following these community visits in the NSA, taking into account all comments received from community members.

1.3 PREPARATION AND REVIEW OF THE EIS

Upon receipt of the NIRB's EIS Guidelines, the Proponent is required to prepare and submit to the NIRB a *Draft* EIS that meets or exceeds the requirements specified herein. While the Guidelines are intended to facilitate the Proponent's creation of a *Draft* EIS submission, the NIRB has endeavoured to make this document as comprehensive as possible to identify the majority of information requirements for the entire NIRB Review Process and increase certainty on expectations by all parties. The NIRB recognizes that some of the information requested herein may not be available for a *Draft* EIS submission, or may be deemed more pertinent for a *Final* EIS submission. When this judgement is made by the Proponent, the timeline for the provision of the requested information must be provided. It is also the NIRB's expectation that the Proponent will focus its discussions on key issues, and will provide a level of detail appropriately weighted to the importance of the issue being analyzed.

It is the sole responsibility of the Proponent to prepare an EIS that includes sufficient baseline data and analysis for a complete assessment of the anticipated impacts of the Project. The EIS should be concise and should focus on the assessment of significant ecosystemic and socio-economic impacts. In particular, omissions in these Guidelines cannot be used to justify any inadequacies in the EIS. The EIS must be a stand-alone document that allows the reader to understand the Project and its likelihood to cause significant environmental effects.

The NIRB will conduct an internal review of the material presented in the Proponent's submission of an EIS to determine whether the document conforms to these Guidelines (conformity review). The guideline conformity review is focused on identifying whether any

information requested in the Guidelines or in the NIRB's Minimum EIS Requirements (Appendix A) has been omitted from the EIS. Guideline conformity review is a presence or absence analysis rather than an evaluation of the quality of the information presented, although the NIRB may point out significant deficiencies encountered. Should any omissions be identified, the Proponent is responsible for submitting supplementary information and may be required to revise and resubmit the *Draft* EIS.

Following a positive EIS Guidelines conformity determination by the NIRB and acceptance of the EIS submission, the NIRB will distribute the EIS to Inuit organizations, community stakeholders, Federal and Territorial regulatory agencies, technical advisors, and other interested parties for review. The technical review period involves a more detailed review of the EIS than the guideline conformity review, and is intended to analyze the quality of the information presented by the Proponent. A technical review of an EIS comprises the following:

- Determination of whether Parties agree/disagree with the conclusions in the EIS regarding the alternatives assessment, environmental impacts, proposed mitigation, significance of impacts, and monitoring measures – and reasons to support the determination;
- Determination of whether or not conclusions in the EIS are supported by the analysis – and reasons to support the determination;
- Determination of whether appropriate methodology was utilised in the EIS to develop conclusions – and reasons to support the determination, along with any proposed alternative methodologies which may be more appropriate (if applicable);
- Assessment of the quality and presentation of the information in the EIS; and
- Any comments regarding additional information which would be useful in assessing impacts – and reasons to support any comments made.

1.4 REASSESSMENT OF THE GUIDELINES

The NIRB reserves the right at any time, having given reasonable notice to the Proponent, to reassess these Guidelines and to update and amend them accordingly to allow for consideration to changes in the Project description, baseline information, relevant technological advances, or changes in the regulatory and/or regional environments.

2.0 GUIDING PRINCIPLES

2.1 NIRB'S IMPACT REVIEW PRINCIPLES

In accordance with the NIRB's primary objectives found in the NLCA, Section 12.2.5, the following principles should be followed in the review process, and precautionary approaches should be adopted in the preparation of the EIS:

- **An ecosystem-based approach must be adopted for the review** - In order to gain an adequate understanding of the effects of the Project, an ecosystem-based approach must be adopted to ensure that the review addresses both the direct impacts that the Project

will have on the various ecosystem components, as well as the interactions that will occur between components.

- Socio-economic issues, such as the Project's potential to affect economic development within the region, must be included in the review - Members of the community constitute a critical part of the environment, and their concerns relating to the Project need to be to be assessed by the NIRB. As such, adverse and beneficial effects of the Project on members of the community with respect to health, recreation, and other aspects of social well-being need to be addressed in the EIS, in order to ensure a culturally holistic understanding of the Project's effects.
- An understanding of past and potential future environmental, economic, and social trends in the Kivalliq Region of Nunavut, and how the Project will influence these trends is required - The inclusion of a time perspective on all phases of the Project, from the early planning stages through operations and closure including post-closure and maintenance phases where appropriate. It is important to include all phases of the Project in order to provide the NIRB with a full understanding of the cumulative environmental effects in combination with other past, present and reasonably foreseeable projects.
- **The well-being of residents of Canada outside the Nunavut Settlement Area must be taken into account** – Significant transboundary bio-physical and socio-economic effects directly related to this Project must be included in the EIS in order to ensure the NIRB's assessment of the well-being of Canadians outside of the Nunavut Settlement Area.

The NIRB will consider the need for, alternatives to, and alternative means of carrying out the Project in assessing the justifiability of any significant environmental and socio-economic effects identified, and in formulating its recommendations to the responsible Minister.

2.2 PUBLIC PARTICIPATION AND ENGAGEMENT

Public participation is a central objective of the NIRB review process. Meaningful public participation requires the review to address concerns of the general public regarding the anticipated or potential environmental effects of the Project. In preparing its EIS, the Proponent is required to engage residents and organizations in all potentially-affected communities, including where relevant, adjacent jurisdictions outside of the Nunavut Settlement Area.

Another objective of the NIRB review process is to involve potentially affected Nunavummiut to address concerns regarding any changes that the Project may cause in the environment and the resulting effects of any such changes on the traditional and current use of land/ice and resources. The Proponent must ensure that Nunavummiut have the information that they require in respect of the Project and of how the Project may impact them.

Meaningful involvement in the environmental impact assessment process takes place when all parties involved have a clear understanding of the proposed project as early as possible. The NIRB Review process requires the development of a public participation and an awareness program to initiate engagement of the public during the initial stages of the review, to facilitate meaningful consultation with those communities potentially affected by a proposed project. Throughout the community visits, concerns were voiced about the necessity for meaningful consultation about this proposed Project. Therefore, the Proponent is required to:

- Continue to provide up-to-date information describing the Project to the public, particularly residents of communities likely to be most affected by the Project;
- Involve the public in determining how best to deliver that information, *i.e.* the types of information required, translation and interpreting needs, different formats, the possible need for community meetings; and
- Explain the results of the EIS in a clear direct manner to make the issues comprehensible to as wide an audience as possible.

The Proponent must provide the highlights of this engagement within the EIS, including the methods used, the results, and the ways in which the Proponent intends to address the concerns identified.

2.3 PRECAUTIONARY PRINCIPLE

One of the purposes of environmental assessment is to ensure that projects are considered in a careful and precautionary manner before authorities take action in connection with them, in order to ensure that such projects do not cause significant adverse environmental effects. Principle 15 of the 1992 Rio Declaration on Environment and Development states that *"[w]here there are threats of serious or irreversible damage; lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation"* (UNCED, 1992). This precautionary principle has since been incorporated into several pieces of Canadian legislation, including the *Canadian Environmental Protection Act* (Government of Canada, 1999a), the *Oceans Act* (Government of Canada, 1996), and the *Canada National Marine Areas Conservation Act* (Government of Canada, 2002a). In applying a precautionary approach to its planned undertakings, the Proponent must:

- Demonstrate that the proposed Project are examined in a manner consistent with the precautionary principle in order to ensure that they do not cause serious or irreversible damage to the environment;
- Outline the assumptions made about the effects of the proposed Project and the approaches to minimize these effects, including assumptions that are developed where scientific uncertainty exists;
- Identify any follow-up and monitoring activities planned, particularly in areas where scientific uncertainty exists in the prediction of effects; and
- Present public views on the acceptability of these effects.

2.4 SUSTAINABLE DEVELOPMENT

Sustainable development is defined as development that "*meets the needs of the present without compromising the ability of future generations to meet their own needs*" (UN, 1987). The central task of environmental impact assessment is to contribute to sustainable development by safeguarding the sustainability of VECs in the face of development that might compromise that sustainability (Duinker and Greig, 2006). Promotion of the principle of sustainable development is fundamental to the NIRB's primary objectives laid out in Section 12.2.5 of the NLCA:

In carrying out its functions, the primary objectives of NIRB shall be at all times to protect and promote the existing and future well-being of the residents and communities of the Nunavut Settlement Area, and to protect the ecosystemic integrity of the Nunavut Settlement Area. NIRB shall take into account the well-being of residents of Canada outside the Nunavut Settlement Area.

The EIS Guidelines are based upon three factors that the NIRB considers directly associated with sustainable development. These factors are:

1) The extent to which biological diversity is affected by the Project;
2) The capacity of renewable and non-renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of future generations; and
3) The "precautionary principle" defined as follows: if there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UNCED, 1992).

The NIRB interprets progress towards sustainable development as meeting the following goals where possible:

- Preservation of ecosystem integrity, including the capability of natural systems (local and regional) to maintain their structure and functions and to support biological diversity;
- Respect for intergenerational equity. That is, the right of future generations to the sustainable use of renewable and non-renewable resources depends on our commitment to those resources today; and
- The attainment of durable social and economic benefits, particularly in Nunavut.

The Proponent's EIS should clearly demonstrate how the Project meets these three goals.

2.5 TRADITIONAL KNOWLEDGE

A growing number of researchers are calling on government regulatory agencies to integrate local or traditional knowledge with "scientific" knowledge in a number of resource areas (Davis and Wagner, 2003). As noted by Berkes *et al*., (2000), this is partly due to a recognition that such knowledge can contribute to the conservation of biodiversity (Gadgil *et al*., 1993), rare species (Colding, 1998), protected areas (Johannes, 1998), ecological processes (Alcorn, 1989), and to sustainable resource use in general (Schmink *et al*., 1992; Berkes, 1999). The incorporation of traditional knowledge into regulatory frameworks may also reflect a widespread concern regarding the social and economic sustainability of natural resource based livelihoods throughout the world (Blaikie and Brookfield, 1987; McGoodwin, 1990; Meadows *et al*., 1992; WCED, 1987).

The phrase "Traditional Knowledge" (TK) refers to Inuit Qaujimajatuqangit (*i.e.* Inuit TK) restrictively, while Inuit Qaujimaningit refers to Inuit knowledge without reference to temporality. Inuit Qaujimaningit encompasses Inuit TK (and variations thereof) as well as Inuit epistemology as it relates to Inuit Societal Values and Inuit Qaujimaningit (or Inuit Knowledge-

both contemporary and traditional) (QIA, 2009). In this document, TK broadly refers to Inuit Qaujimaningit and is meant to encompass local and community based knowledge, ecological knowledge (both traditional and contemporary), which is rooted in the daily life of Inuit people, and has an important contribution to make to an environmental assessment (Stevenson, 1996). This knowledge represents experience acquired over thousands of years of direct human contact with the environment (Berkes, 1993) and is rooted in personal observation, collective experience and oral transmission over many generations. TK relates to factual information on such matters as ecosystem function, social and economic well-being, and explanations of these facts and casual relations among them. It plays a significant role in the EIS development in term of acquisition of adequate baseline information, identification of key issues, prediction of the effects, and assessment of their significance, all of which are essential to the EIS and its review. Recognizing TK as indispensible element both as baseline information and as an Inuit lens through which impact analyses can be better understood can also result in more active and meaningful community engagement.

TK can be obtained with the cooperation of other concerned parties. Peer-referenced, systematic identification of local TK experts assures that those considered most knowledgeable within either the local community, social group, or livelihood fraternity will be revealed and potentially included in work dedicated to documenting the local ecological knowledge system (Davis and Wagner, 2003). The Proponent must incorporate into the EIS the TK to which it has access or that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality.

2.6 STUDY STRATEGY AND METHODOLOGY

The Proponent is expected to observe the intent of these Guidelines and to identify all significant environmental effects that are likely to arise from the Project (including situations not explicitly identified in these Guidelines), the mitigation measures that would be applied, and the significance of any residual effects. It is possible that the EIS Guidelines include matters that, in the judgement of the Proponent, are not relevant or significant to the Project. If that definition of such matters results in omissions from the EIS they must be clearly indicated, so that the public and other interested parties have an opportunity to comment on this judgement. Where the NIRB disagrees with the Proponent's decision, it may require the Proponent to provide the additional information. The Proponent is advised to consult with the NIRB on any issues within these Guidelines on which it plans significant deviation.

The Proponent should explain and justify methods used to predict impacts of the Project on each VEC and VSEC, the interactions among these components and the relations of these components within the environment. The information presented must be substantiated. In particular, the Proponent must describe how the VECs were selected and what methods were used to predict and assess the adverse environmental effects of the Project on these components. The value of a component not only relates to its role in the ecosystem, but also to the value placed on it by humans. The culture and way of life of the people using, or with a cultural connection to, the area affected by the Project may themselves be considered VSECs.

In describing methods, the Proponent must document how it used scientific, engineering, traditional and other knowledge to reach its conclusions. Assumptions must be clearly identified

and justified. All data collection methods must be specified. All data, models and studies must be documented such that the analyses are transparent and reproducible. The uncertainty, reliability and sensitivity of models used to reach conclusions must also be indicated.

The Proponent shall identify all significant gaps of knowledge and understanding where they are relevant to key conclusions presented in the EIS. Further, the Proponent should identify, with justifications which are significant and relevant to the EIS. All steps to be taken by the Proponent to address these gaps must also be identified.

Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from TK, the EIS must contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

2.7 USE OF EXISTING INFORMATION

In preparing the EIS, the NIRB expects the Proponent will rely heavily on the use of existing information and available results of surveys and studies completed in the Project regions by the government agencies, institutions and individual researchers, which are related to the Project and the environment. For example, 'lessons learned' already exist in relation to previous projects in Nunavut (e.g., the Meadowbank Gold Mine project) and should be captured by the Proponent. When using existing information to meet the requirements of various sections of the EIS Guidelines, the Proponent should either include the quoted information directly in the EIS with clear reference indicating the source of information (*i.e.* document, section, and page numbers), or clearly direct the NIRB (through cross-referencing, indicating the document, section and page number) to where it may obtain the information if the referred information is contained in the EIS (including supporting documents of the EIS). This is to ensure that the referenced materials can be obtained and confirmed by reviewers. The Proponent must also clarify how representative the data are, clearly separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from them.

The EIS must clearly document any information or knowledge gaps encountered in the existing literature or other information sources, and discuss how these gaps might affect the ability to draw conclusions and the reliability of those conclusions drawn in the assessment.

3.0 SCOPE OF THE NIRB ASSESSMENT

Based on the information contained within the Project Description and the NIRB's requirements for the Proponent's development of an EIS, the following sections comprise the focus and scope of the NIRB review. In preparing the *Draft* EIS, the Proponent must follow these Guidelines closely, while paying specific attention to the requirements of the NLCA, the NIRB's Minimum EIS Requirements (Appendix A), and the General EIS Principles as described in the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (NIRB, 2006). In addition, the Proponent should note that directions regarding the EIS Format are a further submission requirement of the NIRB. A detailed discussion of the EIS format requirements may be found in Section 4.4.

3.1 NLCA – SECTIONS 12.5.2 AND 12.5.5

Where appropriate, the EIS shall contain information with respect to the following as per Section 12.5.2 of the NLCA:

a) Project description, including the purpose and need for the Project;
b) Anticipated ecosystemic and socio-economic impacts of the Project;
c) Anticipated effects of the environment on the Project;
d) Steps which the Proponent proposes to take including any contingency plans, to avoid and mitigate adverse impacts;
e) Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional preferences as to benefits;
f) Steps which the Proponent proposes to take to compensate interests adversely affected by the Project;
g) The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
h) The interests in land and waters which the Proponent has secured, or seeks to secure;
i) Options for implementing the proposal; and
j) Any other matters that NIRB considers relevant.

Furthermore, when reviewing any project proposal, Section 12.5.5 of the NLCA requires the NIRB to take into account all matters that are relevant to its mandate, including the following:

a) Whether the project would enhance and protect the existing and future well-being of the residents and communities of the Nunavut Settlement Area, taking into account the interests of other Canadians;
b) Whether the project would unduly prejudice the ecosystemic integrity of the Nunavut Settlement Area;
c) Whether the proposal reflects the priorities and values of the residents of the Nunavut Settlement Area;
d) Steps which the proponent proposed to take to avoid and mitigate adverse impacts;
e) Steps which the Proponent proposes to take, or that should be taken, to compensate interests adversely affected by the project;
f) Posting of performance bonds;
g) The monitoring program that the Proponent proposes to establish, or that should be established for ecosystemic and socio-economic impacts; and
h) Steps which the Proponent proposes to take, or that should be taken, to restore ecosystemic integrity following project abandonment.

3.2 SCOPE OF NIRB'S ASSESSMENT

The scope of the NIRB's assessment of the Kiggavik project proposal is based on the requirements of Sections 12.5.2 (items a – j) of the NLCA as listed above, the NIRB's 10

Minimum EIS Requirements, and the project proposal submitted by AREVA Resources Canada Inc. on November 25, 2008. For further details please refer to Appendix B, the *Final* Scope of the NIRB's Assessment of the Kiggavik Project Proposal (February 9, 2011).

PART II – THE ENVIRONMENTAL IMPACT STATEMENT

4.0 OVERVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1 PRESENTATION

The Proponent shall provide an EIS that is complete and provide sufficient information to identify, describe and determine the significance of potential impacts on the ecosystemic and socio-economic environments that could arise from the Project. The EIS should include scientific works, subject-specific studies and all other sources of information covering all aspects of the Project in regards to ecosystemic and socio-economic perspectives.

For clarity and ease of reference, the EIS should be presented in the same order as the EIS Guidelines. However, in certain sections of the EIS, the Proponent may decide that the information is better presented following a different sequence. The EIS must include a guide that cross-references the Guidelines with the EIS such that requirements of the EIS Guidelines are easily located within the EIS. In the interest of brevity, the EIS should make reference to, rather than repeat, information that has already been presented in other sections of the document. A key subject index is recommended and should reference locations in the text by volume, section, sub-section and page.

The EIS shall be made available to the NIRB electronically on searchable CD-ROM, and also in hard copy. The Proponent shall be responsible, where requested, for the delivery of the EIS to regulators and relevant authorities.

4.2 CONFORMITY

The Proponent is expected to observe the intent of the Guidelines, which will then lead to the preparation of an EIS. Specific issues or directions described in the Guidelines must be easily identifiable in the EIS. In accordance with the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (NIRB, 2006), the EIS shall contain a concordance table directing reviewers to the location (document, section, and page number) where specific information addressing the Guidelines and the NIRB's Minimum EIS Requirements may be found. The Proponent is cautioned that any significant deviation from these Guidelines could result in a negative conformity decision and subsequent requirements for revision. Where any differences in direction are encountered between the NIRB's *Guide 7* and the EIS Guidelines issued under NLCA Section 12.5.2, these Guidelines shall prevail.

4.3 LENGTH

In accordance with the NIRB's *Guide 7* (NIRB, 2006), the Proponent's EIS Main Document (*i.e.* Volume I) shall be concise and not exceed 150 pages without permission from the NIRB. The 150 page limit shall not include: the Title Page, Executive Summary, Popular Summary (in English and Inuktitut), Glossary (in English and Inuktitut), Table of Contents, Concordance Table, Consultants and Organizations and References. To ensure the main document within the EIS report remains manageable for reviewers, communities, and the general public, any data of a detailed nature shall be contained in separate volumes as appendices and technical reports

submitted in supporting documents of the main document. The Proponent must submit a list of all documents and supporting maps and tables for reference.

4.4 FORMAT

The EIS shall be double-spaced**,** and its sections numbered. Subject to any other instructions given by the NIRB, the following format shall be adopted, based on the NIRB's *Guide 7* (NIRB, 2006) and adapted as much as possible to the specific circumstances of the Project:

- Cover sheet with project description;
- Plain language summary/popular summary (in English and Inuktitut);
- Executive summary (in English and Inuktitut);
- Table of Contents;
- Concordance table which lists each of the Guideline requirement and location within the EIS;
- Purpose of and need for the Project;
- Detailed Project description including potential future development;
- Alternatives considered in the development of the Project proposal;
- Discussion of the public consultation initiatives with the communities potentially affected by the Project. Provide the results of the public consultation, as well as, evidence that community concerns where addressed in the planning of the Project activities;
- Baseline of the existing environmental and socioeconomic information, based upon proper studies, given the environment in the region;
- Anticipated ecosystemic and socio-economic impacts of the Project proposal, including its impacts on the valued ecosystem components (VECs) and valued socio-economic components (VSECs) potentially affected by the Project (and as identified by public consultation process);
- Anticipated accidents and malfunctions, effects on the environment, contingency plans and mitigation measures;
- Anticipated effects of the environment on the Project;
- Anticipated cumulative effect of the Project on the region/regions;
- Anticipated transboundary effects;
- Steps which the Proponent proposes to take to avoid and mitigate adverse impacts, including any Contingency Plans (spills, fires, floods, etc.) and adaptive management;
- Statement of residual impacts and significance;
- Steps which the Proponent intends to undertake in order to restore the area affected by the Project activities during operation and upon project closure, including Decommissioning Plan;
- Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional interests;
- The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
- The interests in lands and waters which the Proponent has secured, or seeks to secure;

- List of permits, licenses and authorizations required to undertake the Project proposal;
- List of consultants or individuals who assisted in preparation of the EIS;
- List of agencies, organizations, and persons to whom copies of the EIS will be sent;
- Index; and
- Supporting documentation and appendices, including a commitments table that summarizes the proposed mitigation and other company commitments with cross reference to environmental issues or potential impacts.

4.5 DATA PRESENTATION

The Proponent shall provide charts, diagrams, aerial and other photographs and maps (including ownership of lands) wherever appropriate and useful to clarify the text. Specifically, the Proponent shall include maps or diagrams showing all project related infrastructure and/or activities (e.g., camp sites, drilling activities, dock site and mine site, transportation routes including ground transport, marine shipping and air transport). Where feasible, maps shall be of a common scale and projection to facilitate comparisons. All charts, diagrams, photographs, and maps must be clearly referenced in the text of the EIS, especially where these charts, diagrams, photographs and maps are included in a separate volume to the main EIS document. All files must be limited to a maximum of 2 MB for ease of access over the internet.

4.6 SUMMARIES

4.6.1 Executive Summary (in English and Inuktitut)

The Proponent shall prepare an Executive Summary that describes the key Project elements and key findings of the EIS, with particular reference to the overall conclusions of the assessment, and a clear rationale relating those conclusions to the predicted impacts and the measures proposed to address them. The Executive Summary shall focus on items of known or expected public concern and the significant potential impacts of the Project and the methods proposed to address them. It shall also address outstanding issues and the strategies proposed to address them. The Executive Summary shall form part of the EIS, but it shall also be made available as a separate document.

4.6.2 Popular Summary (in English and Inuktitut)

The Popular Summary shall have the same general structure and objectives as the Executive Summary, but it shall be written in non-technical language and shall include such things as a glossary and additional explanatory text to assist non-specialists in appreciating the content of the EIS as a whole. The Proponent shall consider presenting the Popular Summary in hard copy. Maps indicating major project components including shipping routes and the potentially affected communities should be included, and presented in English and Inuktitut. The Popular Summary shall form part of the EIS, but it shall also be made available as a separate document.

4.7 TRANSLATION

In addition to the Popular Summary, Executive Summary and Glossary, being presented in English and Inuktitut within the EIS, the summary for each thematic volume shall also be

translated into Inuktitut. Maps shall indicate common and accepted place-names usually referred to by the local populations in their own language, in addition to their official toponyms, especially where traditional Inuit place-names have been made official through the process outlined in Section 33.9 of the NLCA.

5.0 ENVIRONMENTAL IMPACT STATEMENT CONTENT

5.1 PROPONENT INFORMATION

The Proponent shall identify itself and explain current and proposed ownership of rights and interests in the Project, operational arrangements, and corporate and management structures. It shall specify the mechanisms used to ensure that corporate policies are respected. It shall present its environmental policy and shall specify whether and how it applies to all businesses for which it has an operating responsibility, to employees, to contractors, to subcontractors and to suppliers. It shall also describe its reporting systems. Furthermore, the Proponent shall provide complete contact information, including telephone and fax numbers, postal and email addresses, and shall include, where necessary, separate addresses for corporate and operations (or other relevant) offices.

The Proponent shall describe its past and/or present experience in exploration, mining (open-pit and underground), transportation networks involving air shipping, marine shipping, and winter and all-weather road components and transportation of radioactive materials. If the Proponent has no experience, discussion should include how the experience will be obtained (e.g., Northwest Territories diamond mines). The Proponent should pay particular reference to:

- Its record of compliance with governmental policies and regulations pertaining to environmental and socio-economic issues in past operations;
- Operation safety, major accidents, spills and emergencies, and corresponding responses;
- Its record in honouring commitments on environmental and socio-economic matters in the event of planned or premature mine closure, whether temporary or permanent, or due to change of ownership;
- Relations with Aboriginal peoples, including prior experience with any Impact and Benefits Agreements if appropriate;
- Operations in Arctic and Sub-arctic regions;
- Its record in incorporating environmental and socio-economic considerations into construction, operations, temporary closure, final closure, and post-closure;
- Corrective actions undertaken in the past, distinguishing between those taken voluntarily and those taken at the insistence of a third party; and,
- The provision of security to ensure payment of compensation in the event of accidents.

The Proponent shall identify and describe any obligations or requirements that it must meet to post a bond or other form of financial security to ensure payment of compensation in the event of accidents that directly or indirectly result in major damage by the Project to the environment, as well as to cover the cost of planned or premature closure, whether temporary or permanent.

If the Proponent does not have prior experience in exploration, mining, or transportation networks, particularly for this region, it shall explain the safeguards that it intends to put in place to compensate for that lack.

5.2 REGULATORY REGIME

The Proponent shall present its understanding of the regulatory regime in which it would be operating by identifying the requirements of all relevant federal, territorial, and local environmental and socio-economic standards, laws, regulations, policies, guidelines and fiscal regimes relating to Project approval, construction, operations, monitoring, closure, and post-closure activities. This section should also explain how the requirements would be met and what specific governmental permits and approvals would be required. A list of currently held and required permits and licences, including dates of issue and expiry (as applicable), shall be appended. Requirements imposed by Article 12 of the NLCA may be excluded from this discussion.

The Proponent should also include a discussion of any steps it proposes to take to ensure it meets its Project related tax obligations (including fuel and payroll taxes) with the Government of Nunavut (GN). The Proponent should, if applicable, also provide any relevant non-confidential information regarding its relationship with the GN in terms of the optional fuel-rebate program.

5.3 REGIONAL CONTEXT

The Proponent shall describe in general terms the regional biophysical and socio-economic environments of the Kivalliq Region and Nunavut as a whole, including: ecological land classifications, ecological processes and relationships, the location of other base and precious metal finds and other existing and potential developments, and current and future land use plans.

5.4 ASSESSMENT BOUNDARIES

5.4.1 Spatial Boundaries

The spatial boundaries of the assessment of the Project (and its components) shall be determined on the basis of the Project's potential impacts on the particular biophysical or social environment being addressed. In accordance with the NIRB's definition of local and regional study areas, the Proponent shall consider the following criteria when establishing spatial boundaries for the assessment of the Project:

- The physical or socio-economic extent of project activities;
- The extent of ecosystems potentially affected by the Project;
- The extent to which traditional land use and Inuit and other harvesting could potentially be affected by the Project; and
- The size, nature and location of past, present, and reasonably foreseeable projects and activities which could interact with the items listed above.

The EIS shall define the spatial boundaries of the maximum area potentially affected by the Project, based on the boundaries for each individual type of impact, taking into account other

relevant factors such as the migratory and/or life cycle of wildlife species (where applicable) or the socio-economic or other economic indicators. Identification of spatial boundaries should also take account the impact pathways as pollutant transport and bioaccumulation mechanisms. Furthermore, Inuit land use and occupancy (past, present, and future), should be considered in addition to other factors when determining spatial boundaries for the impact assessment of the Project.

The Proponent is not required to provide a comprehensive baseline description of the environment at each of the above scales, but must provide sufficient detail to address the relevant environmental and cumulative effects of the Project. For example, the spatial boundaries for archaeological studies related to burial grounds in the Project area might reasonably be expected to differ from those for studies on migration of caribou in the area.

The boundaries for the assessment of socio-economic impacts shall be based on an analysis of the socio-economic effects directly and indirectly associated with the Project. In all cases, priority focus shall be directed to potential impacts within Nunavut, but the EIS shall also consider potential impacts outside of Nunavut, wherever there is reason to anticipate that they might occur. The EIS must contain a justification and rationale for all spatial boundaries and scales chosen.

The following general spatial boundaries are suggested:

- **Local Study Area** (LSA): the Local Study Area shall be defined as that area where there exists the reasonable potential for immediate impacts due to Project activities, ongoing normal activities, or to possible abnormal operating conditions. The Local Study Area includes the Project facilities, buildings and infrastructure, and all areas proposed for Project activities, including the entire proposed shipping route in the NSA.
- **Regional Study Area** (RSA): the Regional Study Area shall be defined as the area within which there exists the potential for direct, indirect, and/or cumulative biophysical and socio-economic effects. This area includes lands, communities, and portions of Nunavut and other regions of Canada that may be relevant to the assessment of wider-spread effects of the Project. The Proponent is advised to duly consider the transboundary implications of impacts to identified VECs/VSECs as results of marine shipping for the Project.

The LSAs and RSAs may vary between disciplines and between VECs/VSECs, as they represent the likely distribution of Project effects on individual VECs/VSECs.

5.4.2 Temporal Boundaries

Like spatial boundaries, temporal boundaries may vary with, among other things, the type of impact being considered and with seasonal changes. The establishment of temporal boundaries has two aspects: the time-horizon that will be used in predicting change; and the temporal variability and periodicity that characterize the predicted impacts (Whitney and Maclaren, 1985). The time-horizon used for predicting change must be a function of the anticipated duration of the Project, including the final closure and post-closure phases, the predicted impacts, and the predictive capability of the various disciplines at play.

The EIS shall determine the temporal boundaries separately for the construction, operation, temporary closure, final closure, and post-closure periods, including planned exploration to be undertaken in conjunction with the Project. The closure period covers decommissioning, and reclamation; post-closure covers the period after the mine has been decommissioned and abandoned, and the site reclaimed and returned as much as possible to its natural state. The temporal boundaries of the post-closure period may encompass many years, depending on the site and on the methods of closure. The Proponent shall also consider where applicable, the temporal bounds of Project alternatives under assessment, noting where they differ from those for the preferred option.

The Proponent shall give due consideration to Inuit land use and occupancy (past, present, and future), in addition to other factors to be considered in its determination of temporal boundaries for the Project.

The description of the existing baseline and the environmental trends should include a consideration of past projects and activities carried out by the Proponent and/or others within the RSA. As is the case for the determination of spatial boundaries, the temporal boundaries must indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented.

For all temporal boundaries, the EIS shall give a rationale and justification for the boundaries chosen, including a description of any consultation with members of the public or technical experts. In doing so, the Proponent shall recognize climate change (including global warming trends) which might influence the some of the impact assessment, for example, there may be no immediate danger of permafrost degradation, but the Proponent must incorporate that possibility into the design of Project components where applicable.

5.5 LAND TENURE

The Proponent shall delineate on a map of suitable scale the legal boundaries of any areas to which it will acquire rights through lease or other tenure arrangements, to include Crown land, Inuit Owned Land, and Commissioner's land. It shall further describe those areas by providing such information as file numbers, start and end dates, fees, name of right holder, renewals, etc.

5.6 ANALYSIS OF NEED AND PURPOSE

The following points must be addressed in discussing the need for and purpose of the Project:

- General feasibility from an economic perspective, including how this Project will benefit communities in Nunavut, either directly or indirectly;
- An assessment of the longer term strategic implications of the Project, and how it may affect or lend to transportation networks (existing and proposed) in Nunavut;
- Identification of past, current and potential future users of the LSA, RSA, and project infrastructure, including commercial, government, public, and private;
- Analysis of community support for, and opposition to, the Project, with a description of how the Proponent has sought input from a broad range of socio-economic groups and

members of the public both within and outside of NSA, and any efforts undertaken to relieve public concern;

- An analysis of the overall net benefit of the Project in terms of Nunavut and of Canada as a whole, which includes considerations that are not related to economics; and
- Describe the current status of Project financing, and the Proponent's financial preparedness to meet the requirement for reclamation and security should the Project proceed.

Discussions addressing the above points shall be supported by an analysis of the positive and negative social and economic effects on existing industries, markets, and communities over the life of the Project. This analysis should also indicate the distribution and magnitude of benefits and/or losses to specific socio-economic groups in the relevant study area.

6.0 PROJECT COMPONENTS AND ACTIVITIES

The description of the Project components and activities shall address all phases of the Project in sufficient detail to allow the Proponent to predict potential adverse environmental effects and address public concerns about the Project. The Proponent shall describe the Project as it is planned to proceed through the site preparation, construction, operation and maintenance, and any potential modifications, closure, reclamation and post closure monitoring. The description must include consideration for temporary closure or care and maintenance in the possibility that operations come to an unforeseen pause.

The following sections contain explicit requirements for the Project components and all activities associated with each project component through the life of the Project.

6.1 ALTERNATIVES

The EIS shall include an explicit analysis of all alternative means of carrying out the Project components, including a "no-go" alternative, the identification and application of criteria used to determine the technical feasibility and economic viability of the alternatives to the Project (e.g. transportation, natural, social, economic and cultural environment). This analysis must be done to a level of detail which is sufficient to allow the NIRB and the public to compare the Project with the alternatives in terms of the economic costs and the environmental, social and economic impacts and benefits. The Proponent must include reasons for selection of the Project as the preferred alternative, and the reasons for rejection of other alternatives.

The EIS shall present alternatives for all Project components with a focus on the following project elements:

- Transportation of uranium concentrate (yellowcake) from the Kiggavik site, including a "no road development" option;
- The location of the Baker Lake Dock and Storage Facility;
- The access road from Baker Lake to the Kiggavik site including the winter road option and the all-weather road option with routing options and road use after decommissioning;
- Accessing the uranium ore deposit under the northern edge of Andrew Lake;

- The marine shipping route, including different options for bringing in supplies to the Kiggavik site;
- Diesel power generation, including solar energy, wind energy, hydro and geothermal energy, etc.;
- Closure and reclamation options;
- Mine waste management;
- Tailings and waste rock storage alternatives;
- Methods for treatment of mill and wastewater effluent; and
- Any Alternatives to mine project components including, but not limited to, tailings management facility, mill, processing and mine (i.e., underground vs open pit).

When the Proponent assesses the economic viability for each alternative option, due consideration must be given to the vulnerability of the arctic ecosystem, as well as the potential for extension of the mine life and/or increased uranium ore production rates. The criteria used to evaluate alternative means should reflect the potential concern for both the short-term (during construction and operations) and long-term (after decommissioning) physical-chemical stability and environmental impacts of the Project. It should also include radiological doses to workers and the public. Also, the associated cumulative effects of each option should be discussed, in accordance with the requirements of Section 7.8, particularly the potential for cumulative impacts on the marine ecosystem and Inuit harvesting activities. In addition to cumulative effects assessment, alternatives assessment shall also include the following aspects: baseline data, VECs and VSECs and assessment boundaries.

Furthermore, as indicated in the public consultation section (Section 7.4), the public opinions and preferences shall also be taken into consideration as a criterion in the assessment all the alternative options. Therefore, the alternative analyses shall include a discussion on how public consultations by the Proponent have influenced the Project planning, and how public preferences have been considered by the Proponent in determining the preferred project alternatives.

6.2 PROJECT DESIGN

General Project design issues discussed in the EIS shall include:

- An explanation of how the bio-physical environment has influenced the design of the Project. This should include consideration of relevant geographical, geological, meteorological, hydrological, and oceanographic conditions. This discussion should also include current land use activities;
- A discussion on global climate change and it must describe and assess, on the basis of current knowledge, how the potential of climate change could affect permafrost and soils with high ice content, the hydrological regime, the groundwater regime, as well as marine ice flow regimes, and the long-term impacts of such changes on the Project. In addition, the Proponent shall identify the Project sensitivity to changes in specific climate-related parameters (CEAA, 2003);

- The Proponent should design and apply multiple scenarios on impacts assessments, where these scenarios span the range of possible future climates, rather than designing and applying a single "best guess" scenario (EC, 2007);
- A discussion of how design, engineering, and management plans will maintain/enhance the existing eco-systemic integrity, focusing on various wildlife habitats, including freshwater habitat, marine habitat, and terrestrial habitat;
- A discussion of how design, engineering, management and monitoring plans will minimize radiation exposure of the environment generally and to caribou specifically;
- A discussion of how the Proponent has applied the precautionary principle in its Project planning, design and management;
- A discussion of how potential radiation doses to workers and the public under both normal operations and potential accident and malfunction situations have influenced the design of the Project;
- How potential impacts to wildlife (e.g. caribou and peregrine falcons) have influenced the design of the Project especially indicating methods to minimize impacts to wildlife, including the geographical location of project components, special attention should be paid to the influence of peregrine falcon habitat on the selection of land farms, borrow pits and quarry sites, etc.;
- How regional socio-economic conditions have influenced the Project design. For example, how local preferences and labour capacity, etc., have influenced the design of work rotations, pace of construction, employment policy, etc.
- How project design, particularly project infrastructure and site preparation, has been influenced by the distribution of archaeological resources and sites used for harvesting of wildlife and quarrying of soapstone;
- How public consultation and TK have influenced the planning and design of the Project; and
- The considerations for future development.

All assumptions underlying design features which are relevant to environmental assessment should be explicitly stated.

6.3 PROJECT PHASES

The Proponent is required to present an overall development plan which describes the Project development phases (site preparation, construction, operation and maintenance, any potential modifications, decommissioning, reclamation and post closure), relevant timeframes, works and undertakings associated with each phase. The plan must also include consideration for temporary closure, or care and maintenance in the possibility that operations come to an unforeseen pause. The Proponent should also clarify all associated monitoring and/or mitigation plans to be implemented in each phase to eliminate or minimize adverse effects that might occur at various project stages for each Project element.

6.4 FUTURE DEVELOPMENT

The Proponent shall evaluate any foreseeable expansions of the current Project, the needs of required infrastructure, and associated eco-systematic and socio-economic impacts. The Proponent shall also evaluate the potential for development of additional ore deposits in the Project area in accordance with previous and current exploration activities. Such an evaluation should be based on the Proponent's business strategic plan for the Project, other predictions and the development realized by projects of a similar nature.

In addition, the Proponent shall discuss how any foreseeable future development scenarios have been taken into consideration when designing the infrastructure and ancillary utilities for the Project. The Proponent's assessment of cumulative impacts of the Project shall also include the future development scenarios as outlined above.

6.5 ECONOMIC AND EMPLOYMENT INFORMATION

The EIS shall include a description on the economic and employment aspects of the Project, including:

- Capital costs, estimated operating costs, and the total expected revenues (current market values);
- The number of person years of work, broken down by life cycle stage;
- The number and types of jobs and required skills (using a recognized classification system);
- Worker housing situations, on-site services and facilities for workers; transportation to work and proposed work schedule;
- Contracting and procurement information including, if known, a breakdown of the number and types of jobs that will be done by contractors and what the contractor obligations to employees will be; and
- Information on benefits that might be expected by employees and whether these benefits will extend to contractor employees (e.g. training, skill enhancement, cultural support, wellness program).

6.6 DETAILED PROJECT PROPOSAL DESCRIPTION

The Proponent shall describe the Project components and all activities associated with each in a systematic way. The description shall encompass all stages of development, from site preparation through to construction, operation and maintenance (including any potential modifications and/or expansions that may be required during the operations phase based on exploration results), as well as decommissioning and post-closure. The description must include an approximate timeline for all phases of the Project, including closure, reclamation and post closure monitoring if applicable. The description should also include changes that would occur in the vicinity as a consequence of mining the uranium deposit. Where specific codes of practice, guidelines and policies apply to items to be addressed, in particular if involving thresholds and quantitative limits to be applied, those documents must be cited and may be included as appendices to the EIS.

For greater clarity, the detailed description of Project components and activities, where appropriate, should cross-reference the impact assessment and environmental management sections of the EIS.

The description shall include the following project components and associated activities, and other information as deemed necessary by the Proponent.

6.6.1 Kiggavik and Sissons Mine Sites

6.6.1.1 Geology/Mineralogy of the Ore Deposit

The Proponent shall describe the uranium ore resources at the Kiggavik and Sissons mine sites, including where appropriate:

- Deposit locations, including detailed maps of the mine site areas;
- Detailed structural geology maps;
- The lithology and mineralogy in the Project area;
- Presence of ice lenses and implications to the Project;
- Fractures and their implications to the Project;
- Types of the deposits and associated bedrocks;
- The average and range of ore grades estimated for the mine site uranium deposits;
- The nature, depth, and thickness of the ore deposits to be mined;
- The estimated volumes and characteristics of the waste rock to be removed;
- The mineralogy and geochemistry of ore and waste rock including radiological characteristics, metal/metalloid content and acid generating potential;
- Ore body delineation;
- The hydrogeological conditions (i.e., permeability of geological formations, hydraulic head and groundwater flow direction) of the open pits (Main Zone, East Zone, Center Zone and Andrew Lake) and the underground mine (End Grid); and
- Anticipated salinity and general characterization of each pit water.

6.6.1.2 Mining, Transport and Processing

The Proponent shall describe the ore mining, transport and processing associated with the Project, using maps and diagrams whenever applicable:

- A mining plan indicating the sequence of development for the proposed open pits (Main Zone, East Zone, Center Zone and Andrew Lake) and underground mine (End Grid);
- Characteristics of the open pits and underground mine design and operation;
- Provide the proposed dewatering plan for the Andrew Lake open pit mine;
- Design of the mine ventilation for the underground mine;
- The daily and yearly average extraction rate(s);

- Cut-off grades, in percent U_3O_8 for ore, mineralized low grade (special waste) and non-mineralized rock (clean rock), based on current economic conditions or reasoned projections;
- Design of the impoundment/retention structures and measures for seepage control;
- Means of drilling, blasting, extraction, loading and transport of ore;
- Design, location and capacity of uranium ore stockpiling facilities and related surface disturbance;
- The locations of the run-of-mine (ROM) stockpiles, and plans to control snow deposition, spring freshet, pooling, water run-off and storm flooding;
- Dust suppression technologies and dust suppressants to be used in mining, transport, storage, loading, crushing and other processes where dust might be generated;
- Discussion of how geotechnical factors, geological characteristics (weak rock formations, fault zones and their hydrogeological characteristics), and permafrost conditions (seasonal thawing, taliks, degradation due to mining disturbances) were considered in the design of the open pits and underground mining facilities;
- Stability analysis of the pit slopes and underground mine works and provide adequate ground control measures where necessary;
- Prediction of the maximum inflow into the open pits and the underground mine during mining. The pumping capacity should be designed by taking into consideration of the predicted maximum inflow. Measures for controlling the inflow, where necessary, should be discussed and the groundwater monitoring program should be described;
- Description of the storm water management and flood control measures for the open pits and underground mines with consideration of a conservative precipitation event (i.e. PMP: Probable Maximum Precipitation);
- A review of similar operations elsewhere in similar settings, with a discussion of the results of research on the long-term stability of the underlying permafrost and frozen materials, as well as the implications to Project planning and design;
- Measures and management plans to control natural hazards and/or mitigate their impacts on the Project, such as rock falls and collapses, extreme climate events, and other geological or geomorphological events (e.g., storm, flooding, and earthquake);
- Provide a comprehensive description of the proposed mill design, including:
    - Facilities and structures
    - Mill process and operations
    - Reagents used
    - Water management strategies
    - Radiation protection measures
- Measures and technologies to be adopted in the design of the open-pit mines and underground mines to reduce noise, greenhouse gas (GHG) emissions and any other anticipated emissions;
- Measures and technologies to be adopted in the design and manufacturing of the proposed mill facility to reduce noise, GHG emissions and any other anticipated emissions; and

- Anticipated quantities of emissions to the atmosphere resulting from the ore mining, transport and processing associated with this Project.

6.6.1.3 Overburden and Waste Rock Disposal (including clean and special waste rock)

The Proponent shall present:

- Description of overburden and waste rock handling, including the design and location of the storage sites, describing the options for each. The Proponent shall include references to similar operations in a comparable conditions, applicable modelling information, and the results of research on the long-term thermal stability of the underlying permafrost and frozen materials;
- Define the radioactive criteria for being considered 'special waste rock', provide anticipated amounts of special waste rock, and its radioactive characteristics, future disposal options, and dose estimates for workers in the vicinity of the special waste rock stockpiles;
- Discussion of the impact of disposing special waste rocks into the in-pit storage facility on permafrost beneath the facility. If thawing of the beneath permafrost is envisioned, prediction of the artesian inflow into the facility should be conducted with support from numerical modeling in both short term and long term;
- Description of the physical and chemical stability of the types of materials to be stored and those to be used for containment construction, with regard to the long-term acid-generation and ML potential of the waste rock. Consideration should be given to the latest monitoring results from mines in the same general climatic conditions;
- Explanation of the relationship between the timing of acid generation and permafrost encapsulation in cold weather conditions, with consideration for potential climate change;
- Description of the physical and chemical characteristics of seepage and runoff from the waste rock piles and appropriate control measures;
- Description of the water balance, and how it was considered in the design of control measures to ensure that runoff from the pile does not result in impacts on water quality in the surrounding environment;
- Description of the potential for rock heave phenomena and any resulting implications to ground stability; and
- Description, in qualitative and quantitative terms (where appropriate), of the chemistry of frozen groundwater from joints and fractures in the waste rock disposal area.

6.6.1.4 Water Supply and Water Treatment Facilities

The Proponent shall present, in connection with its Site Water Management Plan (Subsection 9.4.5), the details on the water supply and water treatment facilities for the Project, including the following:

- Identification of water supply sources (waterbodies and/or watercourses) and projections of volumes of water required from each source;
- Description of water uses including the camp sites, open pit mines, underground mine, milling facility, winter roads, dust suppression, firefighting reserves, workshops and maintenance facilities as well as drilling activities etc.;
- Provide baseline levels and any anticipated increases in contaminants and radionuclides associated with the project in surface water and ground water;
- Description of the water supply source(s) and mitigation measures designed to prevent the entrapment of fish at water intakes, on-site use, storage and final discharge to the environment;
- Proposed management of contact and noncontact water, and how the design of these components incorporates the consideration of climate change, especially when water diversions are proposed (i.e. increased or decreased flows);
- Description of the water treatment process for all major sources of water from the Project, including process effluent, pit water, underground mine water, site and stockpile drainage and domestic wastewater;
- Discussion on the treated effluent discharge methods, including the design of the facility, identification of discharge points, the anticipated water quality and quantities to be disposed of, and conservation and recycling methods. Specific mention of modifications relative to operating in arctic conditions should be identified. Include associated implications for regulatory compliance;
- Description of the receiving environment including the extent of alteration of the receiving waters, how the Proponent will ensure non-toxicity, what the mixing zone would be, and modelling predictions for concentrations of all parameters of concern;
- Discussion of any required alteration of drainage patterns, diversions, and water conservation and recycling measures;
- Description of the facilities for washing mine trucks and other equipment, as well as any treatment of water used for such activities;
- Description of the water re-cycling that will be done for the Project;
- Description of the on-site processes for the collection, handling and disposing of radioactive and non-radioactive water wastes (including melt water) to be generated by the project;
- Discussion on effluent treatment alternatives and the resulting effluent and downstream surface water quality and contaminant loadings to the environment; and
- Measures and technologies to be adopted in the design and manufacturing of the water treatment facilities to reduce noise, GHG emissions and any other anticipated emissions; and
- Anticipated quantities of emissions to the atmosphere resulting from the water treatment facilities associated with this Project.

6.6.1.5 Natural Drainage Diversion

The Proponent shall present in connection with its Site Management Plan:

- Description of any planned diversions of natural drainage from mine site and Project facilities, and estimation of the flows to be diverted;
- Discussion of measures to prevent or mitigate sedimentation within these diverted flows;
- Discussion of potential challenges anticipated in constructing drainage diversions including seasonal effects (e.g. melting ice lenses); and
- Discussion of the potential for mobilizing sediments, generating erosion and disturbances to terrain.

6.6.1.6 Mine De-Watering

The proposed open pits and underground mine are within or below permafrost. The Proponent shall describe the following where relevant:

- Provide the design of the mine water handling system;
- Description of proposed de-watering methods, with estimates of volumes to be pumped based on both the meteorological baseline data and the groundwater inflow prediction;
- Description of proposed geotechnical works, the areas that may be affected, the quantities of bottom sediment requiring disposal, and the proposed disposal methods;
- Estimates of mine water volumes, methods used to calculate volumes, and discussion of potential uses for mine water;
- The contingency plan should the mine water volumes be significantly larger than estimated; and
- Discussion on mine de-watering treatment alternatives and the resulting effluent and downstream surface water quality and contaminant loadings to the environment.

6.6.1.7 Landfills and Landfarms

The Proponent shall describe the following information to the extent possible:

- Research results for effectiveness of similar landfarm operation facilities in comparable geological regions and climate condition;
- Locations of any landfills and landfarms, with estimates of containment capacities, associated design basis and considerations to minimize impact on the surrounding environment;
- An inventory of materials to be landfilled, taking into account the Project stages;
- Description of the proposed collection, handling, storage, treatment, and disposal or treatment methods of contaminated ice, snow, soil and/or surface runoff:
- Design considerations and criteria, engineering features and facilities layout drawings in relation to nearby roads, water courses and waterbodies; and
- The viability of landfarming, given site specific climate and geographic conditions including a discussion on alternatives.

6.6.2 Baker Lake Dock Site and Storage Facility

The Proponent shall provide the following information regarding Project components and activities at the proposed Baker Lake Dock Site and Storage Facility, with site maps and diagrams provided for reference purposes where deemed useful.

- Discussion of how a precautionary approach has been incorporated into the design of dock facility, to account for the challenges of the Project area (i.e., considerations for extreme temperatures, ice thickness, seismic hazards, sea level change, etc. in the layout and structure of various facilities and design features);
- Discussion of the study results related to bathymetry, rock and sediment geotechnical properties, and sediment thickness for the proposed dock site;
- Discussion on how tide levels, annual rebound influencing water depth, and the ice shifting on Baker Lake during freeze-up in the fall season, winter season and break-up in the spring season will affect the design and usage of the dock facilities;
- Description of all facilities proposed to be constructed at the dock facility, including discussion on the wharf storage facility, temporary administration facility, land-based or sea-based navigational aids, etc.;
- Details regarding all undertakings/works required to make the selected dock facility accessible for shipping;
- Discussion of all potential uses of the dock site and storage facilities, including predicted non-Project and/or private uses;
- Description of all facilities associated with the transfer and handling of fuel and any hazardous products;
- Description of all facilities associated with the transfer and handling of uranium concentrate;
- Description of the types and anticipated volumes/quantities of materials and equipment to be transported to and from the dock, including hazardous/dangerous goods cargo;
- Description of water supply and associated water intake sources and facilities;
- Discussion on the waste management at the dock site including shipping waste generated on board and hazardous waste;
- Description on the communication system and power generation unit;
- Discussion of plans for dock security management;
- Measures and technologies to be adopted in the design and manufacturing of the Baker Lake Dock Site and the storage facilities to reduce noise, GHG emissions and any other anticipated emissions; and
- Anticipated quantities of emissions to the atmosphere resulting from the Baker Lake dock site and the storage facility associated with this Project.

6.6.3 Chesterfield Inlet Transfer Site

The Proponent shall provide the following information regarding Project components and activities at the proposed Chesterfield Inlet Transfer Site, with site maps and diagrams provided for reference purposes where deemed useful.

- Discussion of how a precautionary approach has been incorporated into the design of transfer site, to account for the challenges of the Project area (i.e., considerations for extreme temperatures, ice thickness, seismic hazards, sea level change, etc. in the layout and structure of various facilities and design features);
- Discussion of the study results related to bathymetry, rock and sediment geotechnical properties, and sediment thickness for the proposed dock site;
- Discussion on how tide levels, annual rebound influencing water depth, and the ice shifting in Hudson Bay and Chesterfield Inlet during freeze-up in the fall season, winter season and break-up in the spring season will affect the design and usage of the transfer site facilities;
- Description of all facilities proposed to be constructed at the transfer site;
- Details regarding all undertakings/works required to make the selected transfer site accessible for shipping;
- Discussion of all potential uses of the transfer site, including predicted non-Project and/or private uses;
- Description of all facilities associated with the transfer and handling of fuel and any hazardous products;
- Description of the types and anticipated volumes/quantities of materials and equipment to be transported to and from the transfer site, including hazardous/dangerous goods cargo;
- Description on the communication system and power generation unit;
- Discussion of plans for transfer site security management; and
- Measures and technologies to be adopted in the design and manufacturing of the transfer site to reduce noise, GHG emissions and any other anticipated emissions.

6.6.4 Ground Transportation and Associated Water Crossings

The Proponent shall describe all ground transportation, and associated facilities both temporary for construction purposes and permanent for operation and maintenance. Ground transportation includes the all-weather road and/or winter access road, mine hauling roads, site service roads, various access roads, in pit haul roads, other roads used to facilitate maintenance of infrastructure and facilities, etc. The Proponent shall describe the following in connection with the Roads Management Plan (Subsection 9.4.18), including relevant maps and drawings where useful:

- Permitting regime and land tenure of all ground transportation (designations of accessibility to public);
- Discussion on how the selected route(s) may correspond to the needs of other developers and of Nunavummiut, paying particular mind to any public consultation undertaken with respect to the proposed routing, specifically as it may relate to traditional land or resource use;
- Discussion of how TK has been considered in the selection of the ground transportation;
- Relationship of ground transportation with existing hunting and travelling routes (including those routes in close proximity or intersecting planned ground transportation roads);

- Discussion of plans for public access to Project ground transportation roads, including considerations relevant to design and traffic management;
- Measures for mitigating and preventing the permafrost degradation during construction and operation;
- Design specification and features of all ground transportation roads, including construction methods, laydown areas, temporary construction camps, estimates and types of materials required for construction and maintenance, water crossings and diversions of watercourses;
- Description of construction schedule of all water crossings and any temporary works related to the ground transportation;
- Description of all water crossings and in-stream works including alternatives, quantity and locations of each kind, and any diversions of watercourses. Survey plans with dimensions indicating depth, width, length, natural obstructions; high and low water marks, shoreline structures and adjacent properties should also be included;
- The water management should consider the design and size of watercrossings to ensure adequate flow capacity to cope with storms, floods, and other intermittent natural events with consideration of a conservative precipitation event (i.e. the PMP) and to prevent velocity barriers to fish movement or migration;
- Locations and connectivity of roads including terrain conditions along the road alignments;
- Provide a description of any infilling of lake, wetland or stream habitats associated with road construction(s) and the potential impacts to fish and fish habitat;
- Procedures and structures designed to mitigate/manage potential impacts to wildlife and wildlife movement (e.g. caribou crossings and migration routes) and to fish and fish habitat during construction and operation;
- Discussion of design features planned to protect and facilitate wildlife (e.g. caribou crossings) and humans that might cross the roads during operations (including ATVs, snowmobile and sledges), and prevent/minimize collision related mortalities;
- The duration, frequency and extent of use of all facilities, including allowances for public or hunter access;
- Measures for controlling sedimentation and runoff during construction and operation;
- Projected traffic volumes, including the types and numbers of vehicles to be used, fluctuations on a seasonal or annual basis, and speed limits;
- Road management related to daily operation and maintenance, including snow removal, de-icing, snow drifts/banks management and dust suppression methods;
- Accident/incident response procedures and reporting;
- Site reclamation, especially temporary construction camp and quarry sites which are used for extracting construction materials; disposal of construction waste materials and options of final closure and reclamation;
- Measures and technologies to be adopted in the design and manufacturing of the ground transportation to reduce noise, GHG emissions and any other anticipated emissions; and
- Anticipated quantities of emissions to the atmosphere resulting from ground transportation associated with this Project.

6.6.4.1 Thelon River Bridge Crossing

- Design specification and features of the proposed Thelon River bridge crossing including construction methods, laydown areas, in-stream works, estimates and types of materials required for construction and maintenance;
- Description of the projected maintenance requirements for the Thelon River bridge crossing, both short and long term. Include the physical nature of predicted maintenance activities as well as their frequency;
- Description of any required measures for bank stability and erosion control at the Thelon River bridge crossing;
- Discussion on the potential impact of Thelon river ice on water crossing infrastructure during freeze-up in the fall season, winter season and break-up in the spring season; and
- Discussion of design details of the ferry docking/landing sites.

6.6.5 Marine Shipping

The Proponent shall describe all marine shipping associated with the Project, including shipping through Chesterfield Inlet to Baker Lake:

- Applicable environmental legislation, including:
  - International legislation, such as: MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO, 2008);
  - Canadian legislation, such as: *Canada Shipping Act*, *Arctic Waters Pollution Prevention Act* (e.g. the Zone/Date System, the Arctic Ice Regime Shipping System, Ice Navigators if applicable); and
  - How the Proponent and its shipping contractors/partners intend to either meet or exceed these requirements.
- Description of the proposed marine shipping vessel(s) (types, sizes, and numbers of vessels to be used), associated frequency and timing for all project activities during each phase of the Project;
- Description of proposed shipping route(s), with corresponding maps and details regarding bathymetry, navigational aids, other marine traffic using these routes, etc.
- Description of the proposed timeframe for the shipping season(s) through each of the proposed routes;
- Discussion on the potential for ice breaking during the shipping season (note that this would include the planned shipping season);
- Relationship of marine shipping routes and/or seasons with existing hunting and travelling routes;
- Discussion of how TK has been considered in the selection of the routing and timing of shipping activities;
- Description of the results from bathymetric studies undertaken along the proposed shipping routes. Additional discussion of study results should also be included for identified areas where shallow waters and/or strong current exist, with consideration given to the size of barges, and the implications for shipping safety;

- Disposal plans for onboard solid waste and waste water (*i.e.*, onboard sewage and grey water);
- Disposal plans for onboard waste while docked at the dock facility;
- Discussion of the plans for dedicated shipping waste management in accordance with the provisions of the *International Convention for the Prevention of Pollution from Ships*, as amended by the 1978 Protocol (MARPOL, 73/78).
- Ballast water management plan for all Project shipping, with indication of the proposed ballast water exchange locations in mid-ocean, at the dock facility in Baker Lake, and alternative exchange zones within waters under Canadian jurisdiction. Include associated implications for regulatory compliance (Government of Canada, 2006);
- Proposed measures to ensure the fuel used for shipping conforms with Canadian regulations (Government of Canada; 1990, 1991, 1997, 1999b, 1999c, and 2002b);
- Proposed measures to eliminate or reduce the risk of invasive aquatic and non-aquatic species being introduced into Canadian waters as a result of shipping;
- Measures and technologies to be adopted in the design and manufacturing of the barges to reduce the noise, GHG emissions and any other anticipated emissions;
- Anticipated quantities of emissions to the atmosphere resulting from the marine vessels associated with this Project;
- Description of loading and offloading procedures for dangerous goods, fuel, explosives and uranium concentrate, if applicable;
- Identification of all parties responsible for ensuring safe shipping beyond the immediate dock facility site;
- Discussion of proposed safety measures, including:
    - Measure to prevent marine vessels from being beset in pack ice, or being carried into rocks, shoals and small islands where the proposed shipping is close to the shoreline (e.g. in the Chesterfield Inlet channel)
    - Considerations for hiring personnel with local knowledge of the areas and weather conditions to act as on-board monitors
- Discussion of whether the shipping route or part of the proposed shipping route is a compulsory or non-compulsory pilotage area, and associated implications for regulatory compliance (Government of Canada, 2009) if applicable;
- Details regarding the proposed procedures for accident, malfunctions and incident management reporting, including accidental spills of fuel and chemicals or uranium concentrate along the shipping routes, and from the accidental grounding/stranding of ships along the shipping routes; and
- Other details as relevant which may be cross-referenced from the Shipping Management Plan (Subsection 9.4.15).

6.6.6 Air Transportation

The Proponent shall provide information on:

- Description of all potential uses of aerodrome including air traffic and types of aircraft to be used, regardless of whether an airstrip is required or not (e.g. helicopter);

- Estimates of the number of passengers to be transported and the volume of goods and uranium concentrate to be shipped through the airport facilities;
- Estimates of the number of flights on a daily or weekly basis covering all phases of the Project;
- Description of all facilities and infrastructure proposed to be constructed and construction methods;
- Description of service roads, de-icing and containment systems and methods of dust suppression;
- Description of all facilities associated with the transfer and handling of fuel;
- Discussion of current drainage patterns and identification of waterbodies and watercourses that may be in-filled or encroached upon by the airstrips or airport infrastructure or diversions required;
- Description of loading and offloading procedures for uranium concentrates;
- The duration, frequency, and extent of use of each airport facility/airstrip;
- Accident/incident response reporting;
- Estimated flight impact zones, based on flight routes, types of aircraft and traffic volumes;
- Details regarding the proposed procedures for accident, malfunction and incident management and reporting for the transfer of hazardous material including uranium concentrates; and
- Anticipated quantities of emissions to the atmosphere resulting from air transportation associated with this Project.

6.6.7 Borrow Pits and Quarry Sites

Borrow pits and quarry sources will be developed for construction, maintenance, and reclamation of various site facilities from the Baker Lake Dock Facility to both the Kiggavik and the Sissons mine sites. The Proponent shall present the following information for each borrowing pit and quarry source, and a summary of all such sites to be used for the Project, in combination with the Borrow Pits and Quarry Management Plan (Subsection 9.4.13):

- Maps at a scale of 1:10,000 for all sites that are to be used for borrow pits or quarries, indicating the ownerships (Inuit Owned Land [IOL] and Crown Land) of lands where borrow pits and quarries site are planned, and principle geographic features (e.g. on or near eskers and other unique landscapes, the proximity to waterbodies and watercourses);
- Estimates of the quantities that will be extracted from each borrow site;
- Estimates of quantities needed to build the all-weather access road, site haul road between Sissons and Kiggavik, and the airstrip;
- Annual estimates of the quantities used for the roads, dock site and air strip maintenance;
- Characterization of the materials at potential borrow site locations including the ground ice conditions and occurrences of massive ice;

- Description of how the precautionary principle is applied in the designs in terms of minimizing potential effects on environment, wildlife and wildlife habitats, as well as fish habitats if these sites are in close proximity to waterbodies and watercourses, high winds;
- Description of proposed sediment and dust control measures; and
- Other details as relevant which may be cross-referenced from the Borrow Pits and Quarry Management Plan (Subsection 9.4.13).

6.6.8 Power Generation

The Proponent shall describe, in conjunction with its Air Quality Monitoring and Management Plan (Subsection 9.4.3) the following:

- The energy balance for the proposed Project, including strategies for optimization and conservation;
- Type of power generation that will be used over the Project lifespan;
- Locations (positioning) of power generating plants/stations relative to prevailing winds and other infrastructure;
- Description of diesel power generation facilities, including sources, volumes of fuel to be used, transportation methods for fuel and associated transfer points, information regarding secondary containment measures to be employed and equipment and facilities for emergency clean-up;
- Measures and technologies to be adopted in the design and manufacturing of the power generating plants/stations to reduce noise, GHG emissions and any other anticipated emissions;
- Anticipated quantities of emissions to the atmosphere resulting from the generation of power for the Project; and
- Proposed accident/incident management and reporting.

6.6.9 Fuel and Explosives Facilities

The Proponent shall describe the following, in conjunction with its Spill Contingency Plans, (Subsection 9.4.2), Hazardous Materials Management Plan (Subsection 9.4.9) and Explosives Management Plan (Subsection 9.4.10):

- Applicable federal and territorial legislation and regulations;
- The location and characteristics of fuel and explosives storage and/or manufacturing infrastructure and facilities (e.g. explosives and detonator magazines, fuel storage, ammonium nitrate storage, maintenance/wash area, process trucks and their parking area, any offices, warehouses, buildings) as well as methods of secondary containment to be employed. This will include distances to vulnerable features (i.e. dwellings, roads, camps, bodies of water, etc.), and distances between explosives facilities and fuel storage/handling areas;
- Types and estimate of quantities of fuel, explosives, and other similar materials required for the duration of the Project;

- Operational plans (without duplication of the plans noted above) including Oil Pollution Prevention and/or Emergency Plans in connection with the Spill Contingency, and Oil Handling Facility Contingency Plan. This addresses fundamental requirements for the fuel transfer to marine vessels from dock and should be approved by Transport Canada;
- Methods of fuel transfer and transportation from source(s) to and around site;
- Safe handling and spill containment prevention methods and liquid effluent disposal plans;
- Evaluation of worst case scenarios (i.e. accidental explosion);
- Security measures to be implemented, if applicable;
- Accident/incident response reporting, spill response training and contents of spill kits;
- Measures and technologies to be adopted in the design and manufacturing of the fuel and explosives storage and/or manufacturing infrastructure and facilities to reduce noise, GHG emissions and any other anticipated emissions; and
- Anticipated quantities of emissions to the atmosphere resulting from the fuel and explosives storage facilities associated with this Project.

6.6.10 Waste Management Facilities

The Proponent shall describe the sources, types and quantities of radiological and non-radiological waste predicted to be generated by the project, and the on-site processes for the collection, handling and disposing of radioactive and non-radioactive wastes to be generated by the Project. The Proponent shall include the following with cross referencing to applicable management plans (Section 9.4) where appropriate:

- Waste rock management:
    - An inventory of waste rock generated during construction of Project infrastructure, for example: overburden, waste rock, special waste rock, processing wastes, excavated material, and any other related wastes if applicable;
    - Details regarding the ARD and ML characterization of waste rock, the method of testing in terms of both static and kinetic tests, the number of samples and sampling protocols, the company and personnel to carry out the tests, and implications to possible use and disposal;
    - Description of analyses implemented in the development of the proposed pile design and runoff management plans, including any analysis related to the water balance of the waste rock pile, as well as the thermal condition of the pile and surrounding ground;
    - Proposed management plans regarding stockpile design, locations and capacities, with reference to the predicted volumes/tonnage of waste rock, physiochemical characteristics, stockpile methods and procedures including dust control, runoff management, progressive reclamation plans, and other details as deemed relevant;
    - Description of the liner materials to be use; and
    - Discussion of proposed management plans for accommodating the projected volumes of materials at waste rock facilities; with a discussion of measures for

contingency situation in which the designed facility is not adequate to accommodate waste rock really generated.

- Tailings management
    - Comprehensive description of the tailings management facility design;
    - Describe the proposed process and operations of the tailings management facility during both operations and post-closure. The Proponent shall include a contingency plan in the event that discharges from the containment area do not meet licensing criteria;
    - Describe the tailings chemistry, physical properties (rheology, solid content, consolidation density, slurry temperature, volume estimates), mineralogical and radiological characteristics;
    - Discuss method for controlling and monitoring radon flux from the tailings management facility;
    - Discuss how water re-cycling will be done in the tailings area;
    - Discuss how geotechnical factors, geological structures (fault zones and their hydrogeological characteristics), and permafrost conditions (seasonal thawing, taliks and open taliks, degradation due to tailings deposal, and long term evolution) were considered in the design of the tailings management facility;
    - Describe how the general climate conditions including climate trends were considered in the design of the tailings management facility (e.g. prevention of ice formation);
    - Predict the artesian inflow into the tailing management facilities during operation with support from numerical modeling if permafrost beneath the tailing management facilities is predicted to thaw during the life cycle of the tailing management facilities. The potential preferential flow along the fault cut through the pits should be considered in the inflow prediction. Measures for controlling the groundwater inflow/seepage, where necessary, should be discussed and a groundwater monitoring plan should be developed; and
    - Water management in the tailing management facilities should consider the capacity of the tailing management facilities to cope with storms, floods and other intermittent natural events with consideration of a conservative precipitation event (i.e. the PMP). Design of the pumping capacity and treatment plant should take the potential maximum inflow and the PMP event into consideration.
- Sewage/grey water treatment:
    - Description of proposed sewage/grey water treatment facilities to be used during construction and operations, including a discussion of the technology to be employed, the locations of the facilities, point(s) of discharge, solids (sludge) disposal methods, and the volumes and quality of the effluent, as well as the applicable discharge standards;
    - Contingency measures for the disposal of sewage/grey water during periods of sewage plant malfunction and/or disturbances, with details regarding the associated disposal and treatment technologies and facilities;

- Measures and technologies to be adopted in the design of the sewage/grey water treatment facilities to reduce noise, GHG emissions and any other anticipated emissions; and
- Anticipated quantities of emissions to the atmosphere resulting from the sewage/grey water treatment facilities associated with this Project.

- Hazardous waste management:
  - Inventory of the types and predicted volumes/quantities of hazardous wastes to be generated or produced by Project activities, including shipping operations;
  - Description of proposed storage, transport and disposal methods to be employed; and
  - Details regarding the destinations for each type of hazardous waste, including the disposal of containers used to transport or store hazardous materials.
- Camp waste management:
  - Description of the facilities to be used for incineration of domestic waste;
  - Inventory of domestic waste, including both land-based and ship-based generated wastes;
  - Description of incineration technologies, equipment and applicable emission regulations;
  - Methods of disposal of incineration ash;
  - Details regarding training programs for operations personnel;
  - Measures and technologies to be adopted in the design and manufacturing of the camp waste management facilities to reduce noise, GHG emissions and any other anticipated emissions; and
  - Anticipated quantities of emissions to the atmosphere resulting from the camp waste management facilities associated with this Project.

6.6.11 Exploration

The Proponent shall describe:

- Areas proposed for ongoing geotechnical investigations and mineral exploration, including drilling, over the duration of the various Project areas;
- Description of any exploration activities occurring on or near waterbodies and the mitigation measures that will be implemented to prevent impacts to fish and fish habitat;
- Temporary/field facilities, equipment to be used, and required ground and air transport frequencies;
- Proposed wildlife mitigation and monitoring measures associated with exploration program (e.g. compliance with the minimum flight altitudes if aerial surveys are planned/conducted, timing and type of surveys, etc.);
- Proposed mitigation and monitoring measures designed to protect archaeological and cultural resources from being impacted by ongoing exploration; and
- Management plans for drilling waste disposal and drill site reclamation.

6.6.12 Other Project Facilities and Infrastructure

The Proponent shall describe any other relevant project facilities and infrastructures not detailed in Section 6.5 and assess the potential for resulting impacts.

7.0 IMPACT ASSESSMENT APPROACHES

7.1 BASELINE INFORMATION COLLECTION

The Proponent shall present baseline data, including TK, about the existing biophysical and socio-economic environments relevant to the assessment of potential impacts from the Project in all proposed phases. Potential for changes in baseline conditions due to exploration activities related to the Project must be taken into consideration. The Proponent shall explain methodologies for baseline data collection, evaluation of the adequacy of data, confidence levels associated with baseline data, and identification of significant gaps in knowledge and understanding. The associated uncertainties and the steps to be taken to fill information gaps should be discussed. As a critical data gap, comprehensive information on biota tissue concentrations of uranium (U)-238 series radionuclides and other contaminants of specific interest in uranium mining (e.g. selenium, molybdenum) should be collected.

The Proponent should consider other available information containing baseline data related to the Project region, including a review of grey literature, technical scientific reports, and peer-reviewed scientific literature to present a complete picture of baseline conditions.

In order to identify natural fluctuations, trends and cyclical and other recurrent phenomena, the Proponent shall strive to give sufficient time depth and geographic broadness (temporal and spatial scale) to baseline data (e.g. the populations and distributions of certain wildlife VECs are known to fluctuate in cyclic trends over extensive time periods and ranges). The Proponent shall also strive to evaluate the degree that the potential for impacts from undertakings is negligible by specifying the sources of relevant prior impacts which can be identified with reasonable confidence.

Finally, the Proponent shall make any linkages explicit and describe the trade-offs. For example, deficiencies in baseline data increase uncertainties in the prediction of potential impacts, and consequently require an intensification of corresponding monitoring and mitigation programs (Section 9.3), follow up and adaptive plans (Section 9.7).

7.2 VALUED ECOSYSTEM COMPONENTS AND SOCIO-ECONOMIC COMPONENTS

This description should include, but not necessarily be limited to, those VECs and VSECs, processes, and interactions that are likely to be affected by the Project and those identified in these Guidelines. If relevant, the location of these VECs/VSECs should be indicated on maps or charts, indicating to whom these components are valued and the reasons why, in terms of ecosystemic, social, economic, recreational, tourism, aesthetic or other considerations. The Proponent should also indicate the specific geographical areas or ecosystems that are of particular concern, and their relation to the broader regional environment and economy.

VECs should include indicators of sensitivity to contaminants and environmental pathways of exposure and bio-magnification. The Proponent should justify the methods used to predict potential adverse and beneficial effects of the Project on the VECs and VSECs, on the interactions among these components, and on the relations of these components with the environment. In particular, the Proponent should validate the selected VECs/VSECs, especially those VECs/VSECs that will be used to assess the significance of Project component interactions, through consultation with the potentially affected communities. Any uncertainties in the validation must be documented. The NIRB strongly recommends that the Proponent continue to seek input from communities, government agencies and other parties, as well as incorporate the use of TK to identify the VECs and VSECs. All VECs and VSECs used in the assessment should have clearly identified indicators as outlined in Section 7.10.

The Proponent is expected to identify the components and activities of the Project that are anticipated to interact in adverse or beneficial ways with the selected VECs/VSECs. These components/activities could be grouped into the following categories:

- Components and activities related to construction, operation, temporary closure, final closure, and reclamation of the Project; and
- Components and activities induced by the Project development, which will occur in the reasonably foreseeable future.

The following list of biophysical components and socio-economic components related to the Project, identified by the NIRB through scoping, with full consideration of public input, should be considered in the Proponent's selection of VECs and VSECs. This list is not meant to be comprehensive nor exhaustive, and should give the Proponent an appropriate starting point for the identification of relevant VECs and VSECs. The Proponent shall provide a rationale for the selection of communities and relevant studies for which baseline data are provided. The Proponent shall describe the interactions between the socio-economic and bio-physical environments. If components identified in these Guidelines are not included in the EIS, the Proponent must clearly discuss its rationale for the omission.

7.2.1 Valued Ecosystem Components

- Air quality;
- Climate change;
- Noise and vibration;
- Terrestrial environment;
- Permafrost;
- Groundwater and surface water quality and quantity;
- Sediment quality;
- Freshwater aquatic environment, including representative fish species, fish habitat; aquatic macrophytes, benthic invertebrates, and other aquatic organisms;
- Vegetation;
- Terrestrial wildlife and habitat, including representative terrestrial mammals including: caribou (including habitat, migration, and behaviour), muskoxen, wolverine, grizzly

bears, wolves and less conspicuous species that may be maximally exposed to contaminants;
- Birds including raptors, migratory birds and seabirds, and their habitat;
- Marine environment, including marine ecology, marine water and sediment quality and marine habitat;
- Marine biota including fish; and
- Marine wildlife.

7.2.2 Valued Socio-Economic Components

- Population demographics;
- Education and training;
- Livelihood and food security;
- Family and community cohesion;
- Employment;
- Economic development and self-reliance;
- Community infrastructure and public service;
- Contracting and business opportunities;
- Culture, resources and land use;
- Benefits, royalties and taxation;
- Governance and leadership; and
- Human health and well-being including worker health and safety.

7.3 METHODOLOGY

In describing the methodologies used, the Proponent shall explain how it used scientific, engineering, traditional, community, and other knowledge to reach its conclusions. Any assumptions shall be identified and justified. All data, models, and studies must be documented so that the analyses are transparent and reproducible. All data collection methods shall be specified, and the uncertainty, reliability and sensitivity of methods and models used to reach conclusions shall be indicated. All conclusions shall be substantiated.

The Proponent shall, to the extent possible, consider other available information, including knowledge on what types of data other project proponents, governments, and other researchers are collecting and have collected, in making choices with respect to the types of data it will collect for Project-specific monitoring programs as well as any regional monitoring initiatives it will participate in. There may be some conflicting information within the scientific community or community and/or TK collected. It is suggested that these conflicting viewpoints also be identified and presented in a balanced manner with the Proponents conclusions stated.

The Proponent shall, to the extent possible, consider other available information, including knowledge on what types of data other project proponents, governments, and other researchers are collecting and have collected, in making choices with respect to the types of data it will

collect for Project-specific monitoring programs as well as any regional monitoring initiatives it will participate in.

To support the key conclusions presented in its EIS, the Proponent shall broadly identify knowledge and understanding gaps, and identify with justification, which are significant and relevant to the conclusions. The steps taken by the Proponent to address these gaps shall also be identified. Where the conclusions drawn from scientific and technical knowledge are in conflict with the conclusions drawn from community and/or TK, the EIS shall contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

7.3.1 Acquisition Methodology and Documentation

The Proponent shall specify and justify all sampling protocols and statistical processes employed in both the biophysical and social contexts. The reliability and scope of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed. All data based on environmental sampling necessarily involve some variability, which must be determined to assess the reliability and scope of the data. The Proponent shall, for all data obtained from environmental sampling, provide a dispersion or variability coefficient (variance, standard deviation, confidence interval, etc.) and indicate the size of the sample used. The sampling methods and standards should be in accordance with those prescribed by regulators operating in Nunavut. Similarly, when using mathematical models the Proponent shall indicate the inputs and assumptions employed, the prototypes used, the accuracy, and the inherent limits of interpretation.

For the types and formats of data, the Proponent shall consider other available information, including what types of data other project proponents, governments and researchers have collected. This recommendation applies to data collected for the Nunavut General Monitoring Program (NGMP), as per Article 12 of the NLCA, the Proponent's project-specific monitoring programs as well as any regional monitoring initiatives the Proponent will participate in. Every effort should be made to synchronize with the initiatives being made by Governments in respect to the NGMP and liaise with the Secretariat where appropriate.

7.3.2 Data Analysis and Presentation

The Proponent shall ensure that where qualitative criteria are used to describe the environment, to compare various design and development options, or to assess impacts, each of these criteria shall be defined, their relative importance stated, and the differences between the categories (e.g., desirable, acceptable, unacceptable) indicated with justification of each criterion. The Proponent shall support all analyses, interpretations of results, and conclusions with a review of the relevant literature, providing all relevant references and indicating the public availability of all works consulted. Any contributions based on TK shall also be specified and sources identified, subject to any concerns relating to ownership or confidentiality.

The Proponent shall also correlate its conclusions about impact significance with any thresholds referred to or adopted from relevant guidelines or regional policies.

7.4 PUBLIC CONSULTATION

Public consultation is required when:

- Identifying current and historical patterns of land and resource use;
- Acquiring TK;
- Identifying VECs and VSECs;
- Evaluating the significance of potential impacts;
- Deciding upon mitigating measures; and
- Identifying and implementing monitoring measures, including post-project audits.

The Proponent shall describe where, when, how why and with whom it conducted public consultation, including its efforts to inform participants how the information that they supplied was or will be used. The Proponent shall also describe how communication was facilitated with the public through accommodating regional languages/dialects; not only through translation but through live translation/interpretation at community/public meetings.

A summary of key dialogues and identified issue areas from pre-consultation and consultation activities, along with any commitments made by the Proponent to the community during these discussions must be presented in the EIS and will enable responsible agencies to:

- Assess the transparency, meaningfulness and completeness of community consultation efforts;
- Understand messages communicated within the process of dialogue;
- Obtain an increased understanding of the expectations held within communities based upon responses to specific issues raised; and
- Assess how public participation has influenced the development of the Project.

7.5 TRADITIONAL KNOWLEDGE

The Proponent shall present and justify its definition of TK and shall explain the methodology used to collect it, including:

- Format and location of meetings;
- Description of background information provided at meetings;
- Level of community participation and composition of participants;
- Design of studies on TK;
- Selection process for participants in such studies, including participants outside the NSA;
- Types of TK collected; and
- Associated issues related to the storage and ownership related to TK.

The Proponent shall summarize what kinds of TK were collected and indicate whether special efforts made to collect TK from Inuit Elders, women or special groups, or harvesters familiar with the Project area.

In all sections of the EIA, the Proponent shall discuss how it weighed and incorporated TK in areas such as baseline data collection, impact prediction, significance assessment, and the development of mitigation and monitoring programs. It shall explain how it integrated TK and popular science, including the manner in which it reconciled any apparent discrepancies between the two. It shall also include incidences where TK is being used to address gaps in currently available scientific data should be clearly identified as such. All assumptions shall be justified.

The Proponent shall outline its program to pursue the collection of TK and to integrate it into ongoing baseline data collection, mitigation, and monitoring programs, and shall describe the roles and responsibilities of all concerned individuals and organizations in collecting, analyzing, interpreting, and synthesizing data, including TK. Furthermore, the Proponent shall describe any other past or current TK studies in which it has participated or played a supporting role.

7.6 IMPACT ASSESSMENT APPROACH

The required impact assessment, including the significance analysis, should describe: the effect considered, the significance of the effect and justification for that determination, and if applicable, how the effect fits into a cumulative effects analysis and transboundary effects analysis. In this assessment, more emphasis should be placed on those significant impacts on VECs and VSECs, extending across all the Project phases if applicable. The biophysical elements and socio-economic elements potentially impacted by the Project components, activities and undertakings should be referred to in the categories listed in the Section 8.1 and Section 8.2. Based on the predicted potential adverse effects, the proposed mitigation measures shall be addressed in the corresponding management plans as listed in Section 9.0.

The impact assessment for each biophysical and socio-economical element can be linked to a list of project components and activities deemed responsible for the potential impacts. Vice versa, a project component or activity can also be linked to various environment elements, in particular VECs and VSECs, on which it might potentially have impacts. A matrix or a comparable tool should be employed to identify all linkages between environmental elements and project components and activities, highlighting those significant interactions between both.

7.7 IMPACT PREDICTION

The Proponent shall explain and justify the methods used for impact prediction, including: mathematical or numerical modeling, statistical modeling (e.g., variance and correlation analyses), analysis of sequential series, expert opinion, previous experiences, and the prediction from known tendencies and TK if applicable.

All studies used in the prediction of impacts must be specified, the original authors identified, and the studies made public. All statements based on public consultation shall be justified and the sources and methodology specified. The choice of methodologies and interpretation of results shall be justified in light of current theories, knowledge and standards.

The Proponent shall assess the direct, indirect, short-term, and long-term impacts of the Project on the biophysical and socio-economic environments, and the interactions between them, focusing on the anticipated response of the VECs and VSECs. The Proponent shall also assess the degree of uncertainty associated with each predicted effect. Where potential cumulative

effects are identified, a discussion should be provided related to the CEA as outlined in Section 7.8 of these Guidelines.

The Proponent shall identify potential impacts resulting from each Project phase, including impacts arising from accidental events and malfunctions, with accepted practices used to draw impact predictions. Predictions shall be presented with appropriate explanations and justification, and the Proponent shall:

- Explain how scientific, engineering, community and Inuit knowledge was used;
- Document model assumptions and study methodologies;
- Document data collection methods and limitations thereof;
- Support analyses, interpretation of results and conclusions with reference to appropriate literature;
- Describe how uncertainty in impact predictions have been dealt with;
- Specify and reference sources for any contributions based on TK;
- Identify which studies included the assistance of communities and individuals, who was involved (if the information can be made public), and how participants were selected;
- Identify all proposed mitigation measures and adaptive management strategies, if applicable; and
- Describe the potential residual effects.

7.8 CUMULATIVE EFFECTS ASSESSMENT

A cumulative impact (or effect) can be defined as the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time.

The Proponent is expected to carry out its cumulative effects assessment (CEA) with consideration for the following factors:

- *A larger spatial boundary (RSA rather than LSA)*: This will enable the Proponent to assess the project impacts in relation to other activities (including other projects and exploration) in the geographical region, and implies that spatial assessment boundaries may cross jurisdictional boundaries for a better understanding of additive and interactive pathways of different types of cumulative effects (NIRB, 2007);
- *A longer temporal scale (as defined in Subsection 5.4.2)*: This will enable the Proponent to consider all activities from the present time into the past and the reasonably foreseeable future for a more accurate analysis of variability and significant long-term effects;
- *Alternatives analysis*: CEA requires the explicit creation of alternative development scenarios and analysis of potential cumulative effects associated with each option (Greig *et al.*, 2002). Therefore, the Proponent should endeavour to ensure its CEA addresses the alternatives presented under Section 6.1 of these Guidelines.

- *Consideration of effects on VECs and VSECs*: An effective CEA will allow the Proponent to more accurately assess how the interaction of impacts from the various Project components and activities, and those from other past, present and reasonably foreseeable projects (including exploration), might impact in a cumulative fashion on selected VECs/VSECs;
- *Evaluation of significance*: Effective CEA requires identifying and predicting the likelihood and significance of potential cumulative effects, including direct, indirect and residual impacts. The Proponent shall consider and determine the significance of the cumulative effects using the criteria described in Section 7.11.

As per the identified objectives and methodologies for a CEA, the Proponent shall:

- Justify the environmental components that will constitute the focus of the CEA. The Proponent's assessment should emphasize the cumulative effects on the main VECs/VSECs that could potentially be most affected by the Project;
- Present a justification for the spatial and temporal boundaries for the CEA. It should be noted that these boundaries can vary depending on the VECs or VSECs assessed. The Proponent shall give due consideration to the potential for cumulative effects that may be transboundary and should not limit the evaluation boundaries to the NSA, especially where migratory species are concerned;
- Discuss and justify the choice of projects, components and selected activities for the CEA. These shall include past activities and projects, those currently being carried out and any reasonably foreseeable project or activity;
- Identify any additional uranium exploration or mining/milling projects within the RSA, along with a discussion of the cumulative impacts of any radiological releases; and
- Discuss the mitigation measures that are technically and economically feasible, and determine the significance of the cumulative effects. If any impact is identified and verified beyond the Proponents sole responsibility or capacity, the Proponent shall make best efforts to identify other responsible parties in order to mitigate the impact collectively.

7.9 TRANSBOUNDARY IMPACTS

Transboundary impacts, for the purpose of the current Guidelines, are defined as those effects linked directly to the activities of the Project inside the NSA, which occur across provincial, territorial, international boundaries or may occur outside of the NSA. The Proponent shall give due consideration to the potential for transboundary impacts which may be a result from interactions between the effects of the Project in the NSA, and the effects of projects located outside Nunavut. The potential for transboundary impacts related to cumulative effects associated with this Project shall be defined.

Where feasible, the potential for transboundary impacts should be considered for all VECs and VSECs identified by the Proponent, with specific consideration given to the potential for transboundary impacts associated with marine shipping on marine mammals, migratory birds and seabirds, and their habitat, as well as the large migration range of land mammals such as caribou.

Any residual effects which have the potential to occur outside of the NSA shall also be included in the Proponent's evaluation of transboundary impacts.

7.10 INDICATORS AND CRITERIA

The Proponent shall identify the indicators and/or criteria selected for assessing the potential impacts of the Project, including any cumulative and transboundary impacts, and shall justify their selection. In doing so, the Proponent shall describe the role played by consultation with members of the public and technical experts. In its discussion of indicators, the Proponent shall emphasize the linkage between those indicators and the relevant VECs or VSECs.

7.11 SIGNIFICANCE DETERMINATION

Impact significance is based on comparing the predicted state of the environment with and without the Project and expressing a judgment as to the importance of the changes identified. Assessing the significance of potential impacts is, arguably, the single most important aspect of an environmental impact statement.

In the process of significance determination, the Proponent is expected to communicate with potentially-affected communities, including relevant individuals and organizations to solicit input and incorporate their views regarding the value it placed on a VEC or VSEC, as well as associated significance of impacts. The Proponent shall describe how it will ascertain the significance that different parties assigned to each impact, and how it will proceed if different parties ascribe varying significance to VECs, VSECs or the associated impacts. If it is impossible to attain a consensus on the significance of certain impacts, the Proponent shall present the range of viewpoints expressed and shall present and justify its preference, if any. Finally, the Proponent shall describe the significance it ascribes to each effect, and justify how the significance of the effect was determined, taking into consideration and avoiding duplication of, the information provided above.

The dynamic change of ecosystems and their components must also be considered in determining impact significance. The Proponent shall evaluate the significance of potential impacts in the light of data on the current "state of health" of ecosystems and their predictable evolution, taking account global climate change. Consistent with the ecosystem approach required above, the Proponent should strive to highlight the interactions within and between ecosystem components in an effort to increase understanding of the dynamism of the ecosystems in question and the nature and severity of the predicted impacts.

The terms used to describe the level of significance, such as "low", "medium", "high", "adverse", "beneficial", "positive", "negative" must be clearly defined, where possible in quantitative terms. The following attributes defined by the NIRB shall be taken into consideration in determining the significance of each impact:

- Direction or nature of impact (i.e., positive/beneficial versus negative/adverse);
- Magnitude and complexity of effects;
- Geographic extent of effects;
- Frequency and/or duration of effects;

- Reversibility or irreversibility of effects; and
- Probability of effects.

In addition, the NIRB considers other relevant attributes in assessing the significance of impact:

- Ecological/socio-economic context/value;
- The environmental sensitivity of the area likely to be affected by the project;
- The historical, cultural and archaeological significance of the geographic area likely to be affected by the project;
- The size of the affected human populations, and the size of the affected wildlife populations and related habitat;
- The extent of the effects of the project on other regional human populations and wildlife populations, including the extent of the effects on Inuit Harvesting activities;
- The potential for cumulative adverse effects given past, present and future relevant events;
- Effects on ecosystem function and integrity;
- The effect on the capacity of resources to meet present and future needs; and
- The value attached to the impacted VEC or VSEC by those who identified them.

7.12 CERTAINTY

The Proponent shall also assess the degree of uncertainty associated with each predicted effect. The level of certainty with predictions is related to limitations in the overall understanding of the ecosystem and limitations in accurately foreseeing future events or conditions. The Proponent shall provide a reasonable description how uncertainties have been dealt with, for example through elements of the project design, monitoring and contingency plans design, etc.

7.13 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Proponent shall discuss the potential impacts of the environment on the Project, considering such factors as geotechnical hazards (including slope and underground instability, differential or thaw settlement, frost heave, ice scour and seismic activity), unfavourable geological conditions (weak zones and/or faults), permafrost (ground instability related to permafrost thaw and artesian groundwater pressure due to permafrost confinement), severe weather events (extreme precipitation events, flooding, storm surges etc.), sea ice conditions, sea level trends, subsidence and global climate change. The discussion must specifically describe and assess how the potential for climate change could affect permafrost and the long-term impacts of such changes on Project infrastructure, such as water diversions and impoundment structures, wastewater treatment structures, fuel and chemical storage areas, solid waste sites, waste rock and ore piles, all-weather road structures, winter-road structures, tailings management facility, etc.

Longer-term effects of climate change must also be discussed up to the projected closure phase of the Project. The sensitivity of the Project to long-term climate variability and effects shall be identified and discussed. The Canadian Environmental Assessment Agency Procedural Guide, "*Incorporating Climate Change Considerations in Environmental Assessment: General*

Guidance for Practitioners" (CEAA, 2003) provides guidance for incorporating climate change considerations into an environmental assessment, and may be useful for the Proponent.

8.0 PROJECT ENVIRONMENT AND IMPACT ASSESSMENT

The EIS shall provide a complete analysis of the predicted effects from the Project on the biophysical and socio-economic environments, which will serve as a basis for developing various mitigation and monitoring plans to eliminate or minimize the potential impacts from the Project.

8.1 BIOPHYSICAL ENVIRONMENT AND IMPACT ASSESSMENT

The Proponent shall present relevant information pertaining to the biophysical environment and associated processes to be assessed (see Section 7.1), to serve as a baseline against which the potential impacts of the Project can be measured. This information should be presented in the form of a "Conceptual Site Model" with clear links to ecological and human health risk assessment information presented throughout all documentation. Baseline summaries should also include trends and how the environment is expected to change over the life of the project.

The baseline biophysical environment must include a description of baseline radiological conditions of sufficient detail to allow the impacts of the project to be assessed using subsequent monitoring information. This would include the results of surveys of the radiological conditions of the existing environment, including a description of any significant gaps or uncertainties in the measurements. In describing the biophysical environment, the Proponent shall take an ecosystemic approach that takes into account both scientific and TK perspectives regarding ecosystem health and integrity.

In its impact assessment, the Proponent should identify and justify the thresholds or indicators, and further relate them to Project monitoring and follow-up measures. For each predicted negative impact in this section, associated mitigation measures should be discussed to extent possible, with references to project design (Section 6.2) and environmental management systems (Section 9.0).

8.1.1 Air Quality

8.1.1.1 Baseline Information

- Background air quality data and data related to atmospheric conditions collected in the RSA; and
- Discussion of current sources of emissions and seasonal variations or climatic conditions associated with variations in air quality.

8.1.1.2 Impact Assessment

- Discussion of the standards, guidelines and regulations that the Proponent will incorporate before, during and after operations to minimize and mitigate effects to air quality;

- Assessment of effects on air quality from Project emissions during various Project stages; including radon-222, airborne dust (total suspended particulates (TSP), PM_{10} and $PM_{2.5}$, radioactive constituents, and/or metals), GHG emissions, and standard air contaminants such as sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon dioxide (CO_2), ozone (O_3) etc.
- Assessment of dispersion of Project emissions on a local and regional scale, using appropriate modelling, and discussion of related impacts and mitigation strategies;
- Discussion of Project components and activities which may contribute to the potential for acidic precipitation, and an evaluation of associated effects;
- Assessment of the Project's GHG contributions to Nunavut and Canada
- Predictions of principle pollution emission sources and emission rates of both radiological and non-radiological emissions from the Project at various stages, including:
    - Gaseous emissions from the fuel consumption of mobile equipment such as vehicles, marine vessels, aircrafts, and stationary equipment such as diesel generators and other combustion sources
    - Fugitive dust and gaseous (i.e. radon) emissions from extraction and ore processing, handling, tailings, waste rock and ore stockpiling, quarries and other Project components and works
    - Fugitive dust emissions from ground transportation and wind erosion at various Project components including the all-weather road, access roads and mine hauling roads
- A discussion of the potential effects of changes in air quality on human health.

8.1.2 Climate (including climate change) and Meteorology

8.1.2.1 Baseline Information

- A description of the baseline meteorological and climatic conditions at the LSA and RSA, including methods of determination (with a discussion of how data from outside the project area may have been utilized) and uncertainties encountered;
- Meteorological data including but not limited to: air temperature, precipitation, evaporation and sublimation rates, wind directions and velocity, and prevailing wind directions at areas of key project components and along proposed shipping routes;
- Annual, seasonal, monthly and daily average/mean values of above noted meteorological parameters; seasonal and yearly fluctuations and variability; and extreme climate events over the same period of time in which the data, including site-specific data are collected in the RSA of the Project; and
- Prevalent trends related to key climate parameters in the Project area and any resulting implications to the Project.

8.1.2.2 Impact Assessment

- Effects of climate on the Project, with a focus on the design and planning of Project components and activities including: all-weather road and related water crossings, Thelon

River bridge, Baker Lake dock facilities, open pit mines, underground mine, waste rock stockpile; ore stockpiles, airstrips and access roads;

- Impacts of extreme meteorological events on the Project, and related considerations for Project design and planning, including, but not limited to, the following: extreme temperature and precipitation events; high winds and waves; ice-ride up and pile-up events; extreme ocean water levels (high and low); and severe fog or white out conditions. Potential changes to the timing of ice formation, active layer thickness, and frequency of storms should also be taken into consideration;
- Discussion of the likelihood of all possible climate changes based on various possible scenarios, rather than designing and applying a single "best guess" scenario, and corresponding long term implications to the Project under each scenarios;
- Discussion of the relationship between climate change and GHG emissions from the Project;
- Impacts from climate change on sensitive ecosystem features within the terrestrial and marine ecosystems;
- Predicted effects of climate change on mean and extreme climate parameters, and meteorological phenomena including flooding, storms, etc.
- Potential effects of climate change on permafrost thawing in the Project area, with discussion of the related implications on the stability of project components and sensitive land features, including: Thelon River crossing; other water crossings; and waste rock stockpiles, tailings management facility; and
- Uncertainties related to climate change predictions, and the related effect on other predictions in the EIS, including water quantity and permafrost thawing.

8.1.3 Noise and Vibration

8.1.3.1 Baseline Information

- Description of baseline noise levels in the Project area, including a discussion on variability, and if applicable, their relationship with local weather conditions, seasonal variations, etc.;
- Review of available studies/research the potential impacts of noise and vibrations on wildlife behaviours and health in both terrestrial and marine environments, with a focus on noise from similar mining and shipping operations, in comparable climate and geographical regions if possible. Emphasis should be placed on the identification of noise sensitive species, timing, and levels of noise; and
- Review of available studies/research on the potential impacts of noise and vibrations from blasting in or near freshwater and marine environments.

8.1.3.2 Impact Assessment

- Description of anticipated noise and vibration levels from all relevant Project equipment and activities;

- Discussion of the standards, guidelines, thresholds and regulations that the Proponent will comply with before, during and after operations to minimize and mitigate impacts associated with noise and vibrations;
- Potential increase to atmospheric noise levels from Project activities at different project stages, including those contributions arising from:
    - Ground transportation, including mine traffic and other access roads
    - Air transportation
    - Equipment use at mine and construction sites, including power generators
    - Mine site operation: blasting, drilling, crushing, screening, transport and stockpiling activities
- Potential changes in marine noise levels due to shipping activities, as well as noise propagation in the marine environment; and
- Potential impacts of noise and vibration on the following:
    - Humans in close proximity to noise generating sources
    - Terrestrial wildlife, with a focus on caribou and migratory birds
    - Marine mammals
    - Fish in fresh water and marine environments

8.1.4 Terrestrial Environment

8.1.4.1 Baseline information

- Description of existing unique or valuable landforms (e.g., eskers, fragile landscapes, wetlands), including details regarding their ecological functions and distribution in the LSA;
- Description of existing or proposed protected areas, special management areas, and conservation areas in the RSA;
- Discussion of the geomorphologic and topographic features at areas proposed for construction of major project components, including the type, thickness, and distribution of soils as applicable;
- Assessment of naturally occurring radiation levels in the environment and provide predicted changes to radiation levels as a result of the project;
- Description of the bedrock lithology, morphology, geomorphology and soils (including sediments and the thermal and ground ice conditions) at proposed borrow and quarry sites, and other areas where earthworks are proposed. If eskers are identified as a potential source of granular material then a description of granular material properties, including thermal condition and ice content, should also be described; and
- Discussion of the potential of geohazards, that may potentially affect the project or which occurrence may potentially be affected by the project (e.g., slumping, landslides, potential slippage, seismic hazards) at areas planned for Project facilities and infrastructure.

8.1.4.2 Impact Assessment

- Discussion of general impact on landforms in the LSA as a result of Project development, borrow resource extraction, with a focus on sensitive landforms, and those serving as important plant and wildlife habitat;
- Implications to the Project planning and design of baseline information related to terrain conditions, in particular permafrost, sensitive landforms, high ice-content soils, ice lenses, thaw-sensitive slopes, and talik zones;
- Potential impacts on the abundance and distribution of unique or valuable landforms (e.g., wetlands, eskers and fragile landscapes) from the Project;
- Discussion of the potential for shoreline erosion as a result of wake effects and increased open water due to potential ice breaking activities along proposed shipping routes;
- Discussion of the potential for soil erosion, including stream bank erosion, resulting from surface disturbances associated with the construction, operation, decommissioning and post-construction of Project components; and
- Discussion of the potential impacts to soil quality from compaction, the deposition of air emissions and airborne fugitive dust emissions and spills from the Project.

8.1.5 Permafrost and Ground Stability

8.1.5.1 Baseline information

- Discussion of the relationship between permafrost processes and active layer, surface waterbodies and topography;
- Details regarding the suitability of topsoil and overburden for use in the re-vegetation of surface-disturbed areas;
- Description of permafrost distribution in the LSA, including areas of discontinuous permafrost, high ice-content soils, ice lenses, thaw-sensitive slopes, and talik zones;
- Description of permafrost temperatures at areas planned for Project facilities and infrastructure, including discussion of sensitivity to climate change, and implications for stability and safety of infrastructures;
- Collection of site specific thermal properties such as thermal conductivity, heat capacity, and latent heat, etc. of permafrost soils and permafrost rocks; and
- Sites of paleontological or palaeobotanical significance within the LSA.

8.1.5.2 Impact Assessment

- Potential impacts on the stability of terrain, in particular the thermal stability, in the vicinity of facilities and infrastructure due to the thawing of the ice-rich permafrost soils and other sensitive landforms. Discussion should focus on the potential for impacts arising from surface disturbances due to construction (e.g. overburden stripping, mine pit creation, cuts/fills, excavation) of the facility and infrastructure;
- Assessment and prediction of permafrost behaviour (degradation and its rate) beneath the pits during mining and operation of the tailings management facilities. Long-term predictions of the thermal regime around the tailing management facilities should be

conducted with the consideration of climate change. Numerical modelling should be employed for both short term and long term predictions of permafrost evolution; and

- Discussion of the potential for the occurrence, frequency and distribution of terrain hazards, including snow drifts and snow banks, as a result of construction activities (e.g. cut/fill, extraction of construction materials).

8.1.6 Geology

8.1.6.1 Baseline Information

- Description of regional and local bedrock and quaternary geology. The history of the geological formations and the description of their physical chemical and hydrogeological properties should be given. For data obtained with in situ investigations, maps should be provided showing the location of the boreholes, with their positions relative to the planned project component;
- Description of structural geology, such as fractures and faults, at major project infrastructure areas and where earthworks are proposed (e.g. Kiggavik Mine site, Sissons Mine site, Baker Lake dock site, Storage Facility, etc.);
- Typical regional and local cross-sections of the general geology should be provided showing the geological units and their elevation, groundwater table, and linear geological structures;
- Description of the geiotechnical properties of bedrock and soil units, including ice content and thermal conditions of permafrost soils and rocks, as relating to slope stability, underground stability, and bearing capacity of facility foundations; and
- Acquisition of the in situ stress either with in situ investigation or from other sources with reasonable confidence.

8.1.6.2 Impact Assessment

- Potential geotechnical and geophysical hazards within the Project area, including potential seasonal subsidence, seismicity and faulting, risks associated with cut/fill slopes, underground excavation, and surface constructed facilities. Where appropriate, the assessment should be supplemented by analysis and illustrations such as maps, figures, cross sections and borehole logs;
- Potential effects on foundation stability of major Project components from geological fractures and faults, and associated implications of these features on project planning and engineering design. Those Project components assessed shall include, but are not limited to the docks facilities, major watercourse crossings, open pits, underground mine, and equipment pads; and
- Risk assessment and predictions, with proposed management measures.

8.1.7 Hydrology (including water quantity) and Hydrogeology

8.1.7.1 Baseline Information

- Description of hydrology of the LSA (e.g., streams, surface water flows, subsurface water movement, ice formation, and melt patterns);
- Description of relevant hydrological regimes, drainage basins, watershed boundaries and site water balance in the RSA;
- Description of natural fluctuations, variability, and sources of variability in flow rates, including seasonal fluctuations and year-to-year variability, and the interactions between surface water and groundwater flow systems;
- Description of the timing of freeze/thaw cycles, flood zones, ice cover (seasonal patterns and spatial variation), and ice conditions and typical thicknesses, formations and melt patterns;
- Description of hydrological characteristics of streams, rivers, and lakes in each watershed of the RSA. Items listed should be considered within the context of the range of climate conditions expected (include both climatic variability such as potential for extreme events, seasonal changes);
- A conceptual and numerical hydrogeologic model that discusses the hydrostratigraphy and groundwater flow systems should be presented;
- Characterization of faults and fractures within the mine area, including information about occurrence, hydraulic conductivity testing and interpretation should be presented;
- Description of interactions between permafrost, surface water and ground water, and topography, as well as rock fractures and talik zones between different surface/ground waters;
- Description of permafrost/talik distribution, permeability and hydraulic conductivity of the underlying materials; and
- Description of existing groundwater regimes, distribution characteristics and flow paths in the Project area, including any instances of frozen groundwater within/around the identified deposits.

8.1.7.2 Impact Assessment

- Discussion of the potential impact of variable and extreme stream-flows on Project design and planning, including proposed water crossings;
- Potential impacts to existing water sheds from surface water diversions required by mine site development and other Project components (e.g. waste rock stockpiles);
- Evaluation of storm water run-off throughout the Project area, with consideration for potential impacts to receiving waters (e.g. flow rates and flow patterns);
- Potential impacts to natural drainage patterns from the construction and operation of proposed mine facilities;
- Potential impacts on terrestrial and aquatic wildlife habitat resulting from the modification or redirection of natural flows;
- Potential for ice damming and resultant effects on other resources;

- Assessment of each water crossing and in-stream work, and potential impacts to the navigability and safety of the watercourses;
- Potential changes to permafrost and ground ice conditions as a result of Project activities, including an analysis of the potential for groundwater inflow into the open pit; and
- Potential changes to permafrost/talik distribution, groundwater distribution and flow paths.

8.1.8 Groundwater and Surface Water Quality

8.1.8.1 Baseline Information

- Identify all sources of drinking water (surface and groundwater), as well as water used for recreational purposes, within the area of influence of the project;
- Description of the natural hydrogeochemistry of groundwater system (pH, redox, total dissolved solids (TDS), isotopic composition);
- Description of the physical and chemical characteristics of groundwater and surface water in the LSA, with discussion of seasonal variations of water flow and quality. Chemical characteristics should include baseline levels of contaminants and radionuclides (i.e. U-238, Th-230, Ra-226, Rn-222, and Pb-210) and should be compared to relevant water standards/guidelines;
- Discussion of waters in the LSA of importance to local harvesting activities by surrounding communities;
- Description of lake bathymetry and limnology in the LSA; and
- Discussion of fluvial geomorphology and stability as related to proposed water crossings.

8.1.8.2 Impact Assessment

- Provide predicted increases in contaminants and radionuclides in groundwater and surface water as a result of the project, specifically identifying any water bodies used as drinking water sources or for recreational purposes;
- Potential impacts on groundwater quality and surface water quality in surrounding lakes and rivers from surface runoff and traffic on Project roads, and from dust from road traffic;
- Potential impacts on groundwater quality and surface water quality of lakes and rivers from discharges of Project wastewater treatment plants. A solute transport model based on numerical groundwater flow modelling should be used for water quality predictions;
- Potential impacts on groundwater quality and surface water quality from ARD and ML resulting from waste rock stockpiles, ore stockpiles, open pit dewatering, construction fills, embankment of roads, and open quarry sites;
- Potential impacts of faults on contaminant transport processes in subsurface and surface water quality;
- Potential impacts on surface water quality of nearby lakes and streams as a result of nutrient input from blasting activities;

- Potential for increases in suspended sediments in waterbodies as a result of construction and maintenance of the mine facilities, all-weather road and associated water crossings;
- Potential impacts on surface/ground water quality from runoff at fuel storage facilities, with consideration for possible fuel spills and malfunctions;
- Potential impacts on surface water quality from accidental spills of fuel and chemicals, or uranium concentrate along the ground transportation routes;
- Potential impacts on surface water quality from the deposition of particulate matter resulting from the incomplete combustion of wastes from incineration;
- Potential impacts on groundwater and surface water quality in relation to other site waste management activities, including: storage, handling, landfilling of waste; landfarming of contaminated ice, snow and/or soil; the management of historical contaminated material (e.g. previous spills, mishaps, releases, etc.), and sewage effluent discharges;
- Potential impacts on surface water quality from construction and operation of camps;
- Potential impacts of erosion associated with the all-weather road on surface water quality as a result of vegetation removal, cuts/fills and other surface disturbances; and
- Potential impact of ongoing exploration activities on surface water quality from drilling water withdrawals and returns.

8.1.9 Sediment Quality

8.1.9.1 Baseline Information

- Description of the physical and chemical characteristics (including radionuclides) of the sediment quality in the LSA, with discussion of seasonal variation; and
- Description of the sedimentation rates in lakes and rivers within the LSA.

8.1.9.2 Impact Assessment

- Potential impacts on sediment quality in surrounding lakes and rivers from surface runoff and traffic on Project roads and dust from road traffic;
- Potential impacts on sediment quality of lakes and rivers from discharges of Project wastewater treatment plants;
- Potential impacts on sediment quality from ARD and ML resulting from waste rock stockpiles, ore stockpiles, open pit dewatering, construction fills, embankment of roads, and open quarry sites;
- Potential impacts of erosion associated with the all-weather road on sediment quality as a result of vegetation removal, cuts/fills and other surface disturbances;
- Potential impacts on sediment quality of nearby lakes and streams as a result of nutrient input from blasting activities;
- Potential impacts on sediment from runoff at fuel storage facilities, with consideration for possible fuel spills and malfunctions;
- Potential impacts on sediment quality from the deposition of particulate matter resulting from the incomplete combustion of wastes from incineration;

- Potential impacts to sediment quality in relation to other site waste management activities, including: the storage, handling, landfilling of waste; landfarming of contaminated ice, snow and/or soil; the management of historical contaminated material (e.g. previous spills, mishaps, releases, etc.), and sewage effluent discharges; and
- Potential impacts on sediment quality from construction and operation of camps.

8.1.10 Freshwater Aquatic Environment

8.1.10.1 Baseline Information

- Description of the limnology, freshwater biota, presence of fish and other freshwater species (with emphasis on species that perform particularly significant ecological functions), associated habitats and habitat distribution in the RSA and the LSA. This description should be based on the results of baseline information collected from studies, available published information and/or information resulting from community consultation.
- Description of the biological composition of freshwater aquatic environments in the LSA, including: trophic state, periphyton, macrophytes, phytoplankton, zooplankton, benthic invertibrates, fish, and the interactions and relative significance of each trophic level identified in the food chain;
- Description and population distribution of fish species in the LSA with a focus on arctic char, and including the potential seasonal and annual trends in abundance and distribution of species, their migratory patterns, routes and preferred corridors, and the corresponding sensitive periods when routes include habitats potentially affected by the Project;
- Characterization of habitat requirements for each fish species, including areas used for spawning, rearing, feeding and over-wintering, and any sensitive times for these activities;
- Description of existing freshwater habitat in waterbodies and watercourses (including littoral zones, aquatic and riparian vegetation, lake bottom characteristics, fish overwintering areas, the estimated productive capacity, etc.) within the LSA;
- Description of the habitats and populations of any rare, or regionally unique fish species habitats of any rare or regionally or locally unique species, species designated in Species at Risk, species listed as vulnerable, endangered, or a species of special concern by COSEWIC; species with federal or territorial(e.g., vulnerable, threatened, endangered, extirpated, of special concern), and species of the great importance for Inuit life and culture;
- The health of fish VEC species populations and their contaminant loadings; and
- Discussion of any other issues relating to freshwater aquatic species or habitat identified through public consultation.

8.1.10.2 Impact Assessment

- Potential impacts to fish, invertebrates, aquatic macrophytes, and freshwater habitat including potential impacts to water and sediment quality. Consideration should be given to impacts associated with the following: water withdrawals; discharge; redirection of

natural flows; explosives use; nutrient and contaminant inputs; and sewage and grey water effluent discharge;

- Potential direct or indirect effects on fish and invertebrate biota and habitat of both, including aquatic species at risk, from any changes to the aquatic or riparian environments, as a result of any in-water works or Project activities in close proximity to waterbodies;
- Potential impacts to fish due to blasting in or near waterbodies, including noise and vibration impacts;
- Potential impacts to freshwater fish, invertebrates and habitat from planned containment structures (e.g., sediment control structures and fuel containment structures) and potential accidental spills;
- Potential impacts on identified fish habitat critical for spawning, rearing, nursery and feeding, seasonal migration, winter refuges and migrations corridors;
- Evaluation of the ability of fish to pass at water crossings along access roads and the Thelon River crossing;
- Potential impacts to fish health, distributions and populations especially taking in to consideration radioactive contamination and fugitive dust and potential impact to human health due to consumption of these fish; and
- Quantitative assessment of the ecological risks to freshwater VECs from the potential elevated contaminant loadings as a result of the Project.

8.1.11 Vegetation

8.1.11.1 Baseline Information

- Description of ecological zones, and other relevant classifications of plant associations and phenologies in the LSA;
- Description of the vegetation/plant types in the LSA, including estimated percentage cover and height for principal species, with a discussion on their particular significant ecological functions and/or their importance to wildlife and humans;
- Details regarding associations between vegetation cover types and soil types in the Project area;
- Description of rare or regionally unique plant species or species assemblages, including species with federal or territorial designated status (as designated by the COSEWIC and/or SARA);
- Discussion of the health status of plant species or communities in the LSA, including baseline information on contaminant levels (including metals and radionuclides) in representative species consumed by wildlife and/or humans, either directly (humans eating plants) or indirectly (humans consuming wildlife), and other vegetation that reflects sensitivity to contaminants or environmental pathways of exposure and biomagnification;
- Details regarding species that are culturally valuable to northerners;
- Any other issues related to vegetation and identified through public consultation; and
- Description of TK collected related to plants and plant use in the RSA.

8.1.11.2 Impact Assessment

- Potential impacts to abundance and diversity of vegetation due to Project activities causing surface disturbance;
- Potential impacts to specific vegetation coverage and species composition from construction, operation, and reclamation activities in the Project area;
- Assessment of the potential loss, disturbance, and/or changes to vegetation abundance, diversity, and forage quality as a result of Project components and activities, including potential effects from airborne fugitive dust fall, airborne contaminants from emission sources, and changes to water quality and quantity, permafrost, or snow accumulation;
- Potential impacts on vegetation abundance and diversity from the transfer/introduction of invasive or exotic species into the LSA via Project equipment and vehicles, including aircraft and marine vessels;
- Potential impacts to vegetation of cultural or practical value to Inuit;
- Potential direct and indirect loss of vegetation and associated habitat from construction of the all-weather road and the Thelon River crossing;
- Potential impacts on vegetation quality due to soil erosion, structural soil changes, soil contamination, and fugitive dust and gaseous air emissions from mining, milling and waste management activities;
- Discussion of proposed vegetation quality monitoring, specifically contaminant levels in species directly consumed by wildlife (e.g. lichen) and/or humans (e.g. lichen tea, blueberries) and/or indirectly consumed through food consumption (i.e. caribou) especially taking in to consideration radioactive contamination; and
- Discussion of the management measures for minimizing/mitigation of disturbances to plant associations, including progressive reclamation/re-vegetation plans for disturbed areas, and measures to reduce the potential for establishment of invasive species in the area.

8.1.12 Terrestrial Wildlife and Wildlife Habitat

8.1.12.1 Baseline Information

- Description of wildlife populations, distributions and ecologies in the RSA, with emphasis on identified wildlife VECs and species with special designation (e.g., Species at Risk and species listed as vulnerable or endangered by the COSEWIC). This description should include reference to the significance of ecological functions, and the importance for Inuit life and culture of wildlife VECs;
- Description of biodiversity within the RSA, and associated food chain relationships among terrestrial wildlife species, for example, there is an expectation that the potential for molybdenosis in wildlife sensitive to copper deficiency in northern environments such as muskox and caribou be addressed;
- Details regarding habitats within the LSA which are important for forage, shelter and reproduction of wildlife VECs, including terrestrial and aquatic habitats (e.g., sea ice, freshwater and marine waters);

- Identification of key wildlife habitats in the LSA and RSA as applicable, including: National Parks, Critical Wildlife Areas and other areas with legislated protection; eskers; caribou calving and nursing areas; denning sites; staging areas; and special locations as salt licks, insect relief habitats, and areas used by females and their young. Related discussion should also include migration routes, water course crossings, travel corridors and areas important for Inuit harvesting;
- Identification of habitats of any rare or sensitive species, such as Species at Risk, or those with similar designations or federal and territorial status;
- Description of historic and current seasonal/annual trends in range or habitat use, movements, and distribution of all identified terrestrial wildlife VECs, with reference to scientific reports and TK;
- Description of the migratory patterns and routes of terrestrial wildlife VECs and the corresponding periods when these routes would be affected by the Project;
- Discussion of the relative health of VEC populations, including contaminant loading in representative wildlife VEC species, for example caribou;
- Description of the distribution and population levels of caribou in the RSA and LSA. Consideration should be given to the cyclic nature of caribou, with baseline information collection covering appropriate temporal and spatial scales for an accurate understanding of current population health;
- Details regarding available information on potential impacts to wildlife associated with noise, vibrations, and dust and dust deposition from relevant scientific research and TK; and
- Discussion of other pertinent issues as identified through public consultation.

8.1.12.2 Impact Assessment

- Potential general impacts on terrestrial wildlife in the LSA, including: interference with migratory routes; alienation from important habitat (e.g., denning sites, calving and post-calving areas); and general disturbance or disruption caused by Project activities;
- Potential impacts on population size, abundance, distribution and behaviour of wildlife VECs from:
    - Direct and indirect loss of habitat from the presence of and use of infrastructure, the conduct of project activities and associated sensory disturbances
    - Direct and indirect impacts from potential degraded water quality and ground contamination, as well as airborne contaminants resulting from project facilities and associated activities
    - Direct and indirect impact from dust fall and accumulation on forage resulting from anthropogenic sources, and natural sources influenced by anthropogenic activities including effects of radioactive dust entering into the food chain and the transboundary dispersion as a result of migration
    - Direct and indirect impacts from potential ice-breaking associated with shipping and ice management at dock facility (with special attention to caribou migration, if applicable)
    - Direct and indirect impacts from climate change

- Potential impacts on wildlife from ground traffic and air traffic disturbance, particularly low level flights (i.e., lower than 610 metres) during critical periods (caribou calving and post-calving). For this impact assessment, a delineated Flight Impact Zone could be useful in determining the potential impact of flights on wildlife, with a particular focus on critical life cycle periods and planned air traffic volume and routes;
- Potential impacts on wildlife from injury or mortality caused by Project activities, particularly the use of the all-weather road, winter road, mine hauling roads and other access roads, as well as intentional killing of wildlife to defend human life or property by mine personnel;
- Potential impacts on wildlife from increased hunting pressure resulting from improved access due to Project infrastructure;
- Potential impacts of noise and vibration on wildlife from drilling, blasting and other activities as results of Project construction and operation;
- Assessment of the potential for Project activities to act as an attractant to wildlife species, and associated effect/changes to behaviour and condition;
- Evaluation of the potential for contaminants especially radioactive contamination to be released into the environment as a result of the Project and to be taken up by VEC species; and
- Evaluation of the relative health and potential for chemical or radiological toxicity for inherently sensitive wildlife species based on an analysis of exposure pathways and demographic parameters; for example consideration of arctic ground squirrels and their radiosensitivity as a hibernator, consideration of lemmings and their unique population cycles, consideration of susceptibility of ruminants to molybdenosis, etc.

8.1.13 Birds

8.1.13.1 Baseline Information

- An overview of bird species, populations, distributions and ecologies in the RSA, with emphasis on identified bird VECs and species with special designations by the COSEWIC. This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of bird VECs;
- Description of current habitat use by VECs, including the use of Migratory Bird Sanctuaries, Key Migratory Bird Sites, and other important habitats (e.g. breeding and nesting sites and staging areas) in the RSA and along the proposed shipping routes.
- Description of the relative seasonal/annual abundances, distributions and trends in range or habitat use, movements and population status of bird VECs;
- Description of migratory patterns and routes of VECs potentially impacted by the Project, with a discussion of corresponding sensitive periods; and
- Identification of key migratory bird sites and important bird areas along the shipping route, including those which could potentially be affected by marine spills as a result of current and/or wind patterns.

8.1.13.2 Impact Assessment

- Description of the potential loss, alteration or alienation of habitat (e.g. staging and nesting habitats) as results of Project development. Special consideration should be given to Species at Risk listed on Schedule 1 of the federal *Species at Risk Act* (SARA), species with designations by the COSEWIC, species having significant ecological functions, and /or of importance for Inuit life and culture;
- Potential disruption or alteration of migration routes due to the Project;
- Potential impacts on birds and bird habitat use from air contamination, ground contaminants or degraded water quality;
- Potential disturbances to birds from noise and vibrations as a result of blasting, and land and marine transportation;
- Potential impact from pre-determined Flight Impact Zones, and potential for collision with aircraft;
- Potential for Project facilities to attract wildlife such as grizzly bear, wolverine, foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations;
- Potential attraction of birds and other scavengers/predators by domestic waste at camp sites;
- Potential attraction of birds to Project facilities and infrastructure for roosting and nesting sites;
- Potential for bird mortality due to collisions with tall structures or overhead wires;
- Potential effects of shipping on coastal birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity of shipping routes in the NSA; and
- Potential impacts of toxins especially taking in to consideration radioactive contamination through the food chain.

8.1.14 Marine Environment

8.1.14.1 Baseline Information

- Description of marine physical processes and currents, biological diversity and composition, and associated interactions in the RSA, including the proposed shipping routes within the NSA;
- Presentation of available bathymetric information along the proposed shipping route through Hudson Bay and Hudson Strait, and along the Chesterfield Inlet;
- Description of ice climate in the RSA, including ice formation, thickness, ridging, break-up, and movement. Ice conditions along shipping routes should also be discussed using scientific studies as well as TK if possible, with consideration for predicted climate change and its possible effect on the timing of ice formation in the future;
- Identification of sensitive habitat areas for marine fish, anadromous fish and marine mammals along the shipping routes; and
- Presentation of TK collected related to coastal areas and ice conditions.

8.1.14.2 Impact Assessment

- Potential risks and impacts to the marine ecosystem through the introduction of exotic species, including pathogens, through year-round shipping with frequent voyages;
- Potential impacts on marine resources and habitat;
- Potential impacts to marine water quality due to changes in sediment transport regime as a result of wake effects from shipping and other undertakings;
- Potential impacts of propeller wash effects to the surficial sediment and seabed;
- Potential impacts on marine water quality from ballast water discharge within Canadian waters, in particular contaminated ballast water and/or other contaminants related to marine vessel operations and maintenance;
- Potential impacts on marine water quality from: accidental spills of fuel and chemicals or uranium concentrate along the shipping routes; and from the accidental grounding/stranding of marine vessels along the shipping routes;
- Potential impact on marine environment and bio-accumulation in marine food chains, in particular on benthic organisms, from antifouling toxins (e.g. tributyltin) leaching from marine vessels; and
- Potential impacts of climate change and sea level change on project elements

8.1.15 Marine Wildlife

8.1.15.1 Baseline Information

- Description of marine wildlife populations, distributions and ecologies in the RSA, with emphasis on identified marine wildlife VECs and species with special designations by the COSEWIC. This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of identified marine wildlife VECs;
- Characterization of marine mammal habitat in the LSA, including habitat used by VECs for feeding, calving, nursing, over-wintering, and other critical activities;
- Identification of habitats of any rare or sensitive species, such as Species at Risk, or those with similar designations or status, as well as species important for Inuit harvesting;
- Identification of marine mammals species, historical and current habitats distributions, seasonal migration patterns, critical areas (feeding area, calving areas, over winter areas, etc.), and potential interactions with shipping operation;
- Presentation of available published information and/or information resulting from TK studies regarding identified VECs, including: the relative seasonal and annual trends in abundance and distributions; the estimated productive capacity; migratory patterns and associated corridors/routes; critical habitats on or in proximity of shipping routes; and sensitive periods; and
- Description of the population health of identified VECs, with a discussion of contaminant loadings in representative species important to Inuit as a food source, such as seals and walrus.

8.1.15.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities, on marine wildlife. This analysis should include the following:

- Potential habitat loss or deterioration during critical lifecycle stages of marine wildlife VECs, including feeding, calving and nursing due to shipping routes. Special consideration should be given to Species at Risk, and species listed as endangered or threatened by the COSEWIC;
- Potential direct and indirect impacts to marine wildlife, marine fish and marine habitat from marine shipping activities including increased noise levels;
- Incidental spills, malfunctions and other accidents associated with shipping operations and potential impacts to marine wildlife, marine habitat and marine fish;
- Ballast water discharge, with discussion for the potential for discharge of contaminated ballast waters and related effects;
- Risk assessment of the potential introduction and intrusion of non-native, nuisance and exotic species due to ballast water discharge and ship wash;
- Potential interactions, accidental injuries and mortality of marine mammals directly or indirectly from proposed shipping (open water and potential ice breaking) activities, in particular those marine mammals, which congregate in Hudson Strait/Hudson Bay where shipping routes pass through;
- Potential direct and indirect effects on marine wildlife behaviour, distribution, abundance, migration patterns, species health and reproduction from marine shipping;
- Evaluation of the potential for contaminants (including uranium concentrate) to be released to the environment and taken up by VECs as a result of the Project; and
- Assessment of potential cumulative effects on marine wildlife VECs resulting from escalated marine traffic in the RSA over the mining lifecycle (and including the potentially extended mine operation period). Consideration should be given to the possible significant increase of marine vessel traffic along shipping routes.

8.2 SOCIO-ECONOMIC ENVIRONMENT

The Proponent shall present baseline information on the functioning and stability of the socio-economic environment in the RSA (see Section 7.1), with a corresponding impact assessment covering all Project phases of development (construction, operations, decommissioning and post-closure). The Proponent shall also describe the components of the socio-economic environment and the processes affecting them as they exist without the Project. This will serve as a baseline against which the potential changes and impacts of the Project can be measured and will also justify the Proponent's selection of VSECs and indicators.

The Proponent shall provide a clear rationale for its selection of communities, the public consultation carried out, and relevant reference studies and reports from which baseline data is collected. The Proponent shall describe the interactions between the socio-economic and biophysical environments, including the roles of the land- and wage-based economies and the

nature of the mixed economy of the North. This is not meant to suggest that the Proponent is responsible for the current socio-economic situation of the Kivalliq Region or of Nunavut, or that it is expected to resolve any problems that are identified. Nevertheless, a proper understanding of the structure and functioning of the potentially affected societies is needed in order to identify the potential of the Project to affect them, whether positively or negatively, and to ensure that any socio-economic mitigation measures put in place by the Proponent have a reasonable likelihood of attaining their objectives.

Whenever relevant and appropriate, data shall be disaggregated by age, gender, and ethnic affiliation. Socio-economic indicators are used to present baseline information and subsequently measure impacts related to the proposed project, those indicators selected must be adequate to address all types of foreseeable impacts, including cumulative and residual impacts. The EIS shall clearly identify and justify the Proponent's selection of indicators. Finally, the Proponent is expected to clearly identify limitations and knowledge gaps encountered in its efforts to collect the information required by the following sections of these Guidelines.

8.2.1 Population Demographics

8.2.1.1 Baseline Information

- Description of regional and local community populations, demographics structure, composition, characteristics and population trends;
- Description of cultural, ethnic, religious, and language characteristics and diversities in the RSA;
- Discussion of observed variations in education levels, dietary habits, religious characteristics and other social aspects in different demographics categories in the RSA; and
- Description of the social life of the potentially affected communities, households, family and community stability. Issues related to substance abuse, crime and violence, and other relevant social factors should also be presented.

8.2.1.2 Impact Assessment

- Potential for Project-induced demographic changes in population, migration, re-distribution and the effects of those changes, including interactions between local residents and non-residents;
- Potential effects on community and family stabilities, and culture integrity due to the demographic changes;
- Potential effects from various Project phases, including unemployment as a result of temporary suspension of operations or mine closure;
- Discussion of culturally-sensitive workforce management practices that will meet both the Project's immediate labour force needs as well as the region's longer-term economic development needs; and
- Potential effects on lifestyle, including the effects of a major employment base away from the communities.

8.2.2 Education and Training

8.2.2.1 Baseline Information

- Existing education system (secondary through post-secondary), available training programs for adults and youth, outlook and evolution trends;
- Local education infrastructure, capacity, funding resources, and administration system;
- Education and skill levels of the residents in the Project RSA, and experience of the local labour force in different demographic categories based on available data; and
- Requirements for education levels, skills and experiences of labour force from the Project in short, medium term and foreseeable future, taking account the vision of expansion for the Project lifespan, and regional economy development.

8.2.2.2 Impact Assessment

- Assessment of local labour force sources to satisfy the needs of the Project development at each phase, and identified gap between availability and project needs;
- Discussion of potential need of local labour force training to meet the needs of the Project. Those training can be specific required by the Project, or for universally applicable skills that improve workers' opportunities in other sectors of the economy, this assessment shall include predicted training resources to meet the designed training programs if applicable;
- Evaluation of training programs, if necessary and planned by the Proponent, associated challenges and likelihood of success to satisfy the Project needs and regional economy development with consideration of cultural and language barrier;
- Discussion of the potential for longer term community capacity building programs, if any of those program have been planned or will be planned and anticipated to be implemented by the Project, regarding how mine training plans can enhance the transferability of skills after the mine closure (e.g. management and HR skills, computer skills, heavy equipment experience, finance skills); and
- Discussion of other possible solutions to fill up the gap between requirements of project needs, and education level and qualifications of local labour force.

8.2.3 Livelihood and Food Security

8.2.3.1 Baseline Information

- Description of household social structures within the Project RSA, and where possible, the prevalent representative household social structure, including: the prevalent composition (family/kin-relations co-existing, generations in the household), the gender roles, the prevalent division of household labour based upon existing gender roles, the dominant consumption patterns, access to credit, and how resources are shared/divided within the household as well as how decisions are made in the household;
- Local household incomes, income sources, and compositions of income within the Project RSA;

- Local and regional economy characteristics in term of relation to traditional land use activities and wage incomes;
- Descriptions of the significance of, and level of dependence on country food as major nutrients sources by local residents within the Project RSA; and
- Use of caribou as a subsistence tradition, including harvesting, sustainable use of caribou, and the cultural and social activities specifically hunting, community feasts, making arts and crafts to maintain the people's traditional way of life.

8.2.3.2 Impact Assessment

- Effects of the Project on harvesting;
- Potential social-economic impacts from shipping, taking into account the impact on marine species on which local residents rely on as food sources;
- Potential effects to loss of traditional way of life from potential increased levels of contaminants in traditional foods; and
- Potential changes in the traditional way of life and household function due to employment at the mine.

8.2.4 Employment

8.2.4.1 Baseline Information

- The labour supply statistics in terms of relative genders, ages and other demographic categories;
- Existing local employment opportunities and labour supply status; and
- Expectations and perceptions to the employment at the Project by the residents in the Project RSA.

8.2.4.2 Impact Assessment

- Assessment of the potential for development of local labour force;
- Estimation of the number of jobs to be created directly and indirectly by the Project, with consideration of local business and supplying contracting;
- Discussion of the requirements for employment (e.g., education levels, criminal records, drug and alcohol policies, language abilities), and the potentials of needs to be met by local recruitment, as well as the extent to which the skills of the available workers match job requirements;
- Assessment of opportunities afforded to women;
- Discussion of the commuting arrangements for local hired workers, especially those who live in the communities without proposed direct air transport to mine sites and how the Proponent plans to support the fly-in/fly-out workforce with in-community liaison workers;
- Evaluation of the possible effect of changes in income earnings on patterns of savings, expenditure and consumption values;
- Assessment of the barriers and incentives to healthy financial management; and

- Evaluation of the effects of competition for labour between the Project and existing businesses, institutions, and traditional activities.

8.2.5 Economic Development and Self-reliance

8.2.5.1 Baseline Information

- The traditional economy, current economic structure and development trends in the Project RSA and variability in potential impacted communities as well as in Nunavut;
- The economic development levels in the Project RSA comparing to other regions in Nunavut, advantages and constraints of economy development;
- The roles of renewable resources exploit (e.g. subsistence and commercial hunting and fishing) plays in economy and its significance for local economy; and
- Community and resident self-reliance.

8.2.5.2 Impact Assessment

- Positive and negative impact on the local economy from regional level and community level as well as the implications of the Project on economic diversity;
- Stimulation to local businesses which developed for the Project and depend on the operation of the Project;
- Potential impact on the traditional economic activities including hunting, fishing and sport hunting /guiding, etc;
- Potential impact on the tourism from mine development which impairs the "wilderness experience" of tourism in the Project region;
- Potential impacts related to accessibility and removal of barriers for traveling, fishing, hunting/trapping and other activities by local communities as a result of construction and operation of the all-weather road;
- Disruption to ice travel routes caused by shipping through land fast ice and development of new near and distant cracks; and
- Potential impacts on local and regional economy due to temporary closure, final closure.

8.2.6 Community Infrastructure and Public Services

8.2.6.1 Baseline Information

- Description of current conditions of local housing and other infrastructure, and capacity in the RSA;
- Description of existing public services and associated community facilities in the RSA, including law enforcement, health care (including emergency response), dependency assistance, welfare utilities, temporary accommodation and food services;
- Description of existing outpost camps and other facilities outside of municipal boundaries which facilitate harvesting and recreation activities in the LSA, particularly within proximity of the Project;

- Description of the extent and current capacity of the local transportation systems and associated infrastructure; and
- Discussion of demand for community infrastructure and public services from the Project directly and indirectly.

8.2.6.2 Impact Assessment

- Assessment of incremental costs imposed by the needs from the Project directly or in directly on public infrastructure and services;
- Evaluation of the effect on services and/or infrastructure in public and private sectors, due to the potential use by the Project directly or indirectly;
- Assessment of public health and environmental health needs and implications to the Proponent's community initiatives;
- An assessment of potential increased demand for health care system, including standard medical system, emergency response and emergency medical care, medivac and other emergencies, as well as challenges brought by the increased demand;
- A discussion of the potential to bring in freight for communities by return shipping, and likelihood to share shipping costs with local communities, which will likely reduce the life expenditure of local communities;
- Discussion of building new and updating the existing structures (e.g. weather shields, outposts) beyond of communities on hunting/traveling routes, and/or at hunting grounds to facilitate local hunting activities/traveling in Project areas; and
- A discussion of community access to Project infrastructure upon closure, including the all-weather road.

8.2.7 Contracting and Business Opportunities

8.2.7.1 Baseline Information

- Most up-to-date statistics and data relating to contracting and business opportunities from socio-economic studies of communities in the Project RSA;
- estimates of goods supply, including country food supply for Inuit workers at mine, procurement, services contracting, and other business opportunities in the Project RSA from the Project; and
- The economy structure and characteristics of local and regional economy, existing business types, scales of the different sectors of economy, and potential capacities to meet the needs from the Project.

8.2.7.2 Impact Assessment

- Assessment of both negative and beneficial economic effects from the Project's contracting and business opportunities through Project lifespan;
- Opportunities for local, regional, and territorial businesses to supply goods and services both directly to the Project, and indirectly to meet the demand created by the expenditure of new income by employment in the Project;

- Assessment of the Project effects on other local and regional economic sectors, in particular the competition to other business' needs due to limited capacity of local business;
- Assessment of the contributions made to public, communities and Inuit from the Project;
- Assessment of the of project-related procurement, and potential the capacity to meet the Project needs;
- Discussion on barriers to local business capacity building;
- Assessment of existing country food supply sources from the Project region and Nunavut, and opportunities to supply for Inuit worker in Project;
- Assessment of opportunities for local communities to diversify their economic sources and to supply new goods and services to meet the need from the Project; and
- Potential impacts on local businesses and services, which developed for the Project and depend on the operation of the Project after temporary suspend and final closure.

8.2.8 Land Use

8.2.8.1 Baseline Information:

- Provide an overview of local and regional land use activities in the LSA, including national parks and similar areas, as well as areas potentially impacted by shipping activities;
- Description of current and traditional land use areas and the importance of those areas to Inuit culture and social well beings;
- Description of known land use activities and relation to the local economy, self-reliance, food supplies and livelihood; and
- Description of identified and anticipated overlapping zones and/or areas where the land use activities co-exist or interact with Project components and activities.

8.2.8.2 Impact Assessment

- Discussion of anticipated interactions between project development and land use activities by local residents in the Project RSA, in particular at mine site, all-weather road and shipping routes;
- Potential impacts related to accessibilities to areas for hunting, fishing, marine harvesting, traveling, recreational and religious activities as results of the Project development;
- Potential effects on sustainable resources use, such as country food availability, accessibility of carving stones; traditional clothing in context of general impacts to wildlife and substantive harvesting, taking into account the CEA through the entire lifespan of the Project;
- Potential impact on cultural and traditional values, traditional lifestyles and heritage coherence in the potentially affected communities, which are closely related to land use activities, taking into account the changes to economy structure, shift of consumption fashions, alteration of diet habit, and other social aspects;

- Impacts to users of ice travel routes, including safety concerns as a result of new cracks caused by shipping through ice;
- Discussion on the potential changes to the aesthetics of the natural environment, resulting from Project components and activities; and
- Discussions of the conflict and possible solutions between the need of economic development and traditional land use activities in the project region, taking consideration of governments' role to deal with the issue.

8.2.9 Benefits, Royalty and Taxation

8.2.9.1 Impact Assessment

- Evaluation of the positive impacts from increasing revenues accruing through taxes to governments, royalties and benefit to potentially impacted communities as results of the Project;
- An estimate, of how much fuel is expected to be sourced from Government of Nunavut or from outside sources;
- Scope, progress, and potential success of the development of an IIBA with the Kivalliq Inuit Association (KIA), with a discussion of considerations made for all potentially impacted communities in IIBA negotiations;
- The Proponent shall provide a summary of the draft IIBA exclusive of the financial commitments being negotiated;
- The Proponent shall demonstrate a clear understanding of the opportunities the Project presents to Nunavut communities, as well as undertake a thorough review of options for partnership with the Government of Nunavut, including the two-way negotiation of a Development Partnership Agreement as a way to maximize the benefits of the Project; and
- Any issues related to compensation required as a result of the Project.

8.2.10 Governance and Leadership

8.2.10.1 Baseline Information

- A description of current social and governmental regime in the Project region, structure and functions of the governments, Inuit organizations, other co-management organizations and interactions among those organizations;
- A description of the Proponent's understanding on the roles of governments play in the process of the Project development, and associated requirements and obligations for proponents by policies and regulations;
- A description of the roles of the various parties in socio-economic monitoring programs and the Kivalliq Socio-Economic Monitoring Committee;
- The leadership of GN in policies making responsibilities on contracting, operation and management of community infrastructure, community and regional development planning; mechanism, processes and structures for conflict resolution; and

- Other social and economic responsibilities of governments in the Project impacted regions.

8.2.10.2 Impact Assessment

- Discussion of how the Project planning meets the needs of regional economy development strategic plan (community wellness initiatives, Hamlet programs, housing etc.), if applicable, which are managed by Federal and territorial governments agencies, and Inuit organizations;
- Assessment of how potential conflict of interest will be managed in current governance regime during Project development; and
- Discussion of efforts to be made by the Proponent within existing regulatory framework and government's initiatives, in terms of socio-economic monitoring, education and skill training, community facility development and other initiatives planned by the Proponent.

8.2.11 Human Health and Well-being

8.2.11.1 Baseline Information

- Description of the current status of human health in the RSA, including mental, and psychological health and well-being and identify vulnerable sub-groups where applicable;
- Description of nutritional requirements of residents in the RSA along with quantitative information on the diet habits of residents, including consideration of details such as the seasonal, sex and age-related consumption of country foods;
- Description of the existing infrastructure and health services available within the RSA; and
- Discussion relating to the local health statistics when compared with other parts of Nunavut and Canada as appropriate.

8.2.11.2 Impact Assessment

- Discussion of the standards, guidelines and regulations that the Project will incorporate during construction and operations, at various project sites to minimize the impacts and protect workers' health;
- Assessment of the health, safety and security of workers at the job sites taking into account different project phases and locations (e.g. explosive manufacturing plant, drilling and blasting operation, and heavy equipment operations);
- Potential impacts on human health from air contamination, fugitive dusts resulting from air and ground traffic, potential impacts to potable water quality, and exposure to escalated noise and extreme weather conditions;
- Potential impacts on human health from soil ingestion associated with traditional lifestyles where large amounts of country foods are consumed, and from bioaccumulation and take-up of contaminants associated with changes to the level of contaminants loadings in country foods (i.e., wildlife and vegetation consumed by humans);

- Potential sources and characteristics of any conventional risks to workers or the public during all phases of the project;
- Predicted radiation exposures (radiation doses) to workers and the public during all phases of the project;
- Potential impacts of workplace discipline and cultural conflicts among Nunavummiut and Southern workers;
- Potential impacts on human health and wellbeing within the RSA resulting from potential indirect effects of the Project (e.g. substance abuse, family violence, sexually transmitted infections and other communicable diseases and gambling);
- Potential impacts on community safety and security with consideration for a potential influx of Project personnel into local communities during the life of the Project; and
- Potential impacts to community well-being in the RSA.

8.2.12 Non-traditional Land and Resource Use

Protected areas, visual and aesthetic resources

8.2.13 Cultural, Archaeological and Palaeontological Resources

8.2.13.1 Baseline Information

- Summary description of known archaeological/paleontological, burial, cultural and historic, sacred and spiritual sites within the LSA, based on TK and scientific baseline studies. Each site shall be described on a map with a corresponding scale; large scale maps should be sent to the Government of Nunavut, Department of Culture, Language, Elders and Youth upon request, to assist in its review;
- Description of regulatory requirements and procedures for recovery and removal of artifacts and/or fossils in areas of proposed development; and
- Description of the relationship between cultural sites and social lives of local communities in the LSA.

8.2.13.2 Impact Assessment

- Potential impacts to archaeological and paleontological resources (e.g. burial sites, sacred sites), and other cultural sites within the LSA from development of the Project infrastructure in particular in proximity to the all-weather road, Kiggavik mine site, Sissons mine site and the site haul road between Sissons and Kiggavik;
- Potential impacts on paleontological/archaeological resources from increased Project activity in the area associated with mine including ground and marine transportations and ongoing exploration as well as non-mine related activities;
- Potential impacts to archaeological resources as a result of borrow pit and quarry construction and operation, as well as construction and use of access roads. Discussion of how considerations for potential impacts have been incorporated in the road routing and design should also be presented;

- Potential impacts on cultural well-being, religious and spiritual activities which are related to cultural and historic, sacred and spiritual sites; and
- Identify the potential effects to the heritage values of the Thelon River, designated as a Canadian Heritage River, with regard to the proposed northern all-weather access route including how these values will be protected.

8.3 HUMAN HEALTH AND ENVIRONMENTAL RISK ASSESSMENT

Key components of the Human Health Risk Assessment process include the identification of potential project-human interactions (pathways), radiological and hazardous substance constituents of potential concern (COPC), human receptors and assessment criteria. As such, the Human Health Risk Assessment is to include:

- Predicted sources, quantities and points of release from the project emissions and effluents containing nuclear and hazardous substances;
- Selection process for COPCs;
- Identification of pathways to human receptors;
- Identification and characterization of human receptors (workers and the public);
- Method used to convert radionuclide and hazardous substance exposure and intake by the various human receptors from the various pathways into an exposure or dose (e.g. conversion factors); and
- Criteria used to determine significance of impact (e.g. percentage of radiation dose limits, exposure relative to lifetime cancer risk limit).

Key components of the Environmental Risk Assessment process include the identification of potential project and terrestrial and aquatic receptor interactions (pathways), radiological and hazardous substance COPCs, terrestrial and aquatic ecological receptors and assessment criteria. As such, the Environmental Risk Assessment is to include:

- Predicted sources, quantities and points of release from the project emissions and effluents containing nuclear and hazardous substances;
- Selection process for COPCs;
- Identification of pathways to terrestrial and aquatic ecological receptors (valued ecosystem components);
- Identification and characterization of terrestrial and aquatic ecological receptors;
- Method used to convert radionuclide and hazardous substance exposure and intake by the various ecological receptors from the various pathways into an exposure or dose (e.g. conversion factors); and
- Criteria used to determine significance of impact (e.g. toxicity reference values, radiation dose limit).

8.4 ACCIDENT AND MALFUNCTIONS ASSESSMENT

An assessment must be described for malfunction and accident scenarios that have a reasonable probability of occurring. The assessment is to include:

- A description of the source, quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical, chemical and radiological) likely to be released to the surrounding environment during the postulated malfunctions and accidents; and
- A description of any contingency, clean-up or restoration work in the surrounding environment that would be required during, or immediately following, the postulated malfunction and accident scenarios.

The assessment for conventional malfunctions and accidents should include fire and explosion incident and demonstrate that the conventional malfunctions and accidents are unlikely to cause long-term or residual effects both to persons and the environment, taking into account the proposed mitigation measures including preventive measures and emergency response capability.

9.0 ENVIRONMENTAL MANAGEMENT SYSTEM

9.1 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) provides a systematic approach to consistently manage all environmental affairs for the Proponent, addressing concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, with an aim to improving its environmental performance by continual improvement of the management system. The Proponent shall present its environmental policy, its preliminary EMP and associated environmental management system through which it will deliver this plan. The EMP shall provide a perspective on how potentially adverse environmental effects will be managed throughout the life of the Project.

The Proponent shall discuss the flexibility of the proposed EMP to respond to changes in the mining development plan, the regulatory regime, the biophysical and socio-economic environments, technology, research results, and the understanding of TK. It shall discuss how the results from the EMP will be used in applying adaptive environmental management throughout all phases of the Project, and identify threshold/criteria and indicators to trigger management actions in each sub plan.

The EMP shall be comprised of individual monitoring and mitigation plans, specific to various aspects, components, activities and phases of the Project. Although the information requirements of the following sections are intended to be as comprehensive as possible, it is recognized that various items may be dependent on the Proponent's development plans for the project, which will continue to be refined throughout the NIRB's review process. While some information required under these plans might not be available for the Proponent's *Draft* EIS submission, the Proponent shall include a scheduled timeline relating to stages of the NIRB's review process or the later licensing/regulatory processes when this information will become available (i.e., Technical Meeting, *Final* EIS, Final Hearing, and Water Licensing).

In its individual monitoring and mitigation plans, the Proponent shall also assess the likely effectiveness of mitigation measures and associated follow-up mechanisms for adaptive management. The Proponent shall provide a risk assessment of those economic (e.g., the global

economy and international markets), or other conditions (e.g. ownership transfer) that might also impair the implementation or effectiveness of proposed mitigation measures or management.

9.2 ENVIRONMENTAL PROTECTION PLAN

The Proponent shall, based on its impact predictions for identified VECs and VSECs, prepare an Environmental Protection Plan (EPP) in accordance with its EMP for major aspects of construction and operations, prior to the commencement of construction. The EPP shall be integrated into construction and operation procedure documents which target the site management staff, the Proponent's occupational health, safety and environmental compliance staff, as well as government departments and agencies tasked with environmental and regulatory compliance monitoring/surveillance. If appropriate, a table of contents and an annotated outline for the EPP is to be presented in the EIS which shall address the major construction and operational activities, permit requirements, mitigation measures and contingency planning in combination with other management plans.

9.3 MONITORING AND MITIGATION PLANS

In accordance with the EMP, the Proponent shall present individual monitoring and mitigation plans, specific to various aspects of the Project and the environment, to be incorporated into all applicable phases of the Project. In these plans, the Proponent is required to outline how results from monitoring will be used to refine or modify the design and implementation of mitigation measures and management plans.

These plans will also help the Proponent ensure that the Project is conducted as proposed, the predicted adverse environmental effects are promptly mitigated at the earliest possible time, and that the conditions set at the time of the Project's authorization and the requirements pertaining to the relevant laws and regulations are met. The plans will also make it possible to ensure the proper operation of works, equipment, and facilities connected to the Project. If necessary, the plans will help reorient the work and possibly make improvements at the time of construction and implementation of the various elements of the Project.

In its monitoring and mitigation plans, the Proponent should specify proposed criteria or thresholds to trigger the mitigation measures based on its monitoring results, including the position of the person for the implementation of these mitigation measures, the system of accountability and the phase and component of the Project to which the mitigation measure would be applied.

Each of the monitoring and mitigation plans shall include:

- Objectives of the monitoring program, applicable laws, regulations and/or Acts;
- The VECs and VSECs to be monitored, with associated parameters and indicators, and selection criteria/thresholds to be compliant with;
- Monitoring of the performance of the tailings management facilities, i.e. tailings physical, geochemical and geotechnical parameters/characteristics;

- Description of the frequency, duration, and geographic extent of monitoring with justification for each, and identification of the personnel who will conduct the monitoring, collect, analyze and interpret data;
- Description of measures taken to protect the monitoring infrastructure from changes due to climate changes, and potential major changes in climate (e.g. extreme flows);
- Proposed actions in the event that observed results (impacts) differ from those predicted, including a discussion of actions to be taken for observed non-compliance with the law or regulations, performance targets or with the obligations imposed on contractors by the environmental provisions of their contracts;
- Proposed reporting scheme for monitoring results, including format, reporting intervals, and responsible territorial and federal authorities;
- Evaluation of the efficiency of mitigation measures, and the compliance with Project authorizations;
- Plans for integration of monitoring results with other aspects of the Project including, adjustments for operating procedures and refinement of mitigation measures;
- Procedures/mechanism to assess the effectiveness of monitoring programs, mitigation measures, and adaptive programs for areas disturbed by the Project;
- Discussion of the relationship between monitoring plans and the EMP; and
- Quality assurance and quality control measures to be applied to monitoring programs.

9.4 BIOPHYSICAL ENVIRONMENTAL MANAGEMENT PLANS

The Proponent shall present environmental management plans developed to eliminate or mitigate potential negative impacts of the Project on the biophysical environment as identified in Section 8.1. The Proponent shall also identify any residual effects after appropriate mitigation measures are implemented. These management plans shall target identified VECs.

9.4.1 Risk Management and Emergency Response Plan

The Proponent should provide an assessment of the potential risks from natural hazards, in both marine and terrestrial environments. This plan should encompass the whole life of the mine to mitigate the potential ecological and human health risks. The Proponent should identify and describe the likelihood of possible malfunctions and accidents occurring independently of, or associated with natural hazards.

The Proponent should develop an emergency response plan, supported by appropriate manual emergency response capabilities, that can be applied to deal with the range of emergency situations considered reasonable in the circumstances. These can include conventional emergency incidents or radiological-based incidents. Initiating events can include non-nuclear situations and also involve conditions external to the facility.

The following issues should be included in the Risk Management and Emergency Response Plan:

- Assessment of potential natural hazards in the LSA and shipping corridors, including frequency, magnitude and possibilities of occurrence. Natural hazards to be considered should include extreme weather events, natural seismic events, landslides, and flooding;
- Analysis of the potential for malfunctions and accidents associated with Project facilities and activities, including land or ice based, air and marine transportation, occurring independent of, or associated with natural hazards;
- Assessment of fire risk to evaluate potential fire hazards, as well as the fire protection systems and features (including both physical attributes and program elements) used to mitigate the effects of fire;
- Alerting, notification and reporting procedures, and associated responsible organizations and personnel;
- Contingency responding procedures corresponding to each risk, and associated security systems and prevention measures, such as monitoring systems, hazard and leak detection systems, fire-control systems, and standby emergency systems;
- Discussion of options for the medical transport of injured staff or persons both within and beyond the Project area;
- Discussion of the constraints resulting from logistics and time frames for prompt reaction, with consideration for the potential distance to an accident or emergency site, and possible weather conditions which might cause considerable delays or obstacles;
- Description of how relevant government agencies, Inuit organizations and local communities will be involved in the development of the plans if applicable; and
- Any other contemplated loss prevention practices, including insurance.

9.4.2 Spill Contingency Plans

The Proponent shall develop Spill Contingency Plans based on its Environmental Policy, to promote environmental awareness and safety, as well as to facilitate efficient clean-up for potential spill incidents related to the Project. These plans should include Land and Ice Based Spill Contingency Plans, Oil Handling Facility Contingency Plan and Shipboard Oil Pollution Emergency Plans. In each plan, the Proponent should address potential constraints due to logistics and weather conditions for timely actions and immediate clean-ups. When developing these plans, the following elements should be included:

a. Land and Ice Based Spill Contingency Plan
   - Requirements of federal and territorial regulations;
   - Substances covered by the plan (e.g. oil, hazardous materials, chemicals and other deleterious substances), and potential spill scenarios (on land, water and ice if applicable);
   - Training for emergency response staff, including distributing Material Safety Data Sheets (MSDS) to designated emergency response and health centre staff;
   - Alerting, notification and reporting procedures;
   - Duties and responsibilities of key spill response organizations and personnel;

- Clean-up strategies, technologies and corresponding inventory of spill response equipment and kits based on different substances of spills and environment conditions where spills might occur; and
- Spill site restoration and remediation.

b. Oil Handling Facility (OHF) Contingency Plan
   - Regulatory requirements of the *Canada Shipping Act*;
   - Established Oil Pollution Prevention/Emergency Plan for operation of OHF;
   - Responsible personnel required equipment and training; and
   - Response scenarios and procedures.

c. Shipboard Oil Pollution Emergency Plans (SOPEPs)
   - Requirements of National laws and regulations, as well as international regulations and standards for proposed shipping operation of the Project;
   - Marine transportation to be used for the Project including fuel tankers, container ships, barges, tugs, and any other marine vessels ;
   - Discussion regarding the relationship between SOPEPs and the Canadian Coast Guard's Regional Response Plan, including identification of potential for the Regional Response Plan to be adapted to the Project;
   - Procedures for accident/incident reporting and principle emergency response; and
   - Parties (e.g., the Proponent, marine vessel operators and possible third parties) who carry out emergency actions.

9.4.3 Air Quality Monitoring and Management Plan

The Proponent shall develop an Air Quality Monitoring and Management Plan, which is associated with the baseline date and impact assessment and predictions in Subsection 8.1.1. This plan should include the following key elements:

- Description of proposed air quality monitoring and related adaptive management measures for emissions related to the Project, including thresholds for action and mitigation strategies. Emissions of air contaminants include radon-222, airborne dust TSP, PM_{10} and $PM_{2.5}$, radioactive constituents, and/or metals, GHG emissions, and standard air contaminants such as SO_2, NO_x, CO_2, hydrocarbons, etc.;
- An emissions reduction strategy, through which the Proponent would employ appropriate technologies and operating practices, in an effort to minimize emissions of air contaminants including , comply with approved criteria, and reduce production of GHGs;
- A dust reduction plan which addresses the use of dust suppression agents, procedures and applicable guidelines for all Project areas where fugitive dust is a concern for air quality and human health;
- An incineration management plan, as described in Subsection 9.4.7, describing how emissions will be minimized and the *Canada-wide Standards for Dioxins and Furans* and the *Canada-wide Standards for Mercury emissions* met; and
- Procedures for reporting of monitoring results.

9.4.4 Noise Abatement Plan

The Proponent shall develop a Noise Abatement Plan to provide information on monitoring and mitigating of noise impacts based on its impact assessment in Subsection 8.1.3. This plan should discuss:

- Applicable standards, guidelines and regulations that will be incorporated to minimize and mitigate noise effects from the Project;
- An environmental noise follow-up monitoring program indicating location, duration, timing and type of noise monitoring to be conducted;
- Description of noise control methods based on the climatic conditions and available technologies to be employed should mitigation be required;
- Description of noise attenuation and minimization measures to be employed through choosing appropriate equipment, installation of noise silencing devices, scheduling of take-off and landing aircrafts, and blasting timing; and
- Occupational related noise management programs.

9.4.5 Site Water Management Plan

The Proponent shall develop a Site Water Management Plan for the Project. This Plan should provide a consolidated source of information on the strategies to be applied to intercept, collect, contain, conserve, monitor and prevent the release of potentially contaminated waters. This plan should be associated with the baseline data and impact assessment required by Subsection 8.1.7, and should consider the following:

- Surface runoff, snowmelt, and rainwater that might come in contact with contaminated areas at the mine sites, along the access road and at Baker Lake;
- Runoff from overburden stockpiles, waste rock stockpile areas, special waste rock stockpile areas (identified as ARD and ML potential), ore stockpiles and quarry sites;
- Runoff from the lined fuel tank farms, fuel transfer stations, landfill facility and landfarm facility;
- Monitoring of tailings groundwater; and
- Management measures to reduce potential impacts to the receiving environment, including collection and monitoring of drainage water, installation of settling ponds/sumps and/or silt curtains, and geochemical characterization of construction materials.

9.4.6 Sewage/Grey Water Management Plan

The Proponent shall develop a Sewage/Grey Water Management Plan with consideration for the following:

- Sewage/grey water treatment technologies and facilities, and estimated volumes and treatment targets of the effluent, as well as the applicable discharge standards including standards under the *Fisheries Act*;

- Sewage/grey management in the construction stage at construction camps, including treatment/disposal methods, associated facilities;
- Conceptual operation and maintenance plans, including options for sewage sludge; and
- Contingency measures for sewage plant malfunction and/or disturbances, associated spill response measures, as well as treatment technologies and facilities.

9.4.7 Incineration Management Plan

The Proponent shall develop an Incineration Management Plan which is consistent with the guidance provided in the Environment Canada's *Technical Document for Batch Waste Incineration*. The Plan should include but not be limited to the following:

- Standards/requirements for emissions from incinerator operation;
- An inventory of domestic waste to be incinerated, including both land-based and onboard generated waste;
- Incineration technologies to be used, facilities and applicable standards;
- Disposal of incineration ash;
- Personnel training programs for incinerator management and operation; and
- Collection and reporting of operational data and maintenance records.

9.4.8 Waste Rock Management Plan

The Proponent shall present a Waste Rock Management Plan which should encompass all wastes generated or produced by the Project through all Project phases. This plan should be associated with the description of waste management facilities in Subsection 6.6.10, and should include:

- An inventory of waste rock, including overburden, clean waste rock, special waste rock, subeconomic/low grade mineralized material, processing wastes and excavated materials generated during construction of the mines, access roads and other infrastructure;
- Stockpile design, locations and capacities, with reference to the estimate of waste rock volume/tonnage and associated physiochemical character. Details related to waste rock segregation criteria, stockpile methods and procedures, runoff management, and plans for progressive reclamation should also be presented;
- Details regarding the process for selecting the preferred options for management of waste rock, including a discussion of alternative options (methodologies as well as locations) considered, and the rationale by which the proposed scheme was selected;
- Technically achievable measures to accommodate the projected volumes of material;
- Contingency plans for the proposed control measures should it be found the capacity is inadequate; and
- Conceptual plan to monitor and audit mine waste rock.

9.4.9 Hazardous Materials Management Plan

The Proponent shall develop a Hazardous Materials Management Plan. This plan should be developed in connection with the Emergency Response and Contingency Plan, and include the following:

- Hazardous materials discussed should include: radiological waste, fuel and lubricants, process reagents, chemical reagents used for site laboratory, solvents and paints, medical wastes, batteries, and other office-generated hazardous waste;
- Inventory of the types and volumes of hazardous wastes generated or produced by Project activities;
- Characterization of potential environmental hazards posed by these materials, and the management of these through the environmental management system;
- Description of characteristics of nuclear substances and radiation devices to be stored at the facility and the location of these materials in the facility;
- Purchasing controls, shipment tracking procedures;
- Fuel storage monitoring program;
- Safe handling and storage procedures;
- Discussion of the allocation of responsibilities for managing shipments, storage, handling and use of potentially hazardous materials;
- Methods for transport, storage, handling, and use;
- Identification of disposal methods for potentially hazardous waste generated;
- Contingency and emergency response plans associated with hazardous materials;
- Type and delivery of training for management, workers, and contractors whose responsibilities include handling potentially hazardous materials;
- Procedures for the maintenance and review of records of hazardous material consumption and incidents in order to anticipate and avoid impacts on human health and the environment;
- Plans for unused chemicals and/or reagents upon the completion of Project activities; and
- Procedures to track and manage wastes generated through use of these products, including regular shipments of potentially hazardous waste to licensed disposal facilities.

9.4.10 Explosives Management Plan

The Proponent shall develop an Explosives Management Plan which should provide information on explosives transport, storage and handling at the Project. This plan should discuss the following:

- Applicable federal and territorial Regulations and Acts;
- Methods and procedures for the manufacture, transport, storage, handling, and use of explosives;
- Details on the manufacture and storage facilities for Ammonium Nitrate and Fuel Oil (ANFO), including:

    - Maximum quantity of explosives at each facility
    - Specified location (i.e., detailed site plan), with distances to vulnerable features to demonstrate that safety distances required by the Explosives Regulatory Division of Natural Resources Canada (NRCan) have been considered and met
    - Details on any temporary explosives facilities
    - Liquid effluent disposal plans
- Best practices to minimise usage and loss rate;
- Spill response measures;
- Personnel training program; and
- Internal audit and inspection.

9.4.11 Landfill Management Plan

The Proponent shall develop a Landfill Management Plan which discusses how non-combustible, non-hazardous industrial wastes will be handled in a safe and environmentally sound manner. This plan should include:

- Inventory of the types and volumes of non-combustible, non-hazardous industrial wastes to be generated and landfilled over the life of the Project;
- Landfill design including construction materials, locations and capacities;
- Management plans for operations;
- Rainwater, snow and spring freshet management plans; and
- Final reclamation plans.

9.4.12 Landfarm Management Plan

The Proponent shall develop a Landfarm Management Plan which discusses how hydrocarbon contaminated ice, snow and/or soil wastes will be handled in a safe and environmentally sound manner. This plan should include:

- Inventory of the types and volumes of hydrocarbon contaminated wastes to be generated and landfarmed over the life of the Project;
- Landfarm design including locations and capacities;
- Management plans for operations;
- Rainwater, snow and spring freshet management plans; and
- Final reclamation plans.

9.4.13 Borrow Pits and Quarry Management Plan

The Proponent shall develop a Borrow Pits and Quarry Management Plan which should include the following:

- Regulations and guidelines to be complied with;

- A description of how the Proponent will minimize the overall impact on surrounding environments by maximizing the use of existing pits and quarry sites to the extent possible, to minimize the number of opened pits, and minimizing haul distances and surface disturbance;
- Erosion prevention and control measures;
- Results of ARD potential testing for quarried materials and pit walls, and associated mitigation measures;
- Aggregate extraction and quarry methods, with associated mitigation measures for potential impacts on the environment, including archaeological resources and wildlife;
- Proposed methods for handling ice, with plans to manage water released by the thawing of permafrost and ground ice; and
- Progressive reclamation strategy and associated technologies.

9.4.14 Aquatic Ecosystem Management Plan

The Proponent shall develop an Aquatic Ecosystem Management Plan to address mitigation measures to be implemented to protect and minimize the impacts on aquatic system from any and all project activities occurred in or near and water courses during construction, operation, closure and reclamation phases. This plan should include:

- Erosion and sediment control measures for works in or near waterbodies and water courses;
- Measures to be applied to protect fish, aquatic biota, and the habitat of both during blasting in or near freshwater and marine environments; and
- Monitoring and reporting protocols.

9.4.15 Shipping Management Plan

The Proponent shall present a Shipping Management Plan for all Project-related shipping, in connection with the SOPEPs (Subsection 9.4.2), the Wildlife Mitigation and Monitoring Plan, and other related plans as applicable. This plan should include the following:

- Applicable legislation, regulations, Acts and guidelines;
- Discussion of shipping operations associated with mine developments in the area, with a focus on any applicable lessons learned, and implications to the proposed shipping for the Project, if any;
- Protocols for the transport of fuel and other dangerous goods;
- Ballast water management plan;
- Onboard waste management plan (including solid waste, sewage, and other domestic waste);
- Marine wildlife mitigation and onboard monitoring plans, including:
    - Applicable guidelines, monitoring protocols, and reporting/action procedures
    - Qualifications and training plans for marine mammal monitors

    - Measures to minimize the potential interactions between marine mammals and marine vessels
    - Description of how interactions between marine mammals and shipping operations will be dealt with
- Smuggling prevention measures;
- Identified third party liabilities;
- Contingency plans for accidental spills of fuel and chemicals, extreme weather conditions, and malfunctions during shipping operations, with reporting/action procedures. This should include a discussion of the preparedness of adequate resources to respond to a large fuel spill from a cargo vessel in transit, with reference to the SOPEPs;
- Measures to mitigate potential impacts to the safety of persons traveling by snow mobiles, sledges, and boats along Project shipping routes; and
- Measures intended to mitigate potential socio-economic impacts as results of shipping.

9.4.16 Wildlife Mitigation and Monitoring Plan

The Proponent shall develop a Wildlife Mitigation and Monitoring Plan in consultation with Government of Nunavut, Department of Environment (GN-DoE), Fisheries and Oceans Canada (DFO), Environment Canada (EC), and other relevant agencies or organizations. This plan should include appropriate mitigation and monitoring for selected terrestrial and marine species, with consideration for potential impacts identified in the relevant subsections of the EIS. This plan also should include the following:

- Description of the LSA and the RSA for wildlife mitigation and monitoring programs;
- Selection criteria and rationales for wildlife species selected for monitoring and mitigation;
- Description of how TK collected by the Proponent has been integrated into baseline data collection, impact predictions and significance determinations, and the development of mitigation and monitoring programs;
- Details regarding plans for involvement of local hunters in wildlife baseline studies and monitoring program if applicable, including the mechanisms and resources allocated for local participation;
- Plans for coordinating wildlife studies/monitoring activities with other organizations, institutions, government departments and individual researchers conducting wildlife studies in the RSA, to minimize the impacts on wildlife from studies/survey activities;
- Discussion of how terrestrial wildlife surveys, particularly low elevation caribou surveys, and monitoring protocols (including data confidentiality) will be designed to mitigate potential impacts on terrestrial mammals, in particular caribou;
- Description of monitoring study design and field methods, including indicators to be measured, sampling frequency and methods, timing, spatial extent, and Universal Transverse Mercator (UTM) coordinates of transect lines if applicable, for each wildlife species to be monitored;

- Description of how indicators, sampling design, methodology and analysis will be appropriate and adequate to detect spatial and temporal project-related impacts on wildlife and provide statistically rigorous tests of impact predictions presented in the EIS;
- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of marine mammals due to shipping or potential ice breaking activities;
- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of terrestrial wildlife due to Project activities, including measures to prevent wildlife from entering pit areas;
- Measures to minimize noise disturbance to wildlife and hunters/travellers when conducting aerial wildlife surveys;
- Plans to facilitate the safe passage of wildlife across the all-weather access road and/or winter road, and associated mitigation measures to prevent collisions with wildlife;
- Description of data analysis methods, triggers/thresholds for adaptive management plans, and proposed mitigation measures;
- Mechanism for the evaluation of effectiveness of mitigation measures;
- Quality assurance and quality control measures; and
- Reporting and the plan updating procedures.

9.4.17 Fish Habitat No Net Loss Plan

The Proponent shall present a No Net Loss Plan to discuss measures to be implemented for compensation of the loss of aquatic habitat. This plan should include the principle of No Net Loss for fish habitat, policies for the Management of fish habitat (DFO, 1991), habitat replacement options where appropriate, monitoring programs and compensation plans developed in consultation with DFO and KIA. This plan should discuss the following:

- Requirements of related DFO policies;
- The estimate of total fish habitat loss and methods used for estimations;
- Compensation plans to achieve "No Net Loss" of fish habitat productive capacity; and
- Details regarding the proposed compensation program, including locations and conceptual designs for implementation (e.g., rearing habitat, migration channels, etc.).

9.4.18 Roads Management Plan

The Proponent shall develop a Roads Management Plan for all access road/service roads proposed in the Project areas, covering construction, operation and reclamation phases of the Project. In association with the Spill Contingency Plan and the Wildlife Mitigation and Monitoring Plan, this plan shall include the following:

- General company policies for private roads and roads accessible for public;
- Speed limits of various types of roads;
- Operational procedures for dust suppression, snow removal and snow drift management, control of surface runoff including spring freshet and flooding, and sediment control measures during maintenance and operation;

- Discussion of public access and related management, associated mitigation or safety measures if relevant;
- Mitigation measures and protocols to be implemented during construction and operations to mitigate potential impacts to wildlife, including collisions and follow-up procedures;
- Safety procedures, emergency reporting and procedures for fuel/chemical spills, and other emergency events; and
- Plans for closure and reclamation, including a discussion of potential future uses (e.g., potential public use).

9.5 SOCIO-ECONOMIC ENVIRONMENTAL MANAGEMENT PLANS

The Proponent shall present plans, policies and programs to minimize potential negative socio-economic effects and to optimize the potential positive effects of the Project. These Socio-Economic Environmental Management Plans shall correspond to the socio-economic impacts assessment described in Section 8.2. Also these monitoring plans should be developed to reflect the complete life span of the Project, and contain appropriate monitoring and evaluation techniques (e.g., indicators) that will allow regulators to intervene in a timely and constructive manner.

In this section, the Proponent shall describe its socio-economic monitoring plans and mitigation programs, including how they will identify, react and mitigate potentially adverse socio-economic impacts and augment positive socio-economic impacts. In consultation with the Kivalliq Regional Socio-Economic Monitoring Committee (SEMC), the Proponent should clearly identify the role it will take in regional monitoring initiatives, including how its monitoring plans will align with those of the regional SEMC.

The general areas that shall be considered by the Proponent's socio-economic monitoring include human resources, occupational health and safety, community and public involvement, implementation of benefits agreements (IIBA), and if applicable, development partnership agreements. The Proponent shall outline how the predominant regional language/dialect in the RSA will be incorporated into each respective plan. The management plans shall include, but are not limited the following individual plans:

9.5.1 Occupational Health and Safety Plan

The Proponent shall present an Occupational Health and Safety Plan focusing on the following elements in conjunction with its Spill Contingency Plan, Risk Management Plan, Noise Abatement Plan, and any other relevant plans:

- An overview of the occupational health and safety programs (including radiation protection) for the activities and works being proposed;
- Policies and guidelines regarding interaction with Nunavut's medical health system including the provision of relevant health and safety information regarding hazardous materials to the appropriate health centers;
- Best safety practices and safety awareness programs;

- Employee involvement and related training programs for ensuring awareness of employee responsibilities in environmental and health and safety management, including roles pertaining to safety orientation, hazard analysis, first-aid training, etc.;
- Risk management and safety management Details regarding the preparedness of mine safety equipment and devices;
- Procedures for emergency incidence reporting and actions;
- Details regarding workplace monitoring and control; and
- First aid training and occupational medical surveillance.

9.5.2 Community Involvement Plan

The Proponent shall present a Community Involvement Plan which discusses the following:

- Mechanisms for providing information to the public and potentially affected communities regarding regular updates of Project's progress, initiatives and future work plans (e.g. training opportunities, hiring information, etc.);
- Methods and procedures for establishing effective two-way communications for collecting and addressing public concerns;
- Methods by which to evaluate public engagement efforts in order to identify the effectiveness of the plan;
- Measures to assist communities with addressing potential social needs and problems related to the Project, including proposed counselling services for employees and their families regarding matters such as substance abuse, work-related stress management, family support, etc.;
- Approach to promoting the participation of Nunavummiut in Project employment, including any preferential recruitment policies or practices;
- Plans for promoting local contracting opportunities and purchasing of local products (e.g., country foods);
- Discussion of how input from communities has influenced the design and implementation of monitoring plans and initiatives; and
- Discussion of procedures for community-based monitoring of social, cultural, and ecological conditions to determine if, when, and how the Project contributes to community sustainable development.

9.5.3 Cultural and Heritage Resources Protection Plan

The Proponent shall present a Cultural and Heritage Resources Protection Plan which includes the following:

- Applicable regulations and guidelines for management of potential impacts to identified cultural and heritage resources;
- Discussion on how the heritage values of the Thelon River, designated as a Canadian Heritage River, will be protected if the northern all-weather access route is selected;
- Results of archaeological investigations and studies;

- Inventory of known archaeological resources in Project areas;
- Discussion of how the results from the Proponent's impact assessment have been considered and incorporated into the plan; and
- General and site-specific measures for the protection of archaeological sites and mitigation of potential adverse impacts.

9.5.4 Human Resources Plan

The Proponent shall develop a Human Resource Plan. This plan should include the following:

- Applicable human resources legislation and the Proponent's policies regarding compensation and benefit programs (e.g., health care plan, insurance, vacation/maternity leave, etc.);
- Recruitment strategies with communities that includes regular information updates regarding employment/training opportunities, hiring plans and time schedules, etc.;
- Include a strategy discussing how to overcome potential entry barriers, education and training programs both for Project specific and universally applicable skills (e.g., partnerships with local schools and other educational institutions, on-the-job learning, and apprenticeships);
- Education and Orientation Plan to assist employees to understand their responsibilities in environmental protection and health and safety management;
- Worker rotation and pay schedules, health and safety programs, preferential recruitment policy, gender equality, skills and entry requirements, training and career development;
- Discussion of how the planned work schedules that are adapted to traditional activities, whether the Proponent will provide no-cost commuting to allow workers to continue to live in their own communities and to participate in their traditional economic and cultural activities;
- Considerations of the following issues: on-site public safety and well-being; cross-cultural orientation; firearms control; sexual and gender harassment; alcohol and drugs control measures; and supply of country food to Inuit workers at the mine site;
- Recognition and management plans regarding the rights and needs of hunting activities and traveling through Project areas by the residents from adjacent communities;
- Strategies for communicating relevant information of IIBA terms and conditions to employees;
- Policies and regulations regarding hunting and fishing by non-Inuit employees, while respecting the rights and needs of Inuit employees to harvest and pursue traditional activities, with a discussion of how such policies or regulations were designed to manage potential impacts to fisheries or wildlife resources; and
- Discussion of any proposed policies or regulations regarding the prohibition of recreational hunting, fishing and other related activities by employees at specific locations and timing in Project area.

9.6 MINE CLOSURE AND RECLAMATION PLAN

The Proponent shall develop a preliminary Mine Closure and Reclamation Plan for the Project which outlines how the various components set out in Section 6.0 will be closed and reclaimed following mine closure. The plan can be preliminary with key issues addressed for the Environmental Assessment in the NIRB's Review, and Nunavut Water Board (NWB) Type A water license application, with the following targets:

- To ensure that issues associated with the effective closure and reclamation of all Project components are considered at the earliest possible stage in the mine development process, thereby influencing mine design to take into account environmental issues related to mine closure and reclamation.
- To establish goals for reclamation of lands potentially affected by the Project;
- Description of reclamation methods, time frames and schedules, including proposed progressive reclamation, research programs, and notice periods to employees and public;
- Description of temporary closure measures and a discussion of at what point a temporary closure should be considered permanent for the purposes of requiring implementation of the Mine Closure and Reclamation Plan;
- Discussion of research programs to address challenges to reclamation, given the local conditions;
- Considerations for the protection of public health and safety;
- Description of closure and post-closure monitoring of environmental components including, but not limited to, wildlife, vegetation, air quality, landform stability and water quality;
- Discussion on the long-term monitoring and maintenance that may be required once physical and chemical stability of reclaimed areas have been established;
- Discussion on reduction or elimination of environmental effects once the mine ceases operation;
- Discussion regarding re-establish conditions that permit the land to return to a similar pre-mining land use;
- Considerations for ARD and/or ML potential of rocks and tailings, in association with related waste rock and tailings management strategies;
- Any considerations for the restoration the natural aesthetics of the project; and
- The Plan is considered to be a "living" document; the level of detail should undergo further revision to reflect the progress of the Project as well as changes in technology and/or standards or legislation. Future revisions should also consider input from consultations with communities and other stakeholders on methods to be used, and potential uses for project infrastructure, etc.

9.7 FOLLOW-UP AND ADAPTIVE MANAGEMENT PLANS

A follow-up plan is a formal, ongoing process to: verify the accuracy of the environmental impact predicted in the EA and permitting stage of the Project, and to determine the effectiveness of proposed mitigation measures. If either of these two steps identifies unusual and unforeseen

adverse environmental effects, then the existing mitigation measures must be adjusted, or if necessary, an adaptive plan with new mitigation or compensation measures must be developed, in particular the areas where scientific uncertainty exists in the prediction of adverse effects. In order to offset the likelihood of mitigation failure and the potential severity of the consequences, the Proponent shall formulate a process through which the information related to effectiveness of mitigation measures is analyzed, and associated adaptive measures be employed in the environmental management system:

- The need for such a follow-up and adaptive plan and its objectives;
- How this plan will be structured including, enforcement and penalties for non-compliance;
- Which elements of the monitoring program described in Section 9.3, would be incorporated;
- The mechanisms, through which monitoring results will be analysed, and if necessary, adjusted mitigation measures or adaptive plan will be employed. In addition, how the effectiveness of the new mitigation measure will be assessed and verified;
- The roles to be played by the Proponent, regulatory agencies, and others in such a plan, and possible involvement of independent researchers; and
- The sources of funding for the plan and reporting.

9.8 SIGNIFICANCE OF RESIDUAL IMPACTS

After having established the mitigation measures, the EIS shall present the residual effects assessment of the Project on the components of the biophysical and human environments, so that the reader can clearly understand the real consequences of the Project, the degree of mitigation of the effects and which effects cannot be mitigated or compensated for.

The Proponent should include a summary table in this section of its EIS, which presents the effects before and after mitigation on the various components of the environment, the mitigation measures applied and the residual effects have been assessed.

The determination of significance of residual impact shall take into account the attributes of each impact in accordance with the criteria established in Section 7.11.

10.0 CONCLUSION

The EIS should end with a conclusion presenting a summary analysis of the overall projected biophysical and socio-economic impacts, anticipated transboundary and cumulative effects, proposed mitigation measures, and residual impacts. While highlighting the impacts in the Kivalliq Region, this conclusion should clearly present the importance of the EIS findings to the NSA and Canada.

11.0 LIST OF CONSULTANTS AND ORGANIZATIONS

The Proponent shall prepare a list of all the consultants who contributed to the preparation of the EIS, including their role and contact information in an appendix to the EIS. In addition, the

Proponent shall prepare a list of the organizations consulted, including the time, place, and purpose of the consultation; reference materials provided, and contact information for the organisation.

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APPENDIX A

NUNAVUT IMPACT REVIEW BOARD'S 10 MINIMUM EIS REQUIREMENTS

The following are the minimum required elements for an Environmental Impact Statement required under a Part 5 Review:

1. Statement of Consultation Principles and Practices

The Proponent must conduct pre-Project consultations with locally affected persons. Where at all possible, information about the Project must be distributed, and comments collected with a view to resolving any differences. Discussions should include, but not be limited to, land uses, policies, resource uses, Archaeological areas, infrastructure, and terrain sensitivities. Inuit cultural concerns must be highlighted throughout. The Proponent shall explain where, how, why, and with whom it conducted public consultation, and shall demonstrate an understanding of the rights, interests, values, aspirations, and concerns of the potentially affected communities All comments from the public must be summarized, documented, and presented in the EIS.

2. Definition of Project

A definition of the Project must include a discussion of any connected or subsequently related projects in order to reveal the primary purpose and better understand complex or multi-staged related proposals.

3. Statement of Project's Purpose

Based on the concepts of the Precautionary Principle and Sustainable Development, an EIS must contain a statement explaining the need for, and the purpose of the Project. Where further economic development is needed for a given area, the Board expects the deficiencies in the economic status quo to be stated.

4. Anticipated Impacts Analysis

A comprehensive impact assessment must be carried out which includes, but is not limited to, environmental effects that are likely to result from the Project in combination with other projects or activities that have been, or will be, carried out. Anticipated impacts include short and long-term, direct and indirect, positive and negative, cumulative, socio-economic, archaeological and cultural impacts. This element of the EIS must include a mitigation analysis that explains how the impacts could be avoided, minimized, cured, eliminated, or compensated.

5. Cumulative Effects Analysis (CEA)

Cumulative Effects must be analyzed for all Part 5 Reviews. A project proposal causes a Cumulative Effect if, when added to other projects in the region, or projects reasonably foreseeable in the region, will cause an additive effect. A comprehensive examination of all Cumulative Effects must be included in an EIS.

6. Significant Effects Analysis

The Board must be advised of the significant impacts of the Project. This should be based upon:

a. the Project setting, taking into account the location's unique ecosystemic characteristics, and

b. the severity of the impacts, taking into account, but not limited to public health, land use plans, protected areas, habitat, or species, public concern, etc.

Ultimately, the Board will decide which effects are significant and report to the Minister accordingly.

7. Project Alternatives

This requirement includes, but goes well beyond, alternative means of carrying out the Project that might be economically and technically feasible and the environmental effects of those alternative means. This assessment must include the "no-go" or "no-build" alternative, as well as the "preferred" alternative. The "no-go" alternative is not only a potentially stand-alone option; it also serves as a baseline for comparison with other development alternatives that might reasonably be proposed in the circumstances.

8. Sustainability Analysis

The EIS must contain an analysis of the ability of renewable resources affected by the Project to sustain current and future generations in Nunavut and Canada.

9. Monitoring or Post-Project Analysis (PPA)

The purposes of a PPA are to:

a. measure the relevant effects of projects on the ecosystemic and socio-economic environments of the Nunavut Settlement Area;

b. determine whether and to what extent the land or resource use in question is carried out within the predetermined terms and conditions;

c. provide the information base necessary for agencies to enforce terms and conditions of land or resource use approvals; and

d. assess the accuracy of the predictions contained in the project impact statements.

10. Trans-Boundary Effects Analysis

Where relevant, an EIS must include an assessment of all significant adverse ecosystemic or socio-economic trans-boundary effects.

**It is important to note that Section 12.5.2(j) of the NLCA gives the NIRB the authority to add other requirements as deemed necessary. The NIRB will always review each project proposal on a case-by-case basis, including instructions from the Minister, and may add other requirements as per s. 12.5.2 and 12.5.5 of the NLCA.

APPENDIX B

FINAL SCOPE OF THE NIRB'S ASSESSMENT OF THE KIGGAVIK PROJECT PROPOSAL (FEBRUARY 9, 2011)

The process of "scoping" seeks to identify the physical works and activities proposed for the project and the factors to be considered in assessing the effects of the project, in the context of appropriate spatial and temporal scales throughout all project stages including preconstruction, construction, operation, modification/maintenance, decommissioning, abandonment and restoration. The Nunavut Impact Review Board (NIRB or Board) solicits advice from the public and interested parties when identifying the Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent's Environmental Impact Statement (EIS).

The scope of the NIRB's assessment of the Kiggavik project proposal is based on the requirements of Sections 12.5.2 (items a – j) of the Nunavut Land Claims Agreement (NLCA), the NIRB's 10 Minimum EIS Requirements, and the project proposal submitted by AREVA Resources Canada Inc. (AREVA) on November 25, 2008.

1) Project description, including the purpose and need for the project

The scope of the development under review includes the physical works and activities or undertakings that constitute the Kiggavik project proposal, as filed with the NIRB on November 25, 2008 by the Proponent.

Project Proposal Summary

The Kiggavik project is a proposed uranium ore mining and milling operation located in the Kivalliq Region, approximately 80 kilometres (km) west of Baker Lake. According to the project proposal, the Kiggavik project is estimated to contain geological resources representing approximately 52,000 tonnes uranium (U) with a grade of approximately 0.23% U.

The proposed project includes three main geographical areas incorporated in the Kiggavik project: the Kiggavik site, the Sissons site and the Baker Lake dock site. The main base of operations will be the Kiggavik site, which would include open pit mining, power generation, ore processing, warehousing, administration and personnel accommodation. The proposed activities at the Sissons site are expected to include open pit mining, underground mining and the ancillary activities required to support these mining operations at the Sissons site. The dock at Baker Lake would serve as a transfer and storage facility for materials and supplies en route to Kiggavik and/or as a transfer and storage facility for uranium concentrate product (or more commonly known as yellowcake) to be shipped south.

The proposed project involves the development of five individual mines, three open pit mines (East Zone, Center Zone and Main Zone) at the Kiggavik site and both an open pit mine (Andrew Lake) and an underground mine (End Grid) at the Sissons site. Reagents, fuel and supplies would be barged to a storage facility near Baker Lake and transported to Kiggavik via truck on a 90-100 km access road. Uranium ore concentrate, commonly referred to as

yellowcake, may be transported by air or it may be transported by barge during the open water season to southern Canada.

The proposed operational mine life is approximately 17 years, with a 3 year pre-operational construction phase and a post-operational decommissioning period of approximately 5 years. However, the potential development of additional deposits in the proposed project area could extend the operating life of the project.

Project Components

a. Kiggavik Mine Site

Activities: The main base of the operations would be at the Kiggavik site, which is proposed to include open pit mining, power generation, ore processing, warehousing, administration and personnel accommodations. Mining and ore stockpiling at the Kiggavik site would begin as early as possibly in the project schedule, while the mill start-up will be delayed until the first of the two tailings facilities is available. The three proposed open pits at Kiggavik would be mined using conventional drilling and blasting techniques, with ore and waste rock removal using mechanical excavators and trucks. Special waste would be segregated and temporarily stored during operation in a stockpile adjacent to the clean waste. During decommissioning, the special waste would be co-disposed with the tailings in the mined-out pits. Ore mined at Kiggavik and Sissons would be processed at the Kiggavik site and the uranium product extracted, commonly referred to as yellowcake, would be transported via truck to the Baker Lake port, barged to Churchill, and then sent by rail to southern Canada and/or the yellowcake could be transported directly via air to southern Canada.

Facilities (during operation): Three open pit mines (East Zone, Center Zone, Main Zone); explosives storage; waste rock and special waste management facilities; ore storage pads; haul roads; mill facility; water treatment facilities; wastewater and sewage treatment facilities; water storage facility; tailings management facilities (*in-pit disposal concept)*; pit dewatering structures; solid waste management facilities (including incinerators, landfill, hazardous material storage, etc.); contaminated soil remediation (soil farm/landfarm) facilities; power house and fuel storage; aerodrome; warehouse; main maintenance shop; main administration complex; dry facilities and the accommodation complex.

b. Sissons Mine Site

Activities: The Sissons site would be located approximately 17 km southwest of the Kiggavik site. Two mines are currently planned at the Sissons site; the Andrew Lake open pit and the End Grid underground mine. Ore mined at Sissons would be hauled to the Kiggavik mill for processing. The Andrew Lake deposit occurs under the northern edge of Andrew Lake and at this time there are two proposed options for obtaining the ore. The first option is to dewater a portion of the lake by constructing a dyke across the lake. The second option proposed is to dewater all off Andrew Lake. The Andrew Lake open pit would be mined using similar techniques as for the Kiggavik open pit mines.

For the End Grid underground mine, underhand drift-and-fill method would be used to access the ore. Mine wastes and special wastes would be managed at the Sissons site.

Facilities (during operation): Open pit mine (Andrew Lake); open pit mine dyke; underground mine (End Grid); pit dewatering structures; satellite explosives storage; waste rock and special waste management facilities; water treatment plant; ore pad; backfill plant; fuel storage; solid waste management facilities (including landfills); contaminated soil remediation (soil farm/landfarm) facilities; satellite maintenance shop; satellite administration offices and dry facilities.

c. Baker Lake Dock Site and Storage Facility

Activities: The proposed location of dock site and storage facility would be dependent on the road option selected for access to the Kiggavik site. A wharf would allow for the docking of two barges at a suitable location from the shore. Fuel would be offloaded to the tank farm via a pipeline constructed on the dock. The proposed Baker Lake storage facility would be used to store fuel, containers, supplies and other materials until they are brought to the Kiggavik site. In addition, yellowcake may be transported to the Baker Lake storage facility from the Kiggavik site and stored at the storage facility until shipped back with the returning barges. Supplies and fuel would be trucked to the Kiggavik site depending on the road option selected.

Facilities (during operation): Wharf; fuel storage/tank farm; storage facility (including yellowcake storage facility), warehouse and laydown area; and satellite administration and community liaison office; ancillary equipment required to transfer and transport fuel and materials (i.e., fuel pipelines, cranes and mobile equipment, etc.), and yellowcake.

d. Road Transportation connecting Baker Lake to the Kiggavik area

A 90 – 100 km access road from Baker Lake to the Kiggavik area is proposed for the transportation of supplies and yellowcake. Currently, there is a winter trail that connects Baker Lake to the Kiggavik area; however construction and maintenance of a more substantial access road would be required. Several options for this access road are being considered and they include a winter road option and two all-weather road options.

i) Winter Road Option

Activities: The proposed winter access route would pass over approximately 50% ice while the remainder is overland. The road would be re-constructed every year by clearing the overland portions and flooding the over-ice portions. Trucks would travel in convoys for safety at a maximum speed of 30 kilometres/hour (km/h).

Facilities: Heated refuge stations along route.

ii) All-Weather Road Options

Activities: The project proposal includes two all-weather route options, a north route and a south route. The proposed north all-weather route follows alongside an existing

ATV trial north of Baker Lake and crosses the Thelon River. Two possible methods of crossing the river have currently been identified: a bridge option and a cable-ferry/ice bridge option. The bridge option would allow the road to remain open year round.

The proposed south all-weather route would begin on the south shore of Baker Lake and continue west to the Kiggavik site.

Regardless of the all-weather route option selected, the road would be based on a fill-only approach, which means that a fill base of suitable thickness is laid down to protect the permafrost.

Facilities: Borrow sources along the route(s); heated refuge stations; 435 metres long bridge with 5 spans (north route only) with four piers in the river.

e. Mobilization and Shipping

Activities: The required fuel, reagents and supplies for the Kiggavik project would be brought in via marine shipping and/or via rail. Fuel and supplies would be brought via ocean-going vessels or via rail to Churchill, Manitoba. Tug-barge vessels or ferries would then be used to transport the supplies and fuel from Churchill to the Baker Lake storage facility. From Baker Lake, trucks would then bring the supplies and fuel to the Kiggavik site using the proposed winter road or the all-weather road. Chesterfield Inlet would also be investigated as a potential transfer site to possibly replace, or supplement the transfer of supplies at Churchill.

In addition, two possibilities have been proposed for the transportation of the yellowcake from Kiggavik to southern Canada. 1) Direct air transport from Kiggavik to Churchill, or to Points North, Saskatchewan. The yellowcake would then be transported via rail (Churchill) or truck (Points North) to southern Canada. 2) Truck transport to Baker Lake and shipped with returning barges to Churchill. The yellowcake would then be transported via rail to its final destination.

The proposed marine transportation for the project has two primary segments that need to be considered. The first is the marine shipment via ocean-going vessel through Hudson Strait and Hudson Bay to Churchill (or Chesterfield Inlet). The second is marine shipment via tug-barge from Churchill (or Chesterfield Inlet) to Baker Lake.

Facilities: Existing facilities at Churchill (or Chesterfield Inlet); tug – barge fleet; Baker Lake dock and storage facility (see above); and access road from Baker Lake to Kiggavik (see above).

f. Air Transportation

Activities: A 2000 metre airstrip is proposed for the Kiggavik site to facilitate the transportation of employees, perishable goods and potentially yellowcake. The airstrip would have capacity to land Hercules aircraft (or similar) and Boeing 737-200 type planes. Part of the workforce required would be brought in on a 7 to 14 day work

schedule from the Kivalliq region communities. Approximately 5 trips per week would be required to fly out the yellowcake containers.

Facilities: Single storey shelter/air terminal; airstrip; all associated navigational aids and infrastructure.

g. Site Haul Road between Kiggavik and Sissons

Activities: An approximately 20 kilometre haul road would be constructed between the Sissons deposit and the Kiggavik site. Ore haulage trucks with a maximum gross weight of 250 tonnes would be used on this road to haul ore from Sissons to the Kiggavik site.

2) Anticipated ecosystemic and socio-economic impacts of the project

The assessment of the potential for ecosystemic and socio-economic impacts caused by the proposed project components and activities in the above section and extending through all the project phases should refer to the environmental and socio-economic factors listed below. The scoping of potential impacts caused by the project components, activities and undertakings to environmental and socio-economic factors shall take into account the appropriate temporal boundaries and spatial boundaries and is expected to draw upon relevant information from scientific sources and traditional knowledge.

- **a. Air Quality**
- **b. Climate (**including climate change) **and Meteorology**
- **c. Noise and Vibration**
- **d. Terrestrial Environment,** including
  - i) Terrestrial ecology
  - ii) Geomorphology and soils
- **e. Permafrost and Ground Stability**
- **f. Geology**
- **g. Hydrology** (including water quantity) **and hydrogeology**
- **h. Groundwater and Surface Water Quality**
- **i. Sediment Quality**
- **j. Freshwater Aquatic Environment**, including
  - i) Aquatic ecology
  - ii) Sediment quality
  - iii) Aquatic biota including fish as defined in the *Fisheries Act*
  - iv) Habitat
- **k. Vegetation**
- **l. Terrestrial Wildlife and Wildlife Habitat,** including
  - i) Caribou and caribou habitat
  - ii) Wildlife migration routes and crossings
- **m. Birds,** including
  - i) Raptors
  - ii) Migratory birds
  - iii) Seabirds

n. **Marine Environment,** including
   i) Marine ecology
   ii) Marine water and sediment quality
   iii) Marine biota including fish
   iv) Marine habitat
o. **Marine Wildlife**
p. **Socio-Economic Factors**, including
   i) Population demographics
   ii) Education and training
   iii) Livelihood and food security
   iv) Family and community cohesion
   v) Employment
   vi) Economic development and self-reliance
   vii) Community infrastructure and public services
   viii) Contracting and business opportunities
   ix) Land use
   x) Benefits, royalty and taxation
   xi) Governance and leadership
q. **Human Health and Well-being** (including worker health and safety)
r. **Non-traditional Land and Resource Use**, including
   i) Protected areas
   ii) Visual and aesthetic resources
s. **Cultural, Archaeological and Palaeontological Resources**
t. **Cumulative Effects,** including
   i) Impacts to caribou, caribou migration and calving grounds, and related socio-economic impacts to Baker Lake and other communities, including communities outside the Nunavut Settlement Area
   ii) Marine traffic (barges/ships) in the region
u. **Transboundary Effects** (including transportation of yellowcake)

3) <u>Anticipated effects of the environment on the project</u>

The scope of the assessment will include the potential anticipated effects of the arctic environment on the project throughout the project's life. The scope of factors will include:

a. **Climate (**including climate change) **and Meteorology**
b. **Permafrost**
c. **Geotechnical hazards** (including slope movement, differential or thaw settlement, frost heave, ice scour and seismic activity)
d. **Subsidence**
e. **Flooding**
f. **Extreme weather events**
g. **Unfavourable geological conditions**

4) <u>Steps which the proponent proposes to take including any contingency plans, to avoid and mitigate adverse impacts</u>

The scope of the assessment will include any contingency plans to avoid and mitigate adverse impacts caused by the proposed project components and activities and these plans should extend through all the project phases. The contingency plans shall take into account the appropriate temporal boundaries and spatial boundaries and is expected to draw upon relevant information from scientific sources and traditional knowledge.

a. Risk Management, including
   i) Emergency response
   ii) Hazardous materials management
   iii) Exposure to hazardous materials, including radioactive and non-radioactive materials
   iv) Accidents and malfunctions
   v) Regulations
   vi) Mitigation measures

5) <u>Steps which the proponent proposes to take to optimize benefits of the project, with specific consideration being given to expressed community and regional preferences as to benefits</u>

The scope of the assessment will include steps which the proponent proposes to take to optimize benefits of the project, including but not limited to:

a. Compensation and Benefits
b. Health Benefits
c. Human Health and Well-being (including worker health and safety)
d. Employment
e. Education and Training
f. Land Use
g. Contracting and Business Opportunities
h. Any non-confidential details from the Inuit Impact Benefits Agreement

6) <u>Steps which the proponent proposes to take to compensate interests adversely affected by the project</u>

The scope of the assessment will include the steps which the proponent proposes to take to compensate interests adversely affected by the project including all non-confidential Inuit Impact Benefits Agreement process and content details.

7) <u>The monitoring program the proponent proposes to establish with respect to ecosystemic and socio-economic impacts</u>

The scope of the assessment will include the monitoring programs that will be established to mitigate the potential for ecosystemic and socio-economic impacts caused by the proposed project components and activities. The scope of factors will include:

a. Monitoring Programs (environmental and socio-economic components)

b. Post-Project Analysis (PPA)

8) <u>The interests in lands and waters which the proponent has secured or seeks to secure</u>

The scope of the development under review will include any interests in lands and waters which the proponent has secured or seeks to secure based on the proposed physical works and activities or undertakings that constitute the Kiggavik project proposal.

- **a. Nunavut Planning Commission** Conformity Determination under the Keewatin Regional Land Use Plan
- **b. Nunavut Impact Review Board** Project Certificate
- **c. Nunavut Water Board** Type 'A' Water Licence
- **d. Indian and Northern Affairs Canada** Class 'A' Land Use Permit, leases, easements, rights-of-ways, and various other permits
- **e. Kivalliq Inuit Association** Production Licence
- **f. Canadian Nuclear Safety Commission** Licence to Prepare and Construct a Uranium Mine and Mill, Licence to Operate
- **g. Fisheries and Oceans Canada** Section 35 *Fisheries Act* Authorization
- **h. Transport Canada** Navigable Water Permit

9) <u>Options for implementing the proposal</u>

The scope of the assessment will include **Project Alternatives** (such as alternatives to individual components/activities, alternate timing and development options).

10) <u>Any other relevant matters</u>

The scope of the assessment will include any other matters that the NIRB considers relevant, including:

- **a. Technological innovations previously untested in the Arctic** including new technology for mine design, and operation and tailings containment
- **b. Legacy issues associated with mining uranium**
- **c. State of knowledge regarding uranium mining and production**, including public awareness of key issues, availability of training resources and educational materials, and availability of meaningful Inuktitut translations for relevant terminology and concepts.
- **d. Radioactive materials and contaminants associated with Uranium and Uranium Mining** including key issues and risks associated with radiation, risks to human health, land, water and wildlife, and long-term storage of radioactive wastes
- **e. Traditional Knowledge**
- **f. Statement of Consultation Principles and Practices**
- **g. Significant Effects Analysis**
- **h. Sustainability Analysis**