Final Scope of the NIRB's Assessment of the Kiggavik Project Proposal

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) 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

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) Steps which the proponent proposes to take to compensate interests adversely affected by the project

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) The monitoring program the proponent proposes to establish with respect to ecosystemic and socio-economic impacts

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) The interests in lands and waters which the proponent has secured or seeks to secure

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) Options for implementing the proposal

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

10) Any other relevant matters

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**