Kiggavik Project

Environmental Impact Statement

Tier 3 Technical Appendix 6D

Wildlife Mitigation and Monitoring Plan

December 2011

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1 INTRODUCTION

1.1 OVERVIEW

The AREVA Resources Canada Inc. (AREVA) Wildlife Mitigation and Monitoring Plan (Plan) will be in effect for the duration of the Kiggavik Project. The Plan is intended to apply to the Kiggavik Project located approximately 80 km west of Baker Lake, Nunavut, and all points located between the site and Baker Lake.

The enclosed document forms part of the Kiggavik Environmental Impact Statement (EIS) submission. The submission has been prepared for the Nunavut Impact Review Board (NIRB) by AREVA to fulfill the requirements of the "Guidelines for the Preparation of an Environmental Impact Statement for AREVA Resources Canada Inc's Kiggavik Project (NIRB File No. 09MN003)".

1.2 PURPOSE AND SCOPE

The purpose of the Plan is to provide information on wildlife mitigation and monitoring strategies. The Plan has been written to address the NIRB "*Guidelines for the Preparation of an Environmental Impact Statement For AREVA Resources Canada Inc's Kiggavik Project", May 2011.* More specifically, the 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*".

A plan was designed and implemented that focused on exploration activities associated with the Kiggavik Project (see attachment A). With the potential development of the Kiggavik Project, a new Plan needs to be developed that focuses on existing, as well as new Project-related effects on wildlife. AREVA is committed to obtaining input from stakeholders (e.g., Baker Lake Hunter and Trappers Organization [HTO], Government of Nunavut's Department of Environment [GNDoE]), and incorporating comments from the Draft EIS in order to develop a new Plan. As such, this Plan is considered conceptual at this stage, and is intended to provide the framework regarding mitigation measures, monitoring procedures and data collection which will be finalized during the Kiggavik Project's licensing stage. The final Plan will contain the following:

- lessons learned from other projects in the region;
- incorporation of Inuit Qaujimajatuqangit (IQ) and responses from other stakeholders;

- mitigation and management policies, effects monitoring study designs and procedures, and management practices to prevent or reduce Project-related effects on wildlife habitat and wildlife;

- an annual summary of findings from the effects monitoring programs and procedures; and,

- a review process of the findings, with feedback from stakeholders, with modifications to current procedures and practices, as well as potentially additional management strategies (i.e., adaptive management).

Development of the study design and monitoring procedures will also take into consideration Plans for other Arctic projects so that results can be comparable, thereby facilitating better management decisions from a broader scale (i.e., landscape, ecosystem) regarding wildlife habitat and wildlife.

1.3 RELATED DOCUMENTS

EIS documents containing information that will provide input in the final Plan include:

- Tier 2
  - Volume 2 Project Description and Assessment Basis
  - Volume 6 Terrestrial Environment
- Tier 3
  - Technical Appendix 2J - Marine Transportation Plan
  - Technical Appendix 2M - Road Management Plan
  - Technical Appendix 2N - Borrow Pits and Quarry Management Plan
  - Technical Appendix 2P - Occupational Health and Safety Plan
  - Technical Appendix 2S - Waste Management Plan
  - Technical Appendix 2T - Environmental Management Plan

2 REGULATORY BACKGROUND

Section 12.5.2 of The Nunavut Land Claims Agreement (NLCA) states that any proponent proposing a project within the territory of Nunavut is responsible for preparing an EIS in accordance with the guidelines established by NIRB (NLCA 1993). Within this section, the proponent is responsible for providing information on:

1. any proposed contingency plans, to avoid and mitigate adverse impacts (subsection 12.5.2(d)); and,

2. the monitoring program that the proponent proposes to establish with respect to ecosystemic and socio-economic impacts (subsection 12.5.2(g)).

The final Plan is intended to meet the NIRB guidelines, as well as any other requirements regarding wildlife habitat and wildlife from other regulatory authorities. Other regulatory acts, policies, and plans that will be taken into consideration during the development of the final Plan include the Keewatin Regional Land Use Plan, Nunavut Wildlife Act, Species and Risk Act (SARA), Migratory Birds Convention Act, and the Federal Policy on Wetland Conservation.

3 SPATIAL BOUNDARIES

3.1 LOCAL STUDY AREA

The local study area (LSA) at the mine site is centered on the Kiggavik and Sissons deposits with an approximate 5-km buffer around all proposed Project facilities, including a proposed airstrip and site haul roads. Dimensions of the Mine LSA are approximately 29 km wide x 20 km wide, for a total area of 450 km^2 (Figure 1).

Currently, three proposed road options are presented in the EIS consisting of two proposed winter roads and an all-season road. The LSA boundary for each of the proposed road options consists of a 5-km wide buffer centered on the proposed road alignments. The South Winter Road LSA is about 561 km^2 while the North Winter Road LSA is about 539 km^2. The North All-Season Road LSA is about 520 km^2. Other potential facilities included within the road alignments include a dock facility at Baker Lake and potential quarry sites. The road LSA boundary used for monitoring Project-related effects on wildlife and wildlife habitat will be contingent on the road option approved following acceptance and approval of the EIS by regulatory agencies.

3.2 REGIONAL STUDY AREA

The regional study area (RSA) is a broader area within which cumulative effects may potentially occur, or a VEC is broader ranging. The RSA incorporates all Project features and associated LSAs, known caribou water crossing locations along the Thelon River basin (DIAND 1992), and critical areas identified by IQ studies. The RSA also includes areas with similar conditions to those found in the Mine LSA and access road LSAs, which will allow the RSA to be used as a comparable reference area for monitoring potential changes caused by the Project. The resulting RSA is 150 km long and 70 km wide, for a total area of 9,828 km^2.

4 MITIGATION

4.1 WILDLIFE HABITAT

Direct effects to wildlife habitat include the physical disturbance to the landscape, which will cause a direct displacement of wildlife. Direct habitat disturbance occurs through construction of the Project footprint, which includes the Kiggavik and Sissons mine sites with its associated infrastructure and access roads, the winter road options (where granular material will be used to create a level travel surface in hummocky microtopography), the potential North All-Season Road, and the dock site facility. Mitigation measures proposed to reduce direct habitat loss include the following:

- Maintaining Project activities within the surveyed boundaries of the Project footprint.
- Progressive reclamation will occur throughout the Kiggavik Project on decommissioned areas to return disturbed areas to a natural state.
- Promoting natural regeneration of native vegetation in reclaimed areas from the seedbank preserved in the stored topsoil used during site reclamation.

Indirect effects to wildlife habitat are associated with changes to habitat quality, which could potentially cause changes in wildlife movement and behaviour. Changes in wildlife movement and behaviour are attributed to sensory disturbance variables, which can consists of dust, noise, lights, smells, changes in soil quality which could influence changes in vegetation abundance and community diversity, as well as changes in vegetation quality. The following mitigation measures proposed to prevent or reduce indirect effects to wildlife habitat include:

- Dust suppression in dust-prone areas associated with the Kiggavik Project.
- Enforcing speed limits to reduce airborne dust created by vehicles and other equipment traffic.
- During open pit mining, blasting patterns will be used to control the dispersion of materials as well as dust.
- Where possible, blasting activities (for road construction) within 3 km of a known raptor nest site will be restricted during the territory occupancy and nesting season (~mid May through to end of August).

- Land-based activities within a 3 km radius of active raptor nest sites will be restricted during the nesting season.

- All equipment and vehicles will have appropriate exhaust mufflers to reduce the amount of noise generated during their use.

- All aircraft will maintain a minimum flying altitude of 300 m above ground level, except during take-off, landing, slinging of equipment, high winds, or other risks to flight safety. All flights occurring below 300 m will be documented regarding occurrence and rationale.

- Industrial machinery and equipment (including the diesel-powered generators) will meet federal air emission standards.

- Low sulphur diesel fuel will be used to reduce emissions associated with diesel fuel combustion.

- Scrubbers will be installed on exhaust stacks to remove particulates, acid mist and excess SO_2 from air emissions prior to discharge.

- All equipment and machinery will be cleaned of foreign particles (e.g., soil, thatch) prior to initial transport to the Kiggavik Project to prevent the introduction of invasive and/or non-native vegetation.

- During winter road use, soft spots on the winter road will be identified and avoided by vehicular traffic. Rig matting may also be used to prevent rutting and other disturbances to soils where the winter road's integrity is compromised.

4.2 WILDLIFE MORTALITY

Occasionally, Project-related activities could lead to wildlife mortality events. Mortality events could be accidental (e.g., vehicle collisions) or deliberate (e.g., to protect human life). In most cases, wildlife mortality events can be avoided through proper and effective mitigation measures that focus on preventing wildlife from being attracted to the Project site, as well as effective communication to alert Project personnel of wildlife occurrence near Project activities to prevent potential interactions. Mitigation measures to prevent and reduce wildlife interactions and mortality events include the following:

- Reporting wildlife observations to environmental staff.

- Communicating presence and location of wildlife observed on-site using radios to all personnel working in the area.

- Road activity will be managed when caribou (*Rangifer tarandus)* are migrating through or near the Project footprint.

- Project personnel will be warned with signage and radio communication when wildlife are moving through the area.

- Roads will be designed to minimize blind spots for drivers, thus reducing the potential for wildlife-vehicle collisions.

- Speed limits will be posted and enforced on all roads and around the mine sites.

- Where practical, site clearing during construction will occur outside of the migratory bird breeding season.

- Preventing breeding birds for nesting within the Project footprint. Any nests found within the Project footprint will be monitored, and efforts will be made to avoid disturbing the area during the nesting period.

- All wastes generated by the Project will be disposed of in accordance to the Waste Management Plan (Technical Appendix 2S) to prevent wildlife from being attracted to wastes, which could potentially lead to problem wildlife issues.

- Project personnel will be restricted from carrying firearms on-site.

- In the event that problem wildlife does occur and the safety of Project personnel is deemed to be at risk, the local Conservation Officer will be contacted to obtain authorization to destroy the animal.

- Many site buildings will be interconnected via corridors, thereby reducing interactions between Project personnel and wildlife.

- To prevent mortality events or injuries to marine mammals, vessels will travel at a maximum speed of 10 knots through important habitat areas (e.g., the area surrounding the community of Churchill is important beluga whale habitat) during the open-water seasons, unless otherwise required for safe navigation.

- Upon the advice of the onboard marine mammal observers, vessels will turn off engines and propellers if marine mammals appear to be herded within the path of the vessel within Chesterfield Inlet, unless conditions are unsafe to do so.

4.3 WILDLIFE MOVEMENT

Throughout the life of the Project, wildlife may travel through the Project footprint. Project-related activities have the potential to disrupt wildlife movement through the area. The following mitigation measures will be incorporated to prevent or reduce Project-related effects on wildlife movement:

- The Project footprint a minimum of 10 km from designated caribou water crossing to preventing disturbing, or causing potential avoidance of the crossing by migrating caribou.
- Wildlife will have the right-of-way when travelling on or through the Project footprint.
- Temporary shutdowns of roads may be initiated when large numbers of caribou are migrating through the area.
- Speed limits will be posted and strictly enforced on all roads and the mine sites.
- Wildlife movement will only be disrupted by Project personnel under special circumstances, such as when aircraft are landing (i.e., herding wildlife off of the airstrip prior to aircraft landing) or when an emergency situation arises.
- Snow management that avoids long continuous cuts or piles of snow that could restrict migration across the Project footprint.
- Minimize the use of fencing and, where required, minimize the lengths of fencing unless required for safety.
- Road embankment height will be reduced, where practical, to prevent visual obstruction for migrating caribou, as well as to facilitate ease of crossing.
- Fine-grained materials will be used on the road surface and road slopes to create a good travel surface for caribou (or other wildlife) attempting to cross the road (i.e., road materials won't cause potential injury or difficulty for animals when crossing).

5 MONITORING

Wildlife species selected for monitoring will focus on the key indicator species identified in the Terrestrial Environment Assessment (i.e., Tier II, Volume 6), consisting of caribou, muskox (*Ovibus moschatus*), lapland longspur (*Calcarius lapponicus*), long-tailed duck (*Clangula hyemalis*), peregrine falcon (*Falco peregrinus*), short-eared owl (*Asio flammeus*), grizzly bear (*Ursus arctos horribilis*), and wolverine (*Gulo gulo*). The rationale for their selection is provided below.

Caribou are a nomadic species that migrate long distances to fulfill their life cycle. Caribou are an important social, cultural, and economic value to people that reside within the caribou's territorial range. For instance, during stakeholder engagement sessions, caribou were identified as a key food source for Baker Lake residents and other northern communities. Caribou are also a primary food source for other wildlife, such as wolves, grizzly bears, wolverines, and fox (*Vulpes spp.)*.

Muskox are a more sedentary species than caribou, but have been known to exhibit movements between winter and summer ranges (ENR 2011). Muskox are traditionally hunted by Inuit and other northern residents for sustenance. Muskox are also an important food source for predatory mammals.

Lapland longspur is a common migratory bird species that breeds in the Arctic. Lapland longspur use many different habitats within the Arctic for breeding, nesting, and fledging young. Lapland longspur and their eggs and offspring are also a food source for raptors and other predatory mammals.

The long-tailed duck is a circumpolar waterfowl that breeds primarily in the Arctic tundra, usually close to water. The long-tailed duck and their eggs and offspring are a food source for raptors and other predatory mammals, and are sometimes hunted by Inuit and other northern residents.

The peregrine falcon is a SARA listed species that is known to nest on cliff faces and ledges located within the RSA. Peregrine falcon populations are progressively rebounding following the banned use of organochlorine compounds such as the pesticide DDT which bio-accumulate in peregrine's, affect egg shell thickness. Peregrine falcons primarily forage on other birds.

Short-eared owl's are a SARA listed species that occur in the Arctic during the nesting season. Short-eared owl's primarily forage on voles and other small rodents. Short-eared owls seem to be sensitive to human activity during the egg-laying and incubation period, as females have been reported to desert the nest if disturbed during this period (SARPR 2011).

Grizzly bears are listed as a species of Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2011), which are known to occur within the RSA. Grizzly bears are omnivores that forage on a variety of plants and their roots, as well as prey items such as caribou, muskox, waterfowl (and their eggs and offspring), and Arctic ground squirrels (*Spermophilus parryii)*. Grizzly bears are widely considered an umbrella species for conservation planning due to their broad ecological requirements.

The wolverine is listed as a species of Special Concern by COSEWIC, which are known to occur within the RSA. The wolverine requires large undisturbed areas to maintain viable populations (COSEWIC 2011). Wolverines are omnivorous, and forage on a variety of food items ranging from large ungulates to smaller furbearers, fish, roots, and berries. The low reproduction rate of wolverines makes this species difficult to recover from population declines.

AREVA will continue to participate in monitoring programs in partnership with the GNDoE and the Baker Lake HTO that were initiated during the exploration program. Specifically, these monitoring programs include:

- The Hunter Harvest Study (to support the determination of total harvest by herd)
- The Caribou Collaring Program (determination of seasonal distribution by herd)
- Supporting the GNDoE-led herd delimitation and population estimate survey (determine regional herd population trends)
- Project-specific caribou monitoring programs (ground-based observations)

In addition, new monitoring programs for the Kiggavik Project will be designed and implemented that focus on wildlife habitat and the key wildlife indicator species. The monitoring programs will likely include, but are not limited to, the following:

- Habitat loss, based on the vegetative area affected during development of the Project footprint
- Soils and vegetation quality and its potential association with wildlife habitat and wildlife health
- Wildlife abundance and distribution in relation to the Project footprint
- Known breeding, nesting or denning areas by wildlife for ongoing utilization within the Project footprint, LSA, and RSA.

6 PERSONNEL TRAINING

All AREVA employees and contractors will undergo a site orientation regarding wildlife. Topics that will be covered during the site orientation include:

- Ban on feeding wildlife
- Reviewing relevant sections of the waste management plan regarding proper disposal of food items and other refuse that wildlife may be attracted to
- Wildlife have the right-of-way when travelling or crossing any roads or the mine sites.
- Reporting wildlife observations and encounters

Furthermore, all AREVA employees and contractors will be given training on how to respond to encounters with wildlife on and around the site that is safe for both humans and wildlife. Safety training specific to bears and other carnivores will be included in the overall training regarding encounters with wildlife.

7 ADAPTIVE MANAGEMENT APPROACH

Monitoring will be completed by AREVA environmental personnel in partnership with the Baker Lake HTO and the GNDoE to determine the efficacy of the Plan. The primary purpose of the monitoring program is to track potential changes to wildlife habitat and wildlife over the life of the Kiggavik Project, with a focus on the predicted environmental effects described in the EIS. Surveys will be completed on a regular schedule following standardized protocols and procedures developed for the Kiggavik Project. Feedback from the communities, government, and other stakeholders on the significance of any changes detected to wildlife habitat and wildlife may constitute changes to the Plan over the life of the Kiggavik Project, as the Plan should be seen as an evolving program. The development of the final Plan must be flexible enough to incorporate comments, suggestions and information based on IQ and scientific knowledge.

8 QUALITY CONTROL

Quality control will occur through the development of technical procedures that will be incorporated into the final Plan. These procedures will provide consistency in study design, field methods, data collection and data input. The technical procedures will be continuously evaluated for effectiveness during the monitoring program, which will be used to modify techniques for assessing and mitigation Project-related effects on wildlife.

9 REPORTING

A report that summarizes the results of the monitoring program will be completed and distributed to regulatory authorities and communities on an annual basis. These reports will also present findings associated with wildlife habitat and wildlife in comparison to the predicted environmental effects identified in the EIS, while providing regulatory authorities and communities a means to provide feedback and direction regarding the Plan.

10 REFERENCES

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2011. Available at: http://www.cosewic.gc.ca/eng/sct5/index_e.cfm Accessed: December 16, 2011.

ENR (Environment and Natural Resources). 2011. Environment and Natural Resources, Government of the Northwest Territories. Available at: http://www.enr.gov.nt.ca/_live/pages/wpPages/Our_Wildlife.aspx. Accessed: December 16, 2011.

NLCA (Nunavut Land Claims Agreement). 1993. Agreement between the Inuit of the Nunavut settlement area and her majesty the Queen in right of Canada.

SARPR (Species at Risk Public Registry). 2011. Species Profile – Short-eared Owl. Available at: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=60 Accessed: December 16, 2011.

AREVA Resources Canada Inc.

KIGGAVIK PROJECT, NUNAVUT

WILDLIFE MITIGATION AND MONITORING PLAN

May 2011 – Version 5

REQUIRED USERS

Required and other users are responsible for using the current version of the Wildlife Mitigation and Monitoring Plan as posted on Q:\KS_Feasibility. Users may print copies of this plan, but are ultimately responsible for ensuring they are using a current copy as posted. Users are requested to destroy all previously printed copies of the plan when they are informed of revisions.

HISTORY OF REVISIONS

Version	Date	Details of Revision
01	March 2007	Original submission
02	January 2008	Updated to reflect changes in field activities/capabilities and areas of continual improvement
02 R1	May 2008	Updated to reflect program changes initiated by new consulting biologist and to integrate comments received by Nunavut and NWT biologists
03	January 2009	Updated to reflect opportunities for improvement
04	January 2010	Updated to reflect opportunities for improvement
05	April 2011	Updated to reflect lessons learned throughout the 2010 field season. These changes include an appendix which outlines the appropriate responses to a variety of scenarios to ensure appropriate mitigative actions are carried out in a timely and effective manner.

Original Copy of this Manual:

Approved and Signed by title: **Kim Sarauer**

Environment and Radiation Protection Supervisor

Approved by:

May 17, 2011

Signature and Date

Approved and Signed by title: **Frederic Guerin**

General Manager, Kiggavik Project

Approved by:

May 20, 2011

Signature and Date

The original hard copy of this approval page has been signed and is located at the AREVA Resources Canada Inc. corporate office.

AREVA

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LIST OF APPENDICES

1 INTRODUCTION

The Wildlife Mitigation and Monitoring Plan (Plan) described herein has been developed by AREVA Resources Canada Inc. (AREVA) for the Kiggavik Project (Project) located approximately 80 km west of Baker Lake, Nunavut. The Plan is implemented during the field season to monitor and reduce Project impacts on wildlife, particularly caribou. The Plan serves as a work instructional and internal best management practice and encompasses activities in Nunavut, including continued exploration and environmental baseline programs.

All AREVA Kiggavik staff, contractors, subcontractors, helicopter contractors, and Independent Wildlife Monitors, have the responsibility to be familiar with and to follow this Plan. Implementation and enforcement is the responsibility of the AREVA Environment and Radiation Protection (ERP) Supervisor or designate. Current field worksites include locations of:

- Camp Activities (including fuel caching)
- Drilling Operations
- Airborne Geophysics
- Ground Geophysics and Exploration Activities
- Environmental Baseline Work and
- Environmental Monitoring

The Plan is reviewed and updated annually in consultation with a biologist knowledgeable in barren ground caribou issues to reflect lessons learned through AREVA experience and the experience of other development projects as well as feedback and recommendations from regulators and community members.

The current Plan has evolved with lessons learned during the previous field seasons; community input; and regulatory commitments. AREVA is working closely with the Government of Nunavut Department of Environment (GN-DoE) to investigate options for collecting meaningful caribou population data using low invasive methodologies.

2 MONITORING PLAN

2.1 Independent Wildlife Monitoring

AREVA will employ an Independent Wildlife Monitor(s) to:

- Verify that this plan is carried out.
- Report regarding wildlife issues at Kiggavik outside of AREVA.
- Provide safety assistance regarding wildlife issues.

The Independent Wildlife Monitor must become familiar with *Procedure KIG-722 Wildlife Monitoring* and *Work Instruction KIG-722-01 Independent Wildlife Monitor Scope of Work* for proper implementation of the Plan which will be provided by AREVA.

2.2 Baseline Data to Support an Environmental Assessment

Wildlife survey data collected to support the development of an Environmental Impact Statement (EIS) is used to support site monitoring and help inform appropriate mitigation actions as required. The environmental consultants communicate regularly with the ERP Supervisor or designate to ensure important wildlife observations are recorded and communicated to appropriate personnel at site.

2.3 Aerial Observations

Wildlife observations during daily transportation of field staff and contractors are recorded, and provide information about the presence of caribou. Please refer to section 3.4 Flight Specific Mitigation for the required altitudes of the above mentioned flights.

2.4 Wildlife Logs

AREVA has provided *Form 722-00-01, Incidental Wildlife Sightings Form* for all site personnel, contractors, and visitors to complete following the observation of any wildlife. Instructions regarding this form are provided during orientation. The Independent Wildlife Monitor utilizes the *KIG-722-01-01 Wildlife Monitoring Data Form* to record information obtained in the field. All wildlife information is transcribed to an electronic file and a summary is included in the monthly wildlife reports.

2.5 Caribou Radio-Collaring Data

The study area will be monitored for approaching caribou with the use of satellite collar information provided by caribou biologists with the Governments of Nunavut and the Northwest Territories**.**

2.6 Raptor Nest Monitoring

The consulting biologist is responsible for communicating any active raptor nest sites to the ERP Supervisor or designate.

3 MITIGATION AND PROTECTION MEASURES

Mitigation and protection measures are heavily based on compliance with permit/lease terms and conditions. Additional AREVA commitments were adopted from recommendations from the Government of Nunavut, GN-DoE, Environment Canada (EC), Beverly and Qamanirjuaq Caribou Management Board (BQCMB) and AREVA-led commitments. AREVA will implement the following mitigation and protection measures for caribou, and other wildlife that are seasonal or annual residents of the Project area.

3.1 General Protection Measures

- Site activities (camp layout, drilling) will be performed in a manner that limits the size of the Project footprint.

- Staff will be required to follow the procedures in the "Safety in Bear Country" manual and all man-bear interactions will be reported to the Baker Lake Conservation Officer.

- If an incident occurs between a grizzly bear, wolverine, wolf, or fox and the field staff, or if there is a disturbance to caribou a Supervisor's Investigation Report will be completed. An incident is defined as a disturbance to caribou, damage to camp facilities caused by wildlife, continued persistence of a carnivore(s) within the camp or work site, and/or interactions between humans and wildlife that lead to harm to either.

- An AREVA representative will contact the Baker Lake Conservation Officer for appropriate protocols and actions if a need for deterrents or other wildlife management techniques are identified.

- Use of "good house keeping" practices to maintain a garbage-free camp and exploration area, should limit the attraction of wildlife to the Project site. All non-hazardous combustible garbage is burned in an incinerator (see Waste Management Plan). Non-combustible waste and hazardous materials are stored in a designated area for future shipment to an approved facility.

- AREVA educates and enforces "no feeding or harassment of wildlife" and the appropriate response to animal encounters, specifically carnivores and muskoxen is communicated.

- The use of firearms is strictly controlled. The facility supervisor or designate must approve any firearm coming on site. The only allowable use of firearms is the use of dangerous animal deterrence measures (e.g. firearms, bear bangers, bear spray, cracker shells and rubber bullets), and for safety kills to protect human life should a situation arise when other measures have failed. The Independent Wildlife Monitor is permitted to carry a firearm. Please refer to *GSP Section 9.03 Firearms and Offensive Weapons* regarding storage and use of firearms.

- Hunting and trapping by AREVA employees and contractors is prohibited on the AREVA land lease.

- AREVA employees and contractors must obtain a Sport Fishing Licence, and provide a copy to the ERP Supervisor or designate before commencing on a fishing trip leaving from site.

- Wildlife has the "right-of-way" and will not be blocked or deterred from moving through the Project area.

- Materials, chemicals, and equipment will be removed from the drill sites and camp area at completion of the project as described in the Abandonment and Restoration Plan. The intent is to reclaim the area as close as possible to the natural state.

- Chemicals are stored in double-walled containers or in secondary containment. Diesel fuel, gasoline, and aviation fuel is contained within arctic berms or double-walled storage tanks (see Spill Contingency Plan). In the event of a spill, the Spill Contingency Plan will be implemented immediately. Used chemicals are stored for transportation off site for proper handling.

- Refer to the Noise Abatement Plan for measures taken to control noise.

3.2 Raptor (and Other Migratory Bird) Protection Measures

AREVA has implemented the following protection measures to mitigate potential impacts to raptors and other migratory birds.

- AREVA will avoid disturbing known raptor nests from April 15th to September 1st by maintaining a 1.5 km buffer when in transit by aircraft and will avoid approaching known nests closely while on foot. Limited disturbance (e.g. raptor nest monitoring) within the aircraft buffer may occur infrequently prior to September in order to obtain necessary baseline data. The consulting biologist will be informed of all other potential disturbances in order to implement potential protection and mitigation measures, and to initiate monitoring efforts to determine vulnerability and susceptibility to the disturbance. Efforts to monitor disturbance response will help to inform future activities.

- If a nest site is established on a man-made structure and eggs are present, the nest will be avoided as much as possible and monitored for nest success.

- Where land disturbance activities occur during the breeding period for land birds (May 30th to July 31st) a bird nest survey will be conducted prior to the land disturbance following *Work Instruction KIG-722-02, Active Bird Nest Identification and Monitoring*. All nests will be recorded and efforts to create appropriate buffers (dependant on species tolerance and protection level) around migratory birds and species at risk will be made. Nests will be monitored for hatch or termination.

3.3 Caribou Protection Measures

The calving grounds for the Beverly and Qamanirjuaq herds are approximately 70 km and 200 km from the exploration areas, respectively. AREVA does not conduct any activity within the designated Caribou Protection Areas or within the larger known Caribou Calving Grounds. The distance between

the Kiggavik camp and the nearest known caribou water crossings is 25 km. Figure 3.3-1 shows the caribou crossings and calving areas in relation to the Kiggavik Project Site. AREVA follows the DIAND Caribou Protection Measures (INAC, 2010) as well as additional caribou protection and mitigation commitments.

- No camp construction, caching of fuel, or blasting will occur within 10 km of a designated and/or recognized caribou crossing during periods of migration between May 15 and September 1. No diamond drilling activity will occur within 5 kilometres of any designated and/or recognized caribou crossing during periods of migration between May 15 and September 1. Operation of ground, air or water-based mobile equipment within 10 km of a caribou crossing is anticipated to happen infrequently and will only occur in the absence of caribou concentrations. Ground-based monitoring and/or aerial reconnaissance flights will be used to monitor caribou presence as required and appropriate prior to and during operations of mobile equipment (INAC, 2010).

- Snowmobile and ATV use will be suspended if cows and calves are within 2 km of activities.

- If a collared caribou is identified as approaching site activities the ERP Supervisor or designate may determine what the collar represents by communicating with the GN or GNWT, with environmental consultants, and exploration companies within the area. The Manager of Nunavut Affairs will be notified and if required, verification will occur through an aerial reconnaissance survey.

- In the event that caribou cows calve outside the designated Caribou Protection Areas, AREVA will suspend operations within 10km[1] of any area occupied by cows and calves between May 15 and July 15 (INAC, 2010). Water circulation in the drills will continue to avoid the rods from freezing in the hole. Monitoring activities and visuals from the drill area will be used to identify when caribou are within 10 km of drilling activities. Through ground based monitoring, the Independent Wildlife Monitor will determine when caribou cows and calves are outside the 10 km buffer, and report the information to the ERP Supervisor or designate. Activities can resume when the caribou are outside the 10 km buffer following confirmation by the ERP Supervisor. If a concentration of caribou remains within 10 km of drilling operations for more than 2 days the ERP Supervisor or designate will contact the Conservation Officer in Baker Lake and the consulting biologist to determine the next appropriate course of action.

- During June and July (to avoid injuries to caribou and humans), drilling activities will be suspended if concentrations of caribou (50 or more) approach within 2 km[2] of drilling operations (NIRB, 2007a and GN-DoE, 2008). Water circulation within the drill will continue to avoid the rods from freezing

[1] The 10 km calving period buffer originated from comments by the BQCMB and GNDOE (BQCMB, 2007, GN, 2007, GN 2008)

[2] With respect to the recommendation for suspending activities when caribou are within 10 km of exploration activities (GN-DoE 2007, GN-DoE 2008), AREVA offers the following information and approach. Studies of woodland caribou have demonstrated avoidance of up to 1 km for well sites and 250 m for roads and seismic lines (Dyer et al. 2001). Data from the Ekati Diamond Mine suggests that the instantaneous negative response (alert, stop feeding) of barren-ground caribou to stressors (e.g., truck traffic) increases within 1 km of the source (BHPB 2004). Behaviour data also demonstrated that the amount of time spent feeding by females with calves was reduced when animals were within 5 km of Ekati mine footprint (BHPB 2004). The size and level of activity of the Kiggavik-Sissons project is much less than an operating diamond mine or road.

in the hole. Monitoring activities and visuals from the drill area will be used to identify when caribou are within 2 km of drilling activities. Through ground based monitoring, the Independent Wildlife Monitor will determine when caribou are outside the 2 km buffer, and report the information to the ERP Supervisor or designate. Activities can resume when caribou are outside the 2 km buffer following confirmation by the ERP Supervisor or designate. If a concentration of caribou remains within 2 km of drilling operations for more than 2 days the ERP Supervisor will contact the Conservation Officer in Baker Lake and the consulting biologist to determine the next appropriate course of action.

- Caribou will have the "right-of-way", and will not be blocked or deterred from moving through the Project area. All activities that may interfere with migration will cease during migration.

- AREVA will forward any direction from GN-DoE or KIA regarding caribou monitoring to NIRB (NIRB 2007).

- Refer to 3.4 Flight Specific Mitigation for altitudes over concentrations of caribou 50 or more within close proximity to one another.

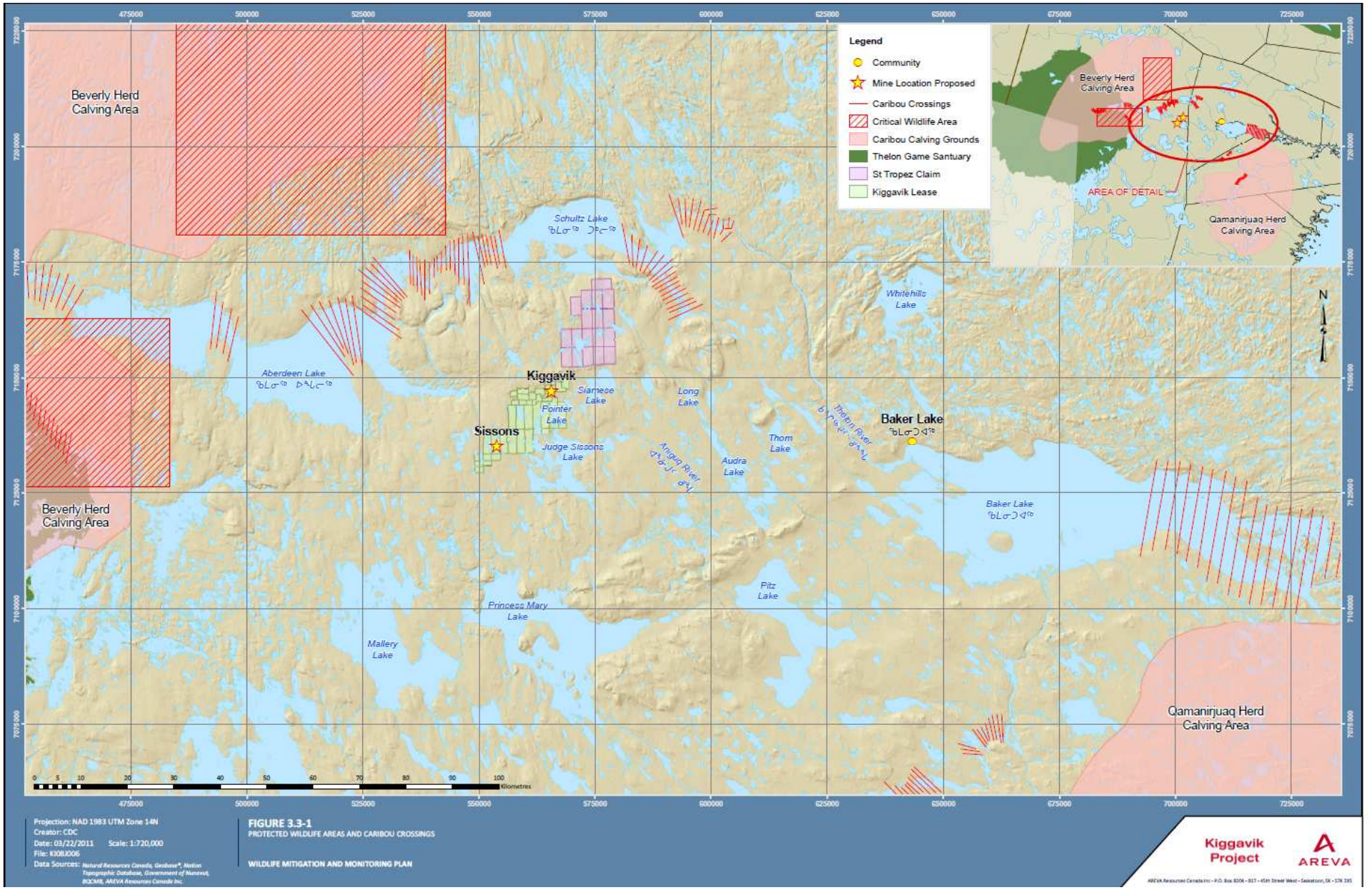

Figure 3.3-1 Beverly and Qamanirjuaq Calving Areas and Caribou Crossings in Relation to Kiggavik Project Site

3.4 Flight Specific Mitigation

AREVA will make efforts to avoid wildlife during flights and to avoid low-level flying to minimize impact of helicopter and airplane noise and presence. Although required flight altitudes are outlined below, some low-level flights are occasionally required for geological/environmental surveys, slinging operations, and during periods of poor weather. Geological or environmental surveys that will be flown below desired altitude must be pre-approved by the ERP Supervisor or designate. Unless otherwise approved by the ERP Supervisor or designate, personnel must adhere to the minimum flight altitudes listed below. If flying at lower altitudes is required, the ERP Supervisor must be notified and reasons documented. Any special requirements including the necessity for high level reconnaissance surveys will be determined by the ERP supervisor or designate.

- For long-range transportation flights (>25 km), aircrafts are required to fly at a minimum of 610 m (2000 ft) above ground level.
- For shorter transportation flights (between 4-25 km)(e.g. movement of staff and equipment between camp and deposits within the Kiggavik lease), the normal practice is to fly all aircraft at a minimum of 300 m (1000 ft) above ground level.
- Unless caribou are present there are no altitude restrictions for flights less than 4 km.
- In the presence of 50 or more caribou best practice is to avoid the caribou by a minimum distance of 610 m [1] above or around the herd.
- Taking-off or landing of aircraft does not occur if 50 or more caribou are within 1 km of the landing area, except where safety is at risk (NIRB, 2007).
- From April 15th to September 1st, AREVA will not fly within 1.5 km of nesting raptors when in air transit and will avoid disturbance in poor weather. Efforts to protect raptors during baseline data collection are given in Section 3.2.
- Aircraft pilots are instructed not to fly over the Beverly calving grounds 70 km northwest of the Project area (Figure 3.3-1).
- A requirement of the projects main helicopter contractor is to provide altitude reports for all flights. Track logs of helicopter flights are maintained.

Protection measures specific to low-level airborne surveys are given in the following section.

[1] For helicopter safety, the normal practice is to fly 2500 ft westbound for long flights such as Baker Lake to the Kiggavik Camp, and 3500 ft eastbound from the Kiggavik Camp to Baker Lake using the altimeter setting of 29.92". This is in accordance with Canadian Aviation Regulations (CARS 602.34 and CARS 602.36)

Table 3.4-1 Required activities and their applicable frequencies and flying altitudes

Activity	Flying Altitude (above ground)[1]
Regular Long Distance Flights >25 km	≥610 m
Short Distance Flights between 4 and 25 km	≥300 m
Aerial Reconnaissance Surveys	≥300 m
Airborne Geophysical Surveys	≥120 m (as required by the survey protocol)
Flights in the vicinity of ≥ 50 caribou	≥610 m (horizontal separation if vertical is not possible)

3.5 Mitigation Specific to Aerial and Ground Geophysical Surveys

3.5.1 Survey Rationale

Aerial

Airborne geophysical techniques are used extensively in exploration to identify physical variations in the underlying geology which can be then used as a means of defining areas of interest. Airborne geophysical surveys are normally conducted at least once in a cycle of exploration activity. Different methods are employed such as Electromagnetics (EM), Gravity Gradiometry, Magnetics and Radiometrics may be conducted in different years if required. Flying altitudes and line spacing's are the main factors that govern the resolution of the survey. To map the targets both a tight line spacing (~150 m) and a low altitude of (50-200 m) following the topography is required.

Airborne geophysical surveys can gain access to remote areas quickly and reduce exploration time. In addition, where environmental issues may limit the amount of exploration possible with ground activities, airborne surveys offers a solution to these issues. If flying over concentrations of caribou is avoided, then this technique is a non-invasive passive technology, an environmentally friendly alternative that will help focus future ground-based activities while limiting or reducing impacts to the environment.

Ground Geophysical Surveys

Ground geophysical surveys are generally the second step in the geophysical exploration. Mainly used to refine the areas of interest that result from the airborne surveys, they employ the same kind of techniques such as DC Resistivity, EM, Gravity, Magnetics, and Radiometrics. They are used to better understand the underlying geology with more detail and to help geologists to define their drill targets.

Ground geophysical surveys have a lower production rate compared to airborne surveys because they are generally realized by men on the ground but the accuracy is better. Techniques have almost no

[1] Normally the altitude above ground is estimated using the aircraft altimeter set to 29.92" of mercury and correcting for the ground elevation along the track. This causes uncertainties due to estimating the ground elevation and the difference between the barametric pressure at the time of the flight and standard pressure of 29.92".

effects on the environment (walking on the ground) and instruments can be quickly removed from the field if caribou are getting too close to the survey area.

3.5.2 Survey Specifications

Airborne Geophysical Survey Specifications

The chosen method is to mount survey instrumentation in a suitable aircraft. Instrumentation includes among others the data acquisition system (which records full tensor gravity gradiometry, triaxial magnetic gradiometry etc if any), digital video, and a complete digital terrain model from an inertially referenced laser (Lidar) altimeter system or a radar system. Specific requirements to complete a survey could be as follows:

- Nominal Flying Height: 120 - 200 m
- Flying Mode: Modified Drape
- Line Spacing: 150 m
- Tie Line Spacing: 750 m
- Ground Cover Restriction: Results are much more precise without snow cover
- Survey time: Dependant on weather conditions and the presence of caribou within the survey area)

Ground Geophysical Survey Specifications

The chosen method is to deploy in the field the adequate technique to realize, if any, a mapping of the apparent resistivity or gravity, to locate anomalous radioactivity, to define magnetic structures and to characterize targets in depth.

The specific requirements to complete a mapping survey could be as follows:

- Line Spacing: 150 m
- Number of lines: 20
- Length of lines: 2000m
- Surface covered: 6 km²
- Ground Cover Restriction: Results are much more precise without snow cover and frozen ground
- Survey time: Dependant surface cover, contractor's crew size, quantity of equipment used, weather conditions and the presence of caribou within the survey areas

3.5.3 Protection Measures

The following protection measures apply to airborne and ground geophysical surveys. The intent of these protection measures is to help ensure surveys are only conducted when caribou disturbance can be minimized.

- The preferred window for conducting geophysical surveys is in June after the northern migration, and efforts will be made to avoid the migration and post calving periods from July 15 to 31.

- The ERP Supervisor or designate is notified of the requested survey area and duration to confirm compliance with the Plan.
- A reconnaissance flight is flown at an altitude of 300 m over the initial line of the proposed area to determine the presence of caribou. If the ceiling is lower than the 300 m but at an altitude that permits safe flying, the reconnaissance flight will be flown at the maximum altitude possible.

Airborne Geophysical Surveys

- If a concentration of caribou (50 or more individuals in close proximity to one another) are within the survey area the aircraft will relocate to another part of the survey block and repeat the reconnaissance flight or the survey will be postponed until the caribou are at a distance of 2 km from the survey area.
- If caribou calves are present in the survey area between May 15th and July 15th the survey will be postponed until either the calves are gone or the survey can be conducted outside of this time period.
- If concentrations of caribou are not observed within the survey route, then the survey proceeds at the approved altitude
- A continuous watch is kept for caribou during the survey. If concentrations of caribou are observed in the survey area during the course of the work, the survey is aborted and another part of the block is selected.
- The contractor must notify the ERP Supervisor or designate of such caribou encounters and provide information pertaining to the location, time, numbers, etc of caribou.

Ground Geophysical Surveys

- Reconnaissance flights are flown daily during the survey to confirm the absence of caribou herds in proximity to the survey area.
- If 50 or more caribou or cows with calves between May 15th and July 15st are not within 10 km of the study area, or are not expected to be within the study area during the survey, the survey can be conducted. In the event the caribou are within 10 km, the geophysical survey will be postponed.
- For concentrations of caribou the ERP Supervisor or designate along with the Consulting Biologist, will determine an adequate distance at which the geophysical wire is to be retrieved. The time required to retrieve wire and the speed in which the caribou are migrating will be considered. This distance will be determined prior to conducting each new survey.
- If 50 or more caribou (in close proximity to one another) approach the survey area, within the minimum distance determined above, the geophysical wire will be retrieved to ensure they are protected.

4 REPORTING

All wildlife activities will be recorded and reported monthly during the field season. With the assistance of the independent Wildlife Monitor, reports will be submitted by the ERP Supervisor or designate on site to the General Manager, Kiggavik, the Manager, Nunavut Affairs, the consulting biologist, Baker Lake Hunters and Trappers Organization (HTO) the Baker Lake Conservation Officer, the GN Department of Environment (GN-DoE), Regional Biologist, Kivalliq Inuit Association (KIA) and Indian and Northern Affairs Canada (INAC). The monthly reports will be used to help construct a year-end overview to be included in the Kiggavik Project Annual Report.

5 REFERENCES

BHPB (BHPB Diamonds Inc). 2004. Ekati Diamond Mine 2003 Wildlife Effects Monitoring Program. Prepared by Golder Associates Ltd. for BHPB Diamonds Inc

BHPB. 2007. Ekati Diamond Mine 2006 Wildlife Effects Monitoring Program. Prepared by Rescan™ Environmental Services Ltd. for BHP Billiton Diamonds Inc

BQCMB. 2007. Letter from BQCMB providing comments and recommendations regarding the Kiggavik and Sissons Uranium Exploration Project (March 12, 2007)

BQCMB, 2008. Letter from BQCMB providing comments and recommendations regarding extension request with INAC and KIA for the Kiggavik-Sissons Project (December 16, 2008)

Durey, O. 2007. Letter from Orin Durey providing comments and recommendations regarding the Kiggavik and Sissons Uranium Exploration Project (March 12, 2007)

Dyer, S.J., J.P. O'Neill, S.M. Wasel, and S. Boutin. 2001. Avoidance of industrial development by woodland caribou. Journal of Wildlife Management, 65:531-542

EC (Environment Canada). 2007. Letter from EC providing comments and recommendations to AREVA Resources Canada Inc. for Kiggavik and Sissons Uranium Exploration Project (March 12, 2007)

EC, 2008. Letter from EC providing comments and recommendations regarding extension request with INAC and KIA for the Kiggavik-Sissons Project (December 16, 2008)

GN-DoE (Government of Nunavut, Department of Environment). 2007. Letter from GNDOE providing comments and recommendations to AREVA Resources Canada Inc. for Kiggavik and Sissons Uranium Exploration Project (March 7, 2007)

GN-DoE, 2008. Letter from GN-DoE providing comments and recommendations regarding extension request with INAC and KIA for the Kiggavik-Sissons Project (December 16, 2008)

Indian and Northern Affairs Canada (INAC), 2007. Land Use Permit N2006C0037 (April 5, 2007)

Indian and Northern Affairs Canada (INAC), 2010, Land Use Permit N2009C0017 (January 21, 2010)

Kivalliq Inuit Association (KIA), 2007. Land Use Licence No. KVL306C02 (April 3, 2007)

KIA, 2008. Extension of Land Use Licence No. KVL306C02 (December 19, 2008)

Nunavut Impact Review Board (NIRB), 2007a. Screening Decision Report, NIRB File No. 06AN085. (April 3, 2007)

NIRB, 2007b. Screening Decision on Amendment Request from INAC - Additional Terms and Conditions for NIRB File No. 06AN085 (August 30, 2007)

NIRB, 2009. Screening Decision on Extension Request from INAC and KIA - Additional Terms and Conditions for NIRB File No. 06AN085 (January 9, 2009)

Nunavut Water Board (NWB), 2008. Nunavut Water Board Licence No. 2BE-KIG0812 (May 12, 2008)

APPENDIX A - EVENTS AND RESPONSES

Event	Contractors	Wildlife Monitor	ERP Supervisor or Designate
General Mitigation			
A disturbance to caribou or an incident occurs between grizzly bear, wolverine, wolf, fox and field staff	• Notify the ERP Supervisor • Assist with the completion of the Supervisor's Investigation Report where necessary	• May be required to assist in emergency situations such as using firearm for safety kills or notifying camp when danger (wildlife) is out of the area • Assist with the completion of the Supervisor's Investigation Report where necessary	• Complete a Supervisor's Investigation Report • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report
If a need for deterrents or other wildlife management techniques are identified	• No action required	• No action required	• Contact Baker Lake Conservation Officer
Caribou Mitigation			
Collared Caribou are identified as approaching site activities	• No action required	• Assist ERP Supervisor with identifying what the collar represents and aerial reconnaissance surveys where necessary	• Determine what the collar represents by contacting the GN and/or GNWT, environmental consultants, or exploration companies in the area • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report
If caribou with **calves** approach drilling rig between **May 15 and July 15,**	• Notify the ERP Supervisor and Wildlife Monitor • If caribou and calves are observed within **10 km** of drilling rig, shut down drilling activity (continue water circulation).	• Station at a vantage point for observing proximity of herd and presence of calves. • Notify the ERP Supervisor of observations • If drilling activity is suspended, continue monitoring and notify ERP Supervisor of caribou proximity to drill rig	• Advise Contractor to shut down drilling activity if Wildlife Monitor determines calves are present within **10 km** • Following verification from Wildlife Monitor, advise Contractor to commence drilling when caribou are outside the 10 km range • If caribou remain within **10 km** for >2 days, notify the Baker Lake Conservation Officer and consulting Biologist for further action • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report

> 50 caribou approach drilling rig during **June or July**	• Notify the ERP Supervisor and Wildlife Monitor • If >50 caribou are observed within **2 km** of drilling rig, shut down drilling activity (continue water circulation)	• Station at a vantage point for observing proximity of herd and presence of calves. • Notify the ERP Supervisor of observations • If drilling activity is suspended, continue monitoring and notify ERP Supervisor of caribou proximity to drill rig	• Advise Contractor to shut down drilling activity if Wildlife Monitor determines >50 caribou are present within **2 km** • Following verification from Wildlife Monitor, advise Contractor to commence drilling when caribou are outside the **2 km** range • If >50 caribou remain within **2 km** for >2 days, notify the Baker Lake Conservation Officer and consulting Biologist for further action • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report
Flight Mitigation			
>50 caribou are within 1 km of landing area	• Pilot will not land or take off within 1 km of >50 caribou except for flight safety. • Flights must be 610 m above ground when flying over >50 caribou (horizontal separation of 610 m is acceptable if 610 m altitude is not possible) • If possible, choose an alternate landing area > 1 km from the herd, • Notify the ERP Supervisor and Wildlife Monitor	• If landing area is within sight, monitor proximity of herd • Notify the ERP Supervisor of observations	• Notify pilots when >50 caribou are within 1 km of their landing area as advised by the Wildlife Monitor • Notify pilots when the caribou have moved outside the 1 km range of the landing area as advised by the Wildlife Monitor • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report
Aerial Geophysical Surveys			
During flight, 50 or more caribou are within the **aerial survey** route	• Notify the ERP Supervisor • The aircraft will relocate to another part of the block and repeat the reconnaissance flight or will be postponed until the animals are a distance of 2 km from the survey area	• No Action Required	• Notify Facility Supervisor, Wildlife Monitor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report.

If calves are present between May 15 and July 15	• Notify the ERP Supervisor • The survey will be postponed until either the calves are gone or the survey can be conducted outside of this time period.	• No Action Required	• Notify Facility Supervisor, Wildlife Monitor and Manager of Nunavut Affairs of mitigating actions
Ground Geophysical Surveys			
Caribou cows and calves are present within 10 kms between May 15 and July 15	• Notify the ERP Supervisor and Wildlife Monitor • Retrieve wire following verification from ERP Supervisor	• Station at a vantage point for observing proximity of herd and presence of calves. • Notify the ERP Supervisor of observations	• The ERP Supervisor in consultation with the Wildlife Monitor will notify the Contractor to retrieve the wire • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report
> 50 caribou are within close proximity (as determined in Section 3.5.3 Protection Measures – Ground Geophysical Surveys) of the **ground survey** area during June/July	• Notify the ERP Supervisor and Wildlife Monitor • Retrieve wire following verification from ERP Supervisor	• Station at a vantage point for observing proximity of herd and presence of calves. • Notify the ERP Supervisor of observations	• The ERP Supervisor in consultation with the Wildlife Monitor will notify the contractor to retrieve the wire • Notify Facility Supervisor and Manager of Nunavut Affairs of mitigating actions • Note in monthly wildlife report