



**AREVA Resources Canada Inc.**

**KIGGAVIK PROJECT, NUNAVUT**

**ABANDONMENT AND RESTORATION PLAN**

**January 2010 – Version 4**

## **REQUIRED USERS**


Required and other users are responsible for using the current version of the Abandonment and Restoration Plan as posted on the Kiggavik drive. 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	Revision	Date	Details of Revision
1	0	March 2007	Original submission
2	0	October 2007	Updated to reflect changes in field activities/capabilities and areas of continual improvement
2	1	May 2008	Updated to reflect comments and conditions received by the Nunavut Water Board associated with the issuance of water licence no. 2BE-KIG0812
3	0	January 2009	Updated to reflect changes in field activities/capabilities and areas of continual improvement
4	0	January 2010	Updated to reflect changes in infrastructure

Approved and Signed by title: **Kim Sarauer**  
**Environment and Radiation Protection Supervisor**

**Kim Sarauer**

Approved by:  Jan. 25, 2010

Signature and Date

Jan. 25, 2010

Signature and Date

## Frederic Guerin

Approved by: \_\_\_\_\_

Signature and Date \_\_\_\_\_ January 25, 2010

January 28, 2010

Signature and Date

AREVA Resources Canada Inc.  
Abandonment and Restoration Plan – Kiggavik Project

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## **1 PREAMBLE**

The AREVA Resources Canada Inc. (ARC) Abandonment and Restoration (A&R) Plan is in effect from the time the required licenses and permits are issued up to the expiry date. The Plan is intended to apply to the Kiggavik Project located approximately 80km west of Baker Lake.

### **1.1 Purpose and Scope**

Abandonment and Restoration (A&R) considerations are on-going during the life of the project. Progressive restoration provides an opportunity to reduce the extent of disturbed land over the life of the project.

The objectives of the A&R Plan are to:

- protect public health and safety by using safe and responsible reclamation practices;
- reduce or eliminate environmental effects, such as ground disturbance, once the project has been ceased;
- re-establish conditions which permit the land to return to a similar pre-exploration land use; and;
- reduce the need for long term monitoring and maintenance by establishing physical and chemical stability of disturbed areas.

The A&R Plan complies with the conditions of permits, licences, regulations and industry standards. The following principles have been established to guide the development of the overall A&R Plan:

- plan and implement in accordance with regulations;
- apply cost effective and appropriate abandonment and reclamation practices to reduce environmental risks and allow for traditional use of the land;
- maintain program of progressive abandonment and reclamation as an integral part of the project; and,
- incorporate new abandonment/reclamation methods and procedures, when applicable.

In September 2008, Nunavut Tunngavik Incorporated (NTI) released a Reclamation Policy. This A&R Plan generally conforms to this policy, with the additional expectation that consultation regarding reclamation plans will be conducted with the Baker Lake Community Lands and Resources Committee during 2010. Inuit Qaujimajatuqangit will be collected during 2010 and incorporated into the 2011 A&R Plan.

### **1.2 Revision to Manual**

This manual is reviewed by the Facility Supervisor, the Environment Health and Safety (EHS) Group and the General Manager, Kiggavik Project on an annual basis and is updated as required to keep it current and consistent with regulatory and procedural changes. A history of revisions can be found at the front of this manual.

### 1.3 Responsibilities

The Facility Supervisor is responsible to ensure that all personnel and contractors assigned to the Project are familiar with the requirements of this Plan.

The EHS Group reports to the Facility Supervisor. The Group includes:

- Environment and Radiation Protection Supervisor
- Environment Technicians
- First aid responders (ARC staff and/or contractors)
- Safety personnel (ARC staff and/or contractors)

The General Manager, Kiggavik Project is ultimately responsible for any activity being carried out by Kiggavik Project personnel.

## 2 INTRODUCTION

This A&R Plan has been prepared for a project that includes advanced exploration activities and environmental baseline program to be carried out by AREVA Resources Canada Inc (ARC).

Head Office location:

P.O. Box 9204

817 – 45<sup>th</sup> Street West

Saskatoon, Saskatchewan S7K 3X5

### 2.1 Location

The Kiggavik Project includes two properties:

- The Kiggavik site is located at approximately 64°26'N and 97° 37'W. The property consists of 17 mineral leases totalling 3,972ha (officially 9,808acres). All leases are currently on Crown Land (i.e: surface and subsurface rights are administered by Indian & Northern Affairs Canada (INAC)).
- The Sissons site is situated roughly 17km south-west of Kiggavik at approximately 64°20'N and 97°52'W. The Sissons property consists of 22 mineral leases totally 14,730ha (officially 36,371.50acres). Five of the mineral leases, including those containing the Andrew Lake and End Grid deposits, are located on Inuit Owned Land subsurface parcels, as such surface rights are administered by the Kivalliq Inuit Association and subsurface rights are “grandfathered” – administered by INAC.

An exploration camp currently exists at the Kiggavik site. This camp can accommodate approximately 60 people.

### 2.2 Schedule

The Kiggavik Camp is temporary and seasonally occupied. Supplies are brought to site during winter by a local contractor on a winter road. No buildings, equipment or waste will remain beyond the expiration date of the permits (i.e., Access to Inuit Owned Land; Land Use Permit; Water Licence), unless new permits have been obtained permitting the camp to remain. If unforeseen delays in permitting renewals occur, ARC will consult with the agencies to arrange for an agreement regarding site infrastructure pending a permitting decision. The project site is secured and readied for each seasonal shutdown; the final restoration will begin once the program is complete.

### 2.3 Infrastructure – Main Camp

In 2007, the temporary camp accommodated approximately 32 persons and has been expanded to accommodate approximately 50 persons in 2008. Further camp expansions and personnel



requirements will be discussed in permit applications for the field season. The camp currently consists of the following buildings:

- one storage shed/ back-up generator/shop;
- One generator building (housing the current generator);
- one helicopter storage/shop;
- one kitchen with storage;
- two offices;
- 17 sleeping units (one is a first aid shack);
- One washroom/dry building constructed with separate male/female facilities;
- one mechanical services room;
- one fuel storage areas (equipped with Arctic Berms);
- grey water collection area;
- industrial incinerator;
- core storage;
- five core logging tents;
- radioactive materials storage compound;
- Fuel esker containing 8 bulk fuel tanks, three for Jet-B fuel and five for diesel fuel, and fuel drums stored on secondary containment

Additions may include the following:

- new sleeping units
- additional office space
- small core logging sheds/tents located in the vicinity of where the drilling will take place (e.g.: Kiggavik and Sissons) and core storage racks. A shed and core storage currently exist at the Andrew Lake drill site, as well as core storage at the Kiggavik site and at Pointer Lake.

### 3 SEASONAL SHUTDOWN

#### 3.1 Buildings and Contents

If possible, all equipment is either removed from site, or stored within buildings or sea containers to ensure they can withstand the winter season. Canvas tents are secured and braced internally so they can withstand snow and wind. All wooden buildings are secured with nailed plywood over the windows and doors to prevent inadvertent opening.

#### 3.2 Water System

Pumps and hoses are drained and dismantled. Pumps may be removed from site for servicing and storage. Hoses are stored on site in the generator shack.

#### 3.3 Fuel Caches and Chemical Storage

An inventory is conducted prior to leaving at the end of the field season in order to track the items that are removed or remain at site. A thorough inspection of all fuel caches is completed and the remaining, not required, empty fuel drums are removed from site. Chemicals, including cleaning products, are removed from site for storage and or disposal. If any chemical products ( $\text{CaCl}_2$ ) remain on site they are stored in secure buildings or sea container.

#### 3.4 Waste

Combustible waste: All non-hazardous combustible waste is burnt in a Single Chamber Cyclonator Incinerator (Series CY1000). The incinerator is stored at the camp site for use the following year. Incinerator ash is collected in drums and will be stored until shipped off-site to an approved handling facility (i.e.: Baker Lake Landfill)

Greywater sump: The greywater collection area is inspected, marked and photographed

The Waste Management Plan and Radiation Protection Plan details waste handling and are in effect from the time the exploration licence is issued to the time it expires.

#### 3.5 Drill Sites

The drill is dismantled into its main components as per the drilling contractor procedure, packaged and secured along with its ancillary equipment and rods. The drill components may winter at site, be removed via the winter road or may be flown out by the drilling contractor.

All drill sites from the current year's field program are inspected for fuel stained soil and undergo a radiation survey for radioactive contamination. Contaminated soil or cuttings are collected in appropriate containers and stored in the long-term core storage area for future handling, which may include transfer to a operating mine site.

Drill sites must be cleaned to the extent that the gamma dose at a height of 1m is less than 1 $\mu$ Sv/h above background. To the greatest extent possible, all residual radioactive materials accumulated during drilling are disposed of down the drill hole. Where this is not practicable, radioactive material is collected, appropriately packaged and stored in the existing core storage areas. Gamma radiation levels at 1m from the surface of the core storage area should be reduced to 1 $\mu$ Sv/h above background and in no instances exceed 2.5 $\mu$ Sv/h. As is necessary, residual radioactive material may be transported to the McClean Lake Operation for storage and disposal.

Drill holes are sealed by cementing/grouting the upper 30m of bedrock or the entire depth of the hole, which ever is less or otherwise approved of by the NWB in writing.

Any remaining waste is taken to camp to be burned or if required, flown off-site to an approved disposal location.

### **3.6 Contamination Clean Up**

Any soil around camp that has become contaminated and had gone previously unnoticed is treated as per the Spill Contingency Plan. Before and after photos are taken to document the contamination and the clean-up.

Clean-up will be conducted in accordance with Government of Nunavut's Department of Environment - Environmental Guideline for Site Remediation.

### **3.7 Progressive Reclamation**

It is ARC's intention to reclaim disturbed sites in an adequate and acceptable manner. Proper reclamation techniques are currently being investigated and will be implemented under the direction and approval of experienced consultants, community members and regulatory agencies. Restoration work will be completed prior to the expiry of the land use licence. This will include but is not limited to reclaiming surface disturbance to promote the growth of vegetation.

### **3.8 Inspection and Documentation**

A full inventory is conducted, and a complete inspection of all areas prior to seasonal closure. Photos are taken to document the conditions prior to leaving the site for the winter. These photos are included in the annual report submitted to the NWB, INAC and KIA and are included in any required spill reporting.

## **4 FINAL ABANDONMENT AND RESTORATION**

The following activities will occur upon cessation of the current exploration/feasibility program, unless further activities or development are anticipated.

### **4.1 Buildings and Contents**

All buildings will be dismantled and removed or burned (if acceptable). All wooden structures including floors will either be burned or shipped off-site, depending on the nature of the wood. As per the Waste Management Plan, wood products are sorted then non-treated wood products are incinerated and treated wood will be shipped off-site for proper disposal.

### **4.2 Equipment**

All equipment, including pumps, generators, etc. will be dismantled and removed from the project area.

### **4.3 Fuel Caches and Chemical Storage**

All fuel drums will be removed. All areas where there have been fuel caches will be thoroughly inspected. The liner of the secondary containment will be removed and taken to an approved disposal facility for reuse or proper disposal, if it can not be reused internally. Any contamination at fuel cache sites will be cleaned up as well as any debris removed. Contaminated soil will be tested for petroleum hydrocarbons (fraction F1 through F4) as per Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (2001) and benzene, ethylbenzene, toluene and xylene as per Canadian Soil quality Guidelines for the Protection of Environmental and Human Health (2004). Any contaminated soil will be handled as prescribed by the Spill Contingency Plan. Final photos will be taken of all fuel caches for inclusion in the final report.

All chemicals will be removed from site. Areas where chemicals have been stored will be inspected to ensure that there has been no contamination.

### **4.4 Sumps**

If sumps are used, they will all be properly closed out at the end of the project and will be inspected to ensure that there is no leaching or run-off. Sumps will be back-filled and leveled as required. Final photos will be taken.

#### **4.5 Camp Site**

A final inspection of the camp site area will be conducted to ensure that there is no waste left behind. All wastes that are not burnable will be removed from site and taken to an approved disposal facility.

#### **4.6 Drill Sites**

The drill will be dismantled into its main components as per the drilling contractor procedure, packaged and secured along with its ancillary equipment and rods. The drill may be flown out by the drilling contractor or taken out overland during the winter.

All drill sites will be inspected for soil contamination. All drums and/or buckets used for the collection and storage of radioactive sediments will be taken to the core storage facility. Any remaining waste will be taken to camp to be burned if possible or to be flown out to an approved disposal location.

An inspection will be conducted by ARC personnel (EH&S or Project Facilitator or designate) to ensure that all drill sites are/have been restored and sumps have been covered and levelled.

#### **4.7 Drill Hole Abandonment**

Drill holes that encounter uranium mineralization with a uranium content greater than 1.0% over a length of more than 1m with a meter percent concentration greater than 5% will be sealed by cementing over the entire mineralization zone; this should be at least 10m above and below each mineralization zone. This practice will be performed as the holes are completed.

#### **4.8 Helicopter Pads**

The helicopter pads consist of wooden platforms. The wood will be burnt or taken off site to an approved disposal facility. The soil around the helicopter pads will be inspected for contamination. As the ground has not been altered, scarification will not be necessary. The ground will be left to re-vegetate on its own.

#### **4.9 Landing Eskers**

The esker which has been used as a landing strip will be inspected for wearing and if need be restored to pre-use conditions.

#### **4.10 Contamination Clean Up**

Any contamination will be treated as per the Spill Contingency Plan.

#### **4.11 Inspection and Documentation**

A complete inspection will be conducted of all areas prior to closure. Photos will be taken to document the conditions prior to leaving the site for use in the final report. Before and after photos will be taken to document any contamination and resulting clean up. These photos will make up part of the final report to be submitted to the Water Resource Inspector; the annual report submitted to the NWB, INAC and KIA and will be included in any required spill reporting.

All agencies will be contacted and notified once the final clean up has been conducted.

Agency contact information can be found in the Project Contact List.